

Assessing the Economic Impact of an Oil and Gas Firm's Head Office Relocation to Calgary, AB

By

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ABSTRACT

Corporate head offices serve as the figureheads and decision-making cores of firms. For a variety of reasons, these head offices tend to locate in major cities. Cities themselves compete to attract head offices for their presumed positive economic impact, but what is the impact? Calgary, Alberta, is Canada's energy centre and an emerging leader in head office counts that is expected to further grow its share of Canadian corporate head offices. This report seeks to estimate the economic impact of an oil and gas (O&G) firm relocating to Calgary, AB. Based on decades of theory and using data from a variety of sources, two multipliers are calculated: the economic base multiplier and the H.C. Davis income multiplier. By applying these multipliers to data regarding head office employment and O&G industry wages, estimates of the employment and income effects of the relocation are found. The results emphasize the importance of both the O&G industry and attracting head offices to Calgary. Based on these conclusions, two key policy avenues are recommended to encourage further expansion of Calgary's head office counts.

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TABLE OF CONTENTS

Chapter		Page #
	Abstract	i
	Acknowledgements	ii
	Table of Contents	iii
	List of Equations	iv
	List of Figures	v
	Executive Summary	vi
1.0	Introduction	1
2.0	Study Area and Background	3
	2.1 Study Area Overview	3
	2.2 Oil & Gas Industry: History and Calgary's Role	8
	2.3 Head Offices in Calgary	11
	2.4 Summary	14
3.0	Method	16
	3.1 Economic Base Multiplier	16
	3.1.1 Multiplier, Assumptions and Equations	16
	3.1.2 Data Collection	19
	3.1.3 Shortcomings of Method	19
	3.2 H.C. Davis Income Multiplier	21
	3.2.1 Multiplier, Assumptions and Equations	21
	3.2.2 Data Collection	24
	3.2.3 Shortcomings of Method	25
	3.3 Summary	25
4.0	Results	26
	4.1 Economic Base Multiplier Results	26
	4.2 H.C. Davis Income Multiplier Results	31
	4.2.1 Sensitivity Analysis	33
	4.3 Economic Impact	37
	4.4 Summary	38
5.0	Conclusion	39
	5.1 The Issue of Time	39
	5.2 The 'Why' for Policymakers	40
	5.3 Future Considerations and Concluding Remarks	44
6.0	Bibliography	45
7.0	Appendix	55

LIST OF EQUATIONS

Equation	Page #
Equation 1	17
Equation 2	17
Equation 3	18
Equation 4	19
Equation 5	19
Equation 6	21
Equation 7	22
Equation 8	22
Equation 9	23
Equation 10	23
Equation 11	24
Equation 12	24
Equation 13	30

LIST OF FIGURES

Figures	Page #
Figure 1 – Major Canadian Cities and Capitals	4
Figure 2 – Calgary Census Metropolitan Area (CMA)	4
Figure 3 – Calgary CMA Population by Unit, 2001-2011	5
Figure 4 – Calgary CMA Cohort Analysis	6
Figure 5 – Calgary CMA versus Canada Real GDP Growth	7
Figure 6 – Barron Building	10
Figure 7 – Scotia Centre	10
Figure 8 – Oil and Gas as a Percentage of Alberta’s Annual GDP 2007-2011	11
Figure 9 – Oil and Gas as a Percentage of Canada’s Annual GDP 2007-2011	11
Figure 10 – Head Office Counts in Canada’s 7 Largest Office Centres, 1999-2005	13
Figure 11 – Calgary CMA Industries where LQ > 1	27-28
Figure 12 – Total Employment, Basic and Non-Basic Employment	30
Figure 13 – Sensitivity Analysis (10% Underestimation)	34
Figure 14 – Sensitivity Analysis (10% Overestimation)	34
Figure 15 – Sensitivity Analysis (20% Underestimation)	35
Figure 16 – Sensitivity Analysis (20% Overestimation)	35
Figure 17 – Sensitivity Analysis Summary Table	36

EXECUTIVE SUMMARY

Topic and Research Question

In promotional materials cities often use their skylines as emblems of power, prosperity and resilience. Beyond their symbolism for boosters, skyscrapers house much of the decision-making capacity of the world's firms. These head offices, or headquarters, are where (one hopes) the talent is found. In such a way, firms are talent-seekers. But who seeks talent-seekers? In an era of globalization, nimble firms are able to capitalize on the growth and decline of cities via their location decisions. Cities now compete to attract head offices for their presumed positive economic impact, but what is the impact? Calgary, Alberta, is Canada's energy centre and is an emerging leader in head office counts (Brown & Beckstead, 2006; CED, 2010). With a strong history of oil and gas (O&G) industrial activity in the area, it is no surprise Calgary's head office counts are dominated by O&G-related firms. This report seeks to answer the following research question: in terms of income and employment generation, what is the local economic impact of a firm in the O&G industry moving its head office to Calgary, AB?

Head Offices in Calgary

Calgary's dominance in housing the O&G industry's decision-makers is clear. The *Globe and Mail's Report on Business (ROB)* magazine publishes an annual "Top 1000", ranking the 1,000 largest publicly traded companies incorporated in Canada. Of the 210 companies on the 2012 list in the O&G industry, 169 (80%) are headquartered in Calgary. These 169 firms represent roughly 22% of the *combined* total market capitalization of the Toronto Stock Exchange and TSX Venture Exchange (The Globe and Mail, 2012a; TMX, 2012). This supremacy has led to business and professional service providers (e.g. banks, accounting firms, consultants) coming to Calgary, bolstering its argument as a prime head office locale for non-O&G firms. The 1999 to 2005 period witnessed Calgary beginning to supplant Vancouver as Western Canada's most important head office centre (Brown & Beckstead, 2006), a title it took in 2010 (CED, 2010). This trend is likely to continue as Calgary becomes more attractive as a head office jurisdiction, especially for O&G-related firms. So just how valuable is an O&G head office relocation?

Method

The method of this report largely follows that of Bell's (1996) study of the mining industry's expansion in Sudbury, ON. The method comprises the calculation of two economic multipliers: the economic base multiplier and the H.C. Davis income multiplier. The economic base multiplier is calculated using the location quotients (LQs) method, which compares employment in the local economy (Calgary) to

employment in the larger economy (Alberta or Canada) by industry. It is thus an indicator of industrial specialization and is used to find the employment effect. The income effect is found using the H.C. Davis income multiplier (Davis, 1976), a more complex and arguably more robust multiplier than the economic base multiplier. The income multiplier overcomes many of the deficiencies of the economic base method and arguably provides a ‘truer’ estimate of the economic impact.

Results

The location quotient method was used to calculate the economic base multiplier, which divides the local economy into basic and non-basic (or export-based and local-based) employment. The table below details five of the seven industries with a $LQ > 2$, meaning they are at least twice as concentrated in Calgary as the Canadian average. While all five are in the O&G industry, oil and gas extraction and pipeline transportation stand out as the top two basic industries, with LQs close to 10 (meaning ten times the concentration).

NAISC	Industry	Y_{Calgary}	Y_{Canada}	LQ_i	B_r	N_r
211	Oil and gas extraction	27,455	72,465	9.86	24,672	2,783
486	Pipeline transportation	1,590	4,335	9.55	1,424	166
412	Petroleum product wholesaler-distributors	2,345	15,315	3.99	1,757	588
213	Support activities for mining and oil and gas extraction	14,295	103,510	3.60	10,320	3,975
324	Petroleum and coal products manufacturing	1,200	14,810	2.11	631	569

$Y = \text{Total Employment}$, $LQ = \text{Location Quotient}$, $B = \text{Basic Employment}$, $N = \text{Non-Basic Employment}$

Source: Statistics Canada, 2008c; 2008e.

Again, this highlights the importance of O&G to Calgary’s economy. The resulting economic base multiplier is approximately 5.83. This means for every unit of basic employment (e.g. any industry in the table above or with a $LQ > 1$), 4.83 non-basic sector jobs are created. When these figures are applied to the average head office employment of 50, the employment impact of a typical head office relocation is just under 300 jobs economy-wide (50 basic plus 242 non-basic).

In contrast to the economic base multiplier, the income multiplier is a much more complex calculation involving a variety of inputs drawn from a diverse set of sources. Consumption, government spending, taxes, federal and provincial funding, and expenditures on imports all play into the multiplier. Given the often disparate data sources and the need for some subjectivity on the part of the researcher, sensitivity analysis was performed to identify the magnitude of and degree to which error in any input affected the

overall multiplier. This analysis demonstrated that while error in some inputs had a greater effect on the multiplier than others, the former group of inputs were treated more carefully ex-ante due to their inherent complexity. The resulting income multiplier was found to be approximately 1.477. This translates to an income effect of roughly 11.7 million CAD for an O&G head office of 50 employees.

Conclusions

The results found in this report reveal just how significant the income and employment effects can be for a relatively small firm relocation. While some disbelief must be suspended given the method's assumptions, the results still ought to be informative for practitioners and policymakers. The findings demonstrate the importance of O&G and its continued expansion as an industry in Calgary as well as the clear economic benefits of attracting head offices. How then can Calgary continue to increase its head office share? Given the risk profile of O&G, further diversification should be an obvious target. This can be achieved while still benefiting existing industry by actively encouraging business and professional services providers to locate in Calgary or expand their existing operations. Pursuant to this, policymakers need to improve access to Calgary's downtown, its key office precinct, from the rest of the city, but especially the airport. The literature has shown airports to be a critical attribute for a city's success as an international centre and head office locale (Bel & Fageda, 2008; Strauss-Kahn & Vives, 2009; Bloom & Grant, 2011). Providing better access between the airport and downtown as well as the successful completion of ongoing projects to expand the airport's capacity and services should be top of mind.

1.0 INTRODUCTION

Corporate head offices serve as the figureheads and decision-making cores of firms. For a variety of reasons, these head offices tend to locate in major cities. Cities themselves compete to attract head offices for their presumed positive economic impact, but what is the impact? Calgary, Alberta, is Canada's energy centre and is an emerging leader in head office counts that is expected to further grow its share of Canadian corporate head offices (Brown & Beckstead, 2006; CED, 2010). With a strong history of oil and gas (O&G) industrial activity in the area, it is no surprise Calgary's head office counts are dominated by O&G-related firms. As each O&G firm locates its headquarters in the city, Calgary enhances its position as an energy hub while inducing business and professional services providers to join the cluster. This hints at the fact that with any head office relocation to Calgary there are spin-off effects on the local economy. Some of these effects are measurable, while others are not. Focusing on the former group of effects, there are a variety of economic tools available to researchers and practitioners to estimate economic impacts. Using two of these tools—the economic base multiplier and the income multiplier—this report seeks to answer the following research question: in terms of income and employment generation, what is the local economic impact of a firm in the oil and gas industry moving its head office to Calgary, AB? Taking a quantitative approach, this report will focus on calculating Calgary's economic base multiplier and income multiplier and applying the results to available statistics on head office employment in Calgary as well as wages in the oil and gas industry (O&G). This method will yield two economic impact estimates for this base scenario, one for the income effect and one for the employment effect. The purpose of this study is not to assess the location decisions of firms in O&G, but to assess the economic impact of the average firm moving its corporate head office to Calgary. From these calculations, conclusions can be drawn on the multiplier effects in Calgary and the economic importance of O&G firms' clustering in Calgary.

The method and structure of the report will generally follow Bell's (1996) similar analysis of the mining industry in Sudbury, ON. Chapter 2 presents the study area (Calgary, AB) and its socio-economic context. This chapter also provides a (brief) history of the oil and gas industry and its role in the evolution of Calgary from a humble fort to the international energy hub it is today. Finally, the chapter will comment on Calgary's current head office market and projected growth of its head office share in Canada. Chapter 3 describes the method of the report, its theoretical background and its precedents. The key equations and data collection processes of the economic base multiplier and the H.C. Davis income multiplier are

presented and any methodological shortcomings are addressed. Chapter 4 presents the results of the two multiplier calculations, the economic base multiplier and the H.C. Davis income multiplier. In the case of the latter, sensitivity analysis is performed to address the complexity of the calculation and its potential for error. These multipliers are then applied to O&G industry employment and wage data to demonstrate the impact of the hypothetical firm relocation. The economic base multiplier yields the employment effect, while the H.C. Davis income multiplier yields the income effect. The final chapter addresses the main shortcoming of this research, translates the results into recommendations for policymakers, and provides conclusory commentary as well as opportunities for further research.

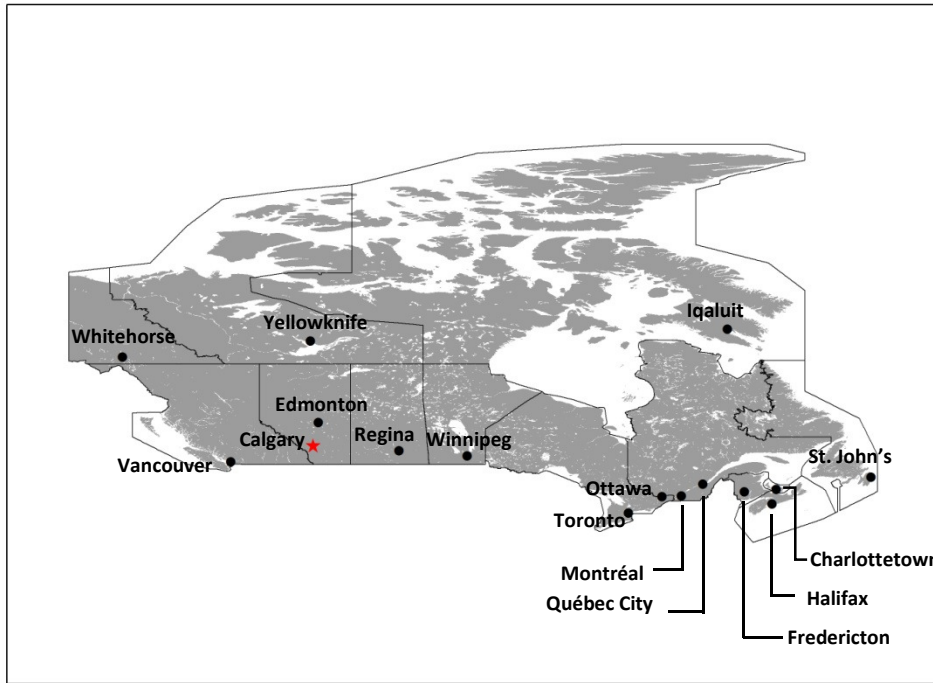
2.0 STUDY AREA AND BACKGROUND

The following chapter introduces the study area of this analysis and provides background information on the history of the oil and gas (O&G) industry, Calgary's role in O&G, and head office growth in Calgary.

2.1 Study Area Overview

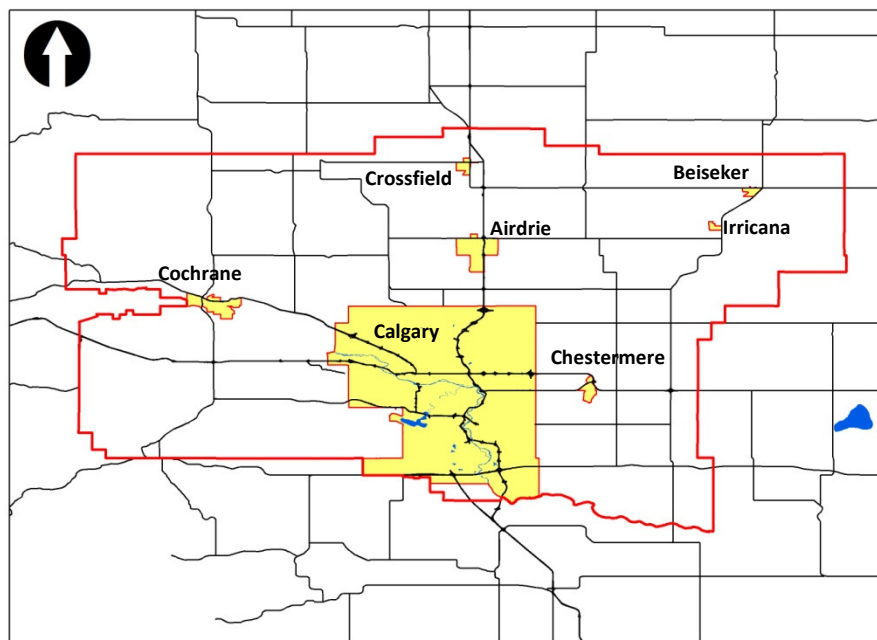
Located in southern Alberta, Calgary (see Figure 1) is well known as both the energy centre of Canada and for its ties to a history of homesteading activities, such as agriculture and ranching. Thanks to these historically important economic drivers, Calgary has grown to become one of the largest and most important cities in Canada. It is vital to note that in this discussion, Calgary is referred to in its capacity as a Census Metropolitan Area (CMA). While Calgary is its own municipality in Alberta, the Calgary CMA is a better representation of the labour force as it includes a larger catchment of those who work in Calgary, despite not living within the City of Calgary's boundaries. Figure 2 illustrates the City of Calgary's municipal boundaries, as well as those towns and villages that fall within the overarching CMA boundaries. The Calgary CMA has a land area of roughly 5,100 km², which represents less than 1% of Alberta's total land area (Statistics Canada, 2012b). Despite a relatively small land area, the Calgary CMA represents one third of Alberta's total population (see Figure 3). Furthermore, the Calgary CMA is the fifth largest CMA in Canada by population according to the 2011 Census (Statistics Canada, 2012a). In the five years from 2006 to 2011, the Calgary CMA had the largest population growth rate among the 33 largest CMAs in Canada at 12.6% (Statistics Canada, 2012a). Figure 3 provides a breakdown of the CMA's population by unit (i.e. municipality, town, village) from 2001 to 2011 as well as the percentage change in 5-year intervals. While the City of Calgary and the CMA as a whole have had above-average growth in the last 10 years, nearby satellite towns Airdrie, Cochrane, and Chestermere have had explosive growth in that same period. This growth further highlights the City of Calgary's importance as an employment centre within the CMA as growth has spilled beyond its municipal boundaries. As of the 2011 Census, the Calgary CMA

Figure 1 – Major Canadian Cities and Capitals



Source: DMTI Spatial 2010, 2012a, 2012b.

Figure 2 – Calgary Census Metropolitan Area (CMA)



- Municipality
- Water
- CMA Boundary
- Highway

0 25 50
Kilometres

Source: DMTI Spatial 2010, 2012a, 2012b.

comprised a total of 488,451 dwellings with a population density of approximately 238 persons per square kilometre, more than 40 times the provincial population density (Statistics Canada, 2012b). The City of Calgary has both increased steadily in population in the last 10 years and has become more densely populated in the same period (Statistics Canada, 2008a; 2012b). Although population growth and economic growth are not cleanly intertwined, Calgary’s relatively accelerated population growth in recent years has coincided with robust economic growth in the last ten years, including an increase in the number of head offices as will be discussed under section 2.3.

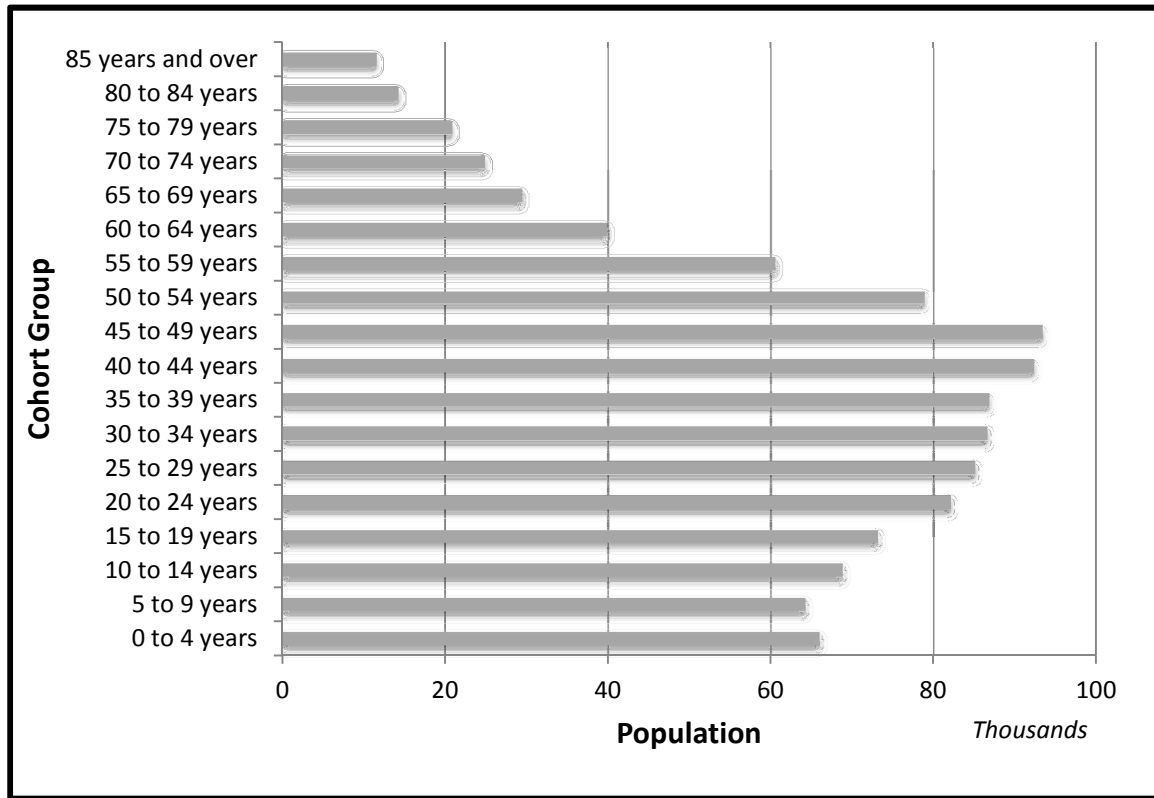
Figure 3 – Calgary CMA Population by Unit, 2001-2011

	2001 Population	2006 Population (% change)	2011 Population (% change)
Calgary	879,003	988,193 (+12%)	1,096,833 (+11%)
Airdrie	20,407	28,927 (+42%)	42,564 (+47%)
Cochrane	12,041	13,760 (+14%)	17,580 (+28%)
Chestermere	3,856	9,564 (+148%)	14,824 (+55%)
Crossfield	2,399	2,648 (+10%)	2,853 (+8%)
Irricana	1,043	1,243 (+19%)	1,162 (-7%)
Beiseker	838	804 (-4%)	785 (-2%)
Other	31,907	34,171 (+7%)	38,238 (+12%)
CMA Total	951,494	1,079,310 (+13%)	1,214,839 (+13%)

Source: Statistics Canada 2008a, 2012b.

No population overview would be complete without reference to the age dynamics of the Calgary CMA. Looking at the cohort analysis depicted in Figure 4, it is clear the dominant age group of the CMA is in the 40 to 49 year old range. The median and average age both sit around 36 years, thus representing an age situation similar to that in the rest of the province and Canada as a whole. While this currently characterizes an economy where the dominant group is in its prime earning years, it is hard to avoid the reality of the oncoming wave of retirees and the relative lack of a supporting population to fill their roles. While the impact of this issue is still down the road and its nature is uncertain, it is certain to have economic ramifications for cities such as Calgary.

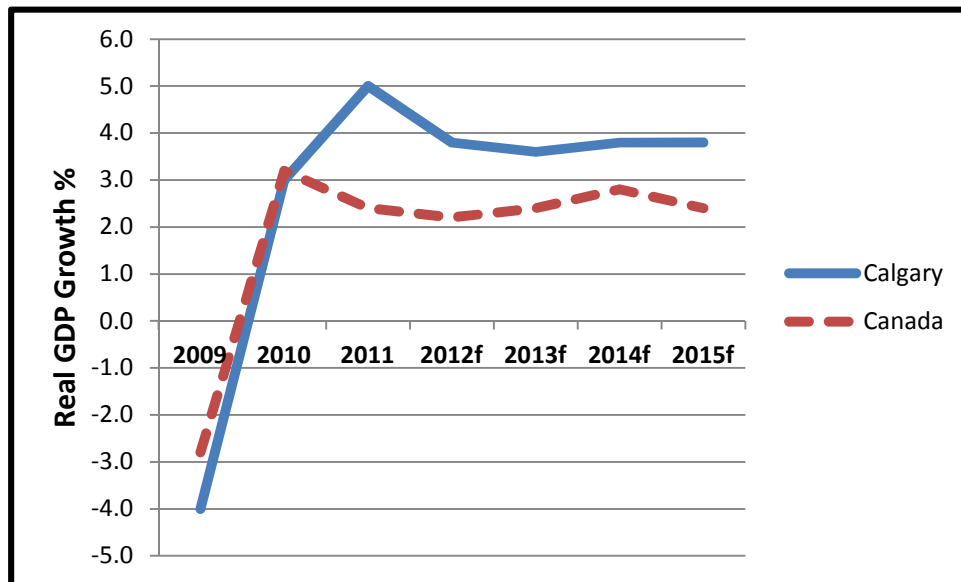
Figure 4 – Calgary CMA Cohort Analysis



Source: Statistics Canada, 2008b.

Looking now from a strictly economic perspective, the Calgary CMA stands out when compared with other CMAs, the rest of Alberta, and the national economy in recent years. Like Alberta as whole, Calgary was harder hit by the 2008-2009 financial crisis than the Canadian national economy as a whole, due in large part to the importance of the energy and business services sectors to the Calgary economy (Lefebvre et al., 2012). In terms of real Gross Domestic Product (GDP) growth, Calgary has recovered well since 2009's negative growth and forecasts point to sustained positive growth for the next five years (see Figure 5) as employment stabilizes and global uncertainty improves (Lefebvre et al., 2012). On the note of employment, the Calgary CMA boasts a strong labour market with 2011 unemployment well below the national average (7.5%) at 5.8% and a strong employment outlook for the future in virtually all sectors (Lefebvre et al., 2012). However, it is important to note that much of the positivity of these forecasts for the CMA are based on the success of the energy sector, which is a notoriously volatile part

Figure 5 – Calgary CMA vs. Canada Real GDP Growth



f = Forecast. Source: Lefebvre et al., 2012.

of the economy. In fact, the Conference Board of Canada measures employment market variability and, as of Fall 2012, ranks the Calgary CMA labour market as nearly twice as volatile as the Canadian labour market as a whole. On the other hand, on the Conference Board of Canada's economic structure rating (where 1 means a highly diversified economy and 0 means no diversification), the Calgary CMA scores a high 0.77 (Lefebvre et al., 2012). The combination of results from these two measures would suggest that while the energy sector is still an integral part of the Calgary economy, economic development efforts have been made to diversify and mitigate the inherent volatility of its primary sector. Based on location quotient analysis carried out as part of the method for this report (described in much greater detail in Chapter 3), key industries were identified based on employment. The Calgary CMA's key industries comprise many tied to the energy sector including oil and gas and their related manufacturing and wholesaling, pipelines, mining, and utilities. Outside of energy, construction, some niche manufacturing sub-industries (e.g. furniture and electronics), and information technology industries are also important to the economy. Professional services and FIRE industries (Finance, Insurance, and Real Estate) are two other key groups of industries that are important employers in the CMA, notwithstanding the fact they are in many ways co-dependents of the energy sector (Statistics Canada, 2008c; 2008d; 2008e). As the skills necessary for many of these industries would indicate, the Calgary labour market is strengthened by a significant supply of educated workers. Roughly 30% of workers in the CMA have at least a university (bachelor's) degree, which is nearly 10% above both the provincial

and national average. It comes as no surprise then that the median income in the CMA is over 31,000 CAD, or 2,000 CAD above the provincial average and over 5,000 CAD higher than the national average (Statistics Canada, 2008b). Suffice it to say, the highs and lows of the Calgary CMA economy are intertwined with the peaks and troughs of the energy sector. Calgary's history and relationship with the primary resident energy industry, oil and gas, will be discussed in the following section.

2.2 Oil & Gas Industry: History and Calgary's Role

Alberta is now popularly known as Canada's major oil- and gas-producing province, a deserved title given the vast majority of crude oil- and natural gas-production occurs in the Western Canada Sedimentary Basin, much of which is located in Alberta (CCEI, 2004). However, it was in Southwestern Ontario where the first commercial oil production occurred (Phelps, 1969). In 1856, a railway man by the name of James Miller Williams divested himself of his original business and devoted himself completely to digging for oil in Enniskillen, a then-tiny township west of London and east of Sarnia, Ontario (Phelps, 1969). Like many projects thereafter, the first oilfield development was marred by technical and financial difficulties (Phelps, 1969). However, as success was struck, a rush followed first to Enniskillen and then the rest of western Ontario (Phelps, 1969). As the Ontario oil industry grew and became more capitalized, the influence of successful production began to spread across Canada. This rush, boom and the subsequent ripples through a wider economy are repeated throughout the history of O&G in Canada. By the 1880s and 1890s, coincidentally around the time Ontario production began to slow down, established companies brought their products to expanding settlements in the Prairies. These early settlers, mainly working on farms, in mines, and in lumber camps, were in need of these petroleum products (mostly lubricants) to operate the range of farming and industrial machinery also flowing into the Prairies at the time (Page, 1984). Among these early settlers were the original Calgarians who built Fort Calgary, a Royal North West Mounted Police detachment charged with bringing some measure of law to an area rife with buffalo slaughtering and whisky trading (McNeill, 1967). Petroleum did not enter the picture on a large scale in Calgary until later, despite the Geological Survey of Canada commenting in 1861 on pools of hydrocarbons in sedimentary layers in nearby Turner Valley (CCEI, 2004). In 1909, Ontario entrepreneur Eugene Coste moved to southern Alberta after his Ontario wells had dried up and made a sizeable natural gas discovery on Bow Island. "Old Glory," as it became known, was significant enough to allow Coste to bankroll a 270-km pipeline from Bow Island to Calgary (CCEI, 2004). Though Coste's "Old Glory" and ensuing pipeline brought some investment to Calgary, it perhaps more importantly brought promise to hopeful oil scouts. In 1914, this promise was

satisfied when Calgary Petroleum Products Company Limited hit it big in Turner Valley (roughly 60 km southwest of Calgary), which spurred a rush to further and more serious exploration of the Western Canada Sedimentary Basin (Bliss, 1987). This initial oil rush produced a spectacular bubble that burst with serious consequences for the wider public who had poured their savings into suddenly worthless drilling certificates (de Mille, 1969). As history tends to dictate, some learned from the first Turner Valley boom and bust, while others since that time have fallen victim to the oft-vicious boom-bust cycle seemingly intrinsic to this industry.

With greater understanding of geology and deeper drilling, Turner Valley was the site of two more, larger discoveries in 1924 and 1936. These Turner Valley times fuelled the first oil crazes in Calgary where investors big and small got caught up in the action. Some were big winners, many were big losers, and every group of people imaginable formed their own oil companies, from doctors to ranchers to schoolteachers and everything in between (Bliss, 1987). The 1936 Turner Valley boom led to significant production and for a time Canada was not as reliant on oil imports. However, the Second World War quickly revealed the need for greater domestic production to feed demand, which in turn led to more aggressive exploration (CCEI, 2004). Shortly after the end of the war, the modern oil and gas era began with the 1947 discovery at Leduc (near Edmonton). Leduc “marked the beginning of Canada’s transition from oil-poor to oil-rich” (CCEI, 2004: p. 25) and sparked a series of major successes throughout the Prairies.

This newfound oil-richness brought huge waves of employment to the Prairies and by the 1950s oil had overtaken coal as the top energy source in Canada (CCEI, 2004). It was also in the 1950s that Calgary’s place as the permanent head office for the O&G industry was literally cemented. The Turner Valley days had brought the buzz, but in the 1950s it was solidified with then-towering, ten-storey skyscrapers giving Calgary a modern look unique within the Prairies (see Figure 6; Bliss, 1987). The 1960s and early 1970s saw continued increases in oil exports (almost entirely to the U.S.) and as the price of oil crept up, so the Calgarian economy boomed along. With the “oil weapon” in 1973, OPEC (Organization of Petroleum Exporting Countries) exerted its market strength in the form of charging monopoly-like prices, despite not having a true monopoly (Bliss, 1987). While on the surface the Arab Oil Embargo left many Canadians fearing an energy crisis of epic proportions and nights left in the cold, it was in reality the start of a nearly ten-year run-up in oil prices. On an inflation-adjusted basis in December 2011

dollars, oil went from just over 20 USD¹ per barrel in 1970 to over 100 USD per barrel in 1980 (CPS LLC, 2012). This decade-long boom had a visible impact on Calgary's skyline as well. The 1950s skyscrapers were surpassed first by a forest of cranes, then by contemporary 40-storey office buildings (see Figure 7; Bliss, 1987: p. 537). Were these symbolic of a permanent boom?

Figure 6 – Barron Building



Completed in 1953, the Barron Building was a hallmark development for Calgary in the 1950s at 11 storeys (Strategic Group, 2012).

Source: Glenbow Archives, 2012

Figure 7 – Scotia Centre



When finished in 1976 the Scotia Centre was the tallest building in Calgary at 42 storeys, until surpassed in 1983 (SSM Inc., 2012).

Source: CANMARC REIT, 2012

The short answer was 'no'. The 1980s brought more instability coupled with a full-fledged war between Alberta and the Federal government over the National Energy Program (Le Riche, 2006). However, much like the 1950s had been crucial in cementing Calgary as the head office of the O&G industry, the 1970s marked an irreversible shift in Calgary's stature as a place of business. Whereas oilmen from the West had once been obligated to travel to Ontario in search of financing, now the eastern financial world was beginning to migrate to the West. As historian Michael Bliss remarks: "Make no mistake, the balance in

¹ USD = U.S. Dollars

Canada was changing. The West was changing from hinterland to heartland...” (Bliss, 1987: p. 537). As will be discussed in Section 2.3, this trend of corporate migration to Calgary has continued to today.

This ‘newer’ modern era of O&G has certainly had its major moments, mostly on an international scale, as the global economy and O&G production has increasingly become an international business. On the home front, this era has been marked by a few large integrated oil companies, a broad middle range of companies, and small firms abound, all duking it out in a business that has woven itself into the very fabric of the Canada’s economy, politics, and consciousness. To give an indication of the O&G’s pervasive role in the Albertan and Canadian economy, consider Figures 8 and 9. While policymakers endeavour to make Calgary a more diversified economy and help soften the harsh boom-bust cycle of the O&G industry, it is hard to ignore the significance of this industry to Calgary. Like many other cities it was a unique combination of historical randomness and good fortune that Calgary was made an energy hub early on. Today Calgary remains the business hub for the energy sector and, due to the strength of its economy on account of O&G, has attracted corporate headquarters for both related and unrelated industries. The following section will discuss the head office market in Calgary.

Figure 8 – Oil and Gas as a Percentage of Alberta’s Annual GDP 2007-2011

Year	2007	2008	2009	2010	2011
% of GDP	28.7%	32.7%	22.5%	24.4%	27.6%

Source: Statistics Canada, 2012c.

Figure 9 – Oil and Gas as a Percentage of Canada’s Annual GDP 2007-2011

Year	2007	2008	2009	2010	2011
% of GDP	8.3%	8.1%	7.5%	7.8%	8.0%

Source: Statistics Canada, 2012d, 2012e.

2.3 Head Offices in Calgary

Most of everyone knows head offices (a.k.a. headquarters) are important, but how is a head office different from any other? A head office is the corporate unit that performs administrative and managerial functions at a location geographically separated from the corporation’s production units (Bloom & Grant, 2011). Key to its function is broader decision-making; its power is then both real and symbolic. This symbolism is also evoked in the physical nature of the head office. Companies vie for space in the tallest building with the most sweeping views to distinguish themselves in the minds of

clients, competitors, and the public. However, the relationship between head offices and cities is a symbiotic one that goes beyond the shaping of a city's skyline.

In the age of globalisation, cities seeking to be world-class have become increasingly interested in attracting head offices as they tend to bring prestige, generate demand for financial and business services, and generally provide high-paying jobs, thereby bolstering a city's tax base (Brown & Beckstead, 2006). On the other hand, head offices endeavour to tap into the agglomeration economies gained by locating in an office cluster (Porter, 2000). Agglomeration economies are cost minimizing benefits of locating in close geographic proximity to competitors, co-dependents, suppliers, service-providers, and clients. Examples include accessing specialized inputs or business services, access to industry information, and lower-cost, more rapid innovation as a complex web of competition and cooperation are played out (Porter, 2000). These agglomeration economies are particularly important in an industry where relationships are important and companies operate in a project-driven environment, such as O&G (Porter, 2000). The O&G industry in particular tends to be highly localized to one city's downtown (e.g. Calgary, Houston, and Perth, Australia) as companies desire to be near the action (Shilton & Stanley, 1999). For O&G, an industry with huge capital costs for any given project, the importance of capital-raising efforts provides further impetus to locate in a central location near banks, other lenders, and investors (Bloom & Grant, 2011). But why would a non-O&G-related firm locate in Calgary? Other than agglomeration economies, companies tend to consider a variety of factors when choosing a head office location. In a study using a dataset of 30,000 U.S. head offices, Strauss-Kahn & Vives found head offices tend to relocate to cities with good airport facilities, low corporate taxes, and excellent business services, on top of the obvious same-industry specialization and agglomeration factors (Strauss-Kahn & Vives, 2009). While Calgary's airport facilities and business services expertise continue to grow, it is perhaps in taxation Calgary sets itself apart from competing Canadian CMAs (CED, 2010). With a favourable tax structure and low corporate, provincial income, and property taxes relative to its peers, Calgary ought to immediately strike a chord in any conversation of relocation (CED, 2010; 2012). While this language can be construed as promotional verbiage (especially considering its source – Calgary Economic Development), the figures for head offices in Canada in the past decade support Calgary's growing strength as a head office cluster.

In the past 25 years Calgary has been a net beneficiary of major corporate relocations. The migration of head offices to Calgary in this period has included several blockbuster moves (e.g. Imperial Oil from Toronto in 2005) supported by a steady in-flow of smaller head offices (CED, 2010). As the results of

Statistics Canada’s Head Office Survey from 2006 indicate, Calgary experienced steady growth in head office counts from 1999 to 2005 while slightly improving its share of head offices in Canada over the same period (See Figure 10; Brown & Beckstead, 2006). Unfortunately, the most recent Head Office Survey (2011) is not set for release until mid-2013 (Statistics Canada, 2012f). Nevertheless, the 1999 to 2005 numbers offer some interesting insights into Calgary’s position among competing head office centres.

Figure 10 - Head Office Counts in Canada’s 7 Largest Office Centres, 1999-2005

Year	1999	2000	2001	2002	2003	2004	2005
Montréal	596	581	566	567	573	562	536
Ottawa-Gatineau	100	98	96	101	104	103	101
Toronto	826	809	817	840	866	893	918
Winnipeg	114	110	120	123	131	129	129
Calgary	279	283	274	272	286	299	316
Edmonton	139	136	141	139	143	150	157
Vancouver	355	344	344	342	355	342	335
TOTAL	2,409	2,361	2,358	2,384	2,458	2,478	2,492
Calgary share	12%	12%	12%	11%	12%	12%	13%

Source: adapted from Brown & Beckstead, 2006.

The 1999 to 2005 period witnessed Calgary beginning to supplant Vancouver as Western Canada’s most important head office centre (Brown & Beckstead, 2006), a title it took in 2010 (CED, 2010). Along with Montréal’s slightly declining numbers, the transition from Vancouver to Calgary supports Klier and Testa’s findings in the U.S. of second-tier cities pulling offices from the traditionally larger metropolitan areas (in this case, Toronto, Montréal, and Vancouver; Klier & Testa, 2002). Much of this transition has to do with timing, as the stock of buildings and infrastructure tend to be newer in less mature cities (Klier & Testa, 2002). Whatever the case, the gains had by Calgary up to 2005 are all the more impressive when the employment side is measured. From 1999 to 2005, head office employment in Calgary increased 64%, more than triple the next fastest (Toronto at 19%; Brown & Beckstead, 2006). From 2000 to 2009, Calgary also had the most head offices on a per capita basis, indicating the importance of head offices to the local economy (CED, 2010). In more recent terms, office employment has a 26% share of total employment in Calgary (Lefebvre et al., 2012). It is clear that Calgary’s overall head office cluster is significant on a local and national scale, contributing employment and other benefits to the local economy. However, given the subject of this report, it is worth investigating the

significance of O&G head offices in Calgary. To carry out this investigation, a more recent and well-known dataset was used.

The Globe and Mail's *Report on Business (ROB)* magazine publishes an annual "Top 1000" ranking the 1,000 largest publicly traded companies incorporated in Canada. The companies are ranked based on after-tax profit in the most recent fiscal year, thus December 2011 is the prevailing year-end on the July/August 2012 list used for this exercise. Of the 1,000 companies ranked on the 2012 edition, 210 are in the oil and gas industry². Of these 210 O&G firms, a whopping 169 (80%) are headquartered in Calgary (The Globe and Mail, 2012a). These 169 companies represent roughly 457 billion CAD³ of market capitalization. When compared with the 2011 Toronto Stock Exchange and TSX Venture Exchange overall market capitalization, this equates to approximately 22% of all market capitalization on the two major exchanges in Canada (based on a combined 2011 market capitalization of approx. 2.109 trillion CAD; TMX, 2012). In other words, Calgary-based O&G companies comprise just over one-fifth of the market value in Canada's largest two equity exchanges. Furthermore, the 169 companies generated over 255 billion CAD in revenue in the most recent fiscal year (i.e. 2011) and held just over half a trillion CAD in assets (The Globe and Mail, 2012a). Without even taking private O&G into consideration, these staggering figures further underscore just how economically important O&G is to Calgary, Alberta, and Canada as a whole. Along with its publicly traded companies list, *ROB* magazine releases a yearly list of the top 350 biggest private companies in Canada, which are ranked based on annual revenue. Of the 350 private companies listed, 23 are in the oil and gas industry², of which 13 (57%) are headquartered in Calgary (The Globe and Mail, 2012b). According to the 2012 edition of the list—again based on the most recent year-end—these 13 companies had combined revenue of just over 46 billion CAD. These 182 public and private Calgary-based companies include many O&G juniors; however some big names in the industry appear: Suncor, Imperial Oil, Canadian Natural Resources, and Enbridge are just a sample of the O&G heavyweights that call Calgary home. It is probably safe to say that Calgary will be home to future O&G heavyweights as well, whether they grow organically in the city or migrate from elsewhere.

2.4 Summary

This section presented the study area of the Calgary CMA and its socio-economic conditions. After presenting the historical context of Calgary's role as an energy hub, the state of its head office cluster was discussed with particular attention paid to the O&G industry. With the greater context of Calgary

² Includes oil and gas producers, integrated oils, gas pipelines, field services providers, and gas utility companies.

³ CAD = Canadian dollar(s)

and its head office cluster now summarised, the next section will review the method used to calculate the impact of an O&G firm's head office moving to Calgary.

3.0 METHOD

The following chapter details the methods used to estimate the economic impact of an oil and gas industry firm relocating its corporate headquarters to Calgary, AB. Two methods were used, both of which are economic multiplier calculations. Each multiplier is examined in turn and the underlying assumptions are presented along with the method of data collection. The method of this report largely follows the approach taken by Brian Bell in his 1996 report (Bell, 1996), which was built on techniques that have been developed by the literature since at least 1921 (Lane, 1966) and heavily used since that time as well. The two primary aspects of the method are the calculation of the economic base multiplier and the H.C. Davis income multiplier model (as described in Davis, 1976).

The key precedent for this research is the 1996 Master of Planning report of SURP graduate Brian Bell, entitled “Regional Economic Base Analysis – Sudbury” (Bell, 1996). The present research will apply a similar research method to Bell’s, however whereas the latter focused on the effect of the mining industry’s expansion in Sudbury, the present research will focus on O&G head office expansion in Calgary. There is a significant body of literature on various types of economic multipliers and how they are used (Lane, 1966; Gibson & Worden, 1981; McNicoll, 1981; Richardson, 1985) as well as empirical studies similar to Bell’s Sudbury case (Greig, 1971; Yannopoulos, 1973; Davis, 1976; Davis, 1986;).

While at least one example exists of a very similar research topic (i.e. economic impact of office relocation), the method used is not easily replicable (Yannopoulos, 1973). Yannopoulos’ (1973) approach is similar to that of the H.C. Davis model in that it is a local application of the Keynesian income multiplier; however, it differs crucially in that the data was collected via mail surveys as opposed to publicly available information. Given this approach is therefore both cost- and time-prohibitive, Yannopoulos’ approach is not followed, although it is still useful for other insights.

3.1 Economic Base Multiplier

3.1.1 Multiplier, Assumptions and Equations

The economic base multiplier using location quotients (LQs) is one of the most discussed urban base multiplier methods in the literature and has remained popular among researchers and practitioners throughout the last 50 years (Isserman, 1977a; Mulligan, 2008). The economic base multiplier is calculated by dividing an economy into the basic sector and the non-basic sector (Isserman, 1977a; see

Equation 1). Basic sector industries are those that produce for external markets, thus driving the export base. Non-basic sector industries are those that chiefly serve the local economy and tend to be net importers as well. In effect, the rationale of the economic base multiplier follows North's classic re-interpretation of the theory of economic growth in that the growth of a region is inextricably linked to the success of its export base and the resulting residentiary (non-basic) development (North, 1955). Therefore, an increase in basic sector income or employment will cause some increase in non-basic sector income or employment. This increase is estimated using the economic base multiplier (see Equation 2). For example with an economic base multiplier of 4, for every 10 basic sector jobs created, a total of 40 jobs will be created (10 basic sector, 30 non-basic sector).

Equation (1)

$$Y_r = N_r + B_r$$

Where:

Y_r = Total employment in the region

N_r = Non-basic employment in the region

B_r = Basic employment in the region

Equation (2)

$$Y_r = pB_r$$

Where:

Y_r = Total employment in the region

p = Proportion of non-basic to basic employment (or the multiplier)

B_r = Basic employment in the region

Perhaps the most accurate way of allocating industries and firms between basic and non-basic sectors is by conducting an area-wide survey (McLean & Voytek, 1992), however this method is extraordinarily resource-intensive and highly impractical for an economy as large as Calgary. The location quotient (LQ) method offers a relatively simple way of determining the basic and non-basic sectors (see Equation 3). In this case, employment is used as the unit of measurement. Industries with a LQ below one are considered non-basic, while those with LQs above one are considered basic (Isserman, 1977a). The LQ is the ratio of an industry's share of employment in the local region to that same industry's share of employment in some larger economy (Isserman, 1977a). In this case, LQs were computed using both Alberta and Canada as the larger economy. Both multiplier iterations will be presented in Chapter 4. As

will be discussed below, the tendency for the LQ method to inflate the multiplier meant it was prudent to use the resulting multiplier calculated using Canada as the larger economy. Furthermore, given the assumption that the larger economy's net exports are equal to zero and barring a supranational dataset, Canada remains the best economy to use with available data (Isserman, 1977b). Beyond this assumption, there are three other important assumptions of this method. First, since employment is considered equal to production, the productivity of employment in region must be equal to that of the larger economy (in this case, national). Second, for the region's share of national employment to equal its share of consumption as well, consumption per employee must be equal for industry *i* in both the region and nation. Finally, if this relationship between production and consumption is to remain true, it must be assumed that export products that are produced locally are also consumed locally. In other words, the region is not importing products that it also exports as part of its basic sector (known as cross-hauling; Isserman, 1977a). Despite these relatively untenable assumptions, the economic base multiplier using the location quotient method is still a valid approach to estimation and is useful as an 'upper bound' estimate, as will be discussed below.

Equation (3)

$$LQ_i = (E_{ir} / E_{tr}) / (E_{in} / E_{tn})$$

Where:

E_{ir} = Regional employment in industry *i*

E_{tr} = Total regional employment

E_{in} = National or provincial employment in industry *i*

E_{tn} = Total national or provincial employment

If an industry is non-basic ($LQ < 1$), its entire employment is considered non-basic. If an industry is basic ($LQ > 1$), some level of non-basic employment is necessary to fulfill local needs; therefore, the LQ is used to determine the degree of specialization in the basic industry (Leigh, 1970). In other words, the greater the LQ, the lower non-basic employment will be relative to basic employment in that industry (see Equation 4 and 5).

Equation (4) and (5)

Industries with $LQ < 1$

$$N_{ir} = T_{ir}$$

$$B_{ir} = 0$$

Industries with $LQ > 1$

$$N_{ir} = T_{ir} / LQ_i$$

$$B_{ir} = N_{ir} (LQ_i - 1)$$

Where:

N_{ir} = Non-basic employment in industry i in region r

T_{ir} = Total employment in industry i in region r

B_{ir} = Basic employment in industry i in region r

LQ_i = Location quotient of industry i

Once all basic and non-basic employment has been allocated based on LQs, the economic base multiplier can be solved for as stipulated in Equation 2.

3.1.2 Data Collection

The most readily available and highest quality data for this sort of analysis is available through the *2006 Census of Population* as provided by Statistics Canada (Statistics Canada, 2008c, 2008d, 2008e). The dataset contained labour force (employment) breakdowns by industry following the North American Industry Classification System (NAISC) 2002 based on 20% sample data. Data for Calgary (CMA), the province of Alberta, and Canada were used to calculate LQs and the resulting multiplier. This dataset contained NAISC codes up to four digits long, which were used where available as opposed to the more used two- and three-digit NAISC codes, as these provide a greater level of disaggregation. Isserman argues that a common issue with location quotient approaches is its effect on product-mix (Isserman, 1977a). By breaking down the data to more specific sub-industries, the diluting effects of grouping a wide range of industrial products or services together are diminished. Tables outlining the NAISC codes can be found in Appendix 7.0.

3.1.3 Shortcomings of Method

While the economic base multiplier is a common and relatively expeditious way of estimating an economic impact, it is not without its shortcomings. First, this method implicitly assumes that the local economy is in equilibrium at the time the two sectors (basic and non-basic) are defined on an industry-by-industry basis (Davis, 1990). That is, if the local economy were in a period of adjustment or reaching a previously unattained high point in its overall production-possibilities frontier, the resulting basic and

non-basic divisions would be misrepresentative of what the economy would typically comprise. In this sense, the economic base multiplier is a short-run method (Lane, 1966; Isserman, 1977a). Another pitfall of the economic base model as a whole is the reliance on employment as the unit of measurement (Davis, 1990). Although employment figures are more readily available and conveniently packaged for analysis than alternatives (e.g. income, production or sales data), employment is unable to account for changes in productivity. For instance, if an industry were to undergo a period of intense capital investment (i.e. substituting labour for capital), thereby increasing productivity, the employment figures may lead one to believe the industry is no longer basic. On the topic of employment, separating out the basic and non-basic employment brings its own difficulties. This report focuses on the location quotient method, which is preferable given the availability and accuracy of data (versus the minimum requirements method), cost-effectiveness (versus the survey method), and the experience of the researcher (versus personal judgment). Nevertheless, using location quotients presents some inadequacies beyond its somewhat weak aforesaid assumptions. The most consistently noted shortcoming of the location quotient method is its tendency to underestimate basic sector employment, which results in an inflated multiplier—the smaller is basic employment, the denominator, the greater is the multiplier (Leigh, 1970; Gibson & Worden, 1981; Richardson, 1985; Davis, 1990). It is not surprising then that some suggest the LQ method is best used as an ‘upper bound’ estimate of the economic base multiplier (Isserman, 1977b; Richardson, 1985). While underestimating basic employment is a recurring issue, certain industries are prone to be counted as basic employment (i.e. $LQ_i > 1$) when perhaps they should not be counted as such (Klosterman & Xie, 1993). Two examples are the construction and real estate industries. A LQ greater than one for either of these industries may indicate a variety of scenarios. On the one hand, property is not regularly exported per se and construction could not be serving non-local demand, the local region may just be experiencing rapid growth. On the other hand, the region could be a service and investment centre serving the broader region or nation, thus exporting its services and knowledge elsewhere. In the case of Calgary, either could be true and it is likely some combination of the two. As such, an argument can be made for several industries as fitting or not fitting the requirements of a basic sector. Again, this highlights the LQ method’s use as an upper bound estimate and using Canada as the highest total economy as opposed to Alberta. Finally, the economic base multiplier, regardless of approach, fails to capture flows that constitute a significant part of a local economy. Investment, pension, and unemployment insurance income are not factored into the economic base multiplier, which led researchers and practitioners to experiment with income

multipliers (Forward, 1990). One such multiplier, the H.C. Davis income multiplier, will be explored in the next section.

3.2 H.C. Davis Income Multiplier

3.2.1 Multiplier, Assumptions and Equations

The H.C. Davis income multiplier model, used by Bell (1996), Reid et al. (1992) and Davis himself (1976), is a regional income multiplier. The multiplier can be applied to a local economy and is based on Keynesian regional income multiplier literature (Brownrigg, 1971; Davis, 1976). Davis' income multiplier attempts to estimate direct, indirect, and induced income generated by a new enterprise in a region (Davis, 1976). Direct activity is generated by the new enterprise itself, while indirect activity is the increase in activity generated by other enterprises selling inputs to or purchasing outputs from the new enterprise (Davis, 1976). Induced activity is the resulting consumption spending from the increased income of those employed in the direct and indirectly affected enterprises (Davis, 1976). Thus, the total impact is the sum of the direct, indirect, and induced impacts created as a result of the new enterprise's activity in the local economy (see Equation 6).

Equation (6)

$$T = A + B + C$$

Where:

T = Total Impact

A = Direct Impact

B = Indirect Impact

C = Induced Impact

The Davis income multiplier has certain advantages that specifically overcome deficiencies of the economic base model. First, income as a unit of measurement is much more sensitive indicator of change than employment. Assuming an increase in productivity leads to higher wages, an increase in productivity will be sufficiently captured by income where it may not be evident by looking at employment (Davis, 1976). Second, since the unit of measurement is income, this model is indifferent to the source of income, which allows for the consideration of non-employment sources such as pension, investment, and unemployment insurance income (Davis, 1976; Forward, 1990). Finally, whereas the base model is predicated on the enterprise in question being part of the base sector and

notwithstanding the possible error in location quotients to begin with, the income model can be applied to an enterprise in any area of the local economy (Davis, 1976).

The Davis income multiplier (K) comprises five factors and is based on the national accounts' definition of income. The first factor is C , consumption of local goods and services. It is assumed C varies linearly with disposable income (Davis, 1976; see Equation 7).

Equation (7)

$$C = c_0 + c_1Y(1 - t_n - t_l)$$

Where:

C = Consumption

c_0 = Constant

c_1 = Marginal propensity of local population to consume locally supplied goods and services

Y = Income

t_n = Non-local tax rate

t_l = Local tax rate

The second factor is imports (M). Imports are considered to be a function of the levels of local consumption (C) and government spending (G) (Davis, 1976; see Equation 8).

Equation (8)

$$M = m_cC + m_gG$$

Where:

M = Imports

m_c = Marginal propensity of the local goods and services sector to import

C = Consumption

m_g = Marginal propensity of local government to import

G = Local government spending

The third factor is local government spending (G), which is assumed to have a functional relationship with government revenues. These revenues include those raised from property taxes, business taxes, and transfers from senior governments (R) (Davis, 1976; see Equation 9).

Equation (9)

$$G = t_l Y + t_b C + R$$

Where:

G = Local government spending

t_l = Local tax rate

Y = Income

t_b = Local business tax rate

C = Consumption

R = Transfers from senior governments

The fourth factor is transfers from senior (i.e. provincial and federal) governments (R). Transfer funds are assumed to have some proportionate relationship with population (P) such that an increase in population will cause a concomitant increase in R (Davis, 1976; see Equation 10). While neither federal nor Alberta's provincial grants or transfers are done on a strictly per capita basis, it is safe to assume there is some relationship between the size of a municipality and the amount of transfers it receives from above (Alberta Municipal Affairs, 2012).

Equation (10)

$$R = rP$$

Where:

R = Transfers from senior governments

r = Provincial and federal grant dollars per capita

P = Population

The fifth and final factor is population (P). Any new enterprise will inevitably cause an increase in population at some or multiple points along the direct-indirect-induced chain of activities. It is therefore assumed that P varies in a positive and linear fashion with income (Y) (Davis, 1976; see Equation 11).

Equation (11)

$$P = p_0 + p_1Y$$

Where:

P = Population

p_0 = Constant

p_1 = Marginal propensity for local population to increase with local income

Y = Income

Equations 7 through 11 can then be boiled down to the Davis income multiplier, K (see Equation 12). This multiplier differs from other income multipliers in its inclusion of the local government's fiscal operations, a more detailed breakdown of consumption, and more directly accounting for import leakages (Davis, 1976).

Equation (12)

$$K = \frac{1}{1 - c_1[1 + t_b(1 - m_g) - m_c] (1 - t_n - t_l) - (t_l + rp_1)(1 - m_g)}$$

Where:

c_1 = Marginal propensity of local population to consume locally supplied goods and services

t_b = Local business tax rate

m_g = Marginal propensity of local government to consume locally supplied goods and services

m_c = Marginal propensity of the local goods and services sector to import

t_n = Non-local tax rate (i.e. federal and provincial)

t_l = Local tax rate

r = Provincial and federal grant dollars per capita

p_1 = Marginal propensity for local population to increase with local income

3.2.2 Data Collection

Inputs for the Davis income multiplier were collected from a variety of sources and will be explained in detail in Chapter 4.

3.2.3 Shortcomings of Method

Although the Davis income multiplier has an arguably stronger conceptual grounding in established economic theory than the economic base model, it is not without its own challenges. First and foremost pertains to data collection. With eight inputs (as seen in Equation 12), many of which are themselves a formula based on other inputs, the Davis multiplier is sensitive to the compounded effect of any error in each input. Drawing data of varying quality from many different sources increases the risk of the multiplier being distorted. For this reason, Greig suggested using multiple estimates or different techniques (Greig, 1971). For this reason, sensitivity analysis is carried out for the Davis income multiplier in Chapter 4, which provides a range of multipliers based on different error scenarios. Another principal difficulty with this method is the persistent use of marginal propensities. While marginal is perhaps more accurate, average propensities were used instead as they are both more easily calculated and, in some cases, have been found to balance out the general over-estimation of the multiplier (marginal propensities will tend to be higher than average propensities, thus by subtracting a smaller factor in the denominator the multiplier will be lower; Greig, 1971). In spite of these shortcomings, McNicoll found that income multipliers like Davis' tend to produce closer approximations to benchmark estimations of the multiplier (as defined by more complex input-output models) than economic base models (McNicoll, 1981).

3.3 Summary

The present chapter discussed the method used for this analysis. While no directly similar precedents exist for this research, the method is sound and based upon decades of theory and practice. The next chapter will discuss the results of the analysis as well as the inputs used in and results of the Equations 2, 3, 4, 5, and 12.

4.0 RESULTS

The present chapter details the results of the multiplier calculations and provides an economic impact estimate based on these calculations. The economic base multiplier calculation is first explained and the results are presented. The calculation and results of the H.C. Davis income multiplier are then revealed, followed by the results of sensitivity analysis that was performed based on the inputs used for the income multiplier calculation. Finally, both sets of multiplier results are applied to the hypothetical scenario of an oil and gas (O&G) industry firm moving its head office to Calgary. The results of this calculation provide an estimate of the economic impact of a hypothetical head office relocation.

4.1 Economic Base Multiplier Results

In order to determine the economic base and resulting multiplier for Calgary, the theoretically complete economy⁴ of the Calgary CMA had to be divided between basic and non-basic industries. This was done using the location quotient method as outlined in Section 3.1.1. Figure 11 shows the resulting location quotients that signify a concentration of employment in the Calgary CMA as compared to Canada as a whole (i.e. those with a location quotient greater than one). The results are presented by industry (NAISC) and sub-industry and the basic and non-basic employment by industry and sub-industry are enumerated. As discussed in Section 3.1.2, NAISC codes up to four digits were used in the data analysis, however in the interest of concision, these four-digit codes were summed to create new three-digit 'parent' codes.⁵ It is for this reason the tables below feature only up to three-digit NAISC codes, when in reality the results are based on more disaggregated data (i.e. four-digit codes).

⁴ It is well known and acknowledged by Statistics Canada that not every operation, transaction, company or individual can be recorded with the same level of scrutiny and control (Statistics Canada, 2013a).

⁵ With disaggregation to four-digit codes, more than 400 sub-industries are present. The discrepancies that exist between each level (or digit) of codes are explained by the process through which employment is categorized. For example, if one were to record a generic kind of employment within a larger industry, it would likely be assigned to a more aggregated code (i.e. fewer digits such as a two-digit industry). This discrepancy could be then be the result of response errors, processing errors or sampling errors (see Statistics Canada, 2013b).

Figure 11 – Calgary CMA Industries where LQ > 1

NAISC	Industry	Y _{Calgary}	Y _{Canada}	LQ _i	B _r	N _r
21	Mining and oil and gas extraction	42,390	238,810	4.62	33,218	9,172
211	Oil and gas extraction	27,455	72,465	9.86	24,672	2,783
213	Support activities for mining and oil and gas extraction	14,295	103,510	3.60	10,320	3,975
22	Utilities	6,625	132,950	1.30	1,519	5,106
221	Utilities	6,630	132,950	1.30	1,524	5,106
23	Construction	53,670	1,069,095	1.31	12,611	41,059
236	Construction of buildings	19,510	375,725	1.35	5,080	14,430
237	Heavy and civil engineering construction	5,510	115,515	1.24	1,074	4,436
238	Specialty trade contractors	28,645	577,855	1.29	6,452	22,193
324	Petroleum and coal products manufacturing	1,200	14,810	2.11	631	569
325	Chemical manufacturing	2,365	92,260	1.04	83	2,362
326	Plastics and rubber products manufacturing	1,965	125,340	1.10	517	5,033
327	Non-metallic mineral product manufacturing	2,445	61,495	1.01	29	3,446
331	Primary metal manufacturing	1,475	84,250	1.05	204	4,246
41	Wholesale trade	31,445	739,305	1.11	3,051	28,394
412	Petroleum product wholesaler-distributors	2,345	15,315	3.99	1,757	588
413	Food, beverage and tobacco wholesaler-distributors	4,355	111,530	1.02	72	4,283
416	Building material and supplies wholesaler-distributors	5,510	110,780	1.30	1,255	4,255
417	Machinery, equipment and supplies wholesaler-distributors	9,645	200,790	1.25	1,934	7,711
419	Wholesale agents and brokers	1,310	34,025	1.00	3	1,307
442	Furniture and home furnishings stores	3,260	79,920	1.06	191	3,069
443	Electronics and appliance stores	3,350	73,055	1.19	544	2,806
448	Clothing and clothing accessories stores	8,280	210,335	1.02	202	8,078
451	Sporting goods, hobby, book and music stores	4,340	89,315	1.27	910	3,430
48	Transportation and warehousing	37,235	820,195	1.18	5,735	31,500
481	Air transportation	6,300	62,320	2.63	3,907	2,393
482	Rail transportation	2,785	35,850	2.02	1,408	1,377
485	Transit and ground passenger transportation	5,925	144,675	1.07	369	5,556
486	Pipeline transportation	1,590	4,335	9.55	1,424	166

Y = Total Employment, LQ = Location Quotient, B = Basic Employment, N = Non-Basic Employment
 Light Grey = Two-digit aggregate industries, Dark Grey = Industries directly related to O&G

NAISC	Industry	Y _{Calgary}	Y _{Canada}	LQ _i	B _r	N _r
492	Couriers and messengers	3,020	62,580	1.26	617	2,403
493	Warehousing and storage	2,580	34,200	1.96	1,267	1,313
51	Information and cultural industries	17,360	417,325	1.08	1,332	16,028
516	Internet publishing and broadcasting	105	1,800	1.52	36	69
517	Telecommunications	8,170	138,610	1.53	2,847	5,323
518	Internet service providers, web search portals, and data processing services	1,390	19,455	1.86	643	747
523	Securities, commodity contracts, and other financial investment and related activities	6,000	123,505	1.26	1,257	4,743
526	Funds and other financial vehicles	255	6,040	1.10	23	232
53	Real estate and rental and leasing	14,665	303,510	1.26	3,008	11,657
531	Real estate	11,030	224,915	1.28	2,392	8,638
532	Rental and leasing services	3,500	76,395	1.19	566	2,934
533	Lessors of non-financial intangible assets (except copyrighted works)	135	2,200	1.60	51	84
54	Professional, scientific and technical services	75,815	1,122,445	1.76	32,707	43,108
55	Management of companies and enterprises	1,375	20,530	1.74	587	788
562	Waste management and remediation services	1,575	36,880	1.11	159	1,416
621	Ambulatory health care services	20,295	480,440	1.10	1,843	18,452
71	Arts, entertainment and recreation	14,455	346,315	1.09	1,155	13,300
711	Performing arts, spectator sports and related industries	5,260	106,335	1.29	1,176	4,084
713	Amusement, gambling and recreation industries	8,325	210,800	1.03	229	8,096
722	Food services and drinking places	36,685	919,185	1.04	1,383	35,302
812	Personal and laundry services	9,090	233,565	1.01	120	8,970
814	Private households	3,545	77,030	1.20	587	2,958

Y = Total Employment, LQ = Location Quotient, B = Basic Employment, N = Non-Basic Employment

Light Grey = Two-digit aggregate industries, Dark Grey = Industries directly related to O&G

Source: Statistics Canada, 2008c; 2008e.

It is important to note Figure 11 shows all of the basic employment in the Calgary economy, but not all the non-basic employment, as those industries with LQs less than 1.00 comprise entirely non-basic employment. Given these caveats, a number of important insights into Calgary's economy can be made based on the LQs in Figure 11. First, Calgary has a relative concentration of several aggregate industry classifications, notable by their two-digit codes. These two-digit classifications have been highlighted in light grey in Figure 11. Interestingly enough, these classifications are well aligned not only with the industries for which Calgary is known (i.e. O&G and mining, utilities, transportation, professional services, management functions), but many of the industries for which Calgary wants to be known make the list, such as information and cultural industries, and arts, entertainment, and recreation (CED, 2008). This suggests both that the LQ method is at least accurate at the most aggregate level and there is some numerical support for Calgary's economic development plans (CED, 2008). A few two-digit classifications appear to fall in neither category; they are not known as staple Calgary industries nor are they promoted as areas of focus by Calgary Economic Development. These include construction, real estate, warehousing, and wholesaling industries. As discussed in Section 3.1.3, basic employment in construction and real estate tends to be difficult to accurately allocate as these industries are greatly accelerated by boom periods. In the case of Calgary and based on the Census' timing (2005-2006), this hypothesis explains part of the larger LQs as Calgary was one year deep into a three-year run of well above average construction and property transaction activity prior to the 2008 financial crisis (urbanMetrics, 2006; Lefebvre et al., 2012). Warehousing and wholesaling, on the other hand, are likely most explained by the dominance of O&G-related industries within their classifications (e.g. petroleum product wholesaling). As such, disaggregating provides further insight into the higher LQs.

To highlight the relative importance of the O&G industry and related industries, such industries are marked in Figure 11 with dark grey. These industries include extraction, wholesaling, manufacturing, transportation (pipelines), and related support activities of the O&G value chain. The three-digit classification of oil and gas extraction has the highest LQ at 9.86, while second place is taken by pipeline transportation at 9.55. The LQs for these industries indicate a concentration in Calgary nearly ten times greater than the elsewhere in the wider region (Canada). In other words, Calgary is highly specialised in the businesses of O&G extraction and pipeline transportation. Beyond these specialties, three other O&G related classifications are found in the seven classifications with LQs greater than 2.00: Support activities for mining and oil and gas extraction, petroleum and coal products manufacturing, and petroleum product wholesaler-distributors. The two remaining classifications in the top seven (LQ > 2.00) are air transportation and rail transportation. While somewhat related to O&G, their higher LQs

can also be in part explained by the fact that Westjet and Canadian Pacific Railway are headquartered in Calgary and have significant employment there as a result (The Globe and Mail, 2012a), and Calgary is certainly a Western Canada transportation hub.

Though these specific location quotients are helpful in gaining a greater understanding and confirm many assumptions regarding the composition of the Calgary economy, all classifications with location quotients greater than 1.00 factor into the multiplier calculation. Figure 12 shows the results of the economic base method in terms of total employment and the division between basic and non-basic employment.

Figure 12 – Total Employment, Basic and Non-Basic Employment

Y_{Calgary}	Y_{Canada}	B_{Calgary}	N_{Calgary}
658,510	17,146,130	113,046	545,444

Y = Total Employment, B = Total Basic Employment, N = Total Non-Basic Employment
Source: Statistics Canada, 2008c; 2008e.

Recall that total employment is the sum of basic and non-basic employment, as expressed in Equation 1 from Section 3.1.1:

$$Y_r = N_r + B_r$$

The difference between the total in the first column (658,510) and the sum of the third and fourth columns (113,046 + 545,444) of 20 units of employment (jobs) is due to rounding in the calculation and the aforementioned discrepancies caused by disaggregation. Given these employment figures, the resulting multiplier is a simple calculation. In this case, Equation 2 provides the answer:

$$Y_r = pB_r$$

Using the numbers from Figure 11, p is solved for and rounds to 5.83. Therefore, when basic employment increases by 1, non-basic employment increases by 4.83. This can be more clearly understood when Equation 2 is substituted into Equation 1 and one solves for N_r :

Equation (13)

$$N_r = pB_r - B_r$$

Where:

- N_r = Non-basic employment in the region
- p = Proportion of non-basic to basic employment (or the multiplier)
- B_r = Basic employment in the region

Following the same method, the economic base multiplier was also calculated using Alberta as the larger region. As expected, the resulting multiplier was significantly higher, rounding to 8.26. This translates to more than two extra units of non-basic employment for every single unit of basic employment. Evidently the Canada region multiplier is a more modest upper bound multiplier estimate for calculating economic impact. This calculation will be presented in Section 4.3 along with the similar calculation using the result of the H.C. Davis income multiplier to be discussed in the next section.

4.2 H.C. Davis Income Multiplier Results

In contrast to the economic base multiplier, the H.C. Davis income multiplier is a more complex calculation due to the variety of specific inputs, many of which are not simply laid out in a digestible form as is census data. As mentioned in Section 3.2.3, because of the number of inputs and calculations within the overall multiplier calculation, this income multiplier is sensitive to the compounded effect of any error in each input. This will be explored further through sensitivity analysis in Section 4.2.1. Another difficulty with the income multiplier caused by the varied inputs is a temporal one. Every effort was made to use data from the 2005 to 2006 period for more meaningful comparison with the economic base model. This was not always possible and some dollar figures were deflated back to 2005 dollars. Despite these methodological shortcomings, the income multiplier generally offers a closer approximation than economic base models and is useful for comparison with the latter (McNicoll, 1981). This section will detail the calculation of the H.C. Davis income multiplier by breaking down each input into its parts.

Given its size, it would be prudent to recall the multiplier equation (Equation 12) from Section 3.2.1:

$$K = \frac{1}{1 - c_1[1 + t_b(1 - m_g) - m_c] (1 - t_n - t_i) - (t_i + rp_1)(1 - m_g)}$$

Where:

c_1 = Marginal propensity of local population to consume locally supplied goods and services

t_b = Local business tax rate

m_g = Marginal propensity of local government to consume locally supplied goods and services

m_c = Marginal propensity of the local goods and services sector to import

t_n = Non-local tax rate (i.e. federal and provincial)

t_i = Local tax rate

r = Provincial and federal grant dollars per capita

p_1 = Marginal propensity for local population to increase with local income

c_1 was determined as the income residual of non-local expenditures, the savings rate, the local tax rate and the non-local tax rate (Davis, 1976). Using the 2005 Survey of Household Spending for the Calgary CMA and 2006 Census data for median household income in Calgary, non-local expenditures were determined to be 5.00% of income and the non-local (i.e. federal and provincial combined) tax rate was found to be 20.79% of income (Statistics Canada, 2006a; 2008c). For the local tax rate, the average value of dwellings in Calgary was taken from the 2006 Census data (Statistics Canada, 2008c). Using the 2005 residential property tax rate and the median household income for Calgary, the local tax rate was found to be 2.21% of income (Statistics Canada, 2008c; City of Calgary, 2012a). Finally, sector accounts data from 2005 was used to determine the savings rate (Statistics Canada, 2006b). As this was quarterly data, the four quarters were averaged, yielding a savings rate of 2.13%. This leaves an income residual (c_1) of 0.699.

t_b is simply Calgary's local business tax rate in 2005, found on the City of Calgary website. t_b is therefore 0.088 (City of Calgary, 2012b).

m_g was determined based on information regarding City of Calgary expenditures as reported in their 2006 Annual Report (City of Calgary, 2012c). m_g is typically found as the multiplier (or percentage) of total expenditures directed to debt servicing and non-local capital expenditures (Davis, 1976). In 2005, debt servicing accounted for 7.50% of total expenditures. Therefore, of the remaining 92.50% of expenditures, how much was going to imported goods and services? This was estimated to be a third of remaining expenditures, or roughly 30% of all expenditures, based on estimates used elsewhere (Davis, 1976; Reid et al., 1992; Bell, 1996; Siegfried & Zimbalist, 2000). In general, the larger the economic centre the smaller m_g (Davis, 1976). These two components yield an m_g of approximately 0.379.

Much like m_g , m_c tends to be smaller the larger the local economy (Davis, 1976). Since the data needed for a more accurate estimate of m_c require a resource-intensive survey method, an estimate based on figures used elsewhere was made (Davis, 1976; Reid et al., 1992; Bell, 1996). Therefore, m_c is estimated at 0.5.

t_n and t_l are both intermediary inputs for the calculation of c_1 . As previously mentioned, the non-local tax rate (t_n) was found to be 20.79% while the local tax rate (t_l) was estimated at 2.21% of income.

rp_1 is the product of provincial and federal grant dollars per capita and the marginal propensity for the local population to increase with local income. Figures for provincial and federal grant dollars to Calgary were found in the City of Calgary's 2006 Annual Report and applied to the 2006 Census population estimate for Calgary CMA. The propensity for population to increase with income was determined as the ratio between population and employment, both drawn for the 2006 Census. These inputs yield an rp_1 estimate of 0.018.

Putting all the inputs together produces an income multiplier estimate (K_o) of approximately 1.477. Section 4.3 will outline what this multiplier translates to in terms of economic impact. The next section will discuss the effects of input errors on the multiplier via sensitivity analysis.

4.2.1 Sensitivity Analysis

While many of the inputs into the H.C. Davis income multiplier are reliable and drawn from primary sources, others are estimates that could range anywhere on a spectrum from spurious to accurate. Every effort was made to make appropriate estimations and record the rationale behind them; however it is important to note that some amount of error is not only likely but expected. Drawing from Reid et al.'s (1992) example, sensitivity analysis was conducted to illustrate what effects error in each input would have on the multiplier as a whole. Figures 13 to 16 each illustrate the effects of an error in each input on the income multiplier. Figures 13 and 14 demonstrate the effects of a 10% over- and underestimation, while Figures 15 and 16 demonstrate a 20% over- and under-estimation. In Figures 13 to 16, the entries in bold represent the inputs that have been increased or decreased by 10% or 20%. For each new multiplier calculation, the remaining (non-bold) inputs are held at their original estimate. Figure 17 provides a summary table identifying the range of estimates caused by each over- and underestimation pairing and their deviation from K_o (=1.477).

Figure 13 – Sensitivity Analysis (10% Underestimation)

	c₁	t_b	m_g	m_c	t_n	t_i	rp₁
c₁	0.629	0.699	0.699	0.699	0.699	0.699	0.699
t_b	0.088	0.079	0.088	0.088	0.088	0.088	0.088
m_g	0.379	0.379	0.341	0.379	0.379	0.379	0.379
m_c	0.500	0.500	0.500	0.450	0.500	0.500	0.500
t_n	0.208	0.208	0.208	0.208	0.187	0.208	0.208
t_i	0.022	0.022	0.022	0.022	0.022	0.020	0.022
rp₁	0.018	0.018	0.018	0.018	0.018	0.018	0.016
K	1.415	1.471	1.485	1.539	1.495	1.476	1.475

Figure 14 - Sensitivity Analysis (10% Overestimation)

	c₁	t_b	m_g	m_c	t_n	t_i	rp₁
c₁	0.769	0.699	0.699	0.699	0.699	0.699	0.699
t_b	0.088	0.096	0.088	0.088	0.088	0.088	0.088
m_g	0.379	0.379	0.416	0.379	0.379	0.379	0.379
m_c	0.500	0.500	0.500	0.550	0.500	0.500	0.500
t_n	0.208	0.208	0.208	0.208	0.229	0.208	0.208
t_i	0.022	0.022	0.022	0.022	0.022	0.024	0.022
rp₁	0.018	0.018	0.018	0.018	0.018	0.018	0.020
K	1.546	1.484	1.470	1.421	1.460	1.479	1.480

Figure 15- Sensitivity Analysis (20% Underestimation)

	c₁	t_b	m_g	m_c	t_n	t_l	rp₁
c₁	0.559	0.699	0.699	0.699	0.699	0.699	0.699
t_b	0.088	0.070	0.088	0.088	0.088	0.088	0.088
m_g	0.379	0.379	0.303	0.379	0.379	0.379	0.379
m_c	0.500	0.500	0.500	0.400	0.500	0.500	0.500
t_n	0.208	0.208	0.208	0.208	0.166	0.208	0.208
t_l	0.022	0.022	0.022	0.022	0.022	0.018	0.022
rp₁	0.018	0.018	0.018	0.018	0.018	0.018	0.014
K	1.358	1.465	1.492	1.605	1.514	1.475	1.473

Figure 16 - Sensitivity Analysis (20% Overestimation)

	c₁	t_b	m_g	m_c	t_n	t_l	rp₁
c₁	0.838	0.699	0.699	0.699	0.699	0.699	0.699
t_b	0.088	0.105	0.088	0.088	0.088	0.088	0.088
m_g	0.379	0.379	0.454	0.379	0.379	0.379	0.379
m_c	0.500	0.500	0.500	0.600	0.500	0.500	0.500
t_n	0.208	0.208	0.208	0.208	0.250	0.208	0.208
t_l	0.022	0.022	0.022	0.022	0.022	0.026	0.022
rp₁	0.018	0.018	0.018	0.018	0.018	0.018	0.022
K	1.620	1.490	1.463	1.369	1.443	1.480	1.482

Figure 17 – Sensitivity Analysis Summary Table

		c_1	t_b	m_g	m_c	t_n	t_i	rp_1
+/- 10%	Range	0.130	0.013	0.014	0.118	0.035	0.002	0.005
	Deviation from K_o (+)	0.068	0.006	-0.007	-0.056	-0.017	0.001	0.002
	Deviation from K_o (-)	-0.062	-0.006	0.007	0.061	0.018	-0.001	-0.002
+/- 20%	Range	0.263	0.026	0.029	0.237	0.082	0.005	0.010
	Deviation from K_o (+)	0.143	0.013	-0.014	-0.109	-0.034	0.002	0.005
	Deviation from K_o (-)	-0.120	-0.013	0.015	0.128	0.036	-0.002	-0.005

While these new multiplier estimates are not reflective of what effect some amount of error in all inputs simultaneously would have on the multiplier, important insights can be made as to how each input affects the multiplier. Of the seven inputs, three inputs (c_1 , m_c , and t_n) have an effect that does not vary linearly. In other words, an overestimation of 20% does not affect the multiplier twice as much as an overestimation of 10%. In the case of c_1 , an overestimation has a greater effect than an underestimation of the same magnitude. m_c and t_n are the inverse; an underestimation has a greater effect than an overestimation of the same magnitude. This non-linearity is simply a function of the multiplier equation. Nevertheless, it is helpful to the researcher—especially when some inputs require a degree of subjectivity—to know when it is better to err on the side of overestimation as opposed to underestimation, or vice versa.

In terms of relative influence on the multiplier, the inputs order as follows (from greatest effect to least effect): c_1 , m_c , t_n , m_g , t_b , rp_1 , and t_i . Judging by the ‘Range’ results from Figure 17, the inputs c_1 and m_c have a significantly greater effect on the multiplier than the other five inputs. One final and important set of insights can be made with particular pertinence to policymakers when the magnitude and sign (+/-) of effects are considered. First, increasing local consumption and mitigating importing by the local goods and services sectors have the greatest effect in increasing economic impact (i.e. the multiplier). Another way of looking at increasing consumption, given it is an income residual, is to decrease the savings rate, non-local expenditures by households, and the local and non-local tax rates. Obviously decreasing one or several of these rates would have its own spin-off effects, but it is worth noting. For example, decreasing the non-local tax rate will increase the multiplier, but what social or environmental impacts would it have? Again, this multiplier strictly considers the income effects, one piece of a complex puzzle. Interestingly, both the local business tax and the local tax rate vary positively with the multiplier. This is undoubtedly an effect of their position in the calculation; a conscious decision given

this is a Keynesian multiplier that values the local government's ability to induce economic activity (Richardson, 1985). From a policy perspective however, raising tax rates seems like the path of most resistance. The ability of the local government to secure federal and provincial grant dollars as well as reducing its need to import are two key aspects over which the local government has some control and are likely more suitable alternatives to tax hikes. Further, tweaking these elements would not likely cause the same degree of unacceptable spin-off effects as tweaks to the tax system could potentially cause. The final section in this chapter will translate the two multipliers into potential economic impacts based on a hypothetical relocation scenario.

4.3 Economic Impact

With the multipliers now at hand, the final step is to apply the multipliers to the research question: What is the economic impact of an oil and gas firm's head office relocation to Calgary?

For the economic base multiplier, the first step was to determine a suitable size of the average head office. Drawing from Brown & Beckstead's (2006) head office employment figures for Canada in 2005, the average employment at a head office unit in Canada was found to be 50 employees. Though the average across all types (industries) of head offices in Canada is perhaps not representative of the O&G industry, no figures exist for the O&G industry's head offices specifically. Furthermore, this figure assumes all employment will be relocation employment, which is perhaps unrealistic as presumably a newly relocated firm would tap into the local labour market to harness local knowledge. However, given the lack of available data and the need for a non-local and local income multiplier if locally-supplied labour were to be included, the assumption of wholly non-local labour is necessary. Using the head office unit average of 50 employees, the economic base multiplier of 5.83 and Equation 13 from Section 4.1, the total employment resulting from the relocation can be found. With an increase in basic employment of 50, the resulting increase in non-basic employment is 242, for a total increase in employment of 292. Thus, based on 2005 figures, the average head office relocation to Calgary yields an increase in employment of nearly 300. However, employment alone does not paint a full picture of the economic impact.

To calculate the economic impact based on the H.C. Davis income multiplier, employment income numbers for the average oil and gas head office were needed. 2006 Census data was used to determine the average employment income of individuals in the oil and gas industry. Based on roughly 28,000 employees in Calgary, the average employment income was found to be 158,834 CAD (Statistics Canada,

2008c). While this may seem high, it is reflective of the high salaries many management-level and head office-based employees in the industry receive. Multiplying the head office employee figure of 50 by the average income of 158,834 CAD produces a first round impact of the relocation of 7,941,700 CAD. Multiplying the first round impact by the income multiplier of 1.477 yields the total impact of 11,733,803 CAD. Therefore, a relocation of 50 oil and gas head office employees leads to a net influx of roughly 12 million CAD.

4.4 Summary

This chapter has detailed the calculation of both the economic base multiplier and the H.C. Davis income multiplier. Based on these multipliers, the economic impact of an O&G firm's head office relocating to Calgary was determined. While the resulting economic effects can be understood by employment and income, there are clear shortcomings of looking at the impact in only these two ways. Perhaps most importantly, the social and environmental impacts are not considered. Though the relocation is a net economic positive, what effects does it have on social structure and the urban environment? These important questions could serve to fill another report and are beyond the scope of the present research.

On the economic side, these multipliers also fail to consider the impact of the firm itself as an economic entity. These multipliers specifically handle the employment and ensuing income dispersion of the firm's labour, but do not take into consideration the spending of the firm itself. Again, an entirely new multiplier could be constructed to determine the effects of the firm's expenditures (e.g. leasing space, hiring consultants, etc.), but this was beyond the scope of this report. Despite their shortcomings, the employment and income effects estimated in this report have value to policymakers both in Calgary and elsewhere. These topics will be discussed further in Chapter 5.

5.0 CONCLUSION

This report sought to find the economic impact, in terms of employment and income, generated by a firm in the oil and gas industry moving its head office to Calgary, AB. The report introduced the reader to Calgary's economy and provided a brief history of the oil and gas industry and its importance to the region. After detailing the method, an economic base multiplier and H.C. Davis income multiplier were calculated. These multipliers were applied to a hypothetical relocation scenario, yielding employment and income economic impact estimates. Thus, the main research question was clearly answered; but what do these two economic impact estimates mean? The purpose of this chapter is to offer some final thoughts on the report as a whole, what the results mean for policymakers, and what opportunities lie ahead to expand upon these findings.

5.1 The Issue of Time

While this report achieved what it set out to achieve in its early stages, it was not without its complications and shortcomings. First and foremost, the report relied on datasets large in both scope and scale. This big, often messy set of data was analysed to try to extract some truth and explain some of the complexity of the economic reality in Calgary. Perhaps the biggest obstacle to approaching 'truth' was the age of the data, as it affected all facets of the method. Unfortunately, much of the data was only available through the *2006 Census of Population*, as the pertinent tables were not yet available for the 2011 Census. Yet, the Census was not the sole culprit of datedness. The 2006 Head Office Survey conducted by Statistics Canada contains data very useful to this report; however, the most recent survey data (2011) is not set for release until later in 2013. With data that is seven or more years old, the conclusions can only go so far. Equally important is the context of this time period. In 2005-2006, Calgary was in the initial upswing of a three-year boom prior to the 2008 financial crisis. On the other hand, this is the most recent, comprehensive data. Evidently there are advantages and disadvantages of the data used, but ultimately the replicability of the method serves to offset the shortcomings in data collection. A similar study of economic impact could be done for almost any industry in any Canadian city and produce satisfactory multiplier estimates. Though the method does not likely yield estimates with the same accuracy as input-output models, it also does not require overly complex calculations and requires no private or privileged information. Ultimately, the method is sound for its purposes and offers clues for policymakers—a point to be expanded in the following section—despite its temporal deficiencies.

5.2 The 'Why' for Policymakers

The economic impact estimates of employment and income presented in the previous chapter demonstrate clear value in attracting head offices, but what can a city do? In the O&G context of Calgary, it is tempting to argue that Calgary can simply rely on its historical role as an energy hub. This equates economic growth to historical luck, or the luck of Calgary being what it is, without considering the effect of policy. Reese & Ye (2011) sought to determine the effect of economic policies versus the effect of 'place luck'. Place luck refers to the characteristics of a municipality that are beyond the control of policymakers; for example, natural features such as lakes or weather, or historical trends. Using a dataset of over 200 municipalities of varying sizes in the U.S., They found that neither policy nor place luck alone is a satisfactory explanation for economic prosperity. In the Calgarian context, it may be tempting to rest on one's laurels and rely on the energy sector's prowess to carry the economy forward, however this place luck-borne economic asset is devalued in the absence of effective policy.

So what constitutes effective policy? A logical first step would be to recognize the value of head offices, something the City of Calgary has already done (CED, 2008; 2010; Bloom & Grant, 2011). A next step would be to identify the competition; who is Calgary competing with as a head office milieu? Competition tends to be greatest among 'peer' cities and regions (Malecki, 2007). However, peers can be found based on a number of metrics: size, industrial specialisation, and demographics are obvious comparative characteristics. For Calgary, competitive peers could include every major Canadian city, but also many American cities. Or perhaps those specialising in energy are better comparators? Looking to Houston (U.S.A), Perth (Australia), Aberdeen (Scotland), Stavanger (Norway), and Abu Dhabi (U.A.E.) could provide an international short-list of peers based on their energy specialisations (mostly O&G). Whether you subscribe to Richard Florida's theories on the 'creative class' or not (see Florida, 2005), it is clear cities are facing pressure to attract both talent and talent-seekers on a global scale. While writing on attracting talent (labour) has gained some recent popularity, the literature regarding talent-seekers (firms) is often overlooked. Cities have expressed their desire for head offices, but what do firms look for in differentiating between cities? Rabianski et al. (2001) argue firms tend to consider attributes of a potential office locale under five major themes: business climate, quality of life, employee relocation, taxes, and planning and regulation. Perusing the list of attributes considered by firms under these themes, it is immediately apparent there is a multitude over which policymakers have a degree of control. Property taxation, development controls, infrastructure, transportation services, and cost of living are but a few of the many attributes firms consider when choosing between cities and regions

(Rabianski et al., 2001). Arguably the two most significant controls with the widest impact are infrastructure and transportation services. Intuitively one would suspect large metropolitan areas would be far ahead of smaller cities when it comes to long-term capital investments such as infrastructure and transportation projects. However, this does not take into consideration the fact that many smaller cities are initiating or may have recently completed such projects to service a growing population. At the same time, these cities are locking in to technologies presumably more modern and efficient than the often dated and dilapidated infrastructure found in older, larger cities. This should make second tier cities more competitive, but what is the evidence? Testa (2006) found from 1975 to 2005 in the U.S., the greatest share of headquarters belonged to the larger metropolitan areas. However, Testa also found that over this time period a shift to midsized U.S. cities occurred in earnest, slowly eroding the share of the larger metropolitans. Looking at Brown & Beckstead's (2006) numbers for head office counts among Canada's seven significant head office locales from 1999 to 2005, Testa's trend is apparent. Over this time period, two of the three largest metropolitan areas (Montréal and Vancouver) saw count declines of more than 5% and 10% respectively. At the same time, three of the four smaller CMAs (Calgary, Edmonton, and Winnipeg) all saw over 10% increases in head office counts. The two anomalies are Toronto, Canada's largest CMA that saw a 10% increase, and Ottawa, which remained relatively flat. These findings aside, the rise of the midsized city is difficult to explain as it likely stems from a complex growth feedback loop. As these midsized cities naturally increase in population, it becomes more affordable to provide urban amenities and infrastructure. These amenities and updated infrastructure attract business and the midsized city becomes more competitive. As the midsized city becomes more appealing and begins to attract business, a cluster⁶ develops. With this cluster comes greater demand for business and professional services, which in turn attracts more business (Testa, 2006). The importance of infrastructure (e.g. roads, airports, transit, and telecommunications) has been documented in the literature regarding head office location decisions (Bel & Fageda, 2008; Strauss-Kahn & Vives, 2009; Bloom & Grant, 2011). Maintaining a competitive tax regime (Strauss-Kahn & Vives, 2009; Egger et al., 2011; Bloom & Grant, 2011) and fostering a strong business environment (e.g. access to skilled labour, co-located business/professional services, new business incubators; Klier and Testa, 2002; Strauss-Kahn & Vives, 2009) have also been shown to be key policy areas for attracting head offices.

⁶ The term 'cluster' was coined by Michael Porter: "Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g. universities, standards agencies, trade associations) in a particular field that compete but also cooperate" (Porter, 2000: p. 16).

Given the trends presented above and Calgary's context, two key policy avenues deserve Calgary's attention.

Continuing to build a critical mass of business and professional service-providers is essential to both maintaining Calgary's strength as an energy hub and encouraging diversification. This is especially clear considering the office market has been historically dependent on the success or failure of the O&G industry. Using an econometric model, urbanMetrics (2006) found statistically significant relationships between total occupied office space in Calgary and drilling activity, the price of oil, and the unemployment rate. While these variables likely co-vary, it is still supportive of the need to diversify away from O&G wherever possible. The need for diversification was recognized in Calgary Economic Development's most recent Economic Development Strategy (CED, 2008). If diversification is tied to the strength of underlying business and professional services, then diversification is tied to the overall business climate. How can Calgary improve the business climate? Several options explored in the literature ought to be considered (or pursued more seriously). Business incubators (Markley & McNamara, 1995; Sherman & Chappell, 1998; Bergek & Norrman, 2008), strong university-industry relationships (Anselin et al., 1997; Parker, 2001; Goldstein & Drucker, 2006; Smilor et al., 2007; Lendel, 2010), central city redevelopment (Moss, 1997; Arthur et al., 2004; Fainstein, 2008), and amenities such as arts and entertainment venues, festivals, and recreation areas (Gottlieb, 1994; Strom, 2002; O'Sullivan & Jackson, 2002; Clark et al., 2002; Clark, 2004) have all been shown to be typically effective economic development policies to attract labour and firms.

Transportation presents another policy imperative for head office attraction. The *City Centre Plan*, the City of Calgary's "comprehensive and strategic long term vision for the future of Calgary's Centre City" (City of Calgary, 2007: p. 13) underscored the need to enhance the downtown as a primary office location and noted the key role of transit in the success of the downtown (City of Calgary, 2007). The *Centre City Plan* further projects the potential for between 16 and 26 new 30-storey buildings to be developed by 2025, which represents a significant influx of development activity and new office employment. Office employment in Calgary is forecast to have an increasing share of employment toward 2025 and with the greatest share of office space (both existing and projected) as well as office employment in the downtown, significant pressure will be put on the transportation network to serve the Centre City (urbanMetrics, 2006; City of Calgary, 2007). Possibly the greatest transportation need in the downtown context is faster, more efficient access to the airport (CED, 2010). Calgary currently uses a light rail transit (LRT) system known as CTrain, but there is no current service to Calgary International

Airport (YYC). *RouteAhead*, Calgary's most recent strategic transit plan, calls for a spur line off of the planned expansion of the existing Northeast LRT line, which will later connect with the planned North Central LRT line (Calgary Transit, 2013). The timeline for the Airport Tunnel rail connection construction is medium-term (Calgary Transit, 2013), however given the on-going projects at YYC it would be highly advisable for this project—or any other plan to provide faster and more frequent service to the airport—to be pushed forward. The Calgary Airport Authority currently has two major projects underway as part of its *Strategic Operating Plan* (CAA, 2008). The first is the construction of a fourth runway, slated to be in service by May 2014 (CAA, 2013a). This runway will be able to handle the world's largest passenger aircraft and more air traffic overall. This runway is crucial to the Authority's second project, the International Facilities Project (CAA, 2013b). To be completed by late 2015, this project will see the construction of an airport expansion providing 22 new gates, new customs facilities and nearly 185,000 m² of new space (CAA, 2013b). While the state of Calgary's airport and its accessibility from downtown may seem removed from the discussion of head offices, airports have been repeatedly noted in the literature as important factors for head offices and their location decision-making (Bel & Fageda, 2008; Strauss-Kahn & Vives, 2009; Bloom & Grant, 2011). Calgary's ability to continually attract and retain head offices is at least partially dependent on its capacity to expand its airport facilities and improve accessibility between YYC and downtown.

Although place luck is a chief contributing factor to economic prosperity, the importance of effective policy should not be discounted. While some policy approaches may constitute a 'race to the bottom' (e.g. taxes), there is ample room for an adept and adaptable city administration to make meaningful investments that benefit both its existing citizens and firms and those it wishes to attract. Unfortunately, to the knowledge of the writer, there is no magic recipe for attracting head offices. Calgary is advantaged in comparison to its Canadian peers outside the top three CMAs (Toronto, Montréal, Vancouver) due to its strong O&G foundation on which it can build, however given the relative volatility of oil prices and its susceptibility to supply issues and inconsistent demand, this foundation ought not to be heavily relied on moving forward. By bolstering business and professional services providers, supporting local business development, and ensuring the transportation network is fast and efficient, firms from all industries will be attracted to Calgary and contribute to its economic diversification and prosperity.

5.3 Future Considerations and Concluding Remarks

Future research opportunities abound given the combination of accessible data and relatively simplified calculation processes. Perhaps most simply, using the latest data (e.g. 2011 Census of Population) could help draw conclusions as to how far Calgary has come in its diversification efforts and whether a head office relocation is as valuable in 2011 as it was in 2006. Expanding the analysis to other industries could also be beneficial to distinguish the perspective and impact of a non-O&G industry firm. At present, Calgary has the majority of O&G-related head offices in Canada, thereby diminishing the potential for relocations. However, there is still plenty of potential in firm originations in Calgary as well as attracting foreign firms. With considerable foreign investment in the oil sands, looking to the needs and impact of international firms could be worthwhile; for instance, the U.S., China, Japan, Norway and a handful of other European countries have considerable investment in Alberta's oil (Berkow et al., 2012). In an era of intense globalisation and relatively nimble multinational enterprises (MNEs), the potential is only matched by the competition. One final area deserving of expansion is the spatial aspect of head offices, an element not discussed in this report. Is the economic impact greater for new downtown head offices than for suburban head offices? The recent decision by Imperial Oil to relocate to a Calgary suburb represented a move of roughly 800,000 square feet or 2% of the total downtown inventory (JLL, 2012). Is such a move a net economic positive?

The results of this report are meaningful on their own, despite any methodological shortcomings. With employment and income multipliers, practitioners can gain an understanding of not only the composition of their local economies, but how new business (or worse, exiting business) affects the local economy. Being able to quantify, albeit in estimate format, the local economy's actors and their impacts can help decision-makers make better decisions. As any city must balance the economic, the social, and the environmental, economic impact analyses provide another tool to assist those who must make difficult decisions in a complex environment. Multiplier calculations and other economic tools hold an important place in any city planning department's toolkit. Nevertheless, it is important to be cognizant of their fallibility and remember F.A. Hayek's wise words: "The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design" (Hayek, 1988: p. 76).

6.0 BIBLIOGRAPHY

- Alberta Municipal Affairs (2012) "Grant Funding Reports – Background Information." PDF from Alberta Municipal Affairs, retrieved from <http://www.municipalaffairs.alberta.ca/municipalgrants-funding-reports.cfm>.
- Anselin, L., Varga, A. & Acs, Z. (1997) "Local Geographic Spillovers between University Research and High Technology Innovations." *Journal of Urban Economics*, 42: p. 422-448.
- Arthur, C.N., Raymond, J.B., Edward, F., Casey, J.D., Emil, E.M. & Roberto, Q. (2004) "Urban Containment and Central-City Revitalization." *Journal of the American Planning Association*, 70(4): p. 411-425.
- Bel, G. & Fageda, X. (2008) "Getting there fast: globalization, intercontinental flights and location of headquarters." *Journal of Economic Geography*, 8: p. 471-495.
- Bell, Brian. (1996) *Regional Economic Base Analysis – Sudbury*. Kingston (ON): Queen's University. P. 1-50.
- Bergek, A. & Norrman, C. (2008) "Incubator best practice: A framework." *Technovation*, 28: p. 20-28.
- Berkow, J., Johnson, R., Barr, A. & Rivait, J. (2012) "The Oil Sands: Which Nations are Players?" (Infographic). *Financial Post*, October 10, 2012. Retrieved from http://business.financialpost.com/2012/10/31/who-owns-the-oil-sands/?__lsa=8092-04e3
- Bliss, M. (1987) *Northern Enterprise: Five Centuries of Canadian Business*. Toronto (ON): McClelland & Stewart Inc.
- Bloom, M. & Grant, M. (2011) "Valuing Headquarters (HQs): Analysis of the Role, Value and Benefit of HQs in Global Value Chains", p. 211-240 in Sydor, A. (2011) *Global Value Chains: Impacts and Implications*. Ottawa (ON): Ministry of Public Works and Government Services.
- Brown, M. & Beckstead, D. (2006) "Head office employment in Canada, 1999 to 2005." *Canadian Economic Observer*, 19(7): p. 3.1-3.11.

Brownrigg, M. (1971) "The regional income multiplier: an attempt to complete the model." *Scottish Journal of Political Economy*, 18(3): p. 281-297.

Calgary Airport Authority (2008) "YYC Strategic Operating Plan." Retrieved from http://yyc.com/Portals/0/15_2009031710575YYCStratPlan%5B1%5D.pdf

Calgary Airport Authority (2013a) "Runway Development Project: Overview." Retrieved from <http://www.yyc.com/en-us/calgaryairportauthority/projectsprograms/runwaydevelopmentproject.aspx>

Calgary Airport Authority (2013b) "International Facilities Project: Overview." Retrieved from <http://www.yyc.com/en-us/calgaryairportauthority/projectsprograms/internationalfacilitiesproject.aspx>

Calgary Economic Development (2008) "Calgary Economic Development Strategy 2008-2018." Retrieved from http://www.calgaryeconomicdevelopment.com/sites/default/files/pdf/research/reports/special_research/Calgary%20Economic%20Development%20Strategy%20Final%20-%20Full%20version.pdf

Calgary Economic Development (2010) *Home Base: What Drives Head Office Locations and Calgary's Place as a Global Business Hub*. Calgary (AB): Calgary Economic Development. P. 1-30.

Calgary Economic Development (2012) *Calgary & Region Economic Outlook 2012-2017*. Calgary (AB): Calgary Economic Development, Spring 2012. P. 1-32.

Calgary Transit (2013) "RouteAhead Strategic Plan 2013." First half retrieved from <http://www.routeahead.ca/wp-content/uploads/2013/02/2013-0118StrategyAheadWeb1.pdf>. Second half retrieved from <http://www.routeahead.ca/wp-content/uploads/2013/02/2013-0118StrategyAheadWeb2.pdf>

Canadian Centre for Energy Information (2004) "Evolution of Canada's oil and gas industry." Calgary (AB): CCEI.

CANMARC REIT (2012) "Scotia Centre." Retrieved from <http://www.canmarcreit.com/portfolio/properties/scotia-centre>

- Capital Professional Services, LLC (2012) "Historical Crude Oil Prices (Table)." Retrieved from http://inflationdata.com/Inflation/Inflation_Rate/Historical_Oil_Prices_Table.asp
- City of Calgary (2007) "Centre City Plan." Retrieved from <http://www.calgary.ca/PDA/LUPP/Documents/Publications/centre-city-plan-one.pdf>
- City of Calgary (2012a) "Historical property tax rates (residential)." Retrieved <http://www.calgary.ca/CA/fs/Pages/Property-Tax/Tax-Bill-and-Tax-Rate-Calculaton/Historical-Tax-Rates.aspx>
- City of Calgary (2012b) "Business tax rate and historical business tax rates." Retrieved from <http://www.calgary.ca/CA/fs/Pages/Business-Tax/Business-Tax-Rate.aspx>
- City of Calgary (2012c) "City of Calgary Annual Report 2006." Retrieved from <http://www.calgary.ca/CA/fs/Documents/Plans-Budgets-and-Financial-Reports/Annual-Reports/Annual-Report-2006.pdf>
- Clark, T.N., Lloyd, R., Wong, K.K. & Jain, P. (2002) "Amenities drive urban growth." *Journal of Urban Affairs*, 24(5): p. 493-515.
- Clark, T.N. (2004) "Urban Amenities: Lakes, Operas, and Juice Bars: Do They Drive Development?" in T.N. Clark (ed.) *The City as an Entertainment Machine* (Research in Urban Policy, Volume 9). Emerald Publishing Ltd., p. 103-140.
- Davis, H.C. (1976) "Assessing the Impact of a New Firm on a Small-Scale Regional Economy: an Alternative to the Economic Base Model." *Plan Canada*, September 1976: p. 171-176.
- Davis, H.C. (1986) "Income and employment multipliers for seven British Columbia regions." *Canadian Journal of Regional Science*, 9(1): p. 103-115.
- Davis, H.C. (1990) *Regional Economic Impact Analysis and Project Evaluation*. Vancouver (BC): UBC Press.
- de Mille, G. (1969) *Oil in Canada's West: The Early Years*. Calgary (AB): Northwest Printing and Lithographing Ltd.
- DMTI Spatial (2010) CanMap RouteLogistics. Markham (ON): DMTI Spatial Inc. Created using ESRI ArcMap 10.

- DMTI Spatial (2012a) Canada Directory. Markham (ON): DMTI Spatial Inc. Created using ESRI ArcMap 10.
- DMTI Spatial (2012b) CanMap Streetfiles. Markham (ON): DMTI Spatial Inc. Created using ESRI ArcMap 10.
- Egger, P., Radulescu, D. & Strecker, N. (2011) "Effective Labor Taxation and the International Location of Headquarters." *CESifo Working Paper Series No. 3822*. Munich (Germany): CESifo.
- Fainstein, S.S. (2008) "Mega-projects in New York, London and Amsterdam." *International Journal of Urban and Regional Research*, 32(4): p. 768-785.
- Florida, R. (2005) *The Flight of the Creative Class: The New Global Competition for Talent*. New York (NY): Harper Business.
- Forward, C.N. (1990) "Variations in employment and non-employment income in Canadian cities as indicators of economic base differences." *The Canadian Geographer*, 34(2): p. 120-132.
- Gibson, L.J. & Worden, M.A. (1981) "Estimating the Economic Base Multiplier: A Test of Alternative Procedures." *Economic Geography*, 57(2): p. 146-159.
- Glenbow Archives (2012) "Barron Building, Calgary, Alberta." File number NA-4476-102. May, 1956. Retrieved from <http://ww2.glenbow.org/dbimages/arc11/u/na-4476-102.jpg>
- Goldstein, H. & Drucker, J. (2006) "The Economic Development Impacts of Universities on Regions: Do Size and Distance Matter?" *Economic Development Quarterly*, 20(1): p. 22-43.
- Gottlieb, P.D. (1994) "Amenities as an Economic Development Tool: Is There Enough Evidence?" *Economic Development Quarterly*, 8(3): p. 270-285.
- Greig, M.A. (1971) "The regional income and employment multiplier effects of a pulp mill and paper mill." *Scottish Journal of Political Economy*, 18(1): p. 31-48.

- Hayek, F.A. (1988) *The Fatal Conceit: The Errors of Socialism*. Chicago (IL): University of Chicago Press.
- Isserman, A.M. (1977a) "The Location Quotient Approach to Estimating Regional Economic Impacts." *Journal of the American Institute of Planners*, 43(1): p. 33-41.
- Isserman, A.M. (1977b) "A bracketing approach for estimating the regional economic impact multipliers and a procedure for assessing their accuracy." *Environment and Planning A*, 9: p. 1003-1011.
- Jones Lang Lasalle (2012) "Look Forward Calgary." Retrieved from <http://www.joneslanglasalle.com/Pages/ResearchDetails.aspx?ItemID=9816>
- Klier, T. & Testa, W. (2002) "Location Trends of Large Company Headquarters During the 1990s." *Economic Perspectives* (Federal Reserve Bank of Chicago), 2002(2): p. 12-26.
- Klosterman, R.E. & Xie, Y. (1993) "ECONBASE: Economic Base Analysis" in Klosterman, R.E., Brail, R.K. & Brossard, E.G. (eds.) *Spreadsheet Models for Urban and Regional Analysis*. New Brunswick (NJ): Center for Urban Policy Research at Rutgers, p. 161-182.
- Lane, T. (1966) "The Urban Base Multiplier: An Evaluation of the State of the Art." *Land Economics*, 42(3): p. 339-347.
- Le Riche, T. (2006) *Alberta's Oil Patch: The People, Politics & Companies*. Edmonton (AB): Folklore Publishing.
- Lefebvre, M., Arcand, A., Sutherland, G., Wiebe, R. & McIntyre, J. (2012) "Calgary Metropolitan Outlook 1 – Autumn 2012." Ottawa (ON): Conference Board of Canada.
- Leigh, R. (1970) "The Use of Location Quotients in Urban Economic Base Studies." *Land Economics*, 46(2): p. 202-205.
- Lendel, I. (2010) "The Impact of Research Universities on Regional Economies: The Concept of University Products." *Economic Development Quarterly*, 24(3): p. 210-230.

- Malecki, E.J. (2007) "Cities and regions competing in the global economy: knowledge and local development policies." *Environment and Planning C: Government and Policy*, 25: p. 638-654.
- Markley, D.M. & McNamara, K.T. (1995) "Economic and Fiscal Impacts of a Business Incubator." *Economic Development Quarterly*, 9(3): p. 273-278.
- McLean, M.L. & Voytek, K.P. (1992) *Understanding Your Economy: Using Analysis to Guide Local Strategic Planning*. Chicago: American Planning Association.
- McNeill, L. (1950) *Tales of the Old Town: Calgary 1875-1950*. Calgary (AB): Calgary Herald.
- McNicoll, I.H. (1981) "Estimating Regional Industry Multipliers: Alternative Techniques." *The Town Planning Review*, 52(1): p. 80-88.
- Mulligan, G.F. (2008) "A New Shortcut Method for Estimating Economic Base Multipliers." *Regional Science Policy & Practice*, 1(1): p. 67-84.
- Moss, M.L. (1997) "Reinventing the central city as a place to live and work." *Housing Policy Debate*, 8(2): p. 471-490.
- North, D.C. (1955) "Location Theory and Regional Economic Growth." *Journal of Political Economy*, 63(3): p. 243-258.
- O'Sullivan, D. & Jackson, M.J. (2002) "Festival Tourism: A Contributor to Sustainable Local Economic Development?" *Journal of Sustainable Tourism*, 10(4): p. 325-342.
- Page, R. (1984) "The Early History of the Canadian Oil Industry, 1860-1900." *Queen's Quarterly*, 91(4): p. 849-866.
- Phelps, E. (1969) "Foundations of the Canadian Oil Industry, 1850-1866." *Profiles of a Province: Studies in the History of Ontario*, 1969: p. 156-165.
- Porter, M.E. (2000) "Location, Competition, and Economic Development: Local Clusters in a Global Economy." *Economic Development Quarterly*, 14(1): p. 15-34.

- Parker, P. (2001) "Local-Global Partnerships for High-Tech Development: Integrating Top-Down and Bottom-Up Models." *Economic Development Quarterly*, 15(2): p. 149-167.
- Porter, M.E. (2000) "Location, Competition, and Economic Development: Local Clusters in a Global Economy." *Economic Development Quarterly*, 14(1): p.15-34.
- Rabianski, J.S., DeLisle, J.R. & Carn, N.G. (2001) "Corporate Real Estate Site Selection: A Community-Specific Information Framework." *Journal of Real Estate Research*, 22(1/2): p. 165-197.
- Reese, L.A. & Ye, M. (2011) "Policy Versus Place Luck: Achieving Local Economic Prosperity." *Economic Development Quarterly*, 25(3): p. 221-236.
- Reid, M., Enemark, G. & Rowbotham, L. (1992) *Economic Impact of the University of Northern British Columbia on Prince George*. Prince George (BC): College of New Caledonia Press. P. 1-62.
- Richardson, H.W. (1985) "Input-output and economic base multipliers: Looking backward and forward." *Journal of Regional Science*, 25(4): p. 607-661.
- Sherman, H. & Chappell, D.S. (1998) "Methodological Challenges in Evaluating Business Incubator Outcomes." *Economic Development Quarterly*, 12(4): p. 313-321.
- Shilton, L. & Stanley, C. (1999) "Spatial Patterns of Headquarters." *Journal of Real Estate Research*, 17(3): p. 341-364.
- Siegfried, J. & Zimbalist, A. (2000) "The Economics of Sports Facilities and Their Communities." *The Journal of Economic Perspectives*, 14(3): p. 95-114.
- Skyscraper Source Media Inc. (2012) "Scotia Centre." Retrieved from <http://skyscraperpage.com/cities/?buildingID=1988>
- Smilor, R., O'Donnell, N., Stein, G. & Welborn III, R.S. (2007) "The Research University and the Development of High-Technology Centers in the United States." *Economic Development Quarterly*, 21(3): p. 203-222.

Statistics Canada (2006a) Survey of household spending (SHS), household spending, summary-level categories, by province, territory and selected metropolitan areas, annual (dollars), Table 203-0001 (CANSIM).

Statistics Canada (2006b) Sector accounts, persons and unincorporated businesses, quarterly (dollars unless otherwise noted), Table 380-0004 (CANSIM).

Statistics Canada (2008a) "Community Profiles." *2006 Census of Population*.

Statistics Canada (2008b) "2006 Population Overview; Household & Family Overview; Labour Force by Industry and Sex; Labour Force by Occupation; Labour Force by Class of Worker and Sex; Place of Work by Sex." *2006 Census of Population*.

Statistics Canada (2008c) 2006 Census of Population, Statistics Canada catalogue no. 97-559-XCB2006009 (Calgary, Code825).

Statistics Canada (2008e) 2006 Census of Population, Statistics Canada catalogue no. 97-559-XCB2006009 (Canada, Code01).

Statistics Canada (2012a) "Population and dwelling counts, for census metropolitan areas, 2011 and 2006 censuses." *2011 Census of Population*.

Statistics Canada (2012b) "Community Profiles." *2011 Census of Population*.

Statistics Canada (2012c) "Table 379-0028: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories, annual (percentage share)." CANSIM (database).

Statistics Canada (2012d) "Table 379-0030: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories, annual (dollars)." CANSIM (database).

Statistics Canada (2012e) "Table 379-0030: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories, annual (dollars)." CANSIM (database).

Statistics Canada (2012f) "Head Office Survey." Retrieved from <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5089&lang=en&db=imdb&adm=8&dis=2>

Statistics Canada (2013a) "Types of data collection." Retrieved from <http://www.statcan.gc.ca/edu/power-pouvoir/ch2/types/5214777-eng.htm>

Statistics Canada (2013b) "Data Quality." Retrieved from <http://www12.statcan.gc.ca/census-recensement/2006/ref/dict/overview-apercu/pop7-eng.cfm>

Strategic Group (2012) "Barron Building." Retrieved from <http://www.strategicgroup.ca/Real-Estate-Portfolio/Barron-Building.aspx>

Strauss-Kahn, V. & Vives, X. (2009) "Why and where do headquarters move?" *Regional Science and Urban Economics*, 39: p. 168-186.

Strom, E. (2002) "Converting Pork into Porcelain: Cultural Institutions and Downtown Development." *Urban Affairs Review*, 38(1): p. 3-21.

Testa, W.A. (2006) "Headquarters Research and Implications for Local Development." *Economic Development Quarterly*, 20(2): p. 111-116.

TMX Group (2012) "TMX Group Equity Financing Statistics – October 2012." Retrieved from http://www.tmx.com/en/news_events/news/news_releases/2012/11-06-2012_TMXGroup-FinancingStats.html

The Globe and Mail (2012a) Report on Business' Top 1000 public companies. Retrieved from <http://www.theglobeandmail.com/report-on-business/rob-magazine/top-1000/2012-rankings-of-canadas-top-1000-public-companies-by-profit/article4371923/>

The Globe and Mail (2012b) Report on Business' Top 350 private companies. Retrieved from <http://www.theglobeandmail.com/report-on-business/rob-magazine/top-1000/2012-rankings-of-canadas-350-biggest-private-companies/article4372009/>

urbanMetrics (2006) "Calgary Office Market Forecast Study: 2006-2025." Retrieved from http://www.calgaryeconomicdevelopment.com/sites/default/files/pdf/research/reports/special_research/Calgary_Office_Market_Forecast.pdf

Yannopoulos, G. (1973) "Local Income Effects of Office Relocation." *Regional Studies*, 7: p. 33-46.

7.0 APPENDIX

NAICS Industry

11	Agriculture, forestry, fishing and hunting
111	Farms (111 to 112)
1110	Farms (1111 to 1129)
113	Forestry and logging
1131	Timber tract operations
1132	Forest nurseries and gathering of forest products
1133	Logging
114	Fishing, hunting and trapping
1141	Fishing
1142	Hunting and trapping
115	Support activities for agriculture and forestry
1150	Support activities for farms (1151 to 1152)
1153	Support activities for forestry
<hr/>	
21	Mining and oil and gas extraction
211	Oil and gas extraction
2111	Oil and gas extraction
212	Mining (except oil and gas)
2121	Coal mining
2122	Metal ore mining
2123	Non-metallic mineral mining and quarrying
213	Support activities for mining and oil and gas extraction
2131	Support activities for mining and oil and gas extraction
219	Mining - Unspecified
2199	Mining - Unspecified
22	Utilities
221	Utilities
2211	Electric power generation, transmission and distribution
2212	Natural gas distribution
2213	Water, sewage and other systems
23	Construction
236	Construction of buildings
2361	Residential building construction
2362	Non-residential building construction
237	Heavy and civil engineering construction
2371	Utility system construction
2372	Land subdivision
2373	Highway, street and bridge construction
2379	Other heavy and civil engineering construction
238	Specialty trade contractors
2381	Foundation, structure, and building exterior contractors
2382	Building equipment contractors
2383	Building finishing contractors
2389	Other specialty trade contractors

NAICS	Industry
31	Manufacturing (31 to 33)
311	Food manufacturing
3111	Animal food manufacturing
3112	Grain and oilseed milling
3113	Sugar and confectionery product manufacturing
3114	Fruit and vegetable preserving and specialty food manufacturing
3115	Dairy product manufacturing
3116	Meat product manufacturing
3117	Seafood product preparation and packaging
3118	Bakeries and tortilla manufacturing
3119	Other food manufacturing
312	Beverage and tobacco product manufacturing
3121	Beverage manufacturing
3122	Tobacco manufacturing
313	Textile mills
3131	Fibre, yarn and thread mills
3132	Fabric mills
3133	Textile and fabric finishing and fabric coating
314	Textile product mills
3141	Textile furnishings mills
3149	Other textile product mills
315	Clothing manufacturing
3151	Clothing knitting mills
3152	Cut and sew clothing manufacturing
3159	Clothing accessories and other clothing manufacturing
316	Leather and allied product manufacturing
3161	Leather and hide tanning and finishing
3162	Footwear manufacturing
3169	Other leather and allied product manufacturing
321	Wood product manufacturing
3211	Sawmills and wood preservation
3212	Veneer, plywood and engineered wood product manufacturing
3219	Other wood product manufacturing
322	Paper manufacturing
3221	Pulp, paper and paperboard mills
3222	Converted paper product manufacturing
323	Printing and related support activities
3231	Printing and related support activities
324	Petroleum and coal products manufacturing
3241	Petroleum and coal products manufacturing
325	Chemical manufacturing
3251	Basic chemical manufacturing
3252	Resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing
3253	Pesticide, fertilizer and other agricultural chemical manufacturing
3254	Pharmaceutical and medicine manufacturing

NAICS Industry

- 3255 Paint, coating and adhesive manufacturing
- 3256 Soap, cleaning compound and toilet preparation manufacturing
- 3259 Other chemical product manufacturing
 - 326 Plastics and rubber products manufacturing
- 3261 Plastic product manufacturing
- 3262 Rubber product manufacturing
 - 327 Non-metallic mineral product manufacturing
- 3271 Clay product and refractory manufacturing
- 3272 Glass and glass product manufacturing
- 3273 Cement and concrete product manufacturing
- 3274 Lime and gypsum product manufacturing
- 3279 Other non-metallic mineral product manufacturing
 - 331 Primary metal manufacturing
- 3311 Iron and steel mills and ferro-alloy manufacturing
- 3312 Steel product manufacturing from purchased steel
- 3313 Alumina and aluminum production and processing
- 3314 Non-ferrous metal (except aluminum) production and processing
- 3315 Foundries
 - 332 Fabricated metal product manufacturing
- 3321 Forging and stamping
- 3322 Cutlery and hand tool manufacturing
- 3323 Architectural and structural metals manufacturing
- 3324 Boiler, tank and shipping container manufacturing
- 3325 Hardware manufacturing
- 3326 Spring and wire product manufacturing
- 3327 Machine shops, turned product, and screw, nut and bolt manufacturing
- 3328 Coating, engraving, heat treating and allied activities
- 3329 Other fabricated metal product manufacturing
 - 333 Machinery manufacturing
- 3331 Agricultural, construction and mining machinery manufacturing
- 3332 Industrial machinery manufacturing
- 3333 Commercial and service industry machinery manufacturing
- 3334 Ventilation, heating, air-conditioning and commercial refrigeration equipment manufacturing
- 3335 Metalworking machinery manufacturing
- 3336 Engine, turbine and power transmission equipment manufacturing
- 3339 Other general-purpose machinery manufacturing
 - 334 Computer and electronic product manufacturing
- 3341 Computer and peripheral equipment manufacturing
- 3342 Communications equipment manufacturing
- 3343 Audio and video equipment manufacturing
- 3344 Semiconductor and other electronic component manufacturing
- 3345 Navigational, measuring, medical and control instruments manufacturing
- 3346 Manufacturing and reproducing magnetic and optical media
 - 335 Electrical equipment, appliance and component manufacturing
- 3351 Electric lighting equipment manufacturing

NAICS Industry

3352	Household appliance manufacturing
3353	Electrical equipment manufacturing
3359	Other electrical equipment and component manufacturing
336	Transportation equipment manufacturing
3361	Motor vehicle manufacturing
3362	Motor vehicle body and trailer manufacturing
3363	Motor vehicle parts manufacturing
3364	Aerospace product and parts manufacturing
3365	Railroad rolling stock manufacturing
3366	Ship and boat building
3369	Other transportation equipment manufacturing
337	Furniture and related product manufacturing
3371	Household and institutional furniture and kitchen cabinet manufacturing
3372	Office furniture (including fixtures) manufacturing
3379	Other furniture-related product manufacturing
339	Miscellaneous manufacturing
3391	Medical equipment and supplies manufacturing
3399	Other miscellaneous manufacturing
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41	Wholesale trade
411	Farm product wholesaler-distributors
4111	Farm product wholesaler-distributors
412	Petroleum product wholesaler-distributors
4121	Petroleum product wholesaler-distributors
413	Food, beverage and tobacco wholesaler-distributors
4131	Food wholesaler-distributors
4132	Beverage wholesaler-distributors
4133	Cigarette and tobacco product wholesaler-distributors
414	Personal and household goods wholesaler-distributors
4141	Textile, clothing and footwear wholesaler-distributors
4142	Home entertainment equipment and household appliance wholesaler-distributors
4143	Home furnishings wholesaler-distributors
4144	Personal goods wholesaler-distributors
4145	Pharmaceuticals, toiletries, cosmetics and sundries wholesaler-distributors
415	Motor vehicle and parts wholesaler-distributors
4151	Motor vehicle wholesaler-distributors
4152	New motor vehicle parts and accessories wholesaler-distributors
4153	Used motor vehicle parts and accessories wholesaler-distributors
416	Building material and supplies wholesaler-distributors
4161	Electrical, plumbing, heating and air-conditioning equipment and supplies wholesaler-distributors
4162	Metal service centres
4163	Lumber, millwork, hardware and other building supplies wholesaler-distributors
417	Machinery, equipment and supplies wholesaler-distributors
4171	Farm, lawn and garden machinery and equipment wholesaler-distributors

NAICS Industry

- 4172 Construction, forestry, mining, and industrial machinery, equipment and supplies wholesaler-distributors
- 4173 Computer and communications equipment and supplies wholesaler-distributors
- 4179 Other machinery, equipment and supplies wholesaler-distributors
- 418 Miscellaneous wholesaler-distributors
- 4181 Recyclable material wholesaler-distributors
- 4182 Paper, paper product and disposable plastic product wholesaler-distributors
- 4183 Agricultural supplies wholesaler-distributors
- 4184 Chemical (except agricultural) and allied product wholesaler-distributors
- 4189 Other miscellaneous wholesaler-distributors
- 419 Wholesale agents and brokers
- 4191 Wholesale agents and brokers
- 44 Retail trade (44 to 45)
- 441 Motor vehicle and parts dealers
- 4411 Automobile dealers
- 4412 Other motor vehicle dealers
- 4413 Automotive parts, accessories and tire stores
- 442 Furniture and home furnishings stores
- 4421 Furniture stores
- 4422 Home furnishings stores
- 443 Electronics and appliance stores
- 4431 Electronics and appliance stores
- 444 Building material and garden equipment and supplies dealers
- 4441 Building material and supplies dealers
- 4442 Lawn and garden equipment and supplies stores
- 445 Food and beverage stores
- 4451 Grocery stores
- 4452 Specialty food stores
- 4453 Beer, wine and liquor stores
- 446 Health and personal care stores
- 4461 Health and personal care stores
- 447 Gasoline stations
- 4471 Gasoline stations
- 448 Clothing and clothing accessories stores
- 4481 Clothing stores
- 4482 Shoe stores
- 4483 Jewellery, luggage and leather goods stores
- 451 Sporting goods, hobby, book and music stores
- 4511 Sporting goods, hobby and musical instrument stores
- 4512 Book, periodical and music stores
- 452 General merchandise stores
- 4521 Department stores
- 4529 Other general merchandise stores
- 453 Miscellaneous store retailers
- 4531 Florists

NAICS Industry

4532 Office supplies, stationery and gift stores
4533 Used merchandise stores
4539 Other miscellaneous store retailers
454 Non-store retailers
4541 Electronic shopping and mail-order houses
4542 Vending machine operators
4543 Direct selling establishments
48 Transportation and warehousing (48 to 49)
481 Air transportation
4811 Scheduled air transportation
4812 Non-scheduled air transportation
482 Rail transportation
4821 Rail transportation
483 Water transportation
4831 Deep sea, coastal and great lakes water transportation
4832 Inland water transportation
484 Truck transportation
4841 General freight trucking
4842 Specialized freight trucking
485 Transit and ground passenger transportation
4851 Urban transit systems
4852 Interurban and rural bus transportation
4853 Taxi and limousine service
4854 School and employee bus transportation
4855 Charter bus industry
4859 Other transit and ground passenger transportation
486 Pipeline transportation
4861 Pipeline transportation of crude oil
4862 Pipeline transportation of natural gas
4869 Other pipeline transportation
487 Scenic and sightseeing transportation
4871 Scenic and sightseeing transportation, land
4872 Scenic and sightseeing transportation, water
4879 Scenic and sightseeing transportation, other
488 Support activities for transportation
4881 Support activities for air transportation
4882 Support activities for rail transportation
4883 Support activities for water transportation
4884 Support activities for road transportation
4885 Freight transportation arrangement
4889 Other support activities for transportation
491 Postal service
4911 Postal service
492 Couriers and messengers
4921 Couriers

NAICS Industry

4922	Local messengers and local delivery
493	Warehousing and storage
4931	Warehousing and storage
51	Information and cultural industries
511	Publishing industries (except Internet)
5111	Newspaper, periodical, book and directory publishers
5112	Software publishers
512	Motion picture and sound recording industries
5121	Motion picture and video industries
5122	Sound recording industries
515	Broadcasting (except Internet)
5151	Radio and television broadcasting
5152	Pay and specialty television
516	Internet publishing and broadcasting
5161	Internet publishing and broadcasting
517	Telecommunications
5171	Wired telecommunications carriers
5172	Wireless telecommunications carriers (except satellite)
5173	Telecommunications resellers
5174	Satellite telecommunications
5175	Cable and other program distribution
5179	Other telecommunications
518	Internet service providers, web search portals, and data processing services
5181	Internet service providers, web search portals
5182	Data processing, hosting and related services
519	Other information services
5191	Other information services
52	Finance and insurance
521	Monetary authorities - Central bank
5211	Monetary authorities - Central bank
522	Credit intermediation and related activities
5221	Depository credit intermediation
5222	Non-depository credit intermediation
5223	Activities related to credit intermediation
523	Securities, commodity contracts, and other financial investment and related activities
5231	Securities and commodity contracts intermediation and brokerage
5232	Securities and commodity exchanges
5239	Other financial investment activities
524	Insurance carriers and related activities
5241	Insurance carriers
5242	Agencies, brokerages and other insurance related activities
526	Funds and other financial vehicles
5261	Pension funds
5269	Other funds and financial vehicles
53	Real estate and rental and leasing

NAICS Industry

531	Real estate
5311	Lessors of real estate
5312	Offices of real estate agents and brokers
5313	Activities related to real estate
532	Rental and leasing services
5321	Automotive equipment rental and leasing
5322	Consumer goods rental
5323	General rental centres
5324	Commercial and industrial machinery and equipment rental and leasing
533	Lessors of non-financial intangible assets (except copyrighted works)
5331	Lessors of non-financial intangible assets (except copyrighted works)
54	Professional, scientific and technical services
541	Professional, scientific and technical services
5411	Legal services
5412	Accounting, tax preparation, bookkeeping and payroll services
5413	Architectural, engineering and related services
5414	Specialized design services
5415	Computer systems design and related services
5416	Management, scientific and technical consulting services
5417	Scientific research and development services
5418	Advertising and related services
5419	Other professional, scientific and technical services
55	Management of companies and enterprises
551	Management of companies and enterprises
5511	Management of companies and enterprises
56	Administrative and support, waste management and remediation services
561	Administrative and support services
5611	Office administrative services
5612	Facilities support services
5613	Employment services
5614	Business support services
5615	Travel arrangement and reservation services
5616	Investigation and security services
5617	Services to buildings and dwellings
5619	Other support services
562	Waste management and remediation services
5621	Waste collection
5622	Waste treatment and disposal
5629	Remediation and other waste management services
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61	Educational services
611	Educational services
6111	Elementary and secondary schools
6112	Community colleges and CEGEPs
6113	Universities
6114	Business schools and computer and management training

NAICS Industry

6115	Technical and trade schools
6116	Other schools and instruction
6117	Educational support services
62	Health care and social assistance
621	Ambulatory health care services
6211	Offices of physicians
6212	Offices of dentists
6213	Offices of other health practitioners
6214	Out-patient care centres
6215	Medical and diagnostic laboratories
6216	Home health care services
6219	Other ambulatory health care services
622	Hospitals
6220	Hospitals (6221 to 6223)
623	Nursing and residential care facilities
6230	Nursing and residential care facilities (6231 to 6239)
624	Social assistance
6241	Individual and family services
6242	Community food and housing, and emergency and other relief services
6243	Vocational rehabilitation services
6244	Child day-care services
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71	Arts, entertainment and recreation
711	Performing arts, spectator sports and related industries
7111	Performing arts companies
7112	Spectator sports
7113	Promoters (presenters) of performing arts, sports and similar events
7114	Agents and managers for artists, athletes, entertainers and other public figures
7115	Independent artists, writers and performers
712	Heritage institutions
7121	Heritage institutions
713	Amusement, gambling and recreation industries
7131	Amusement parks and arcades
7132	Gambling industries
7139	Other amusement and recreation industries
72	Accommodation and food services
721	Accommodation services
7211	Traveller accommodation
7212	RV (recreational vehicle) parks and recreational camps
7213	Rooming and boarding houses
722	Food services and drinking places
7221	Full-service restaurants
7222	Limited-service eating places
7223	Special food services
7224	Drinking places (alcoholic beverages)
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81	Other services (except public administration)

NAICS Industry

- 811 Repair and maintenance
 - 8111 Automotive repair and maintenance
 - 8112 Electronic and precision equipment repair and maintenance
 - 8113 Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance
 - 8114 Personal and household goods repair and maintenance
 - 812 Personal and laundry services
 - 8121 Personal care services
 - 8122 Funeral services
 - 8123 Dry-cleaning and laundry services
 - 8129 Other personal services
 - 813 Religious, grant-making, civic, and professional and similar organizations
 - 8131 Religious organizations
 - 8132 Grant-making and giving services
 - 8133 Social advocacy organizations
 - 8134 Civic and social organizations
 - 8139 Business, professional, labour and other membership organizations
 - 814 Private households
 - 8141 Private households
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- 91 Public administration
 - 911 Federal government public administration
 - 9111 Defence services
 - 9112 Other federal government public administration (9112 to 9119)
 - 912 Provincial and territorial public administration
 - 9120 Provincial and territorial public administration (9121 to 9129)
 - 913 Local, municipal and regional public administration
 - 9130 Local, municipal and regional public administration (9131 to 9139)
 - 914 Aboriginal public administration
 - 9141 Aboriginal public administration
 - 919 International and other extra-territorial public administration
 - 9191 International and other extra-territorial public administration
 - 0 Industry - Not applicable