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## 100 years of Interlocking Directorates in the Canadian Urban System

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Using interlocking directorates as a basis for measurement, this paper examines the altering geographical landscape of Canadian corporate control points over a century by comparing the 1912 network to the 2012 network. Vancouver and Calgary join Toronto at the top of the urban hierarchy whereas Montreal falls. Toronto remains Canada's most central city, but its position is quickly being approached by Calgary and Vancouver as control points. Results here suggest Canada's corporate power is shifting west, making these two cities intriguing to follow in the future as they move toward Toronto's grasp on corporate power over the past 100 years..

This research uses the spatial interlocking directorate network to examine change in the distribution and size of economic decision-making centres in Canada. The analysis of spatial interlocks, which occur when a member of a company's board of directors also serves on another company's board, attempts to depict the rise and fall of Canadian cities as centres of corporate power. Utilizing cities as nodes and director connections as linkages between cities, the purpose of this paper is to examine the altering geographical landscape of Canadian administrative centres over a century. We hypothesize a diffusion of corporate power from Toronto and Montreal, to a second tier of cities, especially toward western Canada. To test this hypothesis, this research will compare the 1912 interlocking directorate network to the same network in 2012. It will examine those cities that have become more (and less) central to the interlocking network over time with the overall goal to illustrate the shift-

ing geography of Canadian decision-making activity over a century.

### Basis for research or research context

Cities are understood as more than nodes of global capital. Fundamentally they can be defined by what flows through them: money, people, and in the case of this study, knowledge (Watson & Beaverstock 2014). With the need to examine knowledge movement, especially outside a locale, a basis is provided for studying knowledge flows between firms through different types of territorially. This need is related to Castells' influential work regarding networks of knowledge in today's post-modern society (1996, 446). He hypothesizes that the spatial flow of knowledge is the result of specific micro networks within the larger system.

Castells (1996) highlights the importance of the managerial elite to the spatial study of knowledge flows. He

argues that this group of people has a disproportionate influence on the macro-network of knowledge transfer. Beaverstock (2005) builds on this influential group, the managerial elite, to introduce the concept of inter-company transferees (ICTs), which involve highly skilled professionals within transnational service firms. The literature regarding world cities has developed extensively over the past couple of decades to reveal how these managerial elites or intercompany transferees are especially pronounced between global cities (Beaverstock 2005; Sassen 2018; Taylor & Derudder 2016). Such individuals are not only a layer of flow in the 'Network Society', but as Beaverstock (2005) and Watson & Beaverstock (2014) argue, the specialization of their wealth, cosmopolitanism as well as cross-border social and cultural ties make significant contributions to their transnationalism and 'elite' status in a city.

Corporations are guided by a group of officers known as the board of directors. A board of directors is a group of individuals that are elected to act as representatives of the owners to establish corporate policies and to make decisions on major company issues. An interlocking directorate refers to the practice of members of a corporate board of directors serving on the boards of multiple corporations. Two firms have a *direct interlock* if a director or executive of one firm is also a director of the other. In this study, interlocks act as communication channels, enabling information to be shared between boards via multiple directors who have access to inside information for multiple companies. They are a direct and personal contact system, which has the ability to transfer information (Heemskerck, Fenema, & Carrol 2014).

The present study shifts the emphasis away from the sharing of directors by boards to the sharing of directors by cities. A director is shared by two cities when the director serves on the board of a company headquartered in one city as well as serving on the board of a company in another thereby generating a series of information linkages among cities. When

**Table 1.** Summary of Data, 1912 and 2012

Variable	1912	2012
Total number of Directors in Dataset	6,997	24,163
Total number of Interlocks in Dataset	5,303	15,620
Total number of Companies in Dataset	1,741	5,699
Number of Directors per Company	4.02	4.24
Number of Interlocks per Director	0.76	0.65
Number of Interlocks per Company	3.05	2.74

examining the spatial interlocking network over time, it is possible to highlight the fluctuation of cities as centres of power within the Canadian urban network (Rice & Semple 1993).

The basis for this work is found in the literature of quaternary location theory. This research stream centres on the geography of corporate decision-making, which began with the evolving distribution of headquarters' locations in the United States and Canada (Semple 1973; Wheeler & Mitchelson 1989) and is still studied today in an international context (Ersoy & Ayben 2015) or examining specific types of headquarters (e.g., high growth firms (Malizia & Motoyama 2016; Kalafsky & Rice 2017)). Later, geographers expressed an interest in the location of a company's subsidiaries (Martz & Semple 1985; Holm, Malmberg, & Solvell 2003; Rice & Pooler 2009).

More recent work has moved beyond previous findings that use the brick and mortar headquarters locations as a proxy for corporate control, to focus on the location of management activities, arguing this location is particularly important because this is where elite knowledge and control lies (Carroll 2001). The results show how some companies, as well as the cities where their headquarters are located, are more interconnected through business linkages than previous research leads us to believe. Here we return to Lavie (2006), who argues that more interconnected firms (and their cities) maintain more control, and thus are more competitive in today's global world. Research on interlocking directorates has developed extensively over the last 100 years. While these paradigms deserve recognition and are still studied today, researchers acknowledge the importance of re-

source dependency (Pfeffer & Salancik 2003) as a notable explanation for interlocking directorates.<sup>1</sup> The survival of the firm is determined by numerous forces, many of which are external to the control of the firm. The degree of success of the firm depends upon a correct perception of its external environment and this perception of its environment, in turn, usually depends upon a firm's information gathering systems. Hence, information-gathering systems are critical for a firm's understanding of its external environment. This, in turn, gives it the ability to maintain control over an unstable external environment. Interlocking directorates are a good example of an information gathering system. Despite the volume of social science research on corporate boards, surprisingly little research has specifically examined the influence of geography on board of directors. It is, however, true that economic geographers have made progress in the more general study of the location of elite corporate activities (of which directors are a prominent example), with regional, national, and global head office locations of major corporations being specific focal points of activity.

Research on interlocking has been driven by sociologists whose research has attempted to explain 'why' these connections take place. They attempt to determine the cause of interlocking directorates and categorize their motivation. Perhaps Porter (1965) provided the first extensive examination of Canadian directors. His research centred on the concentration of economic power in Canada and argued that a small group of directors were the ultimate coordinators and real planners of the Canadian economy. He showed that a small elite occupied command posts at the top of Canadian business, which was reinforced through direc-

torates and country clubs. He showed how the elite class was as an ethnically homogeneous group of people with British ancestry, with barriers preventing the rest of Canadians from gaining admission. A decade later, Clement (1975) agreed with the concentration of economic power finding that top decision-making in Canada was dominated by a small upper class through the boards of companies they sat on and through which they were able to control a hierarchically ordered corporate system. Even with the increasing dominance of the United States compared to Canada, control by this small group of individuals remains intact. Since the time that Porter (1965) and Clement (1975) stated their research's findings, Carroll (1986, 2008, 2010) has been at the forefront of sociological research on Canadian directors and their social class with Klassen (2014) and Brownlee (2005) also providing recent research. Generally this research has showed that through globalization, power retained by this class of Canadians has certainly weakened since Porter's research, but still remains remarkably intact (Carroll and Klassen term this the transnationalist class).

From a geographical standpoint, this answers only one component of interlocking research. By examining the problem spatially, geographical research can offer a different perspective by attempting to determine where they occur. Geography provides a valuable contribution to business network research by exposing the spatial ramifications of corporate attempts to influence the business environment.

Green & Semple (1981) and Green (1983) pioneered the geographic conceptualization of interlocking directorates. They studied the inter-urban network of corporate interlocks and revealed a regionalized network dominated by the cities in which major financial institutions have their headquarters. Rice & Semple (1993), perhaps the closest parallel to this present study, used interlocks to examine the distribution of corporate control in Canada. They found an increasing concentration of power in Toronto and a

**Table 2.** List of Headquarter Provinces, Directors, and Interlocks per Province

Province	Headquarters			Directors			Interlocks		
	1912 %	2012 %	% Change	1912 %	2012 %	% Change	1912 %	2012 %	% Change
Ontario	53.9	39.2	-14.7	52.9	39.2	-13.7	60.8	33.6	-27.2
Alberta	4.4	19.8	15.4	3.6	19.8	16.2	0.6	21.1	20.5
British Columbia	5.5	16.7	11.1	4.9	16.7	11.7	2.1	26.9	24.8
Quebec	18.5	15.8	-2.7	20.8	15.8	-5.0	28.6	11.4	-17.2
Manitoba	6.3	2.8	-3.5	6.3	2.8	-3.5	3.2	2.9	-0.4
Nova Scotia	4.8	2.0	-2.8	4.8	1.9	-2.9	3.2	1.7	-1.5
Saskatchewan	3.4	1.8	-1.5	3.4	1.8	-1.5	0.2	1.3	1.0
New Brunswick	2.0	1.1	-0.9	1.8	1.1	-0.7	0.6	0.7	0.1
Newfoundland	0.5	0.4	-0.1	0.6	0.4	-0.2	0.1	0.2	0.2
NWT & Nunavut	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1
PEI	0.3	0.1	-0.2	0.2	0.1	-0.1	0.0	0.1	0.0
Yukon	0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.1	0.1

decrease in the power of Montreal. However, the time frame of this study was relatively short (less than 20 years), leaving open the question of how Canadian corporate power has shifted over an even more substantial period.

O'Hagan & Green (2002a, 2002b, 2004) explored the gap between previous resource dependency-knowledge transfer research and geographical findings. Two notable findings are worth mentioning here. First, a spatial component was added to the resource dependency paradigm. Second, using a Poisson regression model and network analysis, components of a city that initiate and attract interlocking and thus knowledge transfer, were identified. They also found that distance played a dominant role in the American network. While distance was important in the Canadian network, a hierarchical pattern played a significant role when compared to the United States. Geographical research has also shown that relying on intra-regional information flows can lead to less prosperous firms and that it is important for American companies to build relationships with firms internationally through interlocks (O'Hagan 2015; O'Hagan & Rice 2012, 2015).

### Data and its Limitations

To examine interlocks, two *Directory of Directors* publications, for the years 1912 and 2012, were used. The 1912 version, published by Houston's Standard Publications, was compiled from a 50% response rate from every incorpo-

rated company in Canada. Minor issues arose during our collection process, which was expected considering the data was 100 years old.

The value of the 1912 data source is magnified when considered in parallel with the *Financial Post's 2012 Directory of Directors*, which closely duplicates the data structure of the 1912 counterpart document. The 2012 register includes both publicly traded and privately owned firms, with their headquarters' addresses and the names of their executive officers and directors. Criteria for inclusion of companies for the 2012 sample include: incorporation in Canada; substantial revenue or assets; and Canadian residency for the majority of the directors. Once a company qualifies for inclusion, its officers and directors automatically meet the criteria for a personal listing. While bringing together the 1912 and 2012 datasets is not perfect, they are solid information sources that enable a unique and important historical perspective for the Canadian economy as a whole that would be almost impossible to gain in any other way.

Table 1 summarizes the differences between the two collection years. The 1912 dataset includes 6,997 businessmen showing the directorships and offices they held for 1,741 companies. The 2012 dataset includes 24,163 businesswomen and businessmen for 5,669 companies. The large discrepancy in raw data lies in how each publication collected data, and, as a result, data availability. Undoubtedly, more interlocking directorates occurred in

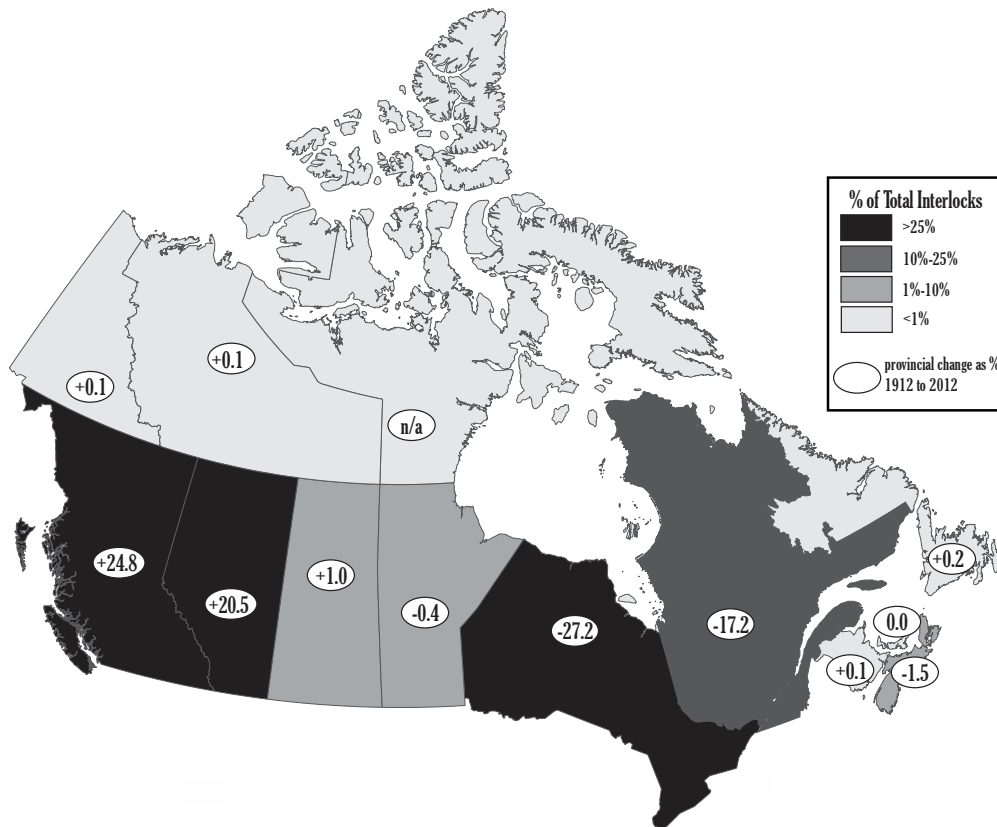
2012 when compared to that of 1912. But the large difference here can also be attributed to data availability. The result is that our analysis is conveyed by comparing percentages and not actual numbers.

### Analysis

The results of the present study found that 87.2% of all directors sat on one company in 1912, which means that 895 directors were part of an interlock in 1912. In 2012, 67,96 directors sat on one company while 7,747 were part of an interlock. Table 1 reveals that there were 5,303 total interlocks in 1912. This amount grew to 15,620 in 2012. If you include all of the directors in the year 1912, the result is that the average number of interlocks per director was 0.76 in 1912. If you include only those directors that were part of an interlock, the average was 5.92 interlocks per director. For 2012, Table 1 reveals that these numbers were much smaller. If you include all of the directors this means that the average number of interlocks per director was 0.65 in 2012. If you include only those directors that were part of an interlock, the average was 2.01 interlocks per director.

Table 2 displays data surrounding headquarters and directors as well as changes to these variables over the one hundred year study period for provinces and territories. Not surprisingly, Ontario leads all of the provinces with 40% of the headquarters and directors. More unexpected was how much Ontario decreased as a destina-

Figure 1. Interlocks per province, as a percentage of all interlocks 2012.



tion for headquarters and directors, 15% and 14%, respectively. Quebec also lost a great deal of control of Canada's economic wealth as it relates to directors and headquarters. In fact, from Saskatchewan eastward all provinces lost economic power. The two provinces who gained significant standing were British Columbia and Alberta. Alberta's increase was over 15% in both categories while British Columbia rose 11%. The general trend shows economic might in Canada has not simply shifted westward, but specifically has migrated to two provinces, Alberta and British Columbia, at the expense of all other provinces.

Figure 1 builds on results of Table 1 but examines interlocks. The importance of Ontario, British Columbia, and Alberta are obvious. Quebec emerges as an important second tier for the Canadian interlocking network. The provinces of Manitoba, Saskatchewan, and Nova Scotia make up a third tier. As the only Atlantic Canadi-

an province in the first three tiers, Nova Scotia plays an important role in the region. The remaining provinces and territories make up a minimal impact on the interlocking network.

What is more interesting in Figure 1 are the changes that occurred to the network over the 100 years under examination. While Ontario remains in the top tier for percentage of total interlocks, the province lost 27% of the total interlocks. In fact in 1912, Ontario maintained over 60% of all interlocks in the country. This dominance declined to 34% in 2012. The other province to lose its position in the network was Quebec, which declined from 17%, from 28% of all interlocks in 1912, to 11% in 2012. Making up for this difference were British Columbia and Alberta, which increased 24% and 20%, respectively, in the network. These two western provinces maintained a minimal impact in 1912 but made up 21% and 26% of the interlocking network in 2012. No doubt, the location of re-

source sector companies in western Canada, and the desire of other Canadian companies to link to their knowledge base, contributed to these gains.

Table 3 displays those cities with highest number of headquarters, directors, and interlocks as well as changes to these variables over the one hundred year study period. The top 25 cities account for a little less than 70% of headquarters and directors in 1912. Surprisingly, these become much more significantly concentrated by 2012, accounting for a substantial 93% of all headquarters and directors. Patterns for interlocks were dissimilar in that they became less concentrated over time. Compared to the other two categories, interlocks were much more concentrated in 1912 as 89% of all interlocks were with directors in the top 25 cities. This decreased slightly to 82% in 2012. The decreasing concentration of interlocks suggests the decreasing importance

**Table 3.** List of Headquarter Cities, Directors, and Interlocks in Each City

City	Headquarters			Directors			Interlocks		
	1912 %	2012 %	% Change	1912 %	2012 %	% Change	1912 %	2012 %	% Change
Toronto	22.47	31.82	9.4	22.7	31.8	9.2	42.9	24.4	-18.6
Calgary	1.76	16.27	14.5	1.6	16.3	14.6	0.4	17.8	17.4
Vancouver	3.57	14.89	11.3	2.9	14.9	12.0	1.0	23.2	22.1
Montreal	14.17	12.85	-1.3	15.4	12.9	-2.6	25.7	6.6	-19.2
Edmonton	1.03	2.79	1.8	0.7	2.8	2.1	0.1	1.7	1.6
Winnipeg	4.97	2.67	-2.3	5.2	2.7	-2.5	3.2	2.7	-0.5
Ottawa	2.97	2.38	-0.6	2.6	2.4	-0.3	2.7	1.1	-1.6
Quebec City	1.57	1.43	-0.1	2.1	1.4	-0.6	1.4	0.7	-0.7
Halifax	1.82	1.43	-0.4	2.0	1.4	-0.6	2.5	0.8	-1.7
Waterloo	1.33	1.29	0.0	1.0	1.3	0.3	0.4	0.5	0.1
Regina	0.79	0.91	0.1	0.9	0.9	0.0	0.2	0.6	0.4
Saskatoon	0.36	0.84	0.5	0.2	0.8	0.6	0.0	0.6	0.6
London	2.48	0.62	-1.9	2.4	0.6	-1.8	2.5	0.4	-2.1
Moncton	0.36	0.62	0.3	0.4	0.6	0.3	0	0.3	0.3
Burlington	0.00	0.60	0.6	0.0	0.6	0.6	0	0.2	0.2
Victoria	0.73	0.58	-0.1	0.7	0.6	-0.1	0.8	0.2	-0.6
Red Deer	0.17	0.50	0.3	0.0	0.5	0.5	0	0.3	0.3
St. John's	1.09	0.35	-0.7	1.1	0.1	-1	0.6	0	-0.6
Hamilton	3.69	0.34	-3.4	3.7	0.3	-3.4	2.9	0.1	-2.8
Aurora	0.00	0.26	0.3	0.0	0.3	0.3	0	0.1	0.1
St. Cath.-Niagara Falls	1.39	0.15	-1.2	0.2	0.01	-0.19	0.7	0	-0.7
Windsor	1.09	0.10	-1.0	0.9	0.1	-0.8	0.7	0.0	-0.7

of what Useem (1984) termed the *inner circle*, that is those directors who sit on a large number of corporate boards. He applied his concept to the United States where companies were becoming less connected to each other via interlocking directorates. Carroll and Sapinski (2017) pointed out that comparative and longitudinal studies have uncovered patterns of interlocking that vary according to country and time period. As previously mentioned, sociological research in Canada suggests that while interlocking in the country remains more concentrated than other countries, it has certainly diffused over time (Carroll 1986, 2008, 2010; Brownlee 2005; Klassen 2014).

With few exceptions, a hierarchical pattern emerges. For headquarters and directors, Toronto is at the top of the hierarchy, followed by a second tier comprised of Calgary, Vancouver, and Montreal. It is not surprising that Toronto is the most important urban centre with 31% of all headquarters and directors, and that Toronto increased by 9% for each of these categories. More surprising was the fact that Toronto decreased from 42% of all interlocks in 1912 to 24% in 2012.

When it comes to interlocks, Vancouver and Calgary join Toronto at the top of the hierarchy while Montreal

declines. In fact, Vancouver and Calgary gained the most compared to all cities for each of headquarters, directors, and interlocks over the 100 year study period. Conversely, Montreal decreased in all categories, and significantly decreased for interlocks. It could be suggested that Montreal decreased so significantly for interlocks, more than any other city, that it is relegated to a third tier in the hierarchy below the emerging cities of Vancouver and Calgary.

Geographical highlights from the third tier follow a similar trend portrayed by upper tier cities, with a decreasing importance of eastern Canadian cities and the rising importance of western Canadian cities. Edmonton, and to a lesser extent Regina, Saskatoon, and Red Deer all experienced an increase in headquarters, directors, and interlocks. Conversely, cities like Ottawa, Quebec City, London, and St. John's, St. Catharines-Niagara Falls, and Windsor lost prominence in these categories. It is important to highlight the decline of Hamilton and Winnipeg. Hamilton, which lost the greatest percentage of headquarters at 3.4%, directors at 3.4%, and the third most interlocks at 2.8%, of all cities in the country. It could be argued that Hamilton's results are even more damaging

when considering they fell to almost non-existent levels for all three categories. As the gateway to western Canada in 1912, Winnipeg was ranked third for headquarters, directors, and interlocks verifying the city's pivotal location for Canadian corporate power. By 1912 however, the city has been replaced by a number of cities that have emerged as powers in Canadian corporate networks.

Table 4 and Table 5 highlight the cities and provinces that were at the 'centre' of the corporate network. To measure what constitutes a 'centre', this analysis uses the concept of *betweenness* to determine those actors (cities) that are the most important. Betweenness is considered a powerful measure of centrality because it takes into account where actors lie in the entire interlocking network. The ability to tap into knowledge embedded in relationships and to control flows of knowledge within the context of board networks should affect the extent to which directors can influence strategic decision-making processes for their firms and the cities where these firms are headquartered. Accordingly, knowledge transfers between the headquarters of firms (and their cities and provinces) should be a function of a director's control of

**Table 4.** Centrality in Interlocks by Canadian City, 1912 Compared to 2012

City	1912		2012	
	Rank	Centrality-Betweenness	Rank	Centrality-Betweenness
Toronto	1	20.561	1	28.806
Vancouver	7	1.552	2	16.071
Calgary	14	0.919	3	13.447
Montreal	2	14.163	4	9.072
Ottawa	9	1.365	5	2.076
Quebec City	15	0.877	6	1.981
Edmonton	20	0.524	7	1.855
Winnipeg	3	5.518	8	1.600
Regina	40	0	9	1.289
Halifax	10	1.277	10	1.150
Waterloo	11	0.767	11	1.239
Moncton	40	0	12	1.044
Saskatoon	40	0	13	0.587
Kingston	31	0.012	14	0.561
Kelowna	40	0	15	0.540
St. John's	40	0	16	0.506
Red Deer	40	0	17	0.405
London	16	0.846	18	0.320
St. John's	21	0.513	19	0.314
Trois-Rivieres	40	0	20	0.306
Fredericton	40	0	21	0.294
Brantford	18	0.549	22	0.292
...	...	...	...	...
Hamilton	5	2.145	87	0.017
Owen Sound	6	2.506	145	0
St. Catharines	8	1.539	61	0.137
Sherbrooke	12	1.08	133	0.001
Sydney	17	0.646	145	0

knowledge flow channels between firms. Betweenness measures control of knowledge flow by calculating how many times an actor sits on the geodesic (the shortest path) linking two other actors together. This form of centrality views an actor as being in a favoured position to the extent that the actor falls on the geodesic paths between other pairs of actors in the network.

It is calculated as:

$$C_B(k) = \sum \partial_{ikj} / \partial_{ij}, i \neq j \neq k$$

Where,

$\partial_{ikj}$  the number of geodesics linking firms *i* and *j* that pass through firm *k*

$\partial_{ij}$  the number of geodesics linking firms *i* and *j*

Table 4 summarizes centrality in interlocks by top Canadian cities for 1912 and 2012.

Toronto is ranked number 1 for both study years and actual increases in centrality over time to over a quarter of all links. Being central creates differing results for Ontario as a whole, as presented in Table 5. Combining results from the two tables would suggest that while Toronto gains in prominence over time in the interlocking network, many places in Ontario decrease in importance. Ontario falls extensively in centrality from sitting on the shortest path of 42.5% of all interlocks in 1912 to 7.5% of all interlocks in 2012. This is confirmed at the bottom of Table 4 where three of the five cities that declined the most in centrality over 100 years were in Ontario. Other Ontario cities, such as the suburbs of Toronto, as well as Ottawa and Waterloo, did increase in significance to the interlocking network.

Not surprisingly, Vancouver and Calgary gained in prominence in the

interlocking network. Table 4 reveals that these two western Canadian cities join Montreal in the second tier of cities for centrality. Associated with these city level findings are provincial level results in Table 5. Unexpectedly, Alberta surpasses Ontario to be positioned at 13.7% of all interlocks while British Columbia sits in a similar position to Ontario on the interlocking network with the shortest path going through these two provinces 7.5% of the time. While the data does not consider international links, the rise of East Asia countries influences the increasing power of Calgary and especially Vancouver in the Canadian interlocking network. On the other hand, Quebec falls significantly, aided by the decreasing importance of Montreal. Edmonton became more central to the network as well, albeit in a third tier with cities such as Ottawa, Quebec City, and Winnipeg. In eastern Canada, Table 4 shows that Moncton increased greatly, surprisingly rivaling Halifax in centrality. Table 5 shows how Nova Scotia fell in prominence similar to the province of Quebec.

To assess the concept of knowledge threshold further, we examine if a distance decay pattern exists for the interlocking network. Figure 2a and Figure 2b map intra-city and intercity interlocks for 1912 and 2012. Intra-city interlocks dominate the Canadian network with 70% of interlocks in 1912 and 63% of interlocks in 2012 are between firms located less than 100 km from each other. The importance of Toronto at the top of the national hierarchy is evident in 1912 and 100 years later in 2012.

Figure 2a reveals that 1912 interlocks resembles a distance decay pattern. A reasonable interpretation is that the result is the product of a lack of infrastructure for transport and communication at the time. Intra-city interlocks far outweigh all other distance intervals. Also evident is the importance of Ontario and Quebec with a great deal of regional interlocking within the southern portion of the two

**Table 5.** Centrality in Interlocks by Canadian City, 1912 compared to 2012

Province	Rank	1912 Centrality- Betweenness	Rank	2012 Centrality- Betweenness
Alberta	6	0.549	1	13.035
British Columbia	5	3.846	2	7.542
Ontario	1	42.857	3	7.542
New Brunswick		0	4	4.461
Newfoundland		0	5	2.723
Nova Scotia	3	11.264	6	2.534
Quebec	2	12.637	7	1.406
Manitoba	4	6.868	8	0.707
Saskatchewan		0	9	0.202
Nunavut		0		0
Prince Edward Island		0		0
North West Territories		0		0
Yukon		0		0

provinces. We also appreciate a hierarchical pattern beginning to emerge as the largest cities share interlocking, regardless of distance.

Results for 2012 further reveal that a distance decay pattern and a hierarchical pattern are even more obvious. Surprisingly, beyond 100 km geography plays a very limited role, with intercity interlocking relegated the largest cities at the top of Canada's hierarchy. The impressive rise of western Canada is mitigated by the fact that cities such as Vancouver, Calgary, Winnipeg and to a lesser extent Edmonton, rely heavily on intracity interlocking rather than a true integration with other regional centres for knowledge transfer. This can be explained by the fact that cities that possess valuable assets, such as corporate knowledge that make linkages desirable, are lacking. A lack of corporate activity across Canada has relegated its interlocking, and thus corporate knowledge, to a hierarchical pattern with geography playing a minimal role beyond intracity links. A threshold for Canadian corporate knowledge exists on two levels. Most importantly, an intra city threshold suggests that firms seek knowledge about local markets. Beyond the city, the significance of Toronto suggests a knowledge threshold at the national level.

### Conclusions

This paper set out to examine the altering geographical landscape of Canadian administrative centres over the last century. Results show that Toronto was the only city that maintained the same position in the hierarchy in both 1912 and 2012. However, the stability of Toronto should not be taken as indicative of a lack of system change. Major developments are connected with the rise of western Canada, especially Calgary and Vancouver, and the fall of Montreal. Even with respect to Toronto, however, some not-so-surprising findings are paired with interesting changes. It is not surprising that Toronto is the most important urban centre with regard to headquarters and directors in both 1912 and 2012. In each of these categories Toronto became increasingly important over time. However, more surprising is the extent to which Toronto saw a drastic decline in its positioning within the interlock network from 1912 to 2012.

Montreal decreased in all categories, and significantly decreased for interlocks. These are not revolutionary findings as it has been documented that Montreal's decline has been a trend for some time. More debatable would be the suggestion that Montreal has decreased so significantly for interlocks, more than any other city, that it is relegated to a third tier position in the hierarchy below the emerging cities of Vancouver and Calgary. Current economic geography literature would suggest a lack of external

connections limits Montreal firms from accessing external knowledge. Given the centrality of knowledge to business success in today's economy, this finding indicates that Montreal's decline in business influence will likely continue.

Considering interlocks, Vancouver and Calgary join Toronto at the top of the hierarchy whereas Montreal falls. In fact, Vancouver and Calgary gained the most substantial amount compared to all cities for each of headquarters, directors, and interlocks over the 100 year study period. Toronto remains Canada's most central city. However, Calgary and Vancouver's ascension in centrality to critical control points in the Canadian urban economy is the principal development found in this research. Results here suggest Canada's corporate power is shifting westward in Canada. British Columbia, in general and Vancouver, in particular, have been developed and marketed as a privileged and competitive gateway in the supply and distribution chains between East Asian and Canadian markets (Montsion 2011). Results on western Canadian cities are tempered by the fact that cities such as Vancouver, Calgary, Winnipeg and to a lesser extent Edmonton, rely heavily on intracity interlocking rather than a true integration with other regional centres for knowledge transfer. This has resulted in global flows of property capital and transnationalism binding Vancouver to East Asian control points like Hong Kong (Olds 1998; Kelly 2003). This process has changed the identity of Vancouver, which in turn will further bind it to its East Asian counterparts over time. The geographical location, especially with the emergence of East Asia, make Alberta and especially British Columbia intriguing to follow in the future to see if they further approach Toronto's grasp on corporate power over the past 100 years.

Results of this study spur further questions to be answered. An industry-specific analysis is needed, and would allow the research to parse out how this has influenced the urban hierarchical structure. Banking/finance, manufacturing, and resources would

Figure 2a. Canadian interlock network, 1912

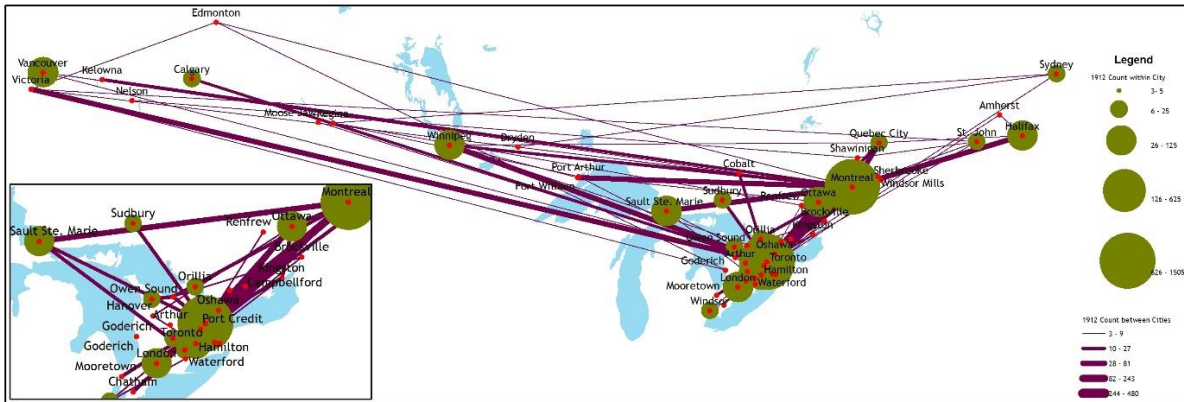
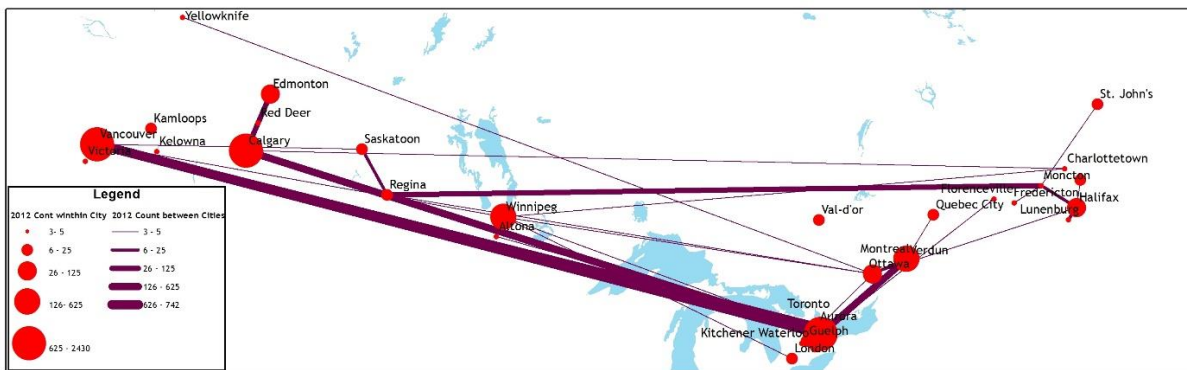


Figure 2a. Canadian interlock network, 2012



be obvious starting points. Geographically, analysis on specific regions would allow this macro level analysis to explore industries and even specific firms impact on interlocking changes. Also the study highlights the need for a parallel longitudinal analysis of director shifts in the US and other countries as data can be found. Continuation of investigation in this area promises to contribute a variety of crucial insights into the competitive positioning of industries and urban regions.



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<sup>1</sup> For a more detailed discussion of interlocking directorates: see Mizruchi (1996). What do interlocks do? An analysis, critique, and assessment of research on interlocking directorates. *Annual Review of Sociology* 22(1), 271–298.