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# Agglomeration and Dispersion of High-order Service Employment in the Montreal Metropolitan Region, 1981–96

William J. Coffey and Richard G. Shearmur

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**Summary.** Much of the recent urban literature on suburban employment centres has neglected the role of high-order services, perhaps the principal component of ‘edge cities’, in the creation of the evolving multinucleated metropolitan structure. This paper specifically explores the role of high-order services in this process. We use employment by place-of-work data at the census-tract level to examine the changing intrametropolitan geography of employment in four finance, insurance and real estate (FIRE) services and eight business services in the Montreal area over the period 1981–96. We find evidence of central business district (CBD) decline in relative, but not absolute, terms. The resulting decentralisation has clearly assumed the form of polycentricity rather than of generalised dispersion. In spite of recent advances in telecommunications technologies, agglomeration economies continue to exert an important impact upon intrametropolitan location.

## 1. Introduction

Since the end of the Second World War, North American metropolitan areas have witnessed several major (and now well-documented) waves of decentralisation from the central city towards the suburbs. First, immediately after the war, the population began to decentralise; more affluent persons, looking for more spacious housing accommodation at a lower cost per unit area and for a better quality of life (for example, less pollution, less congestion, less crime), began to move towards the periphery of the metropolitan area. This process continues today with little sign of abatement. Secondly, at the beginning of the 1960s, consumer and per-

sonal services began to follow their clients into the periphery. The most striking example of this movement is the creation of enormous planned shopping malls in the suburbs. During this period, metropolitan areas also experienced a decentralisation of certain other economic activities. In the 1960s, for example, many manufacturing establishments began to leave the central city in order to relocate in the suburbs. In some cases, decentralisation was motivated by the adoption of new production processes and technologies (for example, involving assembly lines) that required single-storey buildings. In other cases, firms wished to take advan-

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tage of the better transport opportunities available outside the central city (less traffic congestion, higher accessibility to interstate highways and to airports). In still other cases, due to the use of new production technologies, firms began to require an improved accessibility to a large pool of human resources that was generally more educated and more highly skilled than that available in the central city.

Next, in the 1970s, certain office activities began to decentralise within metropolitan areas. In general, these were the 'back offices' of firms located in the CBD. These back-office functions generally involved a range of more highly standardised and routinised activities—those not requiring a high degree of personal contact with clients or with the firm's upper-level administration (for example, data processing, mailing, credit card billings). During this period, the 'front-office' functions (for example, head office functions, business and financial service functions requiring direct contact with clients) remained concentrated in the CBD in a 'complex of corporate activities', in order to take advantage of the agglomeration economies inherent in this location.

More recently, at the end of the 1980s and the beginning of the 1990s, several authors (Cervero, 1989; Hartshorn and Muller, 1989; Garreau, 1991; Giuliano and Small, 1991; and Stanback, 1991) began to identify the appearance of a new wave of suburbanisation involving high-order services or front-office functions. According to many authors, this new wave, which began to manifest itself in the early 1980s, has profoundly modified the space-economy of North American metropolitan regions. In this 'new suburbanisation' (Stanback, 1991), the economies of certain suburban areas have become increasingly large and diversified, and have developed agglomeration economies of a sufficient force to attract the types of activity heretofore found uniquely in the CBD. In particular, this growth is concentrating in a number of 'suburban employment centres' (Cervero, 1989), 'suburban downtowns' (Hartshorn and Muller, 1989) or 'edge cities' (Garreau,

1991), which are increasingly in direct competition with the CBD for the location of high-order service functions. In certain North American metropolitan areas, the CBD has been able to maintain its traditional economic role and importance; in others, growth is now shared between the CBD and suburban agglomerations; in others still, the CBD is clearly losing ground to edge cities. Thus, North American metropolitan areas have clearly entered into a new phase of spatial-economic development.

It is therefore somewhat ironic that, due largely to a lack of suitable data, much of the rapidly growing literature on the role of suburban employment centres in metropolitan economies (see, for example, McDonald and Prather, 1994; Fujii and Hartshorn, 1995; Gordon and Richardson, 1996a, 1996b; Forstall and Greene, 1997; McMillen, 1998) has been unable to analyse specifically the degree to which high-order services have contributed to the creation of this new urban form.<sup>1</sup> Many of these analyses have dealt uniquely with total employment or with broad sectoral aggregations such as manufacturing and services. The goal of the present paper is to help to expand our understanding of the role played by high-order services in producing the current intrametropolitan geography of employment. We use employment by place-of-work data at the census-tract level in order to examine the relative degree of decentralisation of four individual finance, insurance and real estate (FIRE) services and of eight individual business services in the Montreal Census Metropolitan Area (CMA) over the period 1981–96. Specifically, we seek to answer the following questions. Are FIRE and business services, as aggregates and in terms of individual sectors, currently undergoing a decentralisation (either relative or absolute) away from the CBD? And, if so, are these activities dispersing broadly across the CMA or, rather, concentrating in suburban employment centres?

The following section examines the issue of the changing role of intrametropolitan agglomeration economies. We next describe

the study area and the nature of the unique database used to perform our empirical analysis. The following sections then examine the changing intrametropolitan geography of high-order service employment in Montreal over the period 1981–96. Our final section places the empirical results in a broader research and policy context.

## 2. Intrametropolitan Agglomeration Economies

It is now well documented that, across a wide range of national economic systems, high-order services tend to concentrate in a small number of large metropolitan areas (Beyers, 1989; Coffey, 1996a; Illeris, 1996; Léo and Philippe, 1998; Marshall and Wood, 1995). In Canada, for example, in 1991, the country's three largest CMAs contained 50 per cent of all business service employment (Coffey, 1996a). At the intrametropolitan scale, too, high-order services have traditionally tended to concentrate in specific districts within the CBD.

Although the costs (for example, rents, labour costs, taxes) associated with a downtown location have historically been higher than those found in more peripheral locations, many firms have been willing to bear these costs in order to take advantage of the special benefits derived from spatial clustering. These externalities or agglomeration economies provide savings through the sharing of major capital investments and infrastructure, as well as the proximity to a specialised labour force (Stanback, 1991). Above all, however, agglomeration permits quick and easy access to other, complementary, firms with whom there are frequent interactions, either in terms of procuring inputs to production (backward linkages) or in terms of providing service outputs (forward linkages). Further, in addition to these market-driven transactions, the literature has increasingly come to emphasise the role of agglomerations of firms in facilitating informal exchanges and in the transmission of tacit knowledge, as well as in creating an information-rich environment (Romer, 1990;

Saxenian, 1994; Audretsch and Stephan, 1996; Audretsch, 1998). In other words, agglomeration tends to minimise transaction costs, both formal and informal, and to provide benefits that a single firm in isolation could not obtain at any price.<sup>2</sup>

Conceptually, the complex of office activities found in the CBD of all large metropolitan areas is analogous to a metallurgical production complex. In the case of an office-based complex, however, interindustry linkages are not based on the transfer of finished or semi-finished manufactured goods but, rather, on non-standardised and highly complex information, often difficult to explain or decipher, and sensitive to subjective and affective factors. The transfer of this type of 'dialogical' information has traditionally been very expensive since it necessitates face-to-face contact between the parties involved, as in the case of the negotiation of major contracts or loans, or the communication of decisions essential to the management and strategic planning of firms. The real cost of this interpersonal communication entails not only the travel costs involved in bringing the participants together, but also the amount of time that the latter spend in travelling and in meetings—that is, the opportunity costs involved in this use of their time. Therefore, if these persons are able to engage in personal contact in a rapid and efficient manner, tremendous cost savings will result. Thus, it is the need to reduce communications (transactions) costs that is the basis of the office activities complexes that have historically formed the core of the CBDs of large metropolitan areas. Traditionally, the greater an establishment's need to weave a web of intensive interpersonal linkages with other establishments, the more that it has benefited from a location in the heart of the office activities complex. For this reason, face-to-face contact has come to be regarded as the 'glue' that holds together the high-order service complex.

Does this reasoning hold true in the modern era in which metropolitan areas are no longer monocentric? Does the 'new suburbanisation', with its 'suburban downtowns'

or 'edge cities', signal a weakening of the agglomeration economies that once created the CBDs of metropolitan areas? Are the benefits of agglomeration no longer sufficient to counterbalance the higher rents and taxes generally found in the CBD? Have new telecommunications technologies and telework rendered face-to-face contact obsolete? These are questions that currently form the agenda of many urban researchers, yet few clear responses have emerged. Without necessarily providing a definitive answer, an analysis of the nature of decentralisation of high-order service activities away from the CBD (if such has in fact occurred) can provide important evidence concerning the relative importance of agglomeration economies at the intrametropolitan scale. On the one hand, if the relative or absolute decentralisation of high-order service activities from the CBD is a process by which employment is dispersed generally across the metropolitan area, it would appear that the role of agglomeration economies (and the 'glue' that holds agglomerations together—face-to-face contact) is in decline. On the other hand, if high-order service employment is increasingly destined towards suburban employment centres, the role of agglomeration economies and of face-to-face contact would appear to remain relatively important. Fujii and Hartshorn (1995) and Gordon and Richardson (1996a) use the terms 'scatteration' (generalised dispersion) and 'polycentricity' (a spatial structure that includes one or more specialised economic nodes other than the CBD), respectively, to describe these alternative spatial structures. Thus, the distinction between multinucleation and scatteration is a significant one in terms of what it has to tell us about the role of agglomeration economies at the intrametropolitan scale.

In sum, the goal of the empirical portion of our paper is not only to describe the changing intrametropolitan geography of high-order services in Montreal but also, more generally, to provide evidence concerning the role of agglomeration economies in forming the current economic geography of metropolitan areas.

### 3. Study Area, Data, and Employment-pole Structure

In this section, we first present a brief overview of the study area, metropolitan Montreal. We then introduce the data with which we conduct our empirical analysis. Finally, in order to lay the foundation for this analysis, we present an overview of Montreal's employment-pole structure.

#### 3.1 Montreal

In 1996, the Montreal census metropolitan area (CMA) included a population of 3.3 million, which merits it a second-place position in the Canadian urban hierarchy, after Toronto (4.4 million). With a population density of 850 persons per square kilometre, Montreal is the densest of the Canadian metropolitan areas, outdistancing Toronto (750 persons per square kilometre) by a significant margin. The metropolitan area includes Montreal Island, the site of the City of Montreal (population 1.02 million) and 28 other municipalities; Jésus Island, occupied by the City of Laval (which, with 330 400 inhabitants is the second-largest municipality in the Province of Quebec); and the north and south shores of the St Lawrence River.

We have reason to believe, *a priori*, that decentralisation of employment, particularly the new suburbanisation phenomenon involving high-order service employment, is generally less advanced in Canada than in the US. This is principally due to the enhanced level of 'livability' that distinguishes the central cities of Canadian CMAs. The social, economic and environmental conditions that characterise the latter are very different from those found in many of their US counterparts (i.e. generally beset by problems of crime, pollution, blight, congestion, racial strife and low educational and skill levels among the inner-city population), and which Stanback (1991) and Garreau (1991) identify as major factors in the new suburbanisation and the creation of edge cities. Simply stated, Canadian central cities are still very pleasant environments for both residents and businesses.

Even in the Canadian context, we would expect the degree of employment decentralisation in Montreal to be less than in the other two large CMAs, Toronto and Vancouver. First, Montreal is by far the oldest of the large CMAs; in spite of a period of highway construction beginning in the 1950s, Montreal is the Canadian CMA that is the least typical of the modern North American metropolitan model, with its orientation towards the automobile and its advanced urban sprawl. Secondly, among the large Canadian CMAs, Montreal has the highest percentage of metropolitan residents living in the central city: 30.6 per cent in 1996, which is twice the level of Toronto.<sup>3</sup> Thirdly, since the beginning of the 1980s, the debut of the period of creation of edge cities, the Montreal economy has been stagnant, especially relative to those of Toronto and Vancouver. Garreau (1991) argues that a significant relation exists between overall job creation and the formation of edge cities. Finally, Montreal is the only one of the three large Canadian CMAs not to have been characterised by an explicit office decentralisation policy, a measure adopted in Toronto and Vancouver to alleviate congestion in the CBD. In sum, Montreal is the Canadian CMA where the creation of suburban employment centres is perhaps the least likely to have occurred.

### 3.2 Data

The data used to conduct our empirical analysis are based upon special tabulations of the 1981 and 1996 Canadian censuses, and reflect the number of employed workers by place of work. These data are available for the entire CMA at the level of census tracts (CTs). In 1996, the Montreal CMA was composed of 769 CTs, while in 1981 the number was 613 (when adjusting for changes in the spatial limits of the CMA between 1981 and 1996; the 1981 data therefore reflect the 1996 boundaries). Thus, our analysis of change between 1981 and 1996 must be based on the 613 CTs common to both years. (The additional 156 CTs defined by Statistics Canada in 1996 reflect a partitioning of certain are-

ally large 1981 CTs, mainly peripheral CTs that underwent rapid population growth during the period.)

In order to facilitate the presentation of results, we have chosen to examine the following employment categories:

- (1) total employment;
- (2) the FIRE sector in aggregate and its four individual components: financial services (banks and other deposit-accepting establishments, other credit agencies, security brokers and dealers, and investment and holding companies); insurance carriers; real estate operators; and real estate and insurance agencies; and
- (3) the business services sector in aggregate and its eight individual components: employment and personnel agencies; computer services; accounting services; advertising services; engineering and scientific services; legal services; management consulting services; and other business services.

Note that, in spite of different versions of the standard industrial classification being in effect at the beginning and the end of the study period, the sectoral definitions have been standardised in order to ensure direct comparability between 1981 and 1996.

Over the study period, total employment grew by 19.8 per cent (an increase of 242 000 jobs) reaching a total of 1.46 million in 1996. The FIRE sector was somewhat less dynamic (16.3 per cent, representing 13 000 new jobs), accounting for 94 500 jobs in 1996. On the other hand, business services growth was much more rapid (94.6 per cent and a net addition of 59 000 new jobs), reaching a total of 121 900 jobs in 1996. Table 1 presents a profile of the individual components of the high-order services group.

### 3.3 Employment-pole Structure

In a previous paper (Coffey and Shearmur, 2001), we identified 17 employment poles or centres within the Montreal CMA and grouped them into 3 classes (see below). Since these poles will play an important role

**Table 1.** Employment growth, high-order services, Montreal CMA, 1981–96

	1981 (000s)	1996 (000s)	Change 1981–96 (000s)	Growth rate (percentage)
<i>Total employment</i>	1218.1	1459.7	241.6	19.8
<i>FIRE</i>	81.2	94.5	13.2	16.3
Financial services	44.7	49.7	5.0	11.1
Insurance carriers	14.3	16.8	2.6	18.0
Real estate operators	8.5	11.1	2.7	31.8
Real estate and insurance agencies	13.6	16.3	2.7	20.1
<i>Business services</i>	62.7	121.9	59.3	94.6
Employment and personnel agencies	1.9	4.2	2.3	124.1
Computer services	3.2	19.6	16.3	505.1
Accounting services	8.3	12.1	3.8	45.6
Advertising services	4.0	10.7	6.7	165.8
Engineering and scientific services	15.2	21.1	6.0	39.4
Legal services	8.2	13.0	4.8	58.9
Management consulting services	3.8	11.1	7.4	195.7
Other business services	11.5	25.8	14.2	123.3

in the empirical analysis presented in the following section, we consider it necessary to summarise briefly their size and location, as well as our manner of defining them.

Our identification of employment poles in the Montreal CMA is based upon two criteria: the total number of jobs and the ratio of employment to the resident labour force (E-LF ratio). We first examined CTs in terms of their total employment, selecting those tracts with a minimum of 5000 jobs. To this set of CTs, we then applied the E-LF ratio, selecting those tracts in which the value of the ratio is superior to 1.0. On this basis, we have identified three types of employment poles—primary, secondary and isolated—as follows.<sup>4</sup>

(1) *Primary poles*: those containing at least 1 CT with total employment of 12 500 or more. A primary pole can consist of a single CT that surpasses the minimum size threshold; 2 or more contiguous CTs, each of which surpasses the threshold; or 1 or more CTs that surpass the threshold, in combination with 1 or more contiguous CTs having an employment level of 5000–12 499. We have identified 6 primary poles.

(2) *Secondary poles*: those having at least 2 contiguous CTs, each having a total employment level between 5000 and 12 499. There are 4 secondary poles.

(3) *Isolated poles*: those constituted by a single CT having between 5000 and 12 499 jobs. We have identified 7 isolated poles.

Figure 1 shows the location and size of these poles within the Montreal CMA; only two primary poles (Carrefour Laval and Longueuil-Boucherville), two secondary poles (Mirabel and St-Jérôme) and one isolated pole (Metro Longueuil) are located off Montreal Island. As noted above, all CTs in these three types of pole have an E-LF ratio that is greater than 1.0. Note also that we have identified poles on the basis of 1996 values, retaining the same poles for 1981 even if the specific criteria were not met in 1981. On the other hand, there were no cases of poles that met these criteria in 1981 but not in 1996.

#### 4. Intrametropolitan High-order Service Employment Dynamics, 1981–96

In the following empirical analysis, we

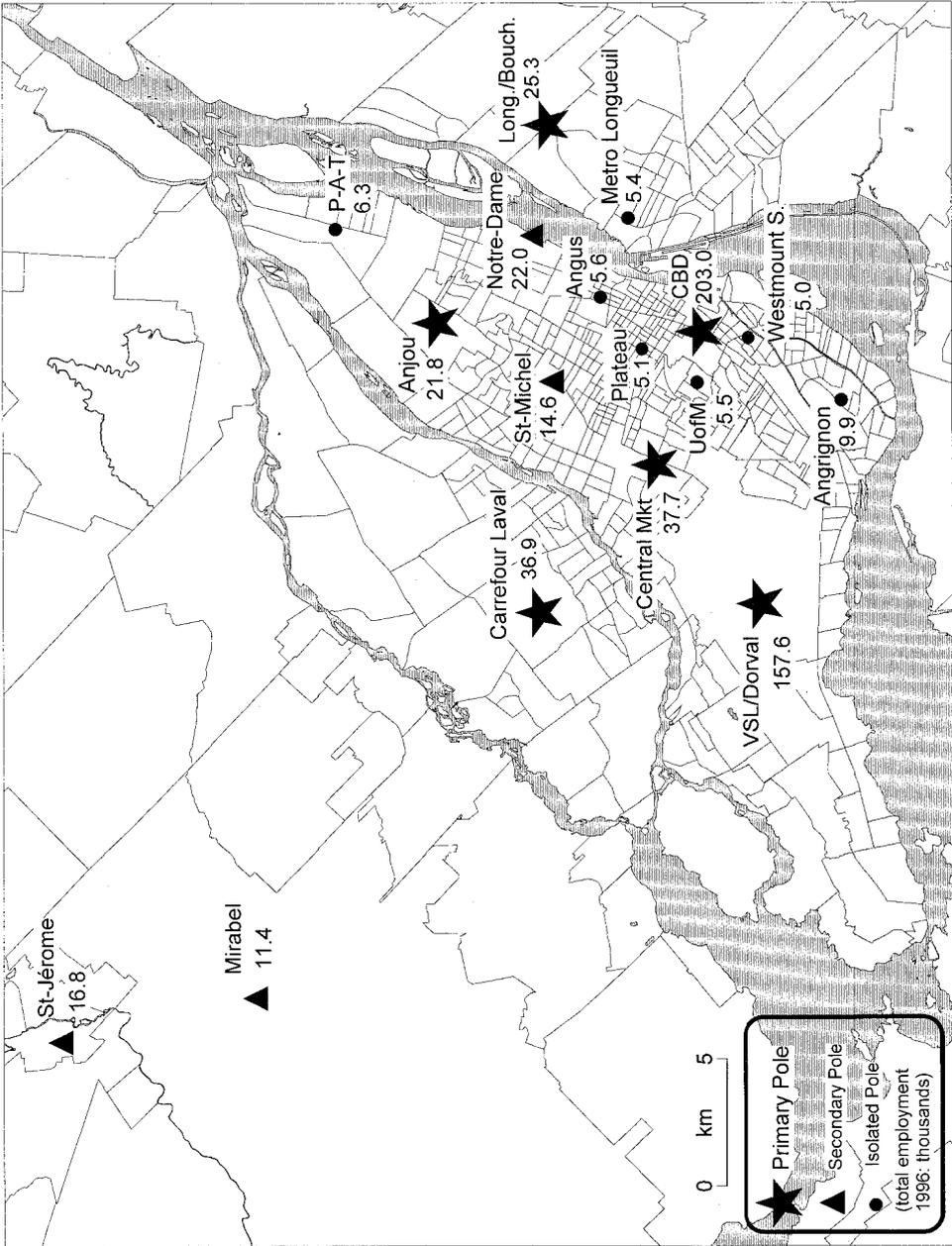


Figure 1. Employment poles in the Montreal CMA, 1981-96.

**Table 2.** Spatial distribution of high-order service employment over 613 census tracts, Montreal CMA, 1981–96: relative entropy ( $H_r$ )

	1981	1996	Change 1981–96	Percentage change
<i>Total employment</i>	0.8599	0.8652	0.0052	0.610
<i>FIRE</i>	0.7022	0.7079	0.0057	0.812
Financial services	0.6817	0.6575	– 0.0242	– 3.550
Insurance carriers	0.5114	0.5590	0.0476	9.308
Real estate operators	0.7424	0.7635	0.0211	2.842
Real estate and insurance agencies	0.7517	0.7631	0.0114	1.517
<i>Business services</i>	0.7222	0.7786	0.0563	7.800
Employment and personnel agencies	0.5836	0.6702	0.0866	14.839
Computer services	0.5255	0.7092	0.1837	34.957
Accounting services	0.6263	0.7182	0.0919	14.673
Advertising services	0.6208	0.7489	0.1281	20.635
Engineering and scientific services	0.6553	0.7148	0.0595	9.080
Legal services	0.5557	0.5664	0.0107	1.925
Management consulting services	0.6068	0.7500	0.1432	23.599
Other business services	0.6906	0.7869	0.0963	– 13.944
Population	0.9601	0.9401	– 0.0200	– 2.081

*Note:* The value of  $H_r$  can vary between 0 (maximum concentration) and 1 (maximum dispersion).

examine the changing intrametropolitan geography of high-order service employment in the Montreal CMA by means of two related approaches. We first attempt to determine whether employment has become more evenly or less evenly distributed across the 613 census tracts, and then examine change in the context of the employment poles identified in the previous section.

#### 4.1 Distribution across Census Tracts

A first approach to examining the intrametropolitan decentralisation of high-order service employment involves an analysis of changes in the distribution of employment across the 613 census tracts over the period 1981–96. Here, the basic issue is determining whether employment in a given sectoral group has become more concentrated in a fewer number of CTs or more evenly distributed across all CTs. Relative entropy ( $H_r$ ) is an appropriate measure of the degree of spatial dispersion in the distribution of employment, and yields a value ranging between 0 (maximum concen-

tration—i.e. all employment in a single CT) and 1 (maximum dispersion—i.e. an equal number of employed persons in each CT).<sup>5</sup>

Table 2 presents the degree of relative entropy of the spatial distribution of employment for all sectors combined (total employment), for the FIRE and business services aggregates, and for the individual components of the latter two groups; for comparison purposes, the relative entropy of the population is also indicated. In 1996, the population ( $H_r = 0.9401$  out of a maximum of 1.0) is more evenly distributed across CTs than is employment in any of the individual sectors or the sectoral groups; this high value is logical, given that CTs are, by definition, designed to include approximately equal numbers of residents. (The value 0.9401 may be interpreted as indicating that the degree of dispersion is 94 per cent of the maximum possible dispersion.) In 1996, the two most concentrated sectors are insurance carriers (0.5590) and legal services (0.5664), although their values indicate that they are far from the maximum degree of concentration possible. Financial services (0.6575) and em-

ployment and personnel agencies (0.6702) are also relatively concentrated; all other high-order service sectors have values greater than 0.7, although none approaches the level of dispersion of total employment (0.8652). Other business services (0.7869) and business services as a whole (0.7786) are the most dispersed sectors, along with real estate operators (0.7635), real estate and insurance agencies (0.7631) and management consulting services (0.7500).

The population became slightly more concentrated in 1996 than it was in 1981.<sup>6</sup> In contrast, with the sole exception of financial services, all of our economic sectors became relatively more dispersed over the period. The largest changes in degree of relative dispersion involve computer services (from 0.5255 to 0.7092—a change of 35 per cent), management consulting services (23.6 per cent) and advertising services (20.6 per cent). On the other hand, the spatial distribution of total employment, the FIRE group, real estate and insurance agencies, legal services, and real estate operators remained relatively stable.

#### 4.2 *Employment Poles*

In this section, we examine the distribution and growth of employment in three classes of zone within the CMA; these zones have been defined on the basis of the employment poles identified in section 3.3: the CBD; all employment poles minus the CBD (external poles); and the CTs that are not a component of an employment pole (the rest of the CMA). We have separated the CBD from the 16 other employment poles specifically in order to explore the hypothesis of CBD decline. Similarly, we have distinguished the external poles from the rest of the CMA in order to explore the hypotheses of polycentricity and scatteration.

Before specifically analysing these issues, it is useful to examine the extent to which the individual poles are specialised in high-order service functions. Table 3 provides an overview of this question by listing, for each pole, those sectors that have a location quo-

tient (LQ) greater than or equal to 120 in 1996.<sup>7</sup> We see, for example, that the CBD is relatively specialised in all high-order services; it is most highly specialised in legal services (LQ = 406) and least highly specialised in engineering and scientific services (167). All other primary poles, with the exception of the Central Market, are specialised in at least one high-order service. Similarly, 3 of the 4 secondary poles and 5 of the 7 isolated poles are specialised in at least 1 high-order service. Among the isolated poles, Westmount South (6 sectors—5 of which have LQs greater than 200) and Metro Longueuil (7 sectors—3 of which have LQs greater than 200) stand out as relatively diversified concentrations of high-order service employment. The rest of the CMA, with a high LQ value of 99 for real estate and insurance agents, is not relatively specialised in high-order services. In addition, when we subtract the CBD from the set of all poles, the group of remaining 16 poles falls below our threshold LQ value of 120 in the case of all sectors (the highest value is 114 for engineering and scientific services). Similarly, when we subtract the CBD from the set of primary poles, the group of 5 remaining poles exceeds the threshold only in the case of engineering and scientific services (139) and computer services (125). It is thus clear that, in 1996, the CBD is by far the most highly specialised centre of high-order service employment.

Although we lack sufficient space to analyse in detail the changes in LQs over the period 1981–96, the broad trends are reasonably clear. The CBD saw its FIRE LQs rise over the period, indicating increasing specialisation in these sectors, and saw its business services LQs decline, indicating a diminishing specialisation. On the other hand, both the group of primary poles minus the CBD and the set of all poles minus the CBD generally saw an increase in FIRE and business service specialisation over the period. In the rest of the CMA, FIRE LQs declined somewhat, while those for business services increased. Thus we have a first indication that, at least in relative terms, the

**Table 3.** High-order service specialisations of employment poles, Montreal CMA, 1996 (location quotients > 120)

Pole	Sectoral specialisations
<i>Primary</i>	
1 CBD	All sectors (high of 406 for legal; low of 167 for engineering and science)
2 VSL/Dorval	Engineering and science (170), computer (157), employment (121)
3 Carrefour Laval	Insurance (142), engineering and science (133)
4 Central Market	—(high of 111: real estate and insurance)
5 Longueuil/Boucherville	Engineering and science (163), advertising (131)
6 Anjou	Employment (176)
Total	All sectors but real estate operators; real estate and insurance agents (high of 193 for insurance; low of 120 for accounting)
<i>Secondary</i>	
7 Mirabel	Employment (167)
8 St-Jérôme	Accounting (129), advertising (127)
9 St-Michel	—(high of 78: accounting)
10 Notre-Dame	Real estate operators (237)
Total	—(high of 106: real estate operators)
<i>Isolated</i>	
11 Angrignon	—(high of 87: insurance)
12 Angus	Engineering and science (177)
13 Pte-aux-Trembles	Real estate operators (136)
14 University of Montreal	—(high of 38: engineering and science)
15 Metro Longueuil	Employment (358), legal (304), real estate operators (207), accounting (180), insurance (153), finance (131), real estate and insurance (125)
16 Plateau Mt Royal	Other business services (253)
17 Westmount S.	Accounting (720), finance (509), management and consulting services (248), computer (237), real estate and insurance (205), insurance (147)
Total	Accounting (127)
Total All poles	Insurance (167), finance (143), legal (160), computer (139), engineering and science (132), employment and personnel (127)
Rest of CMA	—(high of 99 real estate and insurance agencies)
Primary—CBD	Engineering and science (139), computer (125)
All poles—CBD	—(high of 114: engineering and science)

CBD, while still the uncontested centre of high-order service employment, saw its relative degree of specialisation decline somewhat over the period, to the benefit of the other zones. This is especially true in business services.

Figures 2–4 enable us to enhance our analysis of changes in the intrametropolitan

distribution of high-order service employment over the period 1981–96. These figures portray various results for the CBD, the external poles and the rest of the CMA. (We have also separately analysed the primary poles minus the CBD, but have chosen not to show this information for the sake of presentation clarity. Note, however, that the results

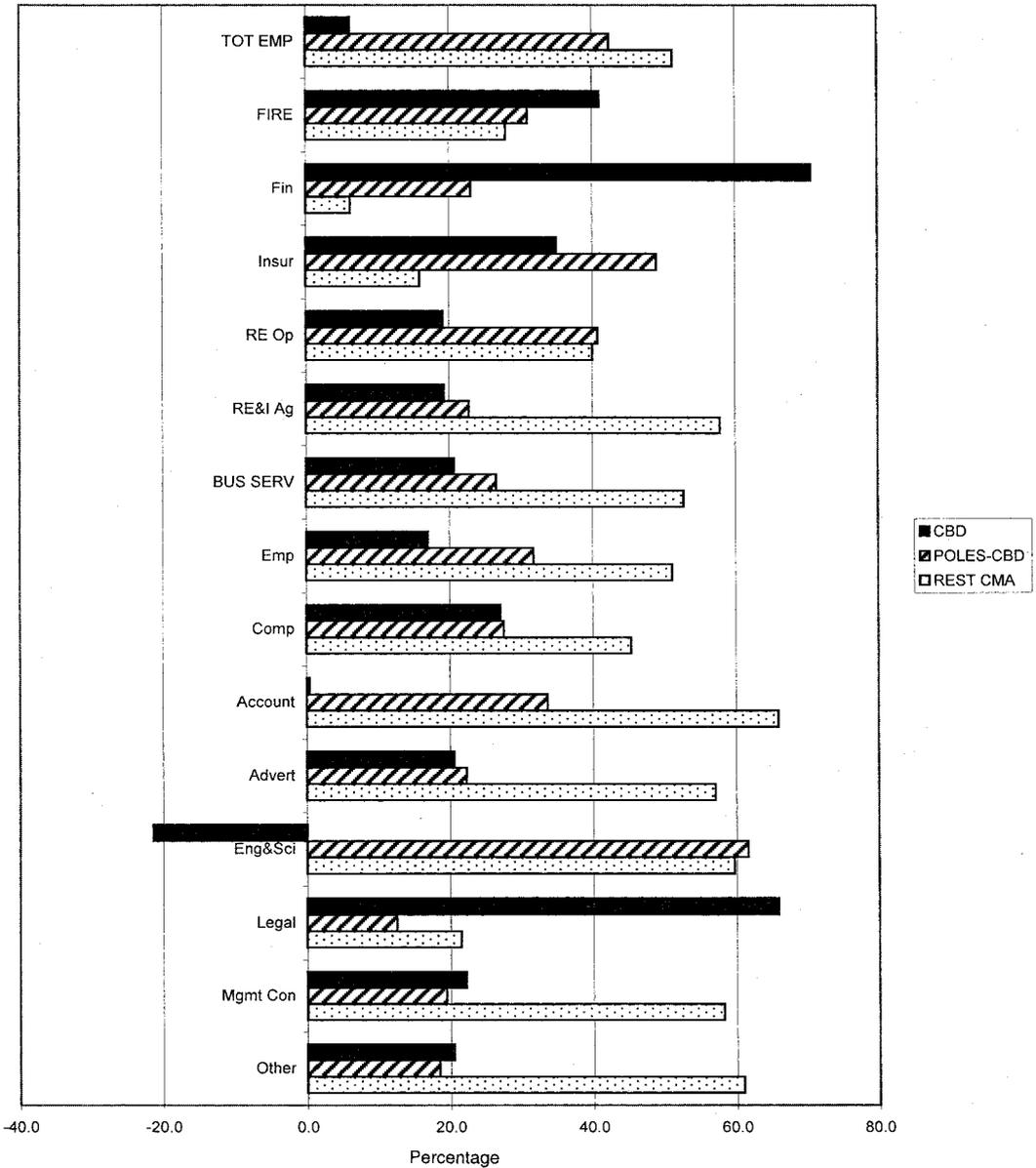
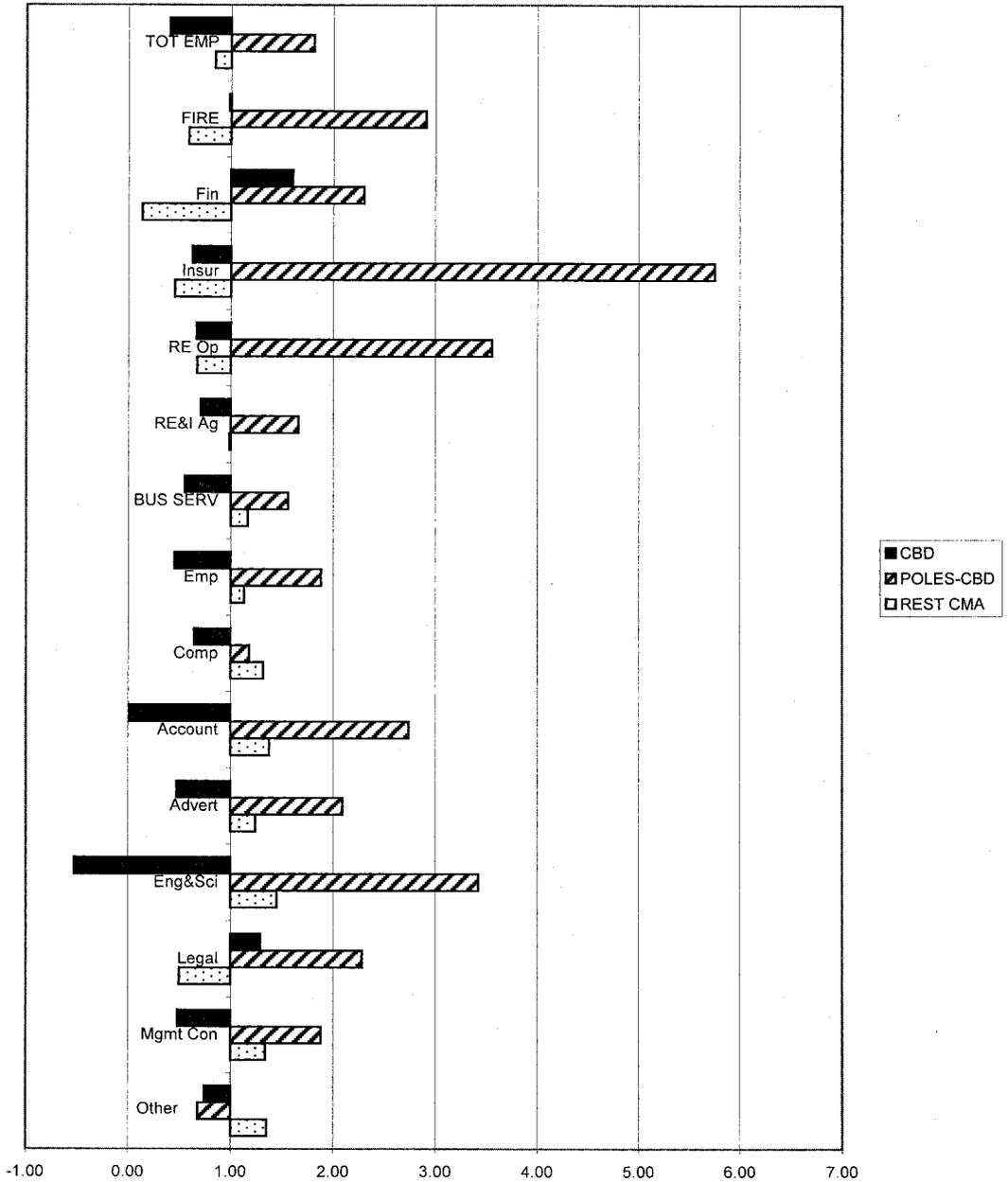


Figure 2. Percentage of CMA employment growth captured, Montreal, 1981-96.

for the external poles and for the primary poles minus the CBD are very similar; in all sectors, with the exception of legal services—where the five primary poles represent only 50 per cent of external-pole employment—the five primary external poles contain the vast majority (between 60 per

cent and 90 per cent) of external pole employment.)

Figure 2 indicates the percentage of CMA employment growth in a given sector that has been captured by each of our 3 types of zone. We first note that the CBD contributed only 6 per cent of total employment growth, com-



**Figure 3.** Ratio of the proportion of growth captured during 1981-96 to the proportion of CMA employment in 1981.

pared with 42 per cent for the external poles and 51 per cent for the rest of the CMA.<sup>8</sup> The CBD captured over two-thirds of all metropolitan growth in the financial and legal sectors, and 41 per cent of FIRE growth generally. The CBD's performance in busi-

ness services was not nearly as strong, however, accounting for only 20.6 per cent of overall growth in this group of sectors; in addition to legal services, the CBD also did relatively well in computer services (27.1 per cent). The CBD also registered the only

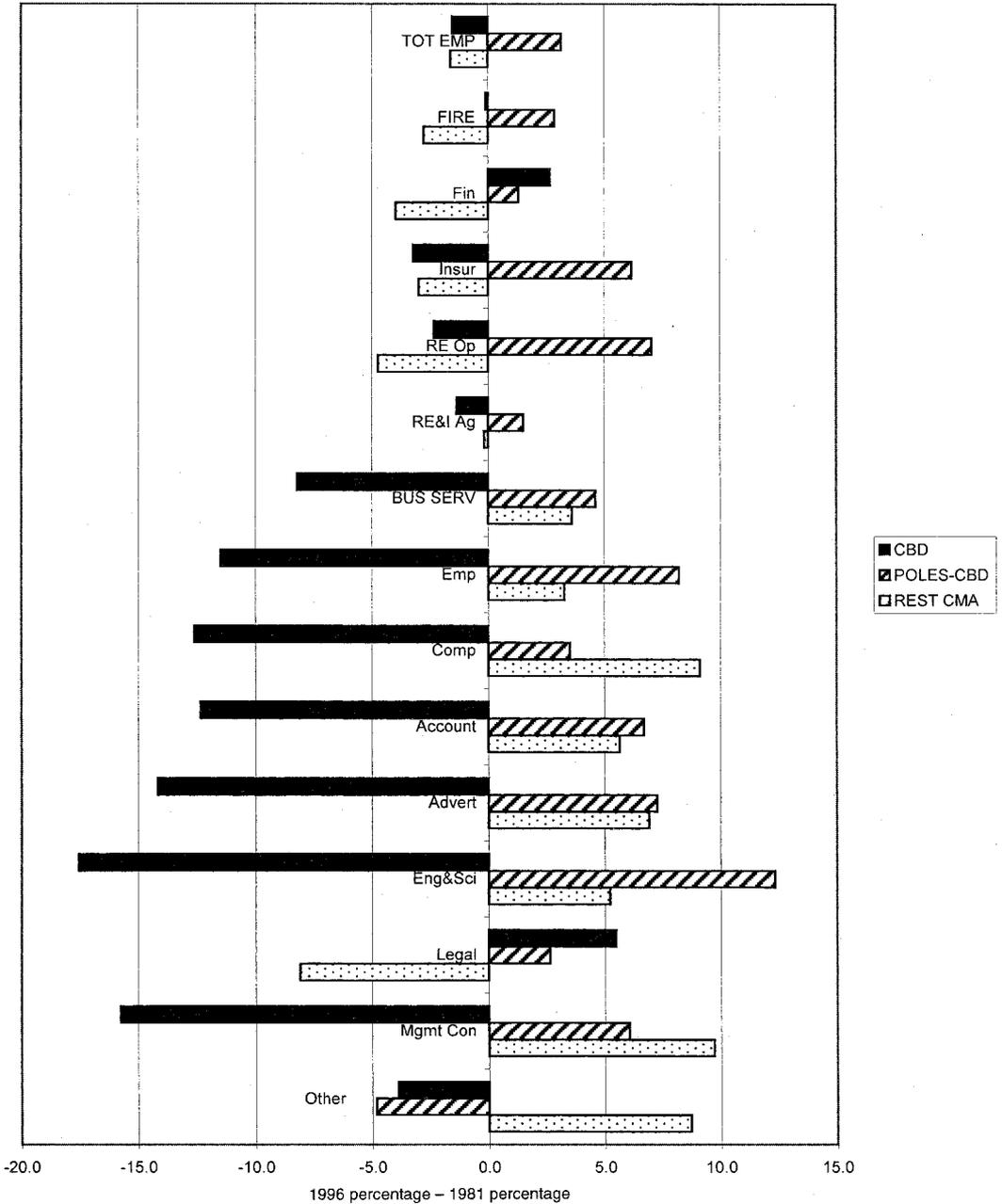


Figure 4. Changes in share of CMA employment, Montreal, 1981-96.

absolute loss of employment: 1300 jobs in engineering and scientific services. The strongest performance of the external poles came in engineering and scientific services (61.6 per cent of CMA growth) and insurance carriers (49 per cent). The rest of the

CMA contributed more than one-half of CMA growth in the case of the business services group and 6 of its individual sectors, as well as in the case of real estate and insurance agents.

The percentage of CMA employment

growth captured by each type of zone may be strongly influenced by the employment base of each type at the beginning of the period. Figure 3 eliminates this possible source of bias by presenting the ratio of the proportion of CMA growth captured to the proportion of CMA employment contained in each type of zone in 1981. This measure indicates the extent to which the growth of each zone was proportional to its initial weight within the CMA. A value of 1.0 shows that growth performance was proportional to the 1981 employment base. A value greater than 1.0 denotes a performance that was proportionally greater than the zone's initial weight, and a value less than 1.0 denotes the inverse. For example, in the case of total employment, the CBD captured 6.2 per cent of growth between 1981 and 1996; in 1981, 15.5 per cent of CMA employment was located there. The ratio ( $6.2/15.5 = 0.40$ ) suggests a relatively weak performance. Values less than 0.0 (of which there is 1 case) indicate an absolute loss of employment over the period.

Figure 3 shows that only in the case of financial services and legal services did the CBD register a growth performance that was disproportionately stronger than its initial employment base would lead one to expect. The rest of the CMA exhibited a mixed performance, growing more than expected in the case of the business services group and seven of its eight individual sectors (i.e. with the exception of legal services). It is the external poles, however, that register the strongest performance in relation to their initial weighting of high-order service employment, showing disproportionately positive growth in all sectors but other business services. Growth was exceptionally strong in insurance carriers, real estate operators and engineering and scientific services, where the ratio exceeds 3.0.

Figure 4, which presents changes in CMA employment share by sector over the period, completes our analysis. In relative terms, we see that the CBD lost ground to the two other types of zone in the case of total employment, all FIRE services (with the exception

of financial services) and all business services (with the exception of legal services). If the CBD has lost ground, which types of zone have improved their relative positions? In the case of total employment and FIRE services, it is clearly the external poles. Where business services are concerned, the external poles and the rest of the CMA have shared the positive performance. (The external poles lost ground only in other business services; the rest of the CMA lost ground only in legal services.) Note, however, that for the business services group as a whole and for the six individual sectors in which both the external poles and the rest of the CMA improved their relative positions, the increased share of the latter exceeded that of the external poles only in the case of two sectors: computer services and management consulting. Thus, the external poles have tended to improve their relative position in business services to a greater extent than has the rest of the CMA.

#### *4.3 Sectoral Agglomeration in Employment Poles*

In the present section, we address two questions. In 1996, which sectors have the greatest propensity to agglomerate in employment poles (and, specifically, in which type of poles)? And which sectors became more agglomerated or less agglomerated over the period 1981–96? Figure 5 enables us to respond to the first of these questions. In 1996, more than half of the CMA employment in eight sectors or sectoral groups is located in employment poles: the FIRE group, plus two of its individual elements, and business services, plus four of its individual elements. Insurance carriers (63.9 per cent) and legal services (60.7 per cent) are the most highly concentrated sectors. In both of these cases, the CBD alone accounts for over half of CMA employment: 52.9 per cent and 56.6 per cent respectively; the CBD's share is also high for financial services (46.8 per cent) and the FIRE group (41.6 per cent). The set of five external primary poles represents a fairly significant share of CMA employment in the

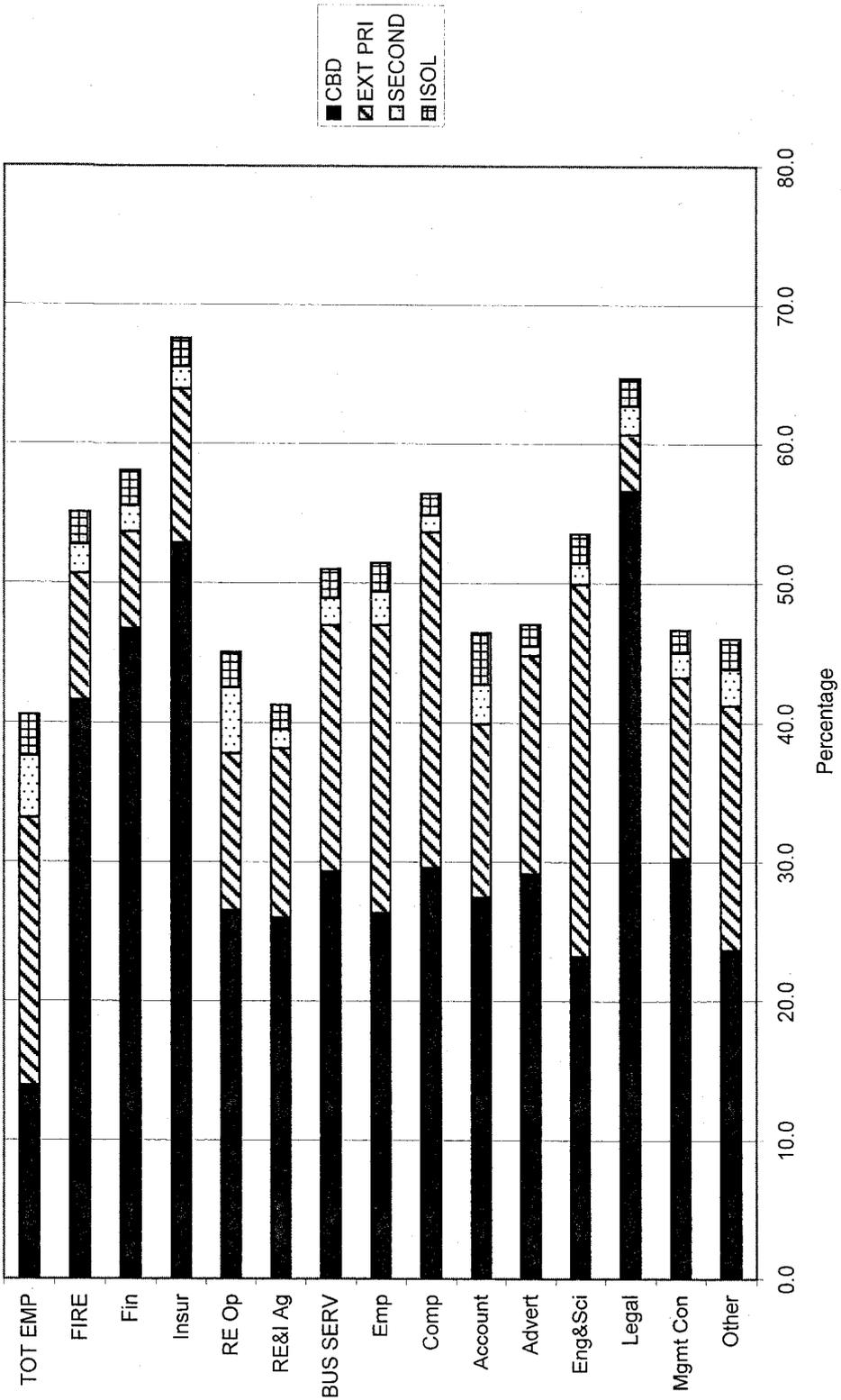


Figure 5. Percentage of CMA employment in poles, Montreal, 1981-96.

case of engineering and scientific services (26.7 per cent), computer services (24.1 per cent) and employment and personnel services (20.7 per cent). In all cases, the shares of the secondary and isolated poles are fairly modest, with a maximum value of 4.7 per cent for real estate operators in the secondary poles. Note that no individual sector or group, including total employment (40.6 per cent), has less than 40 per cent of its employment located in employment poles; real estate and insurance agents (41.3 per cent) is the least aggregated of the high-order service sectors. With the exception of the CBD, the only pole that accounts for more than 10 per cent of employment in a given sector or group is Ville St-Laurent (VSL)/Dorval, in the case of engineering and scientific services (18.4 per cent), computer services (17.0 per cent), employment and personnel agencies (13.2 per cent), other business services (11.1 per cent), and the business services group (11.0 per cent).

Figure 6 provides some relevant information concerning changes in relative level of agglomeration over the period 1981–96. Note that Figure 6 is very similar to Figure 4, with the difference that we have now eliminated the rest of the CMA and have disaggregated the external-poles group into its primary, secondary and isolated components. As we previously noted when discussing Figure 4, the relative share of CMA employment contained in the CBD increased only in financial and legal services; for all other sectors, the CBD's share declined over the period—very significantly in the case of most business services. For both secondary and isolated poles, sectoral shares remained relatively stable. The largest share changes for secondary poles involved real estate operators (3.2 percentage points) and advertising (–1.2 points); isolated poles increased by 1.5 points in the case of accounting, and employment and personnel agencies. The lion's share of the changes already observed for external poles in Figure 4 thus occurred in the five external primary poles. Except for a decline of 5.1 percentage points in other business services, the external primary poles

registered share increases ranging from 1.3 points (financial services) to 11.2 points (engineering and scientific services); the changes in advertising (8.2 points) and employment and personnel agencies (6.2 points) were also relatively large. Interestingly, the only external poles to experience share changes of more than 3 percentage points were Ville St-Laurent/Dorval (9.5 points in engineering and scientific services; 3.6 in advertising; 3.5 in personnel and employment agencies; 3.1 in computer services; and –4.9 in other business services) and Notre-Dame (3.2 points in real estate operators).

## 5. Discussion

What are the implications of the above results in the context of the debate concerning the decentralisation of high-order services and the role of intrametropolitan agglomeration economies in the spatial distribution of the latter? The CBD of the Montreal CMA has shown absolute growth in all high-order service sectors, with the exception of engineering and scientific services, where 1 300 jobs were lost over the 1981–96 period. With a net employment increase of 17 700 FIRE and business service jobs over the period, it would therefore be erroneous to speak of an absolute decline of the CBD as a high-order service centre. On the other hand, with the exception of financial and legal services, the CBD's relative share of CMA high-order service employment decreased significantly, especially in business services. Thus, the period may best be described as one of absolute growth but relative decline for the CBD. As we have argued elsewhere (Coffey, Polèse and Drolet, 1996), the relative decline of the CBD may reflect an increasing specialisation in specific high-order service functions (for example, financial and legal services), as well as the outcome of a process of spatial dispersion of other high-growth activities, the entire expansion of which is unable to be absorbed by the CBD.

Having established that relative decentralisation is occurring, the next logical question is whether it is taking the form of polycen-

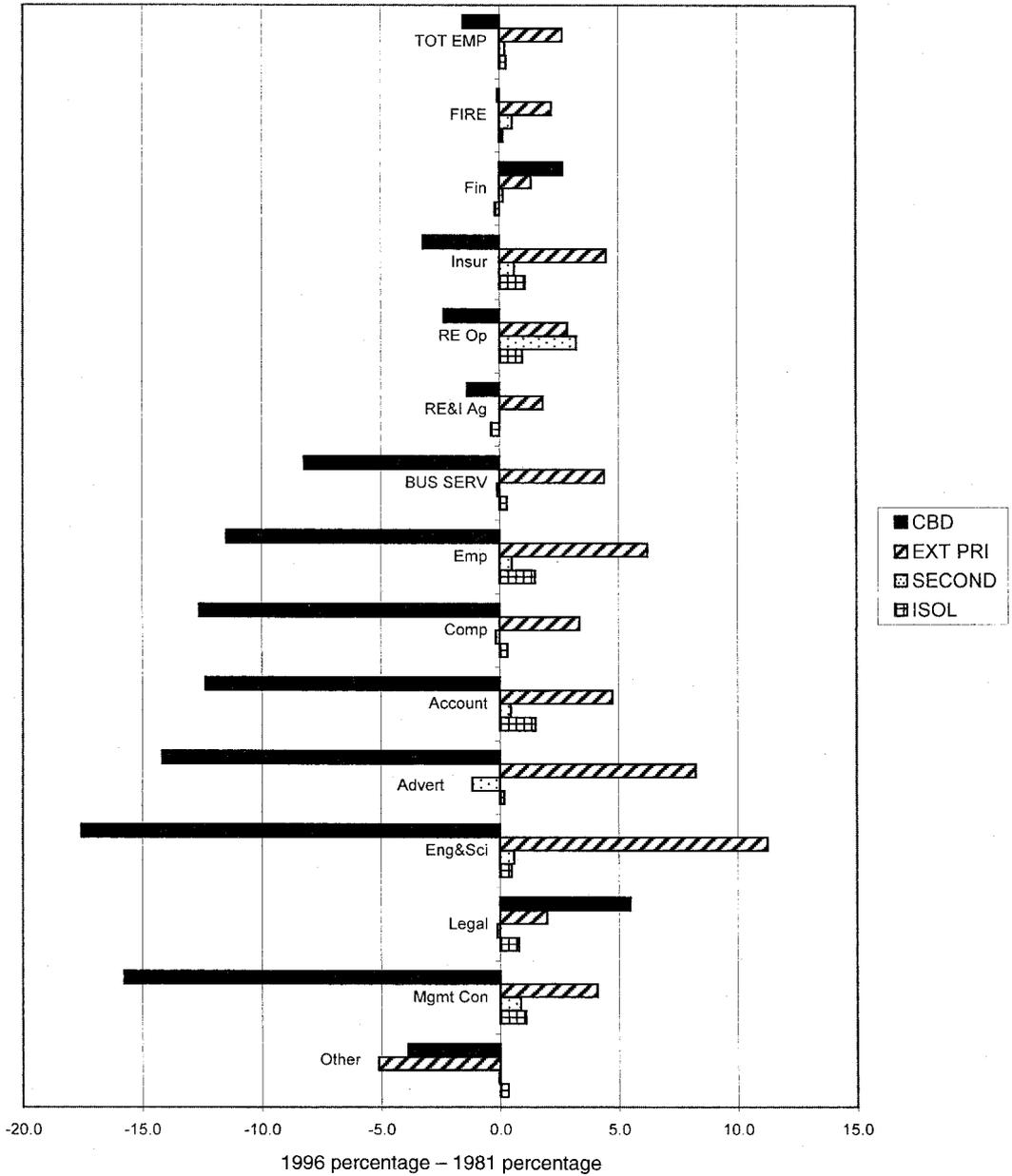


Figure 6. Changes in share of CMA employment by type of pole, Montreal, 1981-96.

tricity or scatteration.<sup>9</sup> Although the index of relative entropy indicates that, with the exception of financial services, all high-order sectors became more evenly distributed across CTs over the period, our analysis of employment-pole dynamics shows that the non-CBD poles (and the primary poles, in

particular) performed far better than the non-pole zones (the rest of the CMA). It is thus clear that high-order service employment growth is tending to concentrate in a relatively small number of employment poles rather than becoming more generally dispersed over the CMA. Montreal, apparently

unlike Los Angeles, seems to be still in a phase of polycentricity rather than to have embarked upon what has been heralded by some (for example, Gordon and Richardson, 1996a) as the next evolutionary phase of metropolitan development—scatteration.

The clear development of increasing polycentricity, in turn, suggests that the set of conditions that induce certain economic activities to cluster together in close proximity does not yet appear to have been supplanted by new telecommunications technologies and the other factors that seem to be creating the evolving ‘city without space’. The continuing importance of the face-to-face contact that underlies clustering is based upon certain characteristics of both high-order services and human nature. First, most high-order services are embodied in human beings; in other words, one cannot easily separate the ‘product’ and the person that produces it. Further, the production of a high-order service generally requires a high level of co-operation between the producer and the consumer (the phenomenon known as co-production). Secondly, even when the service rendered assumes a more tangible (less embodied) form—a written document, for example—the negotiation of a contract and the exact specification of the client’s requirements still necessitate a considerable amount of interpersonal contact. Thirdly, high-order services generally involve ‘orientation functions’: the creation and evaluation of new ideas, the custom manipulation of non-standardised and often ambiguous information, decision-making and the transmission of complex directives. In all of these cases, the interaction between ‘sender’ and ‘receiver’ involves the exchange of dialogical information having qualitative-subjective characteristics that cannot easily be communicated by telecommunications.

Psychologically, face-to-face contact is indispensable for developing an atmosphere of trust that is necessary between two persons wishing to conclude major contracts and negotiations. Further, face-to-face contact facilitates a supplementary informal exchange of information and of new ideas; this cross-

fertilisation often leads to the discovery and the exploitation of new business opportunities and of new methods of producing. It is for this reason that the two ‘institutions’ that often characterise agglomerations of all types of economic activity—the business lunch and the after-work drink—are so important.<sup>10</sup>

Our previous research on Montreal’s geography of employment and, more specifically, on its high-order service firms reinforces these points. In general, there is a high propensity for FIRE and business service employment to cluster together in space, and for both of these sectors to cluster together with communications and consumer services (Coffey *et al.*, 1999). Where high-order services are concerned, we have documented the overwhelming importance of face-to-face contact in the forward and backward linkages of firms (Coffey, 1996b). In addition, we have identified the principal factors underlying the location of FIRE and business services in the Montreal CMA (Coffey, Drolet and Polèse, 1996). A survey of firm management indicated that the accessibility of clients to the firm was the major factor in the locational decision. Further, a multivariate analysis of firm attributes also presented very clear results: those variables that proved to be highly significant in explaining the intrametropolitan location of establishments all involved market linkages to clients, either in terms of the geographic distribution of clients or the types of client served (for example, firms versus households).

This latter observation is particularly relevant in the light of our present results. It is likely that the locational behaviour of certain sectors can, at least in part, be attributed to changes in the nature of the clients that are served. Consider, for example, the two sectors exhibiting extremes of behaviour in our analysis of relative entropy (Table 2) and exceedingly different behaviours in our analysis of the performance of zone types (Figures 2–4). Computer services underwent the highest degree of spatial dispersion over the period 1981–96. To a large extent, this reflects the change from a sector that for-

merly dealt with a relatively small number of corporate mainframe computers to one that now deals with what has become a household appliance—the personal computer. The spatial dispersion of employment in this sector is thus not surprising, and a similar dynamic applies to other business services such as advertising and management consulting. On the other hand, financial services (the major component of which is banks) became more concentrated over the period. This is likely to be due to much of the retail banking function having been shifted from human tellers to ATMs; employment in the banking sector has become increasingly concentrated in management (rather than retail) functions which tend to cluster in specific metropolitan zones. The growth of legal service employment, too, largely occurred in the CBD, probably reflecting the reliance of this sector upon access to government offices, which have remained anchored in the CBD.

Overall, however, the forces of agglomeration remain strong. In 1996, more than 50 per cent of CMA employment in 2 of 4 FIRE sectors and 4 of 8 business service sectors, as well as the FIRE and business service groups, was concentrated in an employment pole. In no sector did the percentage fall below 40 per cent. All of our results considered, we feel that, to paraphrase Mark Twain, reports of the demise of agglomeration economies have been greatly exaggerated.

## Notes

1. The studies by Bodenman (1998), Bogart and Ferry (1999) and Harrington and Campbell (1997) are exceptions to this generalisation.
2. For a more formal treatment of these issues, see Anas *et al.* (1998).
3. The Toronto figure reflects the situation before the recent fusion of municipalities to form the Toronto mega-city.
4. In our previous paper, we employed the terms primary, secondary and tertiary in order to refer to the relative order of importance of poles; these terms make no reference to groups of economic sectors. In order to avoid confusion in the present context, we

have substituted the term 'isolated' for 'tertiary'.

5.  $H_i$  for a given sectoral group is calculated as  $\sum [p_i * \log(1/p_i)] / \log n$ , where  $i=1$  to  $n$ ,  $n=613$  (the present number of spatial units) and  $p_i$  is the proportion of employed persons in a given economic sector that are located in each spatial unit.
6. While, at first view, this might seem to contradict the popular image of the modern North American metropolis with its continuing sprawl, it is entirely logical: in the process of sprawl, the relative proportion of residents in the CTs around the downtown area has declined, while that in the peripheral CTs has increased; the distribution has thus become progressively more unequal in terms of the original distribution of the population used to define CTs.
7. The location quotient is defined as

$$[(e_{ip}/E_p)/(e_{im}/E_m)] \times 100$$

where,  $e_i$  = employment in a given sector,  $i$ ;  $E$  = total employment across all sectors;  $p$  = a given zone (i.e. employment pole, rest of CMA); and  $m$  = the Montreal CMA.

The location quotient compares the spatial concentration of employment in a given sector in a given spatial unit (here, each employment pole, groups of poles or non-pole zone) to that sector's level of concentration in a 'benchmark' spatial unit—in this case, the Montreal CMA. Thus, a sector having the same level of concentration in a given zone as in the metropolitan economy will have a value of 100. Values below 100 indicate a lower degree of specialisation than in the metropolitan system, while those above 100 indicate a higher degree of specialisation. While the cut-off value of 120 (i.e. 20 per cent more specialised than the metropolitan-wide level) is arbitrary, it is one often employed in the literature as a benchmark for specialisation.

8. In absolute figures, across all economic sectors, the CBD added 15 000 jobs, the external poles 102 500 and the rest of the CMA 124 000.
9. For a useful review of the issue of urban spatial structure, see Anas *et al.* (1998).
10. See Scott (1988) and Saxenian (1994) for a discussion of the role of these institutions in high-technology complexes.

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