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*Municipal Revenue Generation in the Calgary and Edmonton Metropolitan Regions and Its Implications for Land Use**

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Introduction

Alberta's municipalities generate local revenue through property taxes, user fees for services, licensing systems, and a host of discretionary tax tools and development-related levies afforded to them by the *Municipal Government Act* (MGA). The most important of these are property taxes, which for Alberta's largest cities, Calgary and Edmonton, accounted for 31.6 percent and 39.0 percent of their respective total revenue in 2014.[1] What makes property taxes unique compared to the many other tax tools available under the MGA, is that they are intrinsically linked to the present use, and by extension the value, of land. This spatial quality, and the relative importance of property taxes to a given municipality's bottom line, has influenced many municipalities in Alberta as they focus on physical growth as a means to increase their revenue base. This growth takes the form of land use intensification – turning undeveloped, agricultural, or brownfield land into a more "profitable" land use – which is either promoted through a municipality's land use policies or even at times undertaken by the municipality itself. The competing priorities of municipalities, in terms of where they plan and approve land development within their boundaries, has led to political conflict between adjacent municipalities.[2] Nowhere in Alberta is this more evident than in the Edmonton and Calgary metropolitan regions, where the expansion of the core cities, rapid residential growth of peripheral urban centres, and the rise of rural residential neighbourhoods and commercial and industrial development in the rural municipal districts has spurred intra-metropolitan competition, harsh words and hurt feelings between municipalities in both metropolitan regions.[3] In this paper, we explore the relationships between municipal finance and metropolitan land use patterns in the Calgary and Edmonton metropolitan areas. In particular, we seek to better understand whether the source of local government revenues and reliance on property taxes impacts municipal governments' development decisions, which are at the heart of the intermunicipal conflict.

The paper is organized into six sections and the main features of each section are summarized as follows. In Section 1, we review two prominent economic models of the impact of property taxation on the extent and timing of land development in urban areas. The Brueckner (2001a) model predicts that greater reliance on property tax will increase sprawl more than a

1. For a general discussion of the current and prospective revenue sources of Calgary and Edmonton, see McMillan and Dahlby (2014b)
2. For past examples see T.J. Plunkett and James Lightbody (1982) for Edmonton or Ghitter and Smart (2009) for Calgary
2. For past examples see T.J. Plunkett and James Lightbody (1982) for Edmonton or Ghitter and Smart (2009) for Calgary
3. For examples see Calgary Herald (2015) "Battle brewing as Chestermere attempts to annex land to block development" from: http://calgaryherald.com/news/local-news/development-battle-brewing-as-chestermere-attempts-to-annex-land-to-block-development accessed on February 15, 2016 or Edmonton Journal (2013) "We're being undercut in the region" from: http://edmontonjournal.com/news/local-news/were-being-undercut-in-the-region accessed on February 15, 2016

personal income or sales tax because it increases the cost of capital which reduces investment in residential structures, resulting in lower population density and an increase the land area of city of a given population size. The Arnott (2006) model indicates that a property tax increase has an ambiguous effect on the timing and the amount of capital invested in residential development, although, for reasonable parameter values, a property tax increase is shown to reduce the amount of capital invested and to delay the timing of the investment. However, the models of taxation and land use developed by Brueckner and Arnott show that the interactions of the key variables—housing prices, land rents, dwelling sizes, the timing of development—are complex, and the consequences for land use are difficult to predict in more realistic contexts. This means that effects of local property taxes and other local government revenues on land usage are basically an empirical question. In order to set the stage for that empirical analysis, we summarize the findings of the most important empirical study on the determinants of sprawl by Burchfield et al. (2006). That study used land use data for 275 U.S. metropolitan areas in 1976 and 1992 to identify some of the geographical, physical and governance characteristics of metropolitan areas that affect sprawl. The only public finance variable that was included in the Burchfield et al. study was per capita intergovernmental transfers. As a result, it provides limited insights into the role of local taxation on the determinants of land use and sprawl.

In Section 2, we summarize the empirical results from the companion technical study conducted by McMillan (2016) on the impact of local public finances on sprawl.[4] McMillan's study combines public finance information from the Lincoln Land Institute's Fiscally Standardized Cities database[5] with 83 observations from the Burchfield et al. data base. His econometric results indicate that local public finance matters and that greater reliance on property taxation reduces sprawl. McMillan then uses the econometric results to show that Calgary and Edmonton's reliance on property taxes and user charges reduces sprawl in the Alberta metropolitan regions by 15 to 30 percent. One implication of these results is that sprawl is predicted to increase by eight percent in Calgary and 16 percent in Edmonton if these cities gain new tax powers under new city charters and they reduce their reliance on property taxes to the average of the 83 U.S. cities.

In Section 3, we introduce the study areas – the metropolitan regions centred on the cities of Calgary and Edmonton. These metropolitan regions have been developed by combining the

4 McMillan (2016) "Municipal Revenue Generation and Metropolitan Land Use (Technical Paper)" *Forthcoming*
5. Lincoln Institute of Land Policy, Fiscally Standardized Cities, http://www.lincolninst.edu/subcenters/fiscally-standardized-cities/ accessed on August 15, 2015

municipalities within the respective Census Metropolitan Areas with the municipalities within the regional planning frameworks in place in both regions.

In Section 4, we then describe the growth and distribution of population, as well as location of residential, commercial, and industrial construction in the Calgary and Edmonton metropolitan regions. In the Calgary Region, the total population grew by 28 percent between 2002 and 2012. While the populations some of the smaller urban municipalities, such as Chestermere, Okotoks, and Airdrie, more than doubled over this period, the population of the city of Calgary still accounted for 74 percent of the total population growth in the region. The city of Calgary's share of the metropolitan region's population only declined from 85.6 percent in 2002 to 83.1 percent in 2012 in spite of the rapid growth of the other urban centres in the region. While the populations of the MD of Foothills and Rocky View County grew at a similar rate as Calgary, they only accounted for 2 percent of the total regional population growth. Consequently, there has not been a marked increase in the share of the population living in the rural areas. The same pattern can be seen in the Edmonton metropolitan region where the total regional population grew by 25 percent between 2002 and 2012. During this period, the city of Edmonton grew at 23 percent, representing 66 percent of the total population growth in the region, while multiple urban municipalities over 10,000 (Beaumont, Fort Saskatchewan, Leduc, Spruce Grove, and Stony Plain) grew more rapidly than Edmonton, collectively they accounted for only 17 percent of the region's population growth. The municipal districts in the Edmonton Region, with the exception of Strathcona County, accounted for only a negligible percentage of the region's population growth over the decade. In summary, the core cities in both metro regions have been the sites of the majority of the population growth over the period 2002 to 2012.

This population growth drives new residential development which we track using building permit data. The city of Calgary's share of new residential construction declined from almost 90 percent in 1988 to 68 percent in 2008, but then rebounded to 75 percent of the regional total in 2014. While the shares of the other urbans areas—such as Airdrie, Cochrane, and Chestermere—have increased, the shares of new residential construction in the municipal districts in the Calgary metropolitan region have remained relatively constant. However, the average values of the new units constructed in Rocky View and Foothills are more than twice the average value in Calgary or Airdrie, indicating that the per unit residential property tax bases of Rocky View and Foothills have increased faster than in the urban areas. Compared to Calgary, a higher percentage of the Edmonton region's new residential construction has occurred outside of the city Edmonton because the Edmonton Region has larger urban centres outside the core city and because of the growth of Sherwood Park which is located in Strathcona County.

However, since 2000, Edmonton's share of new residential construction has increased, and in 2014 it was 73 percent of the total. As in the Calgary Region, the average value of units constructed in the municipal districts has been much higher than in the city of Edmonton.

With regard to both new commercial and new industrial development, the Edmonton Region has become more decentralized over the last three decades, with a significant increase in the shares of new commercial and industrial building permits in Leduc County with the growth of Nisku and in Strathcona County with the growth of Sherwood Park. In contrast, Calgary has retained is dominant share of commercial and industrial development.

In Section 5 we describe the regional planning frameworks that were developed to control development in the Calgary and Edmonton Regions – the Calgary Regional Partnership and the Capital Region Growth Board. Both of which arose in the vacuum that ensued when the Klein Government dismantled the system of Regional Planning Commissions that had effectively controlled regional development in Alberta since the 1950s.[6] These organizations and their regional plans – the Calgary Metropolitan Plan and the Capital Region Growth Plan – direct where growth should occur in their regions to varying degrees of success; something the Notley Government has promised to strengthen with future revisions to the Municipal Government Act.

In Section 6, we describe trends in property taxation, the largest own-source revenue for the municipal governments in the Calgary and Edmonton regions. Our analysis shows that there are substantial differences in the per capita revenues raised by some of the municipal districts and the urban municipalities because the former are able to tax machinery and equipment and linear property or, in the case of Leduc County, commercial and industrial property. The main exceptions are the municipal districts of Foothills and Rocky View in the Calgary Region which currently do not receive substantial amounts of non-residential property tax revenues. In the Edmonton Region, the three municipal districts (especially Lamont County) and the city of Fort Saskatchewan impose relative high non-residential property tax rates and they have relatively low residential property tax rates. Whether the low residential property tax rates in these municipalities have resulted in more residential development is difficult to assess. It is possible that the residential property tax differentials with the city of Edmonton and the other urban municipalities in the Edmonton Region have been capitalized in the value of the land zoned for housing developments and therefore eroded the advantage of building new residences in these

6. Alberta's long history of regional planning began with the District Planning Commissions established in the Town and Rural Planning Act of 1950.

municipalities.[7] The new petrochemical and associated industrial projects in the Industrial Heartland Region are relatively limited in location choice because of siting requirements and agglomeration effects. This has allowed the municipalities in this region to have relatively high non-residential tax rates without displacing these investments to other regions. In the Calgary Region, the competition between the city of Calgary and the neighbouring municipal districts of Foothills and Rocky View is over relatively "footloose" commercial and industrial developments. The convergence of the non-residential tax rates in this region could be interpreted as evidence of competition for these geographically mobile projects, although this explanation seems, at least on the surface, inconsistent with the increases in non-residential mill rates in Foothills and Rocky View.

To conclude, we summarize our observations on the implications of municipal revenue generation on metropolitan land use.

7. See Chaudry-Shah (1989) and Shah (1992) for studies of property tax capitalization in the Edmonton metro region in 1977 which found full capitalization of tax variations and partial capitalization of service differentials.

1. Literature on Municipal Revenue Generation and Land Development

Land development is fundamentally driven by market forces arising from population increase, rising incomes and low(er) commuting/travel costs. As Brueckner (2001b) notes, development may not be welfare maximizing because of market failures such as: [8]

- commuters do not pay the marginal social costs of congestion and pollution or the construction and maintenance costs of road and freeways, leading to pressures to make excessive investment in road infrastructure,
- new development on the periphery may be subsidized with developers paying less than the marginal cost of roadways, utilities and other infrastructure, and
- the externalities generated by agricultural land and open space may not be properly reflected in land prices.

The basic problem (at least from the economist's perspective) is to get the prices right so the market allocates land to its valuable uses from a broad social perspective. Given the often expressed concerns over perceived inefficient development of land, i.e. sparse residential densities referred to as "sprawl", a range of possible causes and potential solutions has been considered, including the way municipal governments' revenues are generated.

Economists have developed models of the effect of municipal revenue generation on land development, two of which are of particular importance to this paper. Brueckner (2001a) develops a spatial model of a city, with a fixed number of residents, to analyze of the effect of property taxes on population density. Residential development involves investments of capital on land to produce dwellings of a fixed size (a given number of square feet). More capital invested per unit of land results in taller structures, more dwellings per unit of land, and higher population density. Commuting costs vary with distance to the center of the city. As a result, housing prices are higher the closer the dwelling is to the center of the city and land rents decline with distance from the center. The geographic area of the city is determined by the condition that land rent from residential development at the city's boundary is equal to the rent obtained from agricultural land use. In the context of this model, a property tax increase has an income effect and a capital intensity effect on land use. An increase in the property tax, by reducing residents' disposable incomes, changes the slope of the land rent gradient, lowering land rent near the center of the city and increasing it at the existing boundary. This induces an expansion of residential development on existing agricultural property and the population density of the city declines.

8. See Brueckner (2001b) for an empirical study, based on 40 small to modest sized urban areas, on the forces underlying urban expansion, which he identifies as population growth, household income, agricultural land value/rent, and commuting costs.

This income effect is not unique to property taxes and would be generated by any local tax increase, including a local sales tax or a local income tax. However, the property tax also has a capital intensity effect because it raises the cost of capital, and this reduces the amount of capital invested per unit of land, i.e. it becomes relatively more costly to build taller residential structures. This reduces the number of dwellings per unit of land and induces an increase in the area of the city and in turn sprawl. Thus, the Brueckner model predicts that a higher property tax will increase sprawl, perhaps more than other taxes, because of the capital intensity effect that is not present with sales or income taxes. However, Brueckner notes that this conclusion is conditional on a key assumption of the model—that dwelling sizes are fixed. If this assumption were relaxed, a property tax increase would create an incentive to reduce dwelling sizes which would increase population density at any given location, reducing the area of the city and increasing overall population density. With this caveat, Brueckner (2001a, p.13) draws the rather weak conclusion that "property taxation may belong on the list of factors causing inefficient spatial expansion of cites…"

Arnott (2006) develops a model of the timing and intensity of investment in land development. The model assumes that a landowner has a unit of vacant land, and that the rent per unit of floor area of a structure is known and will increase over time. Once a structure is built, it does not depreciate and cannot be redeveloped. The owner maximizes the present value of the income from the property by deciding when to develop it and how much capital to invest, which will determine the density of the development. The model is sufficiently complex that the effect of a property tax increase has an ambiguous effect on the timing, and the amount, of capital invested. However, for reasonable parameter values, a property tax increase is shown to reduce the amount of capital invested and to delay the timing of the investment.[9]

The models of taxation and land use developed by Brueckner and Arnott provide interesting insights, but the interactions of the key variables—housing prices, land rents, dwelling sizes, the timing of development—are complex, and the consequences for land use are difficult to predict, especially in the United States where local governments have access to a variety of revenue sources. While the property tax is a main stay of local government finance in the United States, many municipalities also impose sales taxes and even local income taxes. In this environment, more or less reliance on property taxes implies less or more reliance upon sales or income taxes if tax revenues are to be constant. Thus, there is a trade-off or balance among two or three sources of local tax revenues in most states. The

9. See Arnott (2006, Table 1, p.202).

choice may be a significant determinant of land use because property taxes impose a cost on holding land – a cost that may be particularly significant for undeveloped land. Where local sales and/or income taxes substitute for property taxes, the cost holding property is reduced as the cost of financing local services is shifted from property owners to consumers and income earners. The implications for land use of varying reliance on different tax bases are complicated, but we suspect that a greater reliance on property taxation should discourage sprawl. For example, reliance on sales taxation may encourage sprawl if new commercial developments occur on the fringe of the metropolitan area if municipalities in the urban hinterland impose lower sales tax rates than the core city.[10]

For us, the effect that local public finances have on land usage is an empirical question. The most important empirical study on the determinants of sprawl is Burchfield et al. (2006). Their land use data for 275 U.S. metropolitan areas combined that from high-altitude photographs from 1976 with that from satellite images from 1992. Based on the examination of 30 x 30 meter cells, they categorized land as developed (e.g., residential, commercial/industrial, transportation) or undeveloped /open (e.g., agricultural, wetland, forest). The analysis focused on the percentage of open space in the square kilometer surrounding the average residential development in the metro area. Potential determinants of sprawl (or openness, scatteredness, fragmentation of development) were identified from urban economics (e.g., the monocentric city model), geographical features and political influences. The importance of intergovernmental transfers to local governments was included among the political factors. It was the only public finance variable included. Burchfield et al. (2006, p. 625) summarize their results as follows:

> We find that sprawl is positively associated with the degree to which employment is dispersed; the reliance of a city on the automobile over public transport; fast population growth; the value of holding on to undeveloped plots of land; the ease of drilling a well; rugged terrains and no high mountains; temperate climate; the percentage of land in the urban fringe not subject to municipal planning regulations; and low impact of public service financing on local taxpayers.

The authors' conclusion that public finances have little impact upon sprawl is based on a quite limited analysis—per capita transfers was the only public finance variable included in their regression equations. While transfers to municipal governments may play some role, other key components of local public finance are local taxes and user charges. Our objective is to provide more detail on local public finance in an effort to ascertain its role in land use.

10. For example see Burnes et al. (2014).

2. Empirical Analysis of the Impact of Local Public Finances on Sprawl

In an accompanying technical paper to our study, McMillan (2016) utilizes observations on sprawl for 83 metropolitan areas in the United States from the Burchfield et al. database for which detailed public finance information is available from the Lincoln Land Institute's Fiscally Standardized Cities database. Across the 83 metropolitan areas, property taxes averaged 72.4 percent of the total taxes collected in 1977. Conveniently for our purposes, there is a wide range in the relative contribution of property taxes; from 28.1 to 99.5 percent of total taxes with a standard deviation of 17.1. The other taxes are primarily sales taxes, individual income taxes, and miscellaneous taxes. User charges are also an important source of local government revenue and may affect land use. The user charges selected are those related to land use and widely employed by cities. Specifically those included are water, sewerage and solid waste revenues, special assessments (for local improvements) and "other" charges. To provide an indicator of their relative magnitude, user charges are measured as a percentage of total taxes.

Intergovernmental transfers are also an important source of revenue and are, on average, the equivalent of 112.1 percent of total taxes. However, the variation across the metro areas is large, from 46.3 to 254.4 percent with a standard deviation of 38.7. The reason for the magnitude of intergovernmental transfers is that the standardized data includes school districts and schools are heavily supported by grants, particularly grants from the state governments. On average, school districts obtain about one-half their funding from transfers (and over 40 percent from property taxes).

2.1 The Econometric Model

Here we focus on the regression models to explain the measures of sprawl in the 83 metropolitan areas in 1992. A set of regression results summarizing the analyses is reported in **Table 1**. All four regressions include a broad selection of the Burchfield et al. variables plus the extension of the public finance variables noted above. Econometric analysis on this data set also led to some modifications of the Burchfield et al. regression specifications; for example, substituting latitude for heating degree-days.

The variables in the **first regression** equation with significant coefficients are streetcar ridership in 1902, the percentage of the urban fringe overlying aquifers, cooling degree-days, latitude, percentage of the fringe incorporated in 1980, population growth from 1960 to 1976 and that from 1976 to 1992, and property taxes as a percentage of total taxes.

The **second regression** omits streetcar passengers and adds population in 1976. This change demonstrates the relatively high correlation between the two variables (0.57). Streetcar usage in 1902

was included to indicate urban centers historical less friendly to automobile use. But streetcar ridership is highly correlated with population and cities with larger populations normally have higher land values, which should discourage undeveloped open space and sprawl. When the 1976 population replaces streetcar passengers, population size has a significant coefficient, and it has a negative effect on sprawl. Otherwise the regression results are essentially unchanged.

The **third regression** includes the Burchfield et al. variables associated with the monocentric city model. Those include streetcar passengers, and it is the only variable of the group with a statistically significant coefficient. As to be expected, the fit improves with the R^2 increasing to 0.61 from 0.56. Otherwise, except for a reduction in the size of the 1960 to 1976 population growth coefficient, the results are similar to those of the previous two equations.

Regression four is like regression three, but with population in 1976 added. Because of the correlation already noted, neither population 1976 nor streetcar usage has significant coefficients. These results demonstrate the consistency in the variables found to be important in explaining sprawl. Population appears to be a reasonable alternative for historic streetcar passenger ridership and to have its own merits. The population growth variables are highly correlated with decennial population growth and with its standard deviation and are consistently important while those two are never statistically important. The percentage of the urban fringe overlying aquifers contributes to sprawl. The percentage of the fringe incorporated is also a determinant. The combination of cooling degree days and latitude works quite well, although cooling degree-days fluctuates between having and not having a statistically significant coefficient. Finally, the property tax variable has consistently highly significant coefficients, indicating that greater reliance on property taxation is associated with less sprawl. Neither the user charges nor the transfers as a percentage of taxes are ever significant, although the coefficients of the user charges variable are, as expected, consistently negative. The coefficient estimates indicate that property taxes have an economically meaningful impact on sprawl. A ten percent increase in property taxes as a percentage of total taxes from its mean value (i.e., to 77.3 percent from 72.4 percent) reduces the sprawl index by 2.2 percent. The impact of user charges is more tenuous because the variable lacks strong statistical significance. The results suggest a ten percent increase in the role of user charges from their 1977 level (i.e., to 22.6 from 22.4 percent) is associated with a 0.7 percent decrease in sprawl in 1992.[11]

11. In supplementary regressions, user charges appear statistically stronger. The public finance data in the Table 5 regressions are (consistent with Burchfield et al.) for 1977. However, the role of user charges expanded substantially thereafter. For our cities, user charges

Table 1. Extended Regression Results for Sprawl

	Regressions			
	(1)	(2)	(3)	(4)
Centralized-sector employment 1977			-1.1261	-0.91324
			(0.96061)	(0.88143)
Streetcar passengers per capita 1902	-0.02615		-0.02560	-0.01947
	(0.01036)**		(0.01029)**	(0.01369)
Mean decennial % population growth 1920-1970			-0.11618	-0.09848
			(0.15358)	(0.16093)
Std. dev. decennial % population growth 1920-1970			-0.04025	-0.04605
			(0.19105)	(0.19124)
% of urban fringe overlying aquifers	0.09403	0.10184	0.09160	0.09469
	(0.02716)***	(0.02739)***	(0.02431)***	(0.02485)***
Elevation range in urban fringe (m)	-0.00256	-0.00241	-0.00217	-0.00206
	(0.00185)	(0.00223)	(0.00191)	(0.00203)
Terrain ruggedness index in urban fringe (m)	0.32962	0.38684	0.35219	0.36720
	(0.25769)	(0.29056)	(0.27117)	(0.28209)
Mean cooling degree-days	-0.00649	-0.00526	-0.00560	-0.00526
	(0.00324)**	0.00341	(0.00328)*	(0.00336)
Latitude	-1.06110	-0.94774	-1.15519	-1.09369
	(0.53198)**	(0.55931)*	(0.50593)**	(0.51363)**
% of urban fringe incorporated 1980	-0.24786	-0.21998	-0.22209	-0.21289
	(0.10284)**	(0.10665)**	(0.10940)**	(0.11514)*
Population 1992_1976	0.12249	0.12779	0.11170	0.11122
	(0.03848)***	(0.03791)***	(0.03403)***	(0.03501)***
Population 1976_1960	-0.19961	-0.20006	-0.13226	-0.14062
	(0.05317)***	(0.05283)***	(0.05839)**	(0.05715)**
Population 1976		-0.00105		-0.00051
		(0.00045)**		(0.00084)
Property tax as percentage of total taxes	-0.13729	-0.12407	-0.12259	-0.12489
	(0.04623)***	(0.04488)***	(0.04504)***	(0.04623)***
Charges as percentage of total taxes	-0.07993	-0.08656	-0.09689	-0.12205
	(0.09586)	(0.09580)	(0.09221)	(0.09073)
Transfers as percentage of total taxes	-0.00510	0.00400	0.00368	0.00658
	(0.02987)	(0.02997)	(0.02726)	(0.02782)
Constant	111.075	101.489	133.013	126.567
	(21.499)***	(23.401)***	(30.264)***	(28.513)***
Observations	83	83	83	83
R^2	0.5613	0.5654	0.6118	0.6223

Note: Heteroskedastic-consistent standard errors are reported in brackets.

as a percentage of tax revenue increased from 22.4 percent in 1977 to 31.1 percent in 1992. The 1977 user charge variable was negative and significant at the ten percent level in explaining the 1976 sprawl indexes. Also, when the 1992 user charge data were introduced into equation 4 of Table 5, the variable was negative and significant at the ten percent level. Thus, user charges appear to have greater importance than indicated by the results in Table 5 alone.

2.2 Implications for Alberta's Metropolitan Regions

Given the broad similarity of local government, local public finance and of many geographic/ environmental features in the U.S. and in Canada, it seems reasonable that the results above can offer insights into the nature of sprawl in the Calgary and Edmonton Regions.[12]

This exploration into the influences on sprawl considers the effects predicted on sprawl in Calgary and Edmonton (using the results of equation #4). Begin by noting the average (and the predicted) sprawl index value for the 83 observations analyzed in this study. That value, 40.6, is reported in the initial column of **Table 2** for ease of comparison. The remaining columns report the estimated sprawl index values when the geographic, population and public finance characteristics of Calgary and Edmonton are introduced while the other characteristics are held at the U.S. cities' mean values. The stepwise sequence reveals the impacts on sprawl of these three sets of characterizing features. The analyses also demonstrate the implications of some modest differences between Calgary and Edmonton.

Table 2. Predicted Sprawl Index Values for Alberta Metropolitan Regions

Alberta Metro Region	Mean Value of 83 Observations	Predicted Sprawl Indexes Allowing for Alberta Metro Region Characteristics				
				Geography, Population and Public Finance		
		Geography	Geography and Population	Property tax only included	User Charges only included	Property tax and user charges combined
	Sprawl in 1992					
Calgary	40.6	33.2	32.4	30.2	29.8	27.6
Edmonton	40.6	31.6	30.5	27.0	24.8	21.3

Note: The estimates are based on equation 4 in Table1.

The geographic characteristics of Calgary and Edmonton reduce the predicted sprawl measures considerably from the U.S. cities' mean. For Calgary, the value is 33.2 versus 40.6. The population growth characteristics reduce the value further but only to 32.4. It is from this value for Calgary, and 30.5 for Edmonton, that further changes must be compared. The potential impacts of public finances are of prime interest in this analysis. The regression results indicated that a greater reliance on property

12. Because of the temporal variability of the level of transfers and the questionable comparability with US institutions, we ignore the impact of transfers on sprawl. Furthermore, its coefficient estimates were small, were never significant in the regressions, and the implications of the levels in Calgary and Edmonton are minor in part because they did not diverge much from the observed mean for the 83 US observations.

taxes reduced the index of sprawl.[13] Both Calgary and Edmonton rely heavily on property taxation. In addition to the municipal property taxes, there are provincial (previously local school board) school property taxes and those are included in the tax measures. In 2011, property taxes represented 100 percent of the total taxes collected by the City of Edmonton and 89.9 percent of those collected in Calgary. The lower level in Calgary reflects business taxes levied by the city.[14] Edmonton recently abandoned its business taxes replacing them with an increase in the property tax rate applying to commercial and industrial property. The reliance on property taxes in the Alberta metro areas is high relative to that in most U.S. metro areas where property taxes in 1977 averaged 72.4 percent of total local taxes for our 83 observations.[15]

The heavy reliance on property taxes in Calgary and Edmonton is estimated to reduce the sprawl indexes about ten percent – somewhat more in Edmonton and somewhat less in Calgary. For example, the geographic and population characteristics of Calgary yield a predicted sprawl index of 32.4, but when Calgary's reliance on property taxation is introduced, the predicted sprawl index declines to 30.2 (a seven percent reduction). For Edmonton, the reduction is 11.5 percent. These calculations assume no other changes in the public finance variables.

Accounting for differences in fees for local government services is somewhat more complicated. User charges for the U.S. cities consisted mostly of charges for water, sewer and solid waste services. The amounts are relatively modest, averaging 22.4 percent of total taxes for our metro areas although they are said to be gross revenues of those operations. Edmonton especially, but also Calgary, has a history of charging for services and especially for utilities. Estimates of comparable user fee revenues in Calgary and Edmonton (in 2011) are relatively large compared to the levels in the U.S. cities. User fees as a percentage of total taxes are calculated to be 44 and 69 percent respectively. While the Calgary figure is comparatively large, the 69 percent level in Edmonton is beyond the 50.7 percent largest value for the U.S. cities. Nevertheless, the Calgary and Edmonton values are introduced to estimate the possible effects of charges.

The impact of user charges in Calgary is estimated to lower sprawl to 29.8 from the 32.4, the level predicted by the geographic and population characteristics. This reduction is comparable to that

13. Information on the cities' public finances in 2011 and 1996 and a history of local government finance in Alberta are found in LeSage and McMillan (2010) and Dahlby and McMillan (2014b).
14. It might be argued that business taxes are sufficiently related to property to be considered property taxes but we make the distinction here.
15. Only 13 of those 83 had property taxes exceeding 90 percent of total taxes. If one excludes those 13, the average percentage is 67.9 percent. So, where the reliance on property taxes is low(er), about one-third of tax revenues come from other taxes (primarily local sales taxes). Local income taxes exist in some areas.

predicted for the effect of the higher level of property taxes in Calgary. For Edmonton, where user charges are a higher percentage of taxes (69 percent versus 44 percent in Calgary), the impact on sprawl is greater – a 19 percent reduction from the 30.5 the sprawl index implied by its geographic and population characteristics to a sprawl index of 24.8.

When the property tax and the user charge values are combined to predict sprawl, the index for Calgary falls by 15 percent from 32.4 to 27.6. The estimated impact in Edmonton is also greater – a 30 percent decline from 30.5 to 21.4. A simple assessment of the numbers suggests that about 40 percent of the decline in the estimated sprawl indexes for Calgary and Edmonton is attributable to the importance of the property taxes and about 60 percent is due to the high level of charges. That apportionment, however, needs to be viewed with caution because there is considerably less statistical confidence in the role of charges. Nevertheless and although the charge levels in Calgary and Edmonton strain the range of the data used in the regressions, the results do suggest that charges for major local services may have a noticeable negative impact on the scatteredness of residential development.

Even the modest differences between Calgary and Edmonton imply some interesting differences for sprawl. The difference in the property tax reliance in the two cities (89.9 percent in Calgary and 100 percent in Edmonton) indicates that the negative effect on sprawl in Edmonton is over 50 percent larger than in Calgary. Similarly, comparatively higher charges in Edmonton (69 versus 44 percent of total taxes), imply twice the impact on the stock sprawl indexes in Edmonton compared to Calgary. That is, even at the Alberta levels, differences in public finance matter to the degree of sprawl in a metro area.

One implication of these results concerns the predicted effects on sprawl if Calgary and Edmonton are granted city charters and gain new tax powers.[16] If the two cities imposed alternative local taxes that reduced the reliance on property taxes to 72.4 percent, the average of the 83 U.S. cities, sprawl is predicted to increase by eight percent in Calgary and 16 percent in Edmonton.

16. The cities signed a memorandum of understanding on charters with the provincial government in 2014. See http://www.municipalaffairs.alberta.ca/documents/1007-Framework-Agreement-for-Charters-Oct-2014.pdf. For some discussion of the various pressures for alternative taxes, see Dahlby and McMillan (2014a).

3. Alberta's Metropolitan Regions

In the remainder of this paper, we describe population growth, economic development and sources of municipal government revenues in the Calgary and Edmonton Regions. In defining both metropolitan regions, we have chosen to integrate the list of municipalities within the Statistics Canada Census Metropolitan Areas (CMAs) with the municipalities in the metropolitan planning frameworks in place around Calgary (the Calgary Regional Partnership) and Edmonton (the Capital Region Board), as shown in **Table 3**. Importantly, for the Calgary metropolitan region we have included the four municipal districts that withdrew from the planning framework as well as the municipalities that are in the process of withdrawing from the regional plan. While the planning frameworks incorporate municipalities that at first glance may seem peculiar – either in terms of distance between the core-city and the peripheral urban municipality, such as Edmonton to Lamont (74 km) or Calgary to Nanton (92 km), or population with Wabamun at 661 residents and Beiseker at 785 – the CMAs, in particular Calgary's, do not account for municipalities that are important players in the regional economy, such as the municipal district of Foothills and the town of Okotoks.

Municipalities in each metropolitan region, illustrated in **Figures 1 and 2**, have been organized into three categories: 1) the core cities of Calgary and Edmonton, 2) the peripheral urban municipalities which include the smaller cities, towns and villages, and 3) the rural municipal districts, which includes Strathcona County. Federally administered Indian Reserves, Summer Villages (a form of urban secondary residence municipality) and the Townsite of Redwood Meadows have been excluded in this analysis.

Table 3. Municipalities within Alberta's Metropolitan Regions by Population in 2011

Calgary Metropolitan Region (19 municipalities)

Name	Status	CMA (8)	CRP (14)	Pop.
Calgary	City	Y	Y	1,096,833
Airdrie	City	Y	Y	42,564
Rocky View County	MD	Y	F	36,461
Okotoks	Town	N	Y	24,511
Foothills No. 31	MD	N	F	21,258
Cochrane	Town	Y	Y	17,580
Chestermere	Town	Y	Y	14,824
High River	Town	N	Y	12,920
Strathmore	Town	N	Y	12,305
Canmore	Town	N	W	12,288
Wheatland County	MD	N	F	8,285
Banff	Town	N	W	7,584
Crossfield	Town	Y	F	2,853
Black Diamond	Town	N	Y	2,373
Turner Valley	Town	N	Y	2,167
Nanton	Town	N	W	2,132
Bighorn No. 8	MD	N	F	1,341
Irricana	Town	Y	Y	1,162
Beiseker	Village	Y	N	785

Y=Yes
N=No
F=Former
W=Withdrawing

Edmonton Metropolitan Region (25 municipalities)

Name	Status	CMA (23)	CRB (24)	Pop.
Edmonton	City	Y	Y	812,201
Strathcona County	SM	Y	Y	92,490
St. Albert	City	Y	Y	61,466
Parkland County	MD	Y	Y	30,568
Spruce Grove	City	Y	Y	26,171
Leduc	City	Y	Y	24,279
Sturgeon County	MD	Y	Y	19,578
Fort Saskatchewan	City	Y	Y	19,051
Stony Plain	Town	Y	Y	15,051
Leduc County	MD	Y	Y	13,541
Beaumont	Town	Y	Y	13,284
Morinville	Town	Y	Y	8,569
Devon	Town	Y	Y	6,510
Lamont County	MD	N	Y	3,872
Gibbons	Town	Y	Y	3,030
Calmar	Town	Y	Y	1,970
Redwater	Town	Y	Y	1,915
Lamont	Town	N	Y	1,753
Bon Accord	Town	Y	Y	1,488
Legal	Town	Y	Y	1,225
Bruderheim	Town	Y	Y	1,155
Thorsby	Village	Y	Y	951
Warburg	Village	Y	Y	789
Wabamun	Village	Y	Y	661
Spring Lake	Village	Y	N	533

Figure 1. The Calgary Metropolitan Region

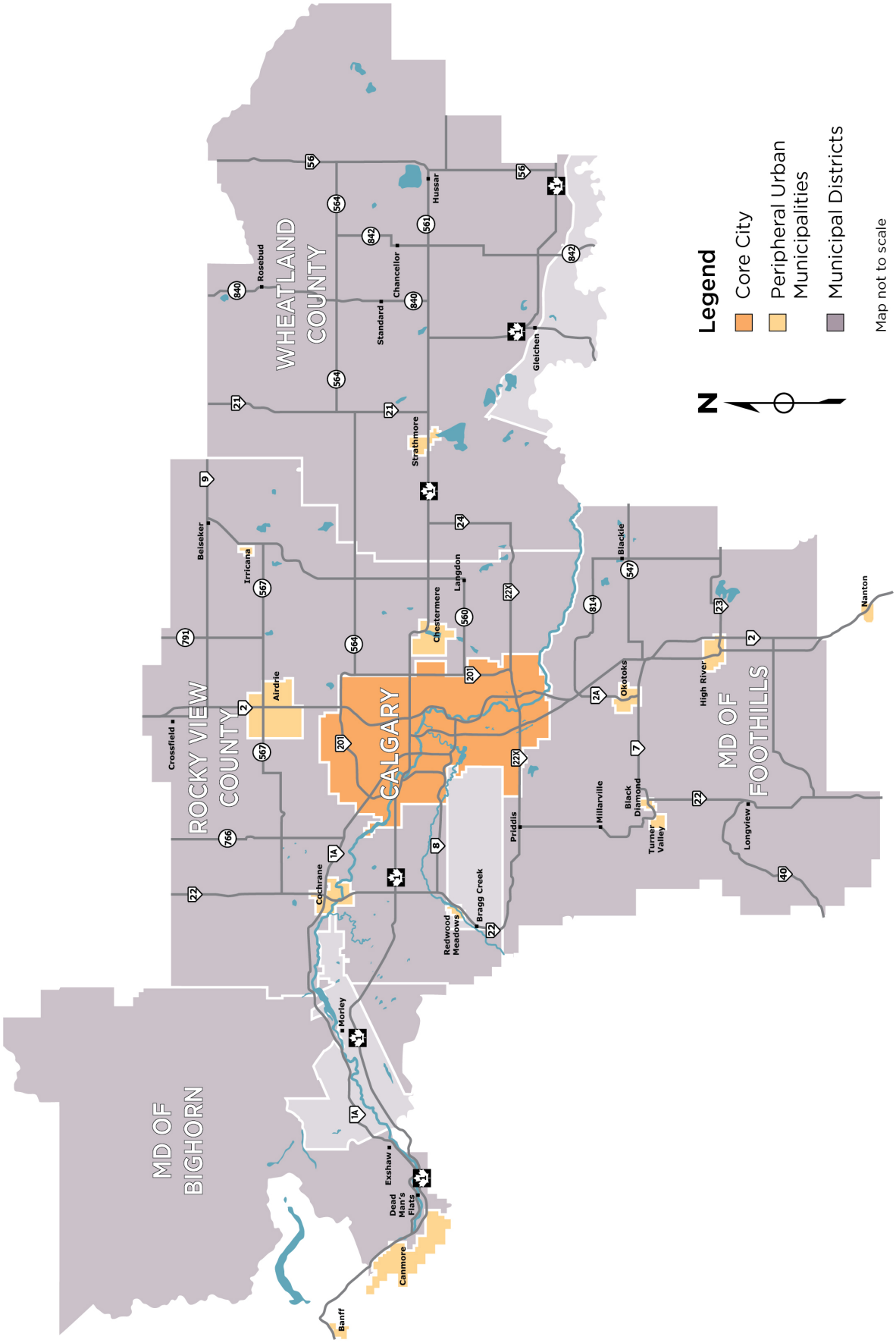
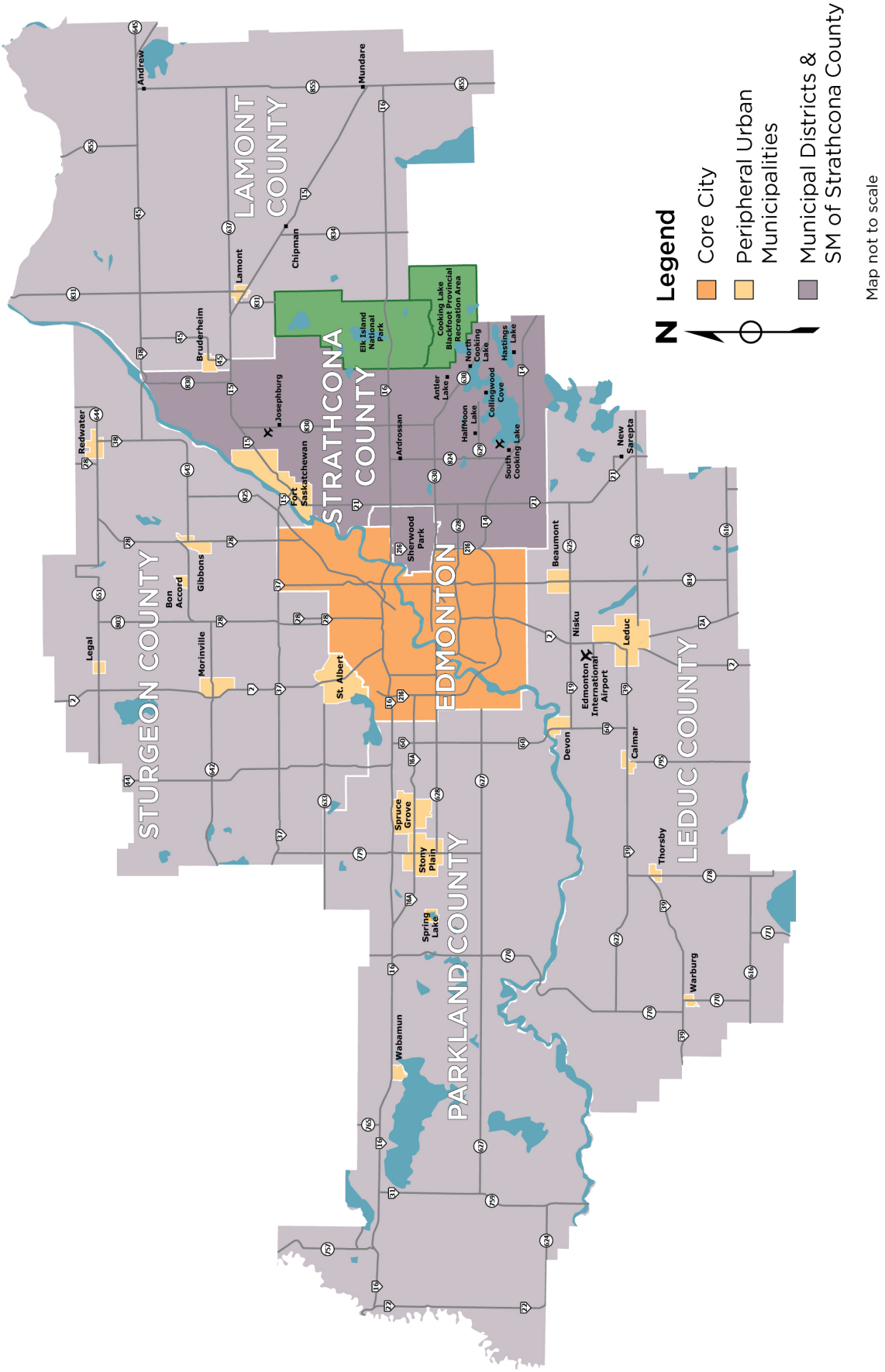


Figure 2. The Edmonton Metropolitan Region



Key to understanding Alberta's metropolitan regions is the fact that the population in each is overwhelmingly concentrated in their respective core-city. As shown in **Table 4,** in 2011 the city of Calgary had 83.1 percent of the region's population, while the remaining 14 peripheral urban municipalities accounted for 11.8 percent and the four municipal districts account for 5.1 percent. Likewise, the city of Edmonton accounted for 69.9 percent of the region's population, while the remaining 19 peripheral urban municipalities accounted for 16.3 percent and the municipal districts accounted for 13.8 percent.

Table 4. Share of Population in Alberta's Metropolitan Region Municipalities in 2011

Metropolitan Region	Metropolitan Population	Percentage in the Core City	Percentage in Other Urban Centres	Percentage in Municipal Districts
Calgary	1,320,226	83.1	11.8	5.1
Edmonton	1,161,568	69.9	16.3	13.8

When comparing the Calgary and Edmonton Regions, a major difference in the degree of concentration in the respective core-cities. In the Calgary Region, this concentration of 83.1 percent is largely the result of incremental annexations that have allowed Calgary to maintain control over its immediate environs. As noted by Sancton (2005):

> The official position of the City of Calgary is to maintain at least a 30-year supply of developable land within its boundaries. Having this land supply allows for the long-term planning necessary to accommodate Calgary's high rate of growth and to facilitate the planning and budgeting of infrastructure (sewers, roads). Periodic annexations are proposed to maintain a long-term land supply. The City claims that its annexation policy is a key part of Calgary's growth management strategy.[17]

As argued by the City its approach to annexation:

> helps ensure that sprawl does not occur, that is, haphazard development, often at very low density. Calgary's planned suburban communities now achieve densities of 6 to 8 dwelling units per acre. This is almost 40% denser than communities built in the 1970's and 1980's, and some 12 to 16 times more land efficient than existing rural residential development outside Calgary's borders.[18]

This approach has been made easier due to the absence of large urban municipalities close to its boundaries since the earlier mentioned major annexations in 1960s. As a result, annexations by the city of Calgary over the last fifty years have consisted of primarily agricultural lands.

17. Andrew Sancton, "The Governance of Metropolitan Areas in Canada" *Public Administration and Development* 25 (2005): 321
18. Calgary City of 2004. Annexation frequently asked questions in Andrew Sancton, "The Governance of Metropolitan Areas in Canada" *Public Administration and Development* 25 (2005): 321

The city of Edmonton's lower share of the metropolitan region's population is largely due to the fact that there are several significantly sized municipalities immediately adjacent to Edmonton, including the Strathcona County (92,490), and St. Albert (61,466). The city of Edmonton tried to annex Strathcona County and St. Albert in 1979; however, the application was highly contentious and was rejected by the approval authority of the day, the Local Authorities Board, after 106 days of testimony.[19]

4. Growth & Development in Alberta's Metropolitan Regions

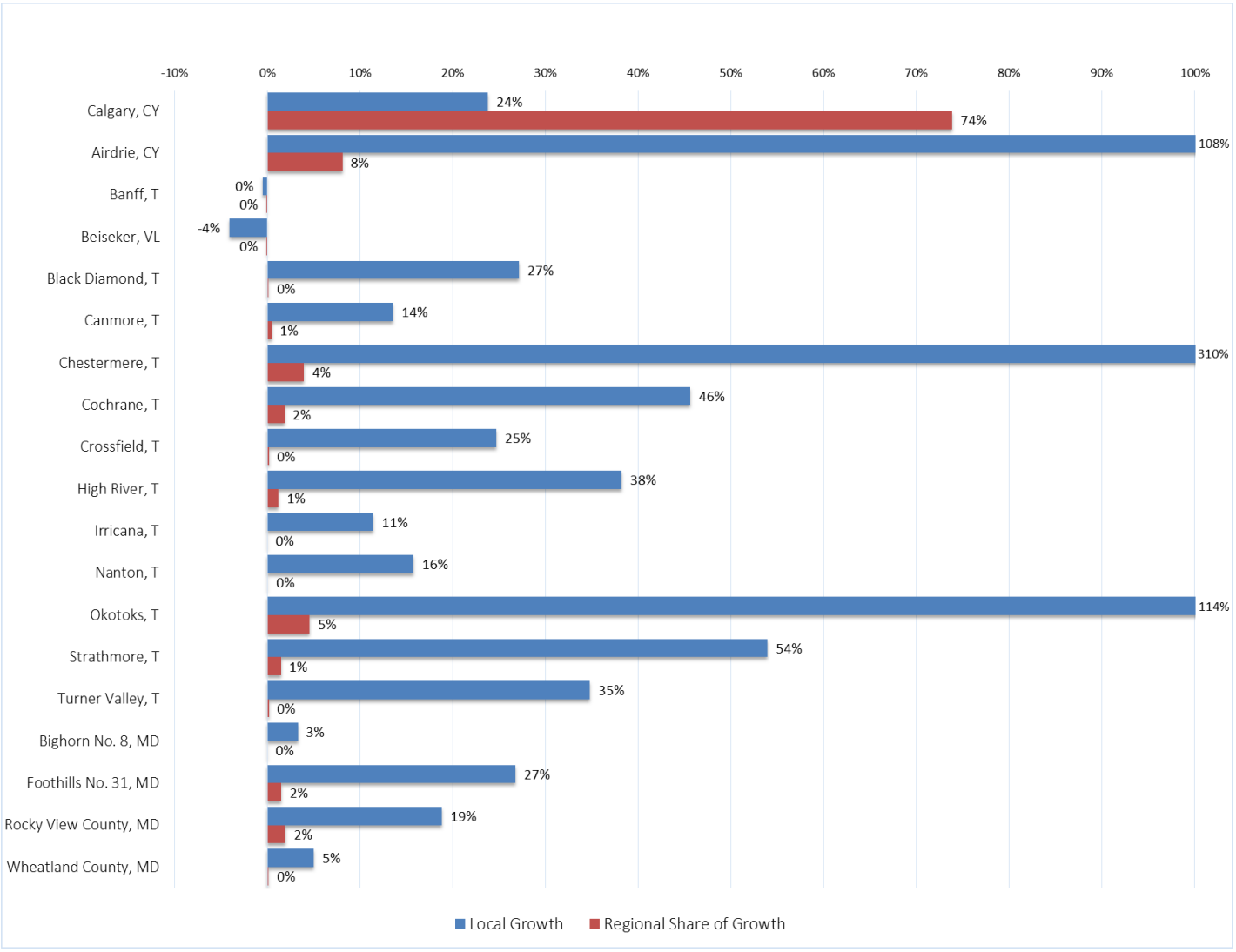
Growth in the metropolitan regions can be explored using two metrics: (1) the net population growth and the share of this growth between municipalities, and (2) the location of residential, commercial and industrial development occurring in each metropolitan region. We explore these components of growth in the following sections.

4.1 Population Growth

Looking first at the Calgary Region (**Figure 3**), the population of the core-city of Calgary grew by 24 percent between 2002 and 2012, a growth rate that was much lower than other urban municipalities such as Chestermere (310%), Okotoks (114%), and Airdrie (108%). However, the larger base population in Calgary (904,987 in 2002) has meant that the city's growth represents 74 percent of the total population growth in the region. The other three municipalities were responsible for four, five and eight percent of regional population growth respectively. The populations of the MD of Foothills and Rocky View County grew by 27 percent and 19 percent respectively, but these municipalities only accounted for only 2 percent of the total regional population growth.

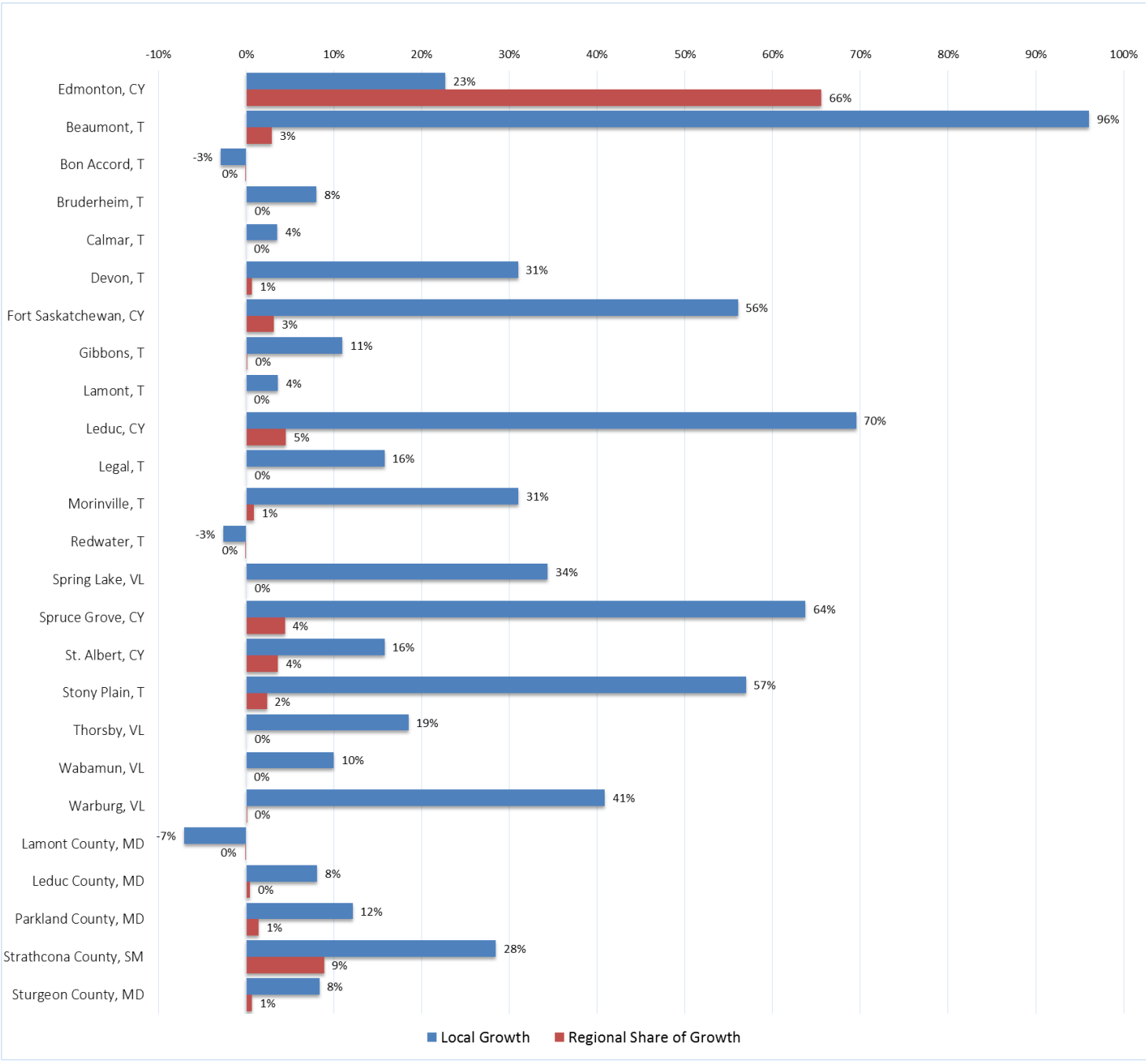
19 T. J. Plunkett and James Lightbody "*Tribunals, Politics, and the Public Interest: The Edmonton Annexation Case*" Canadian Public Policy / Analyse de Politiques, Vol. 8, No. 2 (Spring, 1982): 207

Figure 3. Population Growth within the Calgary Metropolitan Region from 2002 to 2012



The same pattern can be seen in the Edmonton metropolitan region (**Figure 4**). The towns of Beaumont (96%) and Stony Plain (57%), and the cities of St. Albert (64%) and Leduc (70%) show rapid growth but account for only three, two, four and five percent of the regional share in population growth. Whereas the core-city of Edmonton grew at 23 percent, it represented 66 percent of the total population growth in the region. Strathcona County grew 28 percent between 2002 and 2012, representing 9 percent of regional population growth. Growth within the rural municipalities – Leduc County (8%), Lamont County (-7%), Sturgeon County (8%) and Parkland County (12%) – was negligible from a regional perspective. In sum, the core-cities in both metro regions have been the sites of the majority of the population growth over the period 2002 to 2012.

Figure 4. Population Growth within the Edmonton Metropolitan Region from 2002 to 2012



4.2 Residential Development

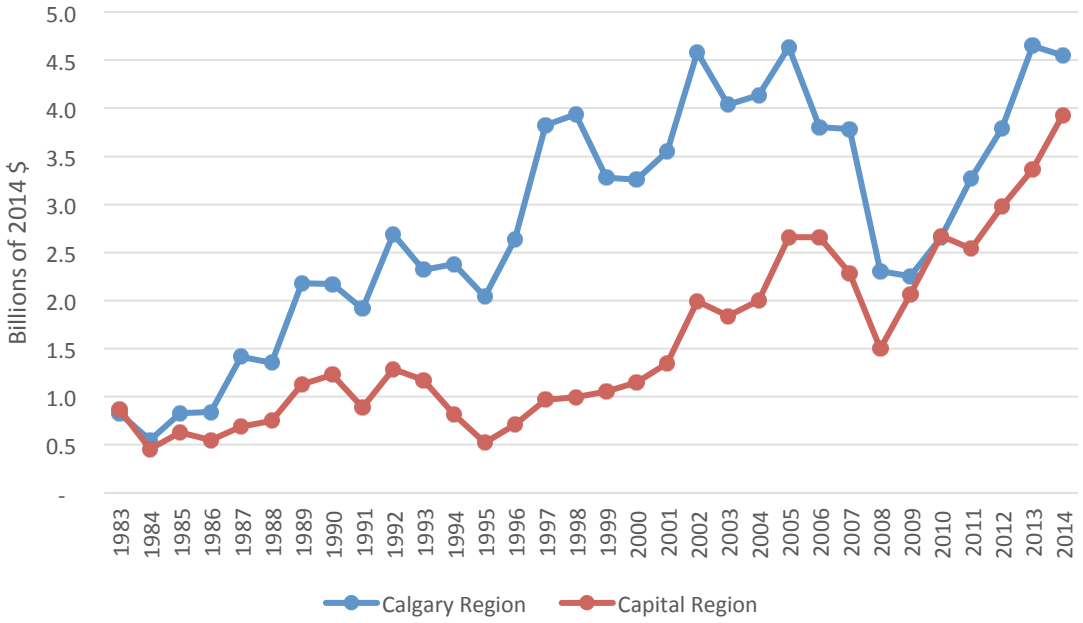
A review of the residential, commercial and industrial building permit data allows us to examine trends in the patterns and locations of development in both metropolitan regions.[20] We begin by

20. The residential, commercial, and industrial building permits data are from Statistics Canada's *Building Permits, Publication 64-001-XWF*. The figures used in this study only include new constructions. The original currency figures were in thousands of dollars, and have been manipulated for ease of presentation. All dollar figures were converted to 2014 dollars for ease of calculations and analysis.

examining the residential building permits issued from 1983 to 2014. Along with rapid population growth came increased demand for, and construction of, new housing.

Figure 5 shows the total value (in 2014 dollars) of residential building permits issued for new construction. Starting from less than $1 billion in 1983, the value of residential building permits increased and peaked at $4.6 billion in 2005. The financial crisis of 2008 to 2010 was the back drop to the sharp drop in residential construction in the Calgary Region, before recovering back to $4.6 billion in 2013. A different pattern of growth is observed in the Edmonton Region. Starting from almost the same level as the Calgary Region in 1983, the value of building permits in the Edmonton Region fluctuated around $1 billion per year until 2000, after which a rapid increase occurred reaching a total value of $3.9 billion in 2014. As in the Calgary Region, the financial crisis and the resulting impact on international oil prices caused a downturn in the value of building permits throughout the Edmonton Region, but the downturn was smaller and the rebound was more rapid than in the Calgary Region.

Figure 5. Value of Residential Building Permits in the Calgary and Edmonton Regions



Where has the new residential construction occurred? **Figures 6 and 7** show the shares of the value of the building permits in the core-cities, peripheral urban areas, and municipal districts within the two metropolitan regions. The city of Calgary's share of new residential construction declined from

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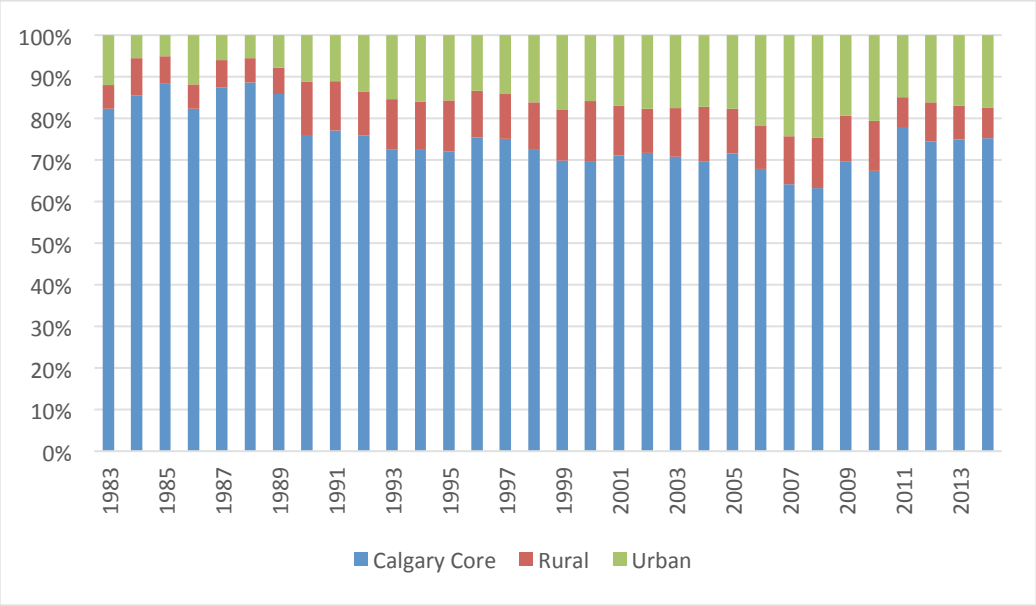
Residential permit values were converted using the new housing price index obtained from CANSIM Table 327-0046. Industrial permit values and commercial permit values were converted using the non-residential building construction price index for industrial structures and commercial structures obtained from CANSIM Table 327-0043.

almost 90 percent in 1988 to 68 percent in 2008. Since then, it has rebounded to 75 percent of the regional total in 2014. **Figure 6** also shows that other urbans areas—such as Airdrie, Cochrane, and Chestermere—have substantially increased their shares of the total new residential construction over this period. By contrast, the share of new construction occurring in rural municipalities—Rocky View, Foothills, Wheatland, and Bighorn—has remained relatively constant. However, one interesting aspect of the pattern of new residential construction is that the average values of the new units constructed in Rocky View and Foothills are substantially higher than the values in either Calgary or Airdrie. Over the entire period, 1983 to 2014, the average value the new residential construction per unit was $593,239 in Rocky View and $493,493 in Foothills, and since 2008, the average value of the building permits in Rocky View was over $750,000 and $640,000 in Foothills. In contrast, the average value of new construction from 1983 to 2014 was $265,294 in Calgary and $231,254 in Airdrie, and the values in recent years are similar to these long term averages. Thus per unit residential property tax bases of Rocky View and Foothills may have increased faster than in Calgary and the other urban areas.

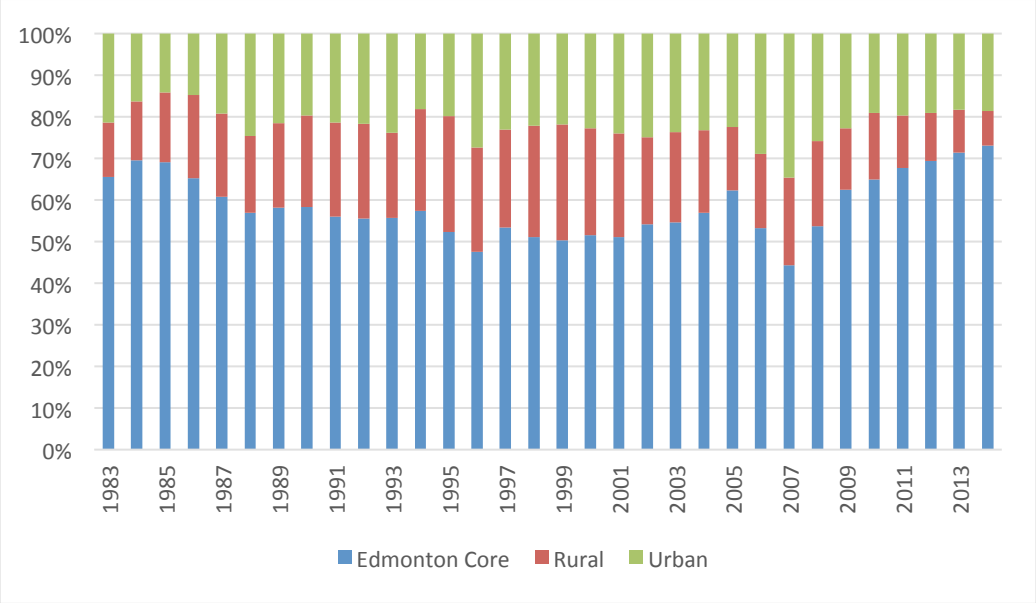
Figure 6. Shares of the Total Value of Residential Building Permits in the Calgary Region



As in Calgary, the city of Edmonton's share of the total value of residential building permits also declined, from 69 percent of the total in the Edmonton Region to 50 percent in 1999. During this period, the percentage of new residential construction in the municipal districts, and in particular Strathcona Country, increased rapidly to 25 percent of the total by 1999. Since that time, and with the exception of

the 2005-2008, Edmonton's share of new residential construction has increased to 73 percent of the total value in 2014. Over the entire 1983 to 2014 period, the new residential units constructed in the Edmonton Region were of similar average value in all of the municipalities, but since 2005 the average value of the units constructed in Sturgeon County, Leduc County, and Parkland County have been significantly higher than those in the Edmonton and the other urban municipalities.

Figure 7. Shares of the Total Value of Residential Building Permits in the Edmonton Region

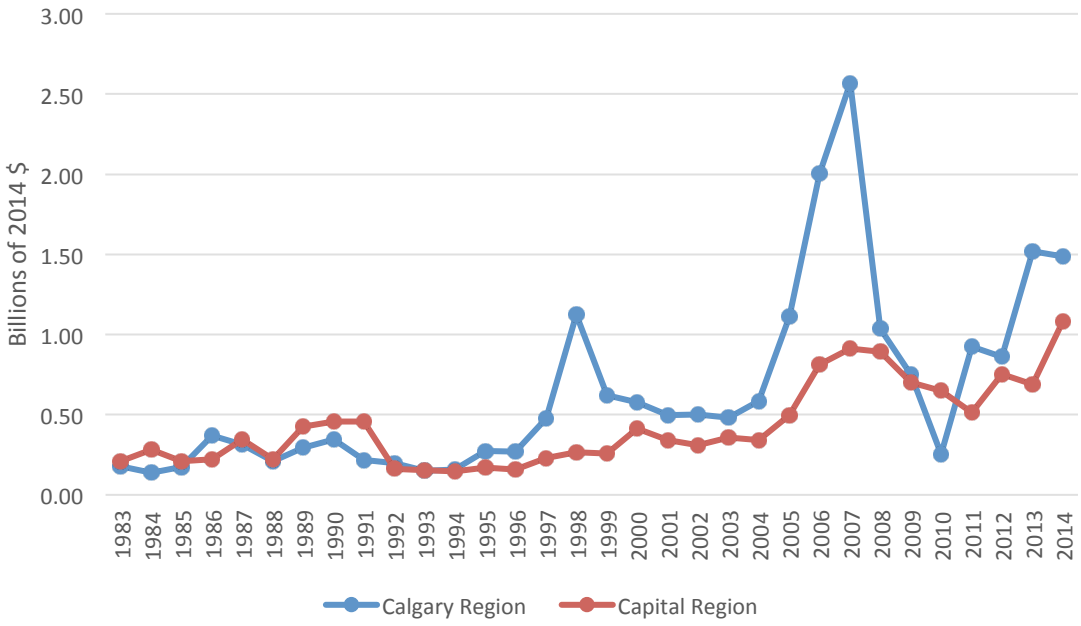


There are significant differences in the trend in residential construction in the two regions. A higher percentage of their respective regions' total has occurred in Calgary than in Edmonton because the peripheral urban municipalities in the Edmonton Region are larger and because of the growth of Sherwood Park in Strathcona County. However, since 2000, Edmonton's share has increased, and in 2014 it was 73 percent, higher than at any other time since 1983, while Calgary's share has stabilized at around 71 percent. Given the current volatility in the local economy, and its impacts on net in-migration, it is impossible to comment on whether these trends will continue in the future. One similar trend in both regions, however, is that the average value units constructed in the neighbouring municipal districts has been much higher than in the core cities, indicating that the population expansions in these districts have resulted in higher per unit property tax bases.

4.3 Commercial Development

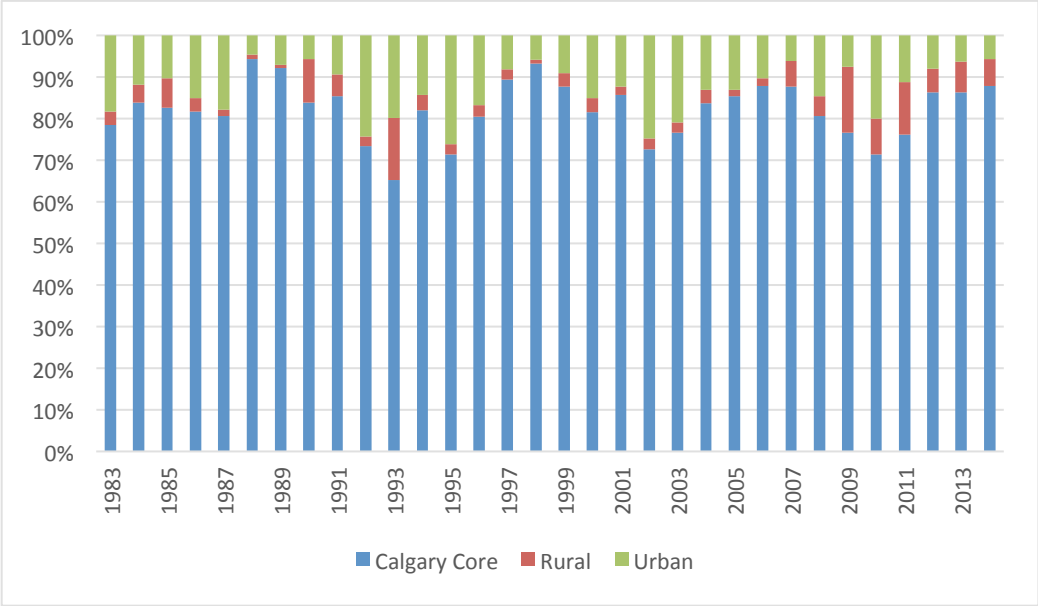
Figure 8 shows the trend in value of building permits for new commercial construction in the Calgary and Edmonton Regions from 1983 to 2014. While the Edmonton Region shows stable growth, there were extreme surges in the value of commercial building permits issued in the Calgary Region in 1998, 2004 to 2008, and 2013.

Figure 8. Value of Commercial Building Permits in the Calgary and Edmonton Regions



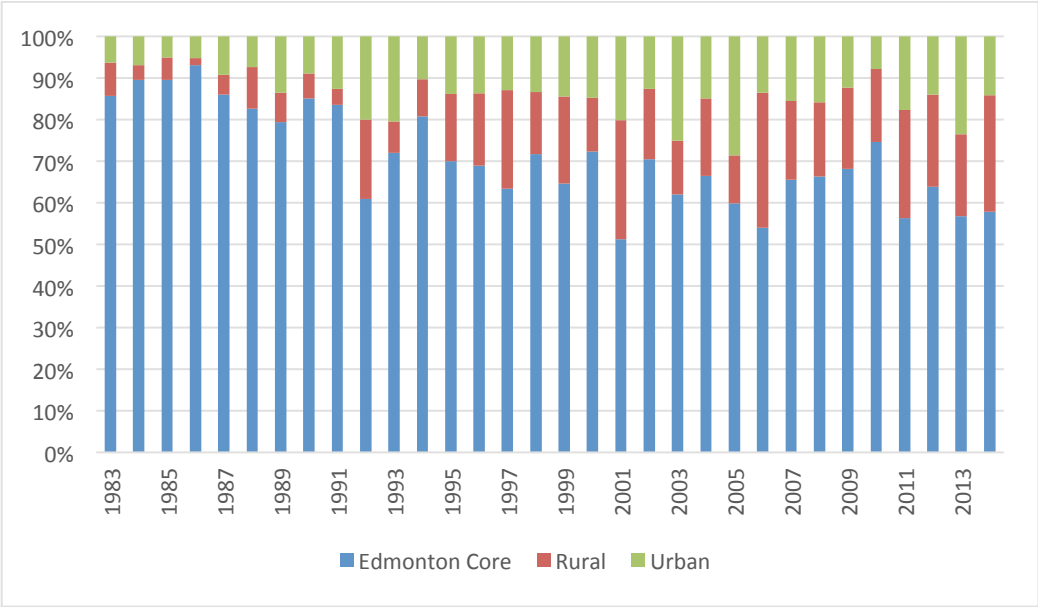
Figures 9 and 10 show the distribution of commercial building permits issue in the core cities, the other urban areas, and the municipal districts in the two regions. Looking at the data, the spike in rural development in 2009 largely occurred in Rocky View County, which is likely related to the construction of the CrossIron Mills shopping centre that opened in August that year and ancillary development around the centre. While development, such as the CrossIron Mills or the Century Downs Casino and Racetrack (opened in 2015) draws attention and economic activity into Rocky View County, the city of Calgary has retained is dominant position in its region with regard to commercial development, having averaged 82 percent of the regional total since 1983.

Figure 9. Shares of the Total Value of Commercial Building Permits in the Calgary Region



In contrast, the city of Edmonton has seen a long term decline in its share of new commercial development, from 87 percent of the regional total in the 1980s to less than 60 percent in the 2011-14 period. There has been a remarkable increase in the share of commercial building permits in the municipal districts, especially in Leduc County with the growth of Nisku and in Strathcona County with the growth Sherwood Park. Over the 32 year period under study, commercial activity in the Edmonton Region has become more decentralized, to the benefit of the adjacent rural municipal districts (including Sherwood Park) over the peripheral urban municipalities.

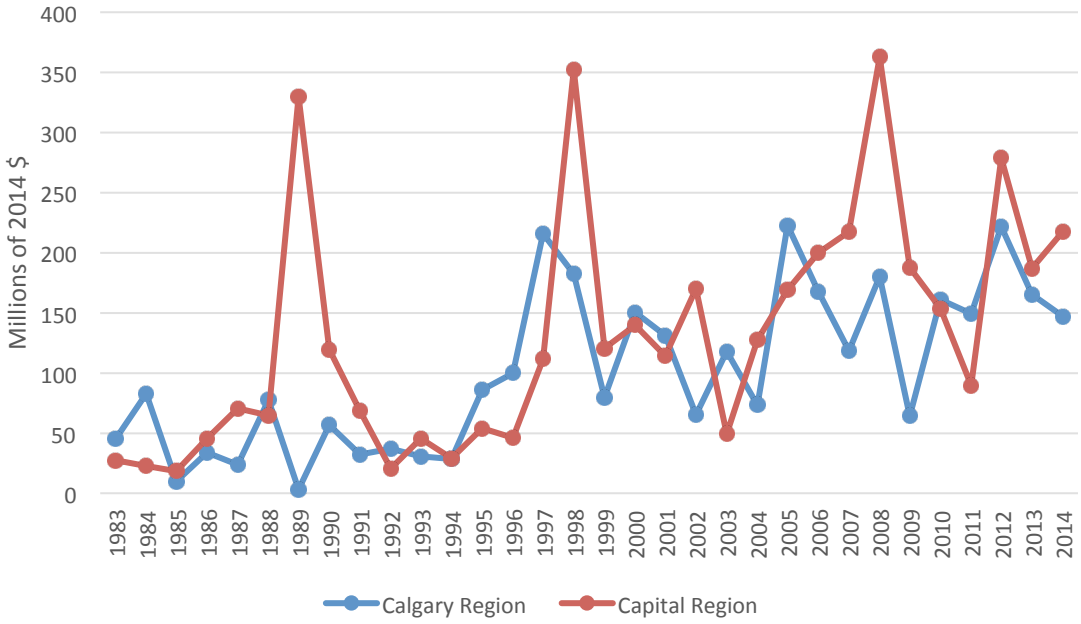
Figure 10. Shares of the Total Value of Commercial Building Permits in the Edmonton Region



4.4 Industrial Development

Figure 11 shows the trend in value of building permits for new industrial building permits in the Calgary and Edmonton Regions from 1983 to 2014. Given that new industrial developments are often large and discrete, it is not surprising that these series show large fluctuations, especially in the Edmonton Region in 1989, 1998, and 2008. Over the entire period, the total value of industrial building permits issued was $4.2 billion in the Edmonton Region compared to $3.3 billion in the Calgary Region.

Figure 11. Value of Industrial Building Permits in the Calgary and Edmonton Regions



Figures 12 and 13 show the distribution of industrial building permits issue in the core cities, the other urban areas, and the municipal districts in the two regions fluctuated greatly from year to year. The city of Calgary's share ranged from 94 percent in 1986 to 9 percent in 1991, while it averaged 67 per cent over the entire 1983 to 2014 period. The municipal districts in the Calgary Region accounted for 23 percent of the total, with Rocky View County receiving the largest share.

Figure 12. Shares of the Total Value of Industrial Building Permits in the Calgary Region

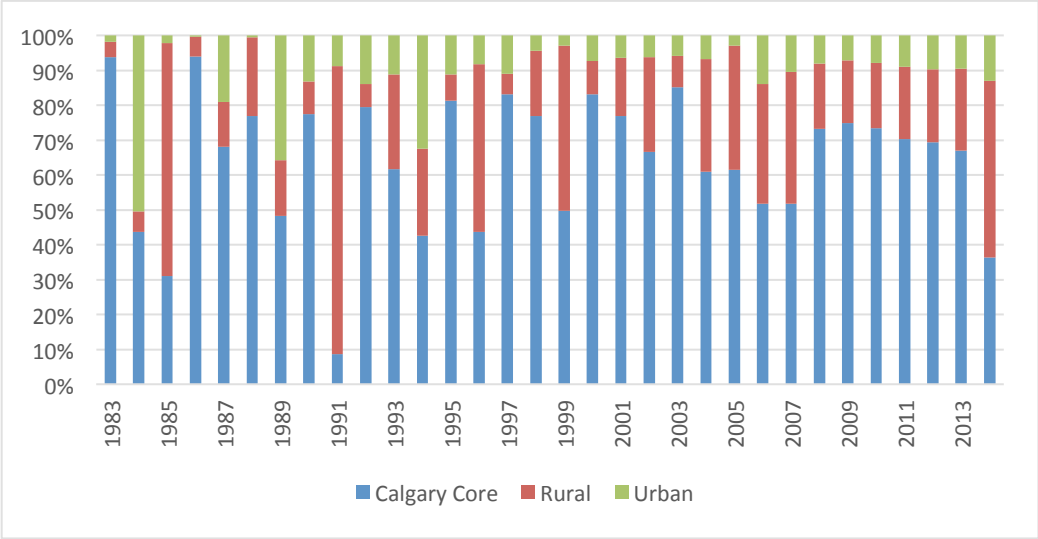
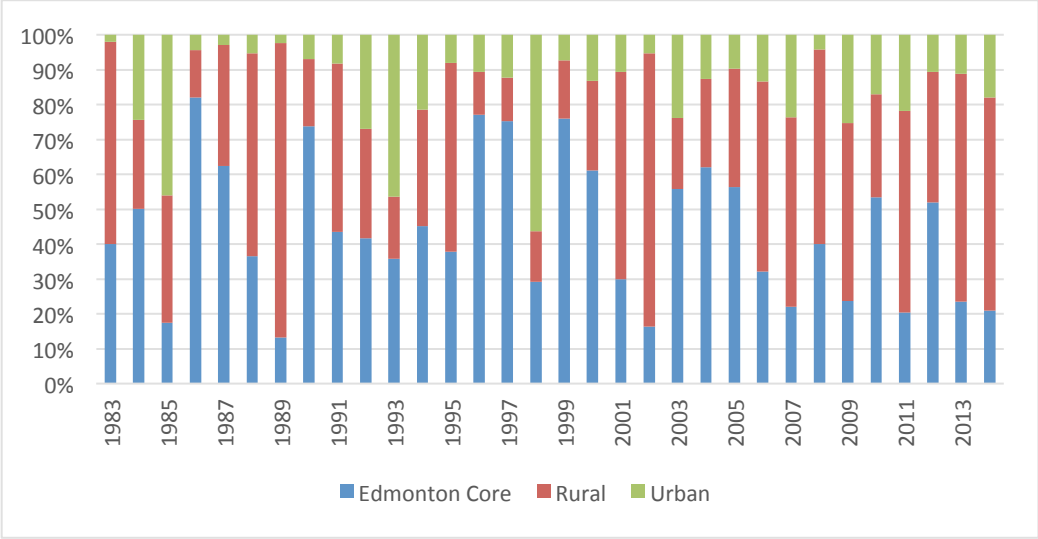


Figure 13 shows that Edmonton's share of total industrial building permits has also fluctuated a great deal and averaged only 39 percent of the total over the 34 year period under study. The five municipal districts in the Edmonton Region have accounted for 45 percent of the total over the entire period. Since 2000, Strathcona County has received 22 percent and Leduc County 15 percent of the total compared to 37 percent in the city of Edmonton. Overall, industrial development has been larger and more dispersed in the Edmonton Region than in the Calgary Region. While the city of Edmonton has received the largest share of industrial development, Strathcona County and Leduc County are important destinations as well. By contrast, most of the industrial development in the Calgary Region, even in recent years, has occurred in the city of Calgary.

Figure 13. Shares of the Total Value of Industrial Building Permits in the Edmonton Region



5. Metropolitan Planning in Alberta

Given this context of rapid, and in the case of the Edmonton Region, dispersed regional growth and development, it is important to understand the contemporary legislative framework in which municipalities in Alberta function. The enactment of the 1995 Municipal Government Act and disbandment of the system of ten urban-oriented Regional Planning Commissions, which had exercised subdivision approval in their hinterlands for almost forty years, effectively eliminated longstanding functional differences between urban and rural municipalities. For the first time in decades, municipal districts gained the ability to direct development in their own jurisdictions, and importantly, "taxation revenue derived from local development, which under regional planning had flowed to cities (as the primary provider of regional urban infrastructure), was redirected to local government."[21] This means that today, the primary intermunicipal governance mechanism is the voluntary system of statutory local-to-local Intermunicipal Development Plans originally developed in 1977 in recognition that "while development on or near the boundaries [between municipalities] often had regional dimensions, the real stake-holders were the neighbouring municipalities themselves."[22] While this bilateral system functions well in many areas of the province, it was seen to be inadequate to address the needs of Alberta's large cities, Calgary and Edmonton, and the complex intermunicipal relationships in their metropolitan regions, and it was not long until municipalities in both regions began rebuilding regional planning areas. The following subsections outline the current regional planning frameworks in the Calgary and Edmonton Regions.

5.1 Calgary Regional Partnership

The Calgary Regional Partnership is a voluntary association of 14 urban municipalities created in 1999 in anticipation of rapid growth in the metropolitan region. The regional planning framework put forth by the Calgary Regional Partnership is the Calgary Metropolitan Plan, which contains a ±60 year planning horizon (from 2014 to 2076) designed to control development throughout the region. Participants of the Calgary Regional Partnership must align their statutory plans to the Calgary Metropolitan Plan; however, the regional partnership does not have jurisdiction on local land use decisions, statutory plan approvals, annexations, nor inter-municipal negotiations. The planning philosophy adopted by the Calgary Regional Partnership focuses on urban containment and growth management, as stated within the Calgary Metropolitan Plan:

21. Geoff Ghitter and Smart, Alan. "Mad Cows, Regional Governance, and Urban Sprawl: Path Dependence and Unintended Consequences in the Calgary Region" (2009): 625
22. Laux, *Planning Law and Practice in Alberta* (3rd Edn.): 1-42-43

> If our planning process revealed one thing, it's that the status quo is not sustainable. If development continues at its current pace, without coordinated regional planning, our region's urban development footprint is sure to increase dramatically. In fact, our modelling suggests that our development footprint could grow by 125,000 hectares or more over the next 50 to 60 years. The fiscal impacts associated with this type of unmanaged growth are unsustainable for governments, municipalities and future taxpayers, not to mention the impacts of the status quo on the land, water and quality of life in the region.
>
> With its regional approach to planning, the Calgary Metropolitan Plan represents an opportunity to ensure development can be more efficient and compact. By implementing the goals in the Plan, we can expect to see a 70 per cent reduction in land used for urban development in the future. Infrastructure costs will decrease proportionately, benefitting us all.[23]

The Calgary Metropolitan Plan was approved by Calgary Regional Partnership members in the summer of 2012 after several years of contentious negotiations which saw all four rural municipal districts – the MD of Foothills, Rocky View County, Wheatland County and the MD of Bighorn – withdraw. Their withdrawal was followed by the towns of Crossfield and High River, and the Townsite of Redwood Meadows (an autonomous town situated on land leased from the Tsuu T'ina First Nation); High River and Redwood Meadows have since rejoined.

In light of the loss of its rural members, the Calgary Regional Partnership, and in particular Calgary's Mayor Naheed Nenshi, have taken the position that the Calgary Metropolitan Plan should be legislated, thereby forcing mandatory membership on all municipalities within the Calgary Metropolitan Plan's planning area.[24] In 2013, the Calgary Regional Partnership entered mediation over potential membership with the municipal districts directly adjacent to Calgary – Rocky View and Foothills. However, the mediation process hit a dead-end when the working group was unable to reach consensus with respect to a new voting structure for critical decisions.

As it currently stands, each of the partnership's member municipalities holds a seat at the General Assembly from where they are entitled to appoint one person to sit on the Board of Directors. These members of the Board have the task of selecting five members amongst themselves to fill the roles of the Executive Committee. It is this Executive Committee that is tasked with the day-to-day governance of the Calgary Regional Partnership. Decision making at the Executive Committee level is consensus based wherever possible, and when a vote is required it is based on a simple majority. However, in instances where there are proposed amendments to the Calgary Metropolitan Plan or

23. Calgary Regional Partnership, *Calgary Metropolitan Plan* (2014): 11
24. Richard Cuthbertson, "Calgary Mayor and Municipal Affairs Minister Exchange Barbs Over Growth Plan," *Calgary Herald* (February 11, 2013) accessed June 15, 2015, http://www.calgaryherald.com/news/Calgary+mayor+ municipal+affairs+minister+ exchange+barbs+ over+growth+plan/7946269/story.html#ixzz2KktBVbwN

decisions on the planning, coordination and governance of the regional water, wastewater and transit systems a vote is required that must be supported by "not less than two-thirds (2/3) of the Directors that represent Member Municipalities that collectively have not less than a majority of the population of all the Member Municipalities."[25] This effective monopoly on all regional decision voting by the City of Calgary, as a result of its share of the regional population, was the main reason the 2013 mediation process was unsuccessful.

5.2 Capital Region Board

Metropolitan planning in the Edmonton Region began in the same vein as the Calgary Regional Partnership – as a voluntary association of municipalities known as the Alberta Capital Region Alliance, formed in 1998 under the moniker "A Community of Communities". However, unlike the Calgary Regional Partnership, the provincial government initiated a governance review of the capital region "…for the purposes of developing a vision for its future, identifying partnerships or initiatives, and establishing a role for the province in attaining that collective vision."[26] As detailed by LeSage and Stefanick (2004):

> In December 1998 the Minister of Municipal Affairs announced the creation of the Alberta Capital Region Governance Review (Alberta Capital Region Governance Review 2000) [known as the Hyndman Review]. Even though the policy problem or problems behind the review were never fully articulated, the minister was adamant that the "status quo will not do." In all likelihood the problem was the total absence of rural municipal participation in the Forum and the general lack of any development control or (at that time) convincing regional economic development initiative in the region. The Capital Region was unfavourably compared in the press with Calgary, with suggestions that the southern city was more economically dynamic and competitive owing to its de facto "unicity" status.[27]

Eight years passed between the publication of the Hyndman Review and passing of the *Capital Region Board Regulation* (Alta Reg 38/2012) on April 15, 2008.[28] The resultant Capital Region Board, is a corporation, deemed to be a regional services commission per section 15.1 of the MGA consisting of 24 member municipalities (urban, rural and specialized) over an area of 11,933 square kilometres. As outlined in the *Capital Region Board Regulation*, the Board's responsibilities include the preparation and implementation of the regional planning framework, known as the Capital Region Growth Plan, in

25. Calgary Regional Partnership "Board of Directors Handbook October 2015" (2015):71
26. Hodge and Robinson, *Planning Canadian Regions* (2002): 259
27. Edward C. LeSage Jr. and Stefanick Lorna, "New Regionalist Metropolitan Action: The Case of the Alberta Capital Region Alliance," Presented at the Canadian Political Science Association meetings, Winnipeg, June 2004: 13
28. Much of this delay rested on disagreement between municipalities on an appropriate voting structure, as detailed in LeSage, Edward C. Jr. and Stefanick Lorna (2004)

addition to coordinating cost sharing policies for municipalities that participate in regional projects. Per section 2(4) each member municipality must appoint a councillor as representative to the board.[29] Each representative has one vote, and if a decision is made by a vote it must be "supported by not fewer than 17 representatives from participating municipalities that collectively have at least 75% of the population in the Capital Region," meaning that the City of Edmonton has to vote in favour of a given item for it to succeed; however, smaller municipalities can prevent Edmonton from controlling the region by voting against an item.[30]

The Capital Region Growth Plan is a 35 year growth strategy based on coordinated decision-making across the region along four priority areas – Land Use, Intermunicipal Transit, Housing, and Geographic Information Services. While the Capital Region Growth Plan does not replace existing Intermunicipal Development Plans within the Edmonton metropolitan planning region, it is the "prevailing document" meaning that all statutory plans and bylaws of member municipalities must conform to the plan.

5.3 The Future of Regional Planning in Alberta

The adoption of the Alberta Land-use Framework in 2008 and the subsequent enactment of the *Alberta Land Stewardship Act* in 2009 signalled the return of province-wide comprehensive regional planning. To-date however, only two of the seven regional plans have been adopted (the Lower Athabasca and South Saskatchewan Regional Plans) and four have yet to be started. For all intents and purposes, the Calgary Metropolitan Plan and the Capital Region Growth Plan, which are recognized as sub-regional plans under the *Alberta Land Stewardship Ac*t, remain the pre-eminent planning frameworks for metropolitan-level development.

However, ongoing concerns of the bilateral nature of the majority of regional planning across Alberta –primarily conducted through Intermunicipal Development Plans –led to the introduction of the highly controversial Bill 28, the *Modernizing Regional Governance Act*, in 2013. The Bill, which would have given the province the power to set up regional growth boards, appoint members, and set mandates while retaining the final word on all decisions, received immediate criticism from municipalities over fears it would destroy local autonomy. An amended version, renamed the *Enabling Regional Growth Boards Act*, was passed on December 11, 2013 and incorporated into the MGA (Part 17.1). The key amendment to this Act was Amendment AIC which added a purpose statement noting the voluntary

29. Alberta Province of, "Capital Region Board Regulation, Alta Reg 38/2012," s.2(4) accessed July 15, 2015, http://canlii.ca/t/lft6
30. Alberta Province of, "Capital Region Board Regulation, Alta Reg 38/2012," s.5(2) accessed July 15, 2015, http://canlii.ca/t/lft6

nature of municipal participation; as it reads in section 708.011 of the MGA: "The purpose of this Part is to enable 2 or more municipalities to initiate, on a voluntary basis, the establishment of a growth management board to provide for integrated and strategic planning for future growth in those municipalities." When the new Part 17.1 came into force, the Capital Region Board, was recognized as a growth management board (see MGA s. 708.25). The passing of Bill 20, the *Municipal Government Amendment Act, 2015,* on March 14, 2015, saw legislation brought forward on how growth management boards should conduct meetings; however, new enabling legislation on City Charters which was incorporated into the MGA, has perhaps the strongest regional implications if both Edmonton and Calgary gain additional taxation powers.

The idea of growth management boards has evolved under the Notley Government with the commitment on September 25, 2015, by then Minister of Municipal Affairs, Deron Bilous, to create new growth management boards as part of revised Municipal Government Act legislation that is expected to be tabled in the Spring of 2016. Bilous confirmed the statement via Twitter "To clarify @nenshi, growth management boards will be mandatory for the metropolitan regions of Calgary & Edmonton #ableg #abndp"[31] This will mean that in the future Calgary and its surrounding municipalities will be forced to cooperate on regional planning issues. In response to the impending changes, Banff, Canmore and Nanton announced their intent to withdraw from the Calgary Regional Partnership, a process that takes four months from announcement to conclusion. The proposed new Municipal Government Act builds on several years of review going back to 2012 that resulted in the previously mentioned Bill 20. In addition to the announcement of mandatory growth management boards on September 25, 2015, the Minister mentioned the use of funding to incent co-operation between municipalities: "Funding is a great way to help incent that behaviour and municipalities that work well together to provide services with each other will have the dollars to be able to do that."[32] Whatever else the Notley Government introduces in a new MGA, there are likely to be major changes to intermunicipal relationships in both metropolitan regions and across the province.

31 Deron Bilous Twitter Account September 25 ,2015, from: https://twitter.com/DeronBilous?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor accessed on February 15, 2016
32 Article

6. Property Taxation in Alberta's Metropolitan Regions

Even with comprehensive metropolitan-scale planning frameworks in place in the Calgary and Edmonton Regions, the plans do not effectively address the underlying competition for property tax revenue between municipalities nor the ability of municipalities to manipulate their property taxes to compete against adjacent municipalities for development. This is increasingly important in the interface between urban and rural municipalities, known as the rural urban fringe. The rural-urban fringe is a unique geography within rural municipalities where industrial and commercial development "often gravitate[s]…because land prices, cost of servicing, and property taxes tend to be much lower there than in the nearby urban centre."[33] Furthermore, this development benefits from proximity to potential markets and a large labour pool in the adjacent urban centres. A common criticism of land use intensification on the rural-urban fringe is that while "the rural host municipality will of course enjoy the tax base that will be generated… the neighbouring urban local government unit may be forced to improve its roadway infrastructure to accommodate increased traffic generated by the project, not to mention providing all the urban services and amenities for project staff residing within [the rural municipality's] boundaries."[34] In this section we explore and describe trends in property taxation – the largest own-source revenue for municipalities in the province – in the Calgary and Edmonton metropolitan regions.

First, some background on property taxation in Alberta. Alberta's municipalities set two property tax rates (in mills) based on the assessed value of property in the municipality. The residential property tax rate applies to residential property and farmland. The non-residential property tax rate applies to the other forms of property, principally machinery and equipment, linear property, railways and other commercial and industrial property[35]. Machinery and equipment property includes materials, devices, fittings, installations, appliances, and apparatus that form an integral part in manufacturing, processing, coal and oil sands excavation and/or transportation, telecommunications, and electric power systems. Linear property includes electric power systems whose rates are controlled or set by the Alberta Utilities Commission, street lighting and telecommunications systems, and pipelines.[36] For assessment purposes, railways, farmland, machinery and equipment, and linear property are defined as "regulated" property and valued using regulated rates provided annually in the Municipal Affairs

33. Frederick Laux, *Planning Law and Practice in Alberta* (3rd Edn.), (Edmonton, Juriliber Ltd., 2010): 5-27
34. Frederick Laux, *Planning Law and Practice in Alberta* (3rd Edn.), (Edmonton, Juriliber Ltd., 2010): 5-27
35. The Alberta Municipal Affairs data on property taxation refers other commercial and industrial property as "land and improvements excluding machinery and equipment" but we will use the more descriptive term "commercial and industrial" property.
36. Not included in this analysis are franchise fees, which are charges against utilities for use of public land within a given municipality, generally speaking they are levied on the delivery of electricity , gas and water service providers separate from linear property taxes.

Minister's Guidelines. For all other types of properties—residential, commercial, and industrial properties—market value is the basis for assessments. Municipalities are responsible for preparing assessments for all property, with the exception of linear property assessments which are the responsibility of Municipal Affairs.

The effective property tax rate in a municipality depends on the assessment ratio or standard as well as on the municipal tax rate. Since assessment practices can vary from municipality to municipality, a given mill rate can represent a different effective property tax rate. To make the mill rates comparable across municipalities, we have adjusted them according to variations in the education mill rate, which is set by the province, and which varies from municipality to municipality, presumably because of variations in assessment ratios. In the Calgary Region, we have standardized the municipal tax rates to Calgary's assessment standard, which is reflected in the education property tax rate in the city of Calgary. To illustrate how the effective mill rates are calculated, Airdrie's non-residential mill rate is 8.0333, but its effective non-residential mill rate is 7.4495, because its assessment ratio appears to be 92.7 percent of Calgary's ratio as reflected in their relative education property tax rates (3.3047/3.5637). The same procedure is used for the Edmonton area municipalities, but using the Edmonton's education mill rate to calculate the effective mill rates.

6.1 Sources of Revenue for Municipal Governments in the Calgary Region

Table 5 shows the composition of municipal revenues in the Calgary Region in 2014. On average, property taxes represented 32 percent of municipal revenues, and it was the largest single source of revenue for most municipal governments. Sales and user charges were the second largest source of revenues for most of the urban municipalities, but they were a relatively small contributor to revenues in the four municipal districts. Business taxes, which represented 4.6 percent of the city of Calgary's revenues in 2014, were not a significant source of revenues for the other municipalities. Reliance on provincial transfers varied considerable across municipalities in part because of provincial programs to alleviate the 2013 flood damage in High River, Black Diamond, Turner Valley, Canmore, and the MD of Bighorn. Because of the wide variation in federal and provincial transfers, in part due to the flood relief, property taxes as a percentage of own-source revenues is a better measure of municipal reliance on property taxes. For Calgary, property taxes were 38.2 percent of own-source revenues. In the other urban municipalities, property taxes were 43.6 percent of own-source revenues. The four municipal districts were the most dependent on property taxes, averaging 69.7 percent of own-source revenues.

Table 5. Composition of Municipal Government Revenue in the Calgary Region in 2014

MUNICIPALITY	Municipal Property Taxes	Sales and User Charges	Franchise and Concession Contracts	Contributed and Donated Assets	Federal Government Conditional and Unconditional Transfers	Provincial Government Conditional and Unconditional Transfers	Other
CALGARY	**31.6%**	**25.1%**	**4.7%**	**5.2%**	**1.2%**	**16.0%**	**16.2%**
AIRDRIE	27.7%	22.6%	3.4%	16.0%	2.6%	3.5%	24.2%
BANFF	38.2%	25.5%	1.9%	0.0%	0.5%	14.9%	19.0%
BEISEKER	51.2%	26.9%	1.4%	0.5%	0.1%	5.3%	14.6%
BLACK DIAMOND	20.9%	9.7%	1.3%	0.0%	0.0%	58.2%	9.8%
CANMORE	28.8%	21.1%	2.3%	2.1%	0.0%	34.5%	11.2%
CHESTERMERE	39.4%	9.1%	0.0%	13.7%	0.0%	23.4%	14.5%
COCHRANE	23.1%	17.2%	2.5%	26.7%	1.4%	10.9%	18.2%
CROSSFIELD	37.4%	27.5%	1.6%	10.6%	0.0%	13.0%	9.9%
HIGH RIVER	11.4%	9.3%	1.7%	11.6%	0.5%	44.4%	21.0%
IRRICANA	45.0%	21.1%	1.1%	0.0%	17.4%	5.1%	10.3%
NANTON	43.5%	19.8%	2.5%	0.1%	0.0%	13.3%	20.9%
OKOTOKS	32.4%	32.0%	2.2%	7.4%	1.5%	12.9%	11.8%
STRATHMORE	41.6%	43.6%	0.0%	0.0%	0.0%	8.5%	6.3%
TURNER VALLEY	16.8%	10.8%	1.2%	0.0%	0.0%	66.1%	5.1%
Unweighted Average	**32.7%**	**21.2%**	**1.6%**	**6.3%**	**1.7%**	**22.4%**	**14.1%**
BIGHORN NO. 8, M.D. OF	21.7%	4.8%	0.0%	0.0%	0.0%	61.1%	12.4%
FOOTHILLS NO. 31, M.D. OF	37.1%	2.7%	0.0%	3.5%	1.4%	48.2%	7.1%
ROCKY VIEW COUNTY	50.5%	8.3%	0.0%	6.3%	0.0%	16.0%	18.9%
WHEATLAND COUNTY	70.1%	2.2%	0.0%	0.1%	0.0%	19.0%	8.6%
Unweighted Average	**44.9%**	**4.5%**	**0.0%**	**2.5%**	**0.4%**	**36.1%**	**11.7%**

The median per capita property tax revenue in the 19 municipalities in the Calgary Region in 2014 was $957, but the range was very large. Two municipal districts had the highest per capita property revenue in 2014—Wheatland collected $3,527 and Bighorn collected $3,129, the result of significant amounts of property taxes levied on machinery and equipment and linear property discussed further below. By contrast, Black Diamond only collected $297 per capita. Calgary collected $1,162 per capita.

Residential property taxes make up about 60 percent of total property tax revenues collected by the city of Calgary, with the remaining 40 percent from commercial and industrial property. In the other urban municipalities in the Calgary Region, residential property taxes are a larger share of total property tax revenues, ranging from around 70 percent in Canmore to 95 percent in Chestermere.

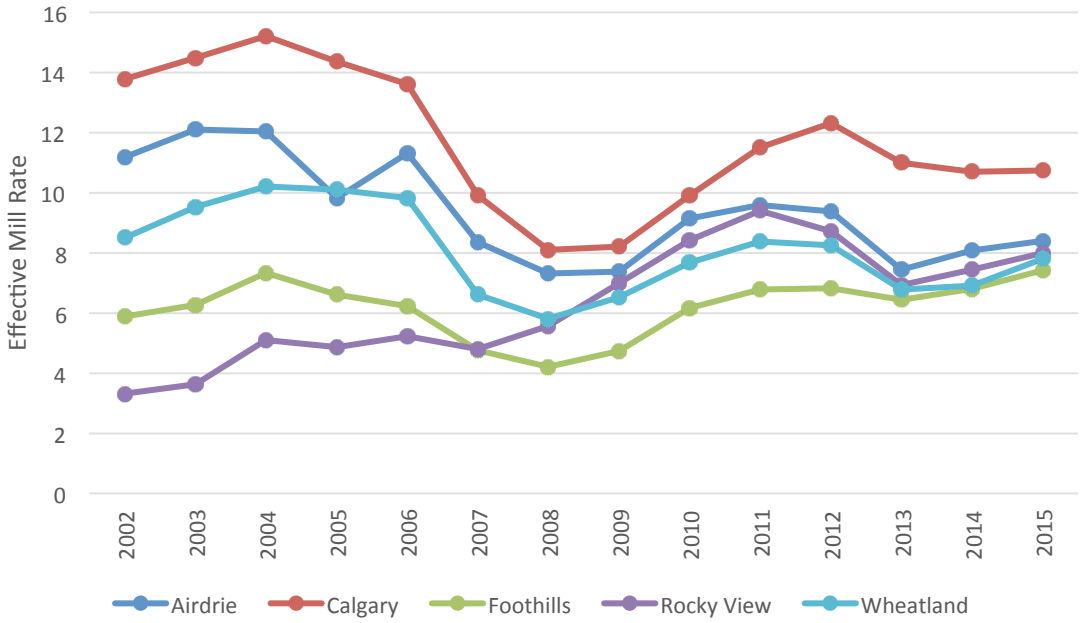
The composition of property tax revenues varies among the four municipal districts. Residential property taxes are less than 20 percent of Wheatland County's total property tax revenues and less than 30 percent of Bighorn's. Property taxes on machinery and equipment and linear property levied on contributed 65 percent of Wheatland's property tax revenues and 36 percent of Bighorn's property tax revenues. On the other hand, residential property taxes have been the largest source of property tax revenue in Rocky View (60 percent) and in Foothills, where the share of residential property taxes has increased from 51 percent in 1994 to 72 percent in 2014. In all of the municipal districts, property taxes on farmland have fallen as a share of total property taxes, representing only six percent of property taxes in Wheatland, three percent in Foothills and Rocky View, and less than one percent in Bighorn.

6.2 Non-Residential Mill Rates in the Calgary Region[37]

Figure 14 shows that there has been a convergence in the non-residential mill rates in Calgary, the three neighbouring municipal districts, and Airdrie. In 2002, the non-residential mill rates ranged from 13.8 in Calgary to 3.3 in Rocky View. Subsequently, the non-residential mill rates in Airdrie and the municipal districts have converged and by 2015 the differential was less than one mill. While the city of Calgary has maintained the highest effective mill rate for non-residential property, it has come down from 15.2 in 2004 to 10.7 in 2015.[38] This trend in non-residential mill rates is consistent with increasing competition among these municipalities for the non-residential tax bases, especially industrial and commercial property, but it could also be consistent with collusion. As shown in **Figure 14**, Foothills and Rocky View have increased their non-residential mill rates since 2003 and Wheatland increased its non-residential mill rate between 2008 and 2015. So while tax competition may have resulted in lower non-residential mill rates in Calgary and Airdrie, the convergence of mill rates has resulted from increases in the non-residential mill rates in the three municipal districts.

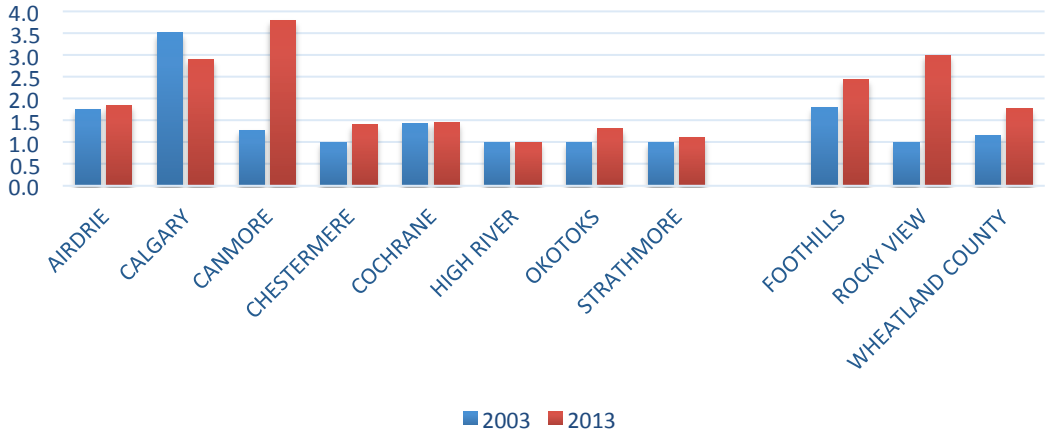
37. The reported mill rates are the adjusted effective mill rates as discussed at the beginning of section 5.
38. The fact that Calgary, the dominant municipal in the region, maintains the highest non-residential mill rate is also consistent with the models of tax competition between jurisdictions of different sizes of. The Kanbur and Keen (1993) model predicts that the smaller jurisdiction will have the lower tax rate because the elasticity of its tax base with respect to its tax rate is higher and therefore it has more to gain from a lower tax rate than a larger jurisdiction.

Figure 14. Non-Residential Mill Rates in the Calgary Region



While the trend in non-residential tax rates could be interpreted as evidence of increased tax competition or as collusion, it is interesting to note that all of the municipalities (except High River) imposed a higher non-residential property tax rate than the rate on residential property in 2013. **Figure 15** shows that the ratio the non-residential mill rate to the residential mill in all of the larger urban municipalities and three municipal districts in 2003 and 2013. In all of the municipalities, except in High River, the ratio exceeded one in 2013. It has also increased over the 10 year in all municipalities except in Calgary, where the ratio fell from 3.51 in 2003 to 2.89 in 2013. The increase in the ratio of non-residential to residential mill rates in the three municipal districts (and Canmore) is particularly striking. The higher relative property tax rate on non-residential property means that an additional dollar of industrial and commercial property generates more tax revenues than an additional dollar of residential property assessment, which may affect the pattern land development in the Calgary Region.

Figure 15. Ratio of the Non-Residential to the Residential Mill Rate in Selected Calgary Region Municipalities in 2003 and 2013

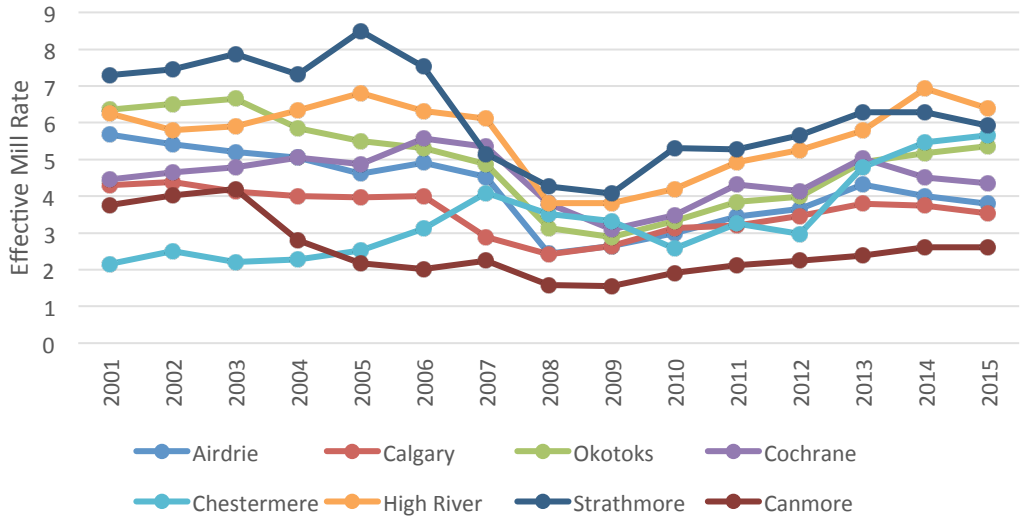


6.3 Residential Mill Rates in the Calgary Region

Figure 16 shows the residential mill rates in the larger urban municipalities from 2001 to 2015. There is a some convergence in the mill rates, from a range of 5.14 mills in 2001 to 3.78 mills in 2015, but the convergence is much smaller than was observed in Figure 14 for the non-residential mill rates. Furthermore, the residential mill rates in most of the urban municipalities, declined and converged in the 2005 to 2009 period, and then increased in the following six years. Note that the non-residential mill rates also declined during this period.[39]

39. The decline in the non-residential rates for Calgary parallels the rise and fall of non-residential equalized assessments (relative to personal income) as reported in McMillan and Dahlby (2014, Figure 1), suggesting that the growth and decline of real assessments goes some way in explaining the variation in mill rates.

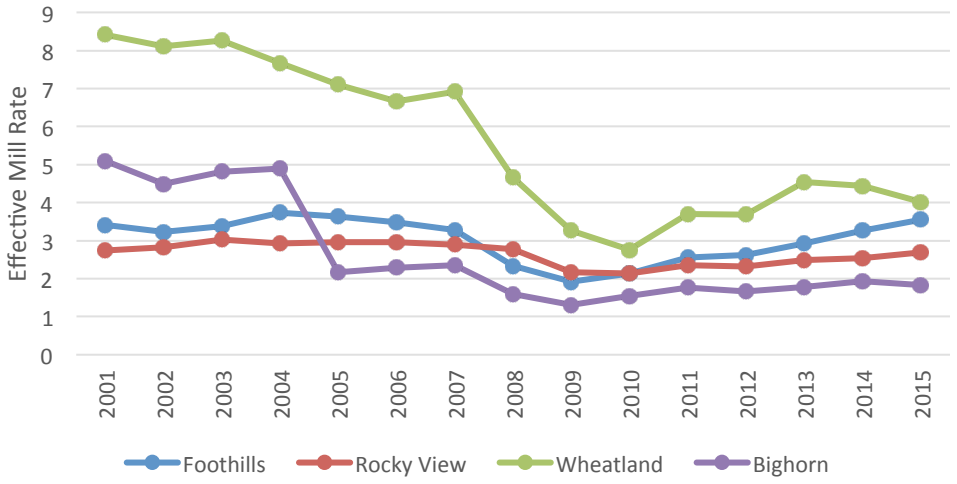
Figure 16. Effective Residential Mill Rates in the Urban Municipalities of the Calgary Region



Shown in **Figure 17**, the trends in the residential mill rates in the four municipal districts in the Calgary region can be explained in terms of the composition of their property tax revenues. As noted in the previous section, property taxes on machinery and equipment and linear property have increased over time and become the largest source of property tax revenues in Bighorn and Wheatland. The increase in property tax revenues from these sources has allowed those municipalities to reduce their residential property tax rates, a fiscal response that was documented in an econometric study of municipal governments' responses to an increase in machinery and equipment assessments in Conger and Dahlby (2015).[40] On the other hand, Rocky View and Foothills, which receive relatively little revenues from property taxes on machinery and equipment and linear property, have maintained their residential property tax rates within relatively narrow ranges.

40. Conger and Dahlby "Policy Forum: Taxation of machinery and Equipment and Linear Property in Alberta," Canadian Tax Journal (2015) 63:2,487-99.

Figure 17. Residential Mill Rates in the Rural Municipalities of the Calgary Region



6.4 Sources of Revenue for Municipal Governments in the Edmonton Region

Table 6 shows the composition of the municipal governments' revenues in the Edmonton Region in 2014. Property taxes were the largest single source of revenue for most municipal governments. On average, property taxes represented 40 percent of the municipal governments' revenues, eight percentage points higher than in the Calgary Region. Sales and user charges contributed 20 percent of revenues in the cities, and close to 30 percent of revenues in the towns and villages. Excluding Strathcona County, sales and user charges were a relatively small source of revenues in the four municipal districts.[41] In contrast with the City of Calgary, Edmonton did not obtain revenues from business taxes in 2014. Provincial transfers represented 11 percent of the revenues of the cities, 16 percent for the towns and villages and 15 percent for the rural municipalities.

41. Strathcona County stands out from the other counties because Sherwood Park is 72 percent of Strathcona County's population and performs similar functions to the other cities in the Edmonton Region. http://www.strathcona.ca/local-government/about-strathcona-county/strathcona-county-history-and-heritage/at-a-glance/population-through-the-years/

Table 6. Composition of Municipal Government Revenue in the Edmonton Region in 2014

MUNICIPALITY	Municipal Property Taxes	Sales and User Charges	Franchise and Concession Contracts	Contributed and Donated Assets	Federal Government Conditional and Unconditional Transfers	Provincial Government Conditional and Unconditional Transfers	Other
EDMONTON	**39.0%**	**20.2%**	**4.2%**	**5.6%**	**1.4%**	**9.4%**	**20.2%**
BEAUMONT	26.9%	17.9%	2.0%	18.0%	1.4%	9.2%	24.5%
BON ACCORD	42.5%	37.2%	5.7%	0.0%	0.0%	9.1%	5.4%
BRUDERHEIM	35.0%	30.7%	1.0%	0.0%	0.0%	14.5%	18.8%
CALMAR	41.0%	24.6%	5.4%	0.0%	0.7%	18.6%	9.6%
DEVON	28.1%	53.3%	0.0%	0.0%	1.4%	13.9%	3.3%
FORT SASKATCHEWAN	40.6%	19.7%	0.0%	14.7%	2.7%	4.6%	17.8%
GIBBONS	35.9%	30.8%	4.8%	0.0%	0.0%	21.1%	7.4%
LAMONT	31.6%	20.5%	3.7%	0.0%	0.1%	36.1%	8.0%
LEDUC	24.5%	12.6%	3.5%	29.5%	0.4%	14.4%	15.1%
LEGAL	40.2%	24.1%	1.9%	0.0%	0.0%	21.4%	12.4%
MORINVILLE	36.6%	23.2%	6.2%	7.6%	0.0%	10.6%	15.8%
REDWATER	34.5%	46.3%	0.0%	0.0%	0.0%	9.9%	9.2%
SPRUCE GROVE	26.0%	21.7%	3.6%	17.7%	0.0%	18.3%	12.8%
ST. ALBERT	44.0%	27.2%	1.0%	6.2%	3.4%	9.2%	9.0%
STONY PLAIN	33.5%	27.7%	5.3%	2.1%	0.5%	10.0%	20.8%
THORSBY	44.3%	29.7%	6.3%	0.0%	0.0%	1.6%	18.1%
WABAMUN	32.2%	22.1%	0.6%	0.0%	0.0%	27.3%	17.8%
WARBURG	33.7%	15.0%	3.5%	0.0%	0.0%	22.8%	24.9%
Unweighted Average	**35.1%**	**26.9%**	**3.0%**	**5.3%**	**0.6%**	**15.2%**	**13.9%**
LAMONT COUNTY	64.0%	5.2%	0.0%	0.0%	0.0%	23.2%	7.6%
LEDUC COUNTY	52.3%	6.1%	0.0%	10.9%	0.0%	11.4%	19.3%
PARKLAND COUNTY	44.3%	6.9%	0.0%	21.9%	0.0%	14.6%	12.2%
STRATHCONA COUNTY	50.5%	22.0%	0.7%	7.3%	0.8%	8.1%	10.5%
STURGEON COUNTY	61.6%	10.8%	0.0%	0.0%	0.0%	15.3%	12.2%
Unweighted Average	**54.6%**	**10.2%**	**0.2%**	**8.0%**	**0.2%**	**14.5%**	**12.4%**

The median per capita property tax revenue in the 24 municipalities in the Edmonton Region in 2014 was $1,052, almost $100 more than the median in the Calgary Region. The five municipal districts ranked among the top six in terms of per capita property tax revenues. The only urban municipality among the top six was Fort Saskatchewan, and it receives a significant portion of its property tax revenues from the taxation of machinery and equipment. Lamont County collected $3,379, Leduc County collected $3,139, and Strathcona County collected $2,076 per capita. Lamont County's largest

source of property tax revenue is from the taxation of machinery and equipment and linear property and the largest source of property tax revenue for Leduc County is industrial and commercial property. By contrast, Warburg only collected $658 per capita. The City of Edmonton collected $1,409 per capita in 2014, almost $300 more than the per capita property taxes for the City of Calgary.

In 2014, residential property taxes represented 56 percent of the total property tax revenues collected by the City of Edmonton, with commercial and industrial property contributing 42 percent, and linear property the remaining two percent. In the other urban municipalities in the Edmonton Region, residential property taxes are a larger share of total property tax revenues than in Edmonton, and as high as 83 percent in St. Albert, but only 47 percent of total property tax revenues in Fort Saskatchewan where property taxes on machinery and equipment contributed 25 percent of the property tax revenues to that city in 2014. Property taxes on machinery and equipment and linear property are an important source of revenue for the three municipal districts north and east of Edmonton, a region that bills itself as "Alberta's Industrial Heartland."[42] Strathcona County and Sturgeon County received 37 percent of their property tax revenues from these sources, and they contributed 63 percent of Lamont County's total property tax revenues. Even Parkland County, which is west of the City of Edmonton and outside Alberta's Industrial Heartland, received 24 percent of its property tax revenues from machinery and equipment and linear property.

Leduc County's non-residential property tax revenues are also significant, but come from a different source. Over half of Leduc County's property tax revenues were received from commercial and industrial property, mainly in the Nisku Industrial Park. Farmland was a negligible source of tax revenue for all of the municipal districts, except Lamont County where they contributed nine percent of total property tax revenues in 2014.

6.5 Non-Residential Mill Rates in the Edmonton Region

In analyzing the trend in the non-residential mill rates in the Edmonton Region, it is useful to focus on two sub-regions—the municipalities that make up the Industrial Heartland region to the north and east of Edmonton, where competition (if it occurs) is for the property tax base associated with petrochemical projects, and the urban municipalities and the two counties which lie to the south and west of Edmonton—Leduc County and Parkland County—where the competition is for commercial and

42. Alberta's Industrial Heartland is an association of five municipalities—the City of Fort Saskatchewan, Lamont County, Strathcona County, Sturgeon County and the City of Edmonton which promote industrial development in a region north east of Edmonton through the coordinated provision of infrastructure, services, and land use zoning. For a map of Alberta's Industrial Heartland, see http://industrialheartland.com/images/stories/maps/alberta%20capital%20region%20-%202010.pdf.

other industrial developments. Turning first to the Industrial Heartland region, **Figure 18** shows that Edmonton, and especially Lamont County, have maintained much higher non-residential mill rates than the other three municipalities.[43] In all five municipalities, the non-residential mill rates declined between 2005 and 2009, a pattern that was also observed in the Calgary Region. Between 2009 and 2014, the median non-residential mill rate has increased by 3.12 mills or 46 percent. In broad terms, the trend in non-residential mill rates of the five municipalities that make up the Industrial Heartland differs from that in the Calgary Region—non-residential mill rates have tended to increase, especially since 2009. The dispersion in mill rates in 2001 was much lower than in the Calgary Region, especially among Strathcona County, Sturgeon County and Fort Saskatchewan, and there has not been the convergence of non-residential mill rates that was observed in the Calgary Region from 2001 to 2015.

Figure 18. Non-Residential Mill Rates in the Industrial Heartland

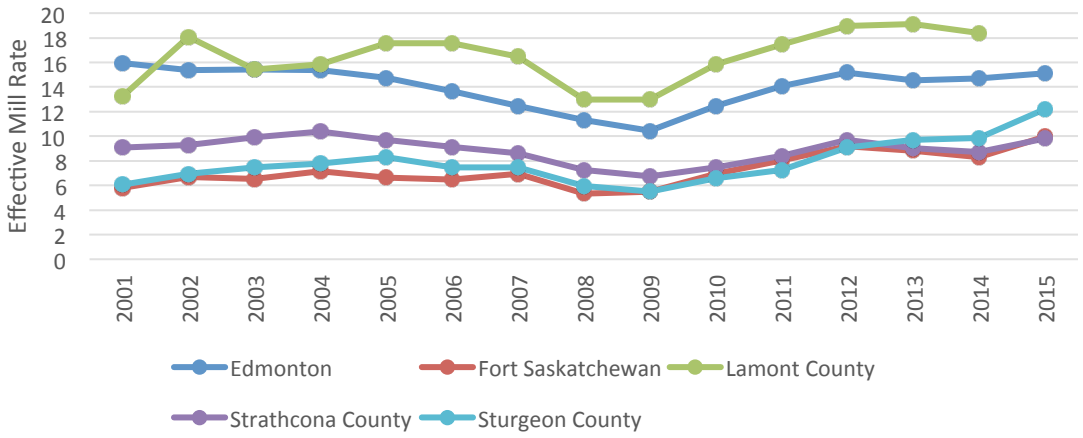
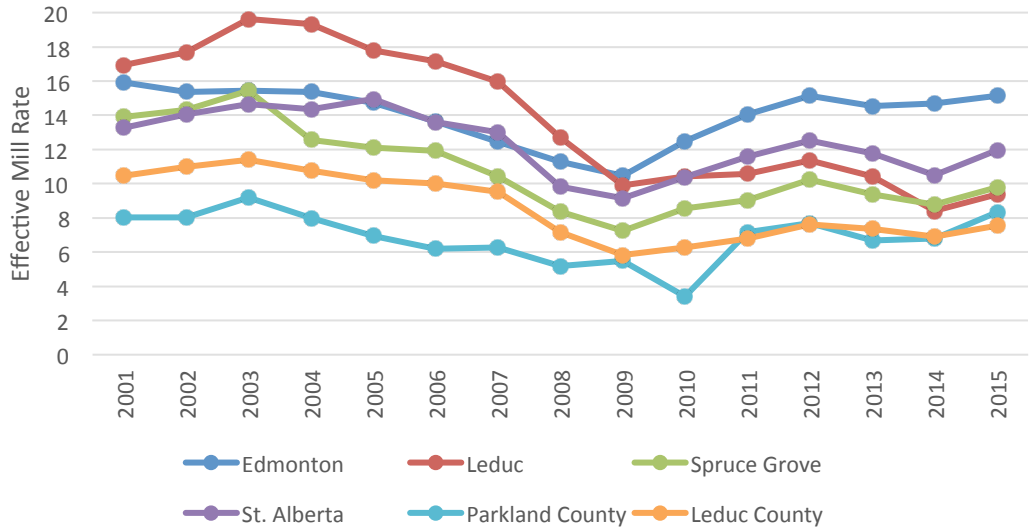


Figure 19 shows the trend in the effective non-residential mill rates for Edmonton, three neighbouring urban municipalities, Leduc, Spruce Grove, and St. Albert, and the two municipal districts to the south and west of Edmonton, Leduc County and Parkland County. In these municipalities, the non-residential mill rates also declined from 2004 to 2009, as in the Calgary Region and Industrial Heartland, but the subsequent increase in the non-residential mill rates to 2015 is much smaller than in the Industrial Heartland to the north and east. In addition, excluding Edmonton, there has been a substantial convergence of the non-residential mill rates of the other five municipalities, a convergence that is similar to that which occurred in the Calgary Region for Airdrie, the counties of Foothills, Rocky View County and Wheatland.

43. We have not computed the effective non-residential mill rate for Lamont County for 2015 because of a suspected coding error in the reported data on the Alberta Municipal Affairs website.

Figure 19. Non-Residential Mill Rates in the Urban Municipalities of the Edmonton Region including Leduc County



Although drawing conclusions based on these few observations is problematic, the determination of the non-residential mill rates seems to be different in the different sub-regions. In the Industrial Heartland, the non-residential tax base is the machinery and equipment and linear property associated with the petrochemical industry and pipelines that are tied to specific locations because of agglomeration effects. This probably reduces the pressures on the municipalities in the Industrial Heartland to compete for the non-residential property tax base. On the other hand, among the urban municipalities and Leduc Country there seem to be stronger competitive forces determining the non-residential mill rates in regions for the commercial property and other industrial developments that are less tied to specific locations.

6.6 Residential Mill Rates in the Edmonton Region

Figure 20 shows the effective residential mill rates in the larger urban municipalities in the Edmonton Region also declined from 2001 to 2008 and then increased by one to two mills by 2015. There has also been a convergence of the residential mill rates, from a range of 3.55 mills in 2001 to 2.52 mills in 2015. St. Albert imposed the highest effective residential mill in 2015, followed by the City of Edmonton. Fort Saskatchewan had the lowest.

Figure 20. Residential Mill Rates in the Urban Municipalities of the Edmonton Region

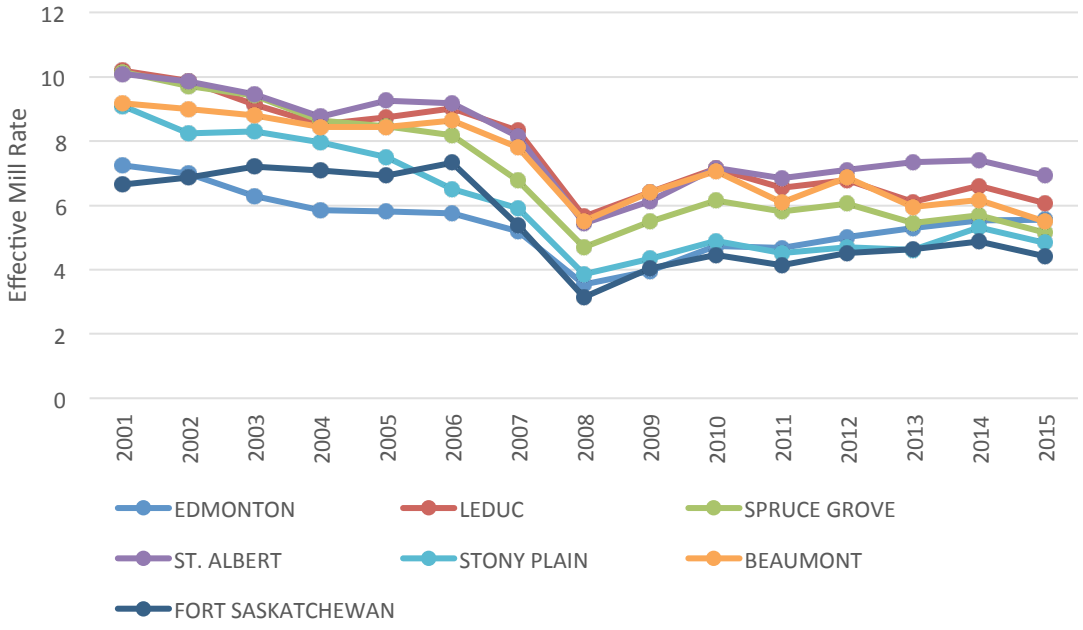


Figure 21 show the effective residential mill rates in the five municipal districts in the Edmonton Region and the city of Edmonton. The trend is broadly similar to what was observed for the urban municipalities in the Edmonton Region, but with a steeper decline and much greater convergence of the non-residential mill rates in the five municipal districts. Edmonton's mill rate in 2015 was highest and 2.22 mills or 40 percent higher than the median effective residential mill rate in the four municipal districts and Strathcona County.

Figure 21. Residential Mill Rates in Edmonton and the Municipal Districts in the Edmonton Region

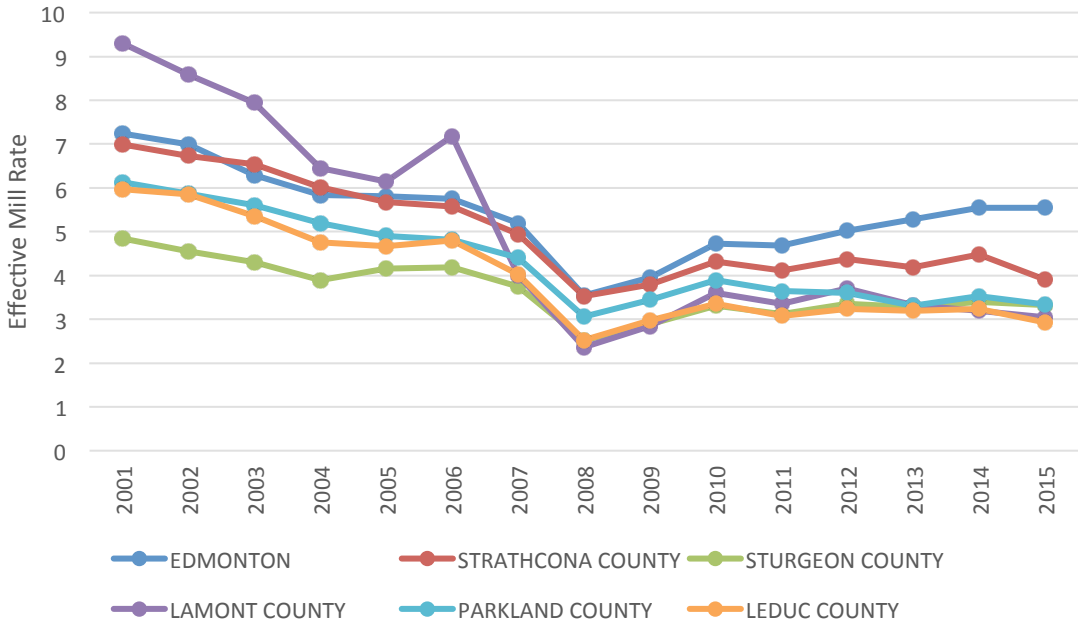
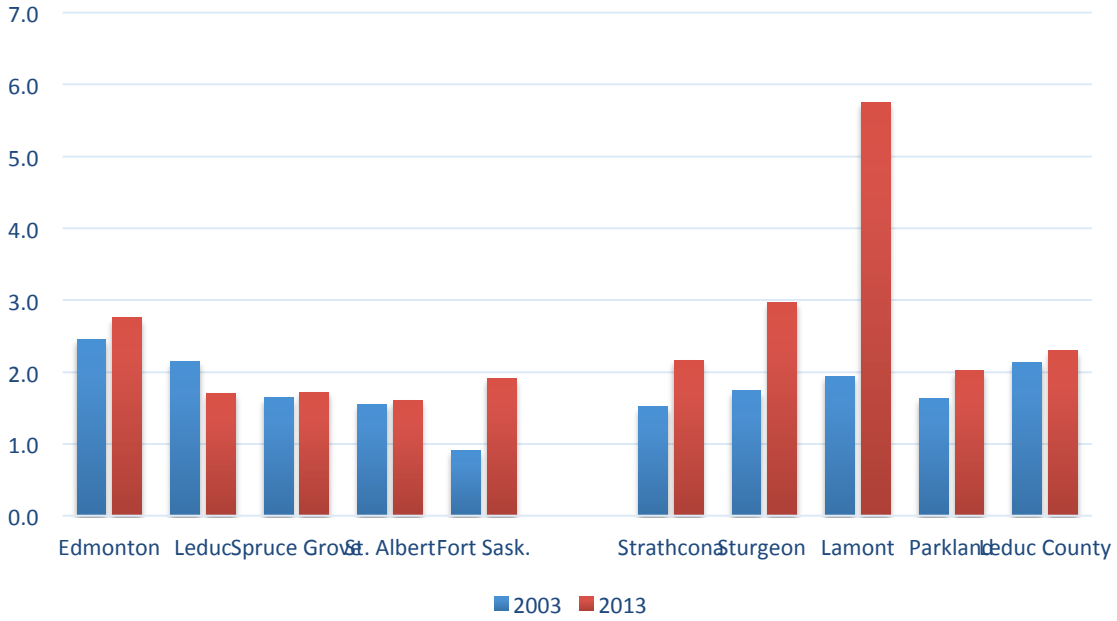


Figure 22 shows the ratio of the non-residential mill rate to the residential mill in the larger urban municipalities, and the five municipal districts in 2003 and 2013. In all of the municipalities, the non-residential rate exceeded the residential rate in 2013. In Edmonton, the ratio increased from 2.45 to 2.75, but among the cities the largest increase was in Fort Saskatchewan where the ratio increased from 0.90 to 1.91. Only in the City of Leduc was there a reduction in the ratio of non-residential to residential mill rates.

In all five municipal districts, the ratio of non-residential to residential mill rates exceeded two, and in Lamont it increased from 1.94 in 2003 to 5.76 in 2013. This increase is a reflection of the trends shown in **Figures 18 and 21** where the residential mill rates of decreased over time and the non-residential mill rates have increased.

Figure 22. Ratio of the Non-Residential to the Residential Mill Rate in Selected Edmonton Region Municipalities in 2003 and 2013



In summary, municipal governments rely mainly on property taxation for their own-source tax revenues in both regions. However, there are substantial differences in the per capita revenues raised by some of the municipal districts and urban municipalities because the former are able to tax machinery and equipment and linear property or in the case of Leduc County commercial and industrial property. The main exceptions are the municipal districts of Foothills and Rocky View in the Calgary Region which currently do not receive substantial amounts of non-residential property tax revenues. In the Edmonton Region, the three municipal districts (especially Lamont County) that comprise the "Industrial Heartland" and the City of Fort Saskatchewan impose relative high non-residential property tax rates, and they have relatively low residential property tax rates. Whether the low residential property tax rates in these municipalities have resulted in more residential development is difficult to assess. It is possible that the residential property tax differentials with the City of Edmonton and the other urban municipalities in the Edmonton Region have been capitalized in the value of the land zoned for housing developments and therefore eroded the advantage of building new residences in these municipalities. The new petrochemical and associated industrial projects in the Industrial Heartland are relatively limited in location choice because of agglomeration effects. This has allowed the municipalities in this region to have relatively high non-residential tax rates without displacing these investments to other regions. In the Calgary Region, the competition between the Calgary and the

neighbouring municipal districts of Foothills and Rocky View is over relatively "footloose" commercial and industrial developments. The convergence of the non-residential tax rates in this region could be interpreted as evidence of competition for these geographically mobile projects, although this explanation seems, at least on the surface, inconsistent with the increases in non-residential mill rates in the MD of Foothills and Rocky View County.

Conclusion

The goal of this study has been to better understand the connection between municipal revenue generation and land use in the Calgary and Edmonton metropolitan areas. The econometric results in McMillan (2016), which are based on the land use patterns from 83 U.S. cities, indicates that local public finance matters and that greater reliance on property taxation and user charges reduces sprawl. McMillan's econometric results imply that Calgary and Edmonton's reliance on property taxes and user charges reduces sprawl in the Alberta metropolitan regions. One implication of these results is that if these cities gain new tax powers under new city charters, and they reduce their reliance on property taxes to the average of the 83 U.S. cities, sprawl will increase by eight percent in Calgary and 16 percent in Edmonton. The greater reliance on property taxes and user charges in Calgary and Edmonton is estimated to reduce sprawl by between 15 and 30 percent relative to the 83 U.S. city average.

The role that the source of municipal revenue has played in determining the pattern of land use has taken place within the context of rapid population growth and economic development in the Calgary and Edmonton regions. While there has been some decentralization of the urban populations, Calgary accounted for 74 percent, and Edmonton 66 percent of the population growth in their respective metropolitan areas. There has not been a marked increase in the share of the population living in the rural areas surrounding Calgary and Edmonton, if Sherwood Park, Strathcona County's urban service area, is considered a peripheral urban municipality.

In line with their shares of total population growth, Calgary and Edmonton have been the locations for the bulk of new residential development in their respective regions. However, one interesting trend is that the average values of the new units constructed in the surrounding rural municipalities is much higher than in cities of Calgary and Edmonton. With regard to both new commercial and new industrial development, the Edmonton Region has become more decentralized over the last three decades, with a significant increase in the shares of new commercial and industrial

building permits in Leduc County and Strathcona County. In contrast, Calgary has retained its dominant share of commercial and industrial development.

While there are extensive planning frameworks in place in both metropolitan regions, the ability of municipalities to set their own property tax rates ensures some flexibility in these systems, enabling municipalities to compete for development by setting competitive property tax rates. While property taxation remains the largest own-source revenue for the municipal governments in the Calgary and Edmonton Regions, there are substantial differences in the per capita revenues raised by some rural municipalities (as well as the city of Fort Saskatchewan) because they have significant amounts of machinery and equipment and linear property or commercial and industrial property in the case of in the case of Leduc County. The main exceptions are the municipal districts of Foothills and Rocky View in the Calgary region which currently do not receive substantial amounts of non-residential property tax revenues. The new petrochemical and associated industrial projects in the Industrial Heartland Region are relatively limited in location choice because of agglomeration effects. This has allowed the municipalities in this region to have relatively high non-residential tax rates, without displacing these investments to other regions, and to impose relatively low residential property tax rates. Whether the low residential property tax rates in these municipalities have resulted in more residential development is difficult to assess. It is possible that the residential property tax differentials with the other municipalities in the Edmonton Region may have been capitalized in the value of the land zoned for housing developments and therefore eroded the advantage of building new residences in these municipalities.

In the Calgary Region, the competition between Calgary and the neighbouring municipal districts of Foothills and Rocky View is over relatively "footloose" commercial and industrial developments. The convergence of the non-residential tax rates in this region could be interpreted as evidence of competition for these geographically mobile projects, although this explanation seems, at least on the surface, inconsistent with the increases in non-residential mill rates in Foothills and Rocky View County.

With the provincial government in the process of strengthening the system of regional planning in Alberta as part of a renewed effort to revise the Municipal Government Act, attention should be paid to ensure forthcoming changes do not stifle intermunicipal competition. Such a move would impact the economic sustainability of the rural and peripheral urban municipalities to the benefit of Calgary and

Edmonton, raising the question of what the future looks like for these municipalities and if they have a place in these metropolitan regions – a very real political Pandora's box.

References

Alberta, Province of. *Capital Region Board Regulation, Alta Reg 38/2012*. Accessed July 15, 2015. http://canlii.ca/t/lft6.

. *Municipal Government Act, RSA 2000, c M-26*. Accessed July 15, 2015. http://canlii.ca/t/52mh6.

Arnott, Richard. "Effects of Property Taxation on Development Timing and Density: Policy Perspectives." *Brookings-Wharton Papers on Urban Affairs* (2006): 189-230.

_____. "Reflections on Calgary's Spatial Structure: An Urban Economist's Critique of Municipal Planning in Calgary." *School of Public Policy SPP Research Papers* (October 2015).

Bennett, Dean. "Alberta Regional Planning Bill: Redford Slams On The Breaks Over Control Concerns." *The Canadian Press*. October 31, 2013. Accessed July 15, 2015. http://www.huffingtonpost.ca/2013/10/31/alberta-regional-planning-bill_n_4183396.html.

Bettison, David G., John K. Kenward, and Larrie Taylor. *Urban Affairs in Alberta*. Edmonton: University of Alberta Press, 1975.

Brueckner, Jan K. "Property Taxation and Urban Sprawl." In *Property Taxation and Local Government Finance*, edited by Wallace E. Oates, 153-172. Cambridge: Lincoln Institute of Land Policy, May 2001.

_____. "Urban Sprawl: Lessons from Urban Economics." *Brookings-Wharton Papers on Urban Affairs* (2001): 65-97.

Burchfield, Marcy, Henry G. Overman, Diego Puga, and Matthew A. Turner. "Causes of Sprawl: A Portrait from Space." *Quarterly Journal of Economics* (May 2006): 587-633.

Burnes,Daria, David Neumark and Michelle J. White Fiscal Zoning and Sales Taxes: "Do Higher Sales taxes Lead to More Retailing and Less Manufacturing, " National Tax Journal, 2014, 67(1), 7-50.

Calgary Regional Partnership. *Calgary Metropolitan Plan*. May 2014. Accessed July 15, 2015. http://calgaryregion.ca/cmp/bin2/pdf/CMP.pdf.

_____. "Board of Directors Handbook October 2015" October 2015. Accessed January 15, 2015. http://calgaryregion.ca/crp/calgary-regional-partnership/resources/reports-documents.html

Chaudry-Shah, Anwar M. "A Capitalization Approach to Fiscal Incidence at the Local Level." *Land Economics*, 1989, 65(4), 359-375.

Climenhaga, David J. "The Death and Life of Regional Planning in the Calgary Area." *Master's Thesis, Carleton University*. 1997.

Conger, Brian and Bev Dahlby "Policy Forum: Taxation of machinery and Equipment and Linear Property in Alberta*," Canadian Tax Journal* (2015) 63:2,487-99.

Cuthbertson, Richard. "Calgary mayor and municipal affairs minister exchange barbs over growth plan." *Calgary Herald*. February 10, 2013. Accessed June 15, 2015.

http://www.calgaryherald.com/news/Calgary+mayor+municipal+affairs+minister+exchange+barbs+over+growth+plan/7946269/story.html.

Ghitter, Geoff, and Alan Smart. "Mad Cows, Regional Governance, and Urban Sprawl: Path Dependence and Unintended Consequences in the Calgary Region." *Urban Affairs Review* 44(5) (May 2009): 617-644.

Hildebrand, Bailey. "Battle brewing as Chestermere attempts to annex land to block development." *Calgary Herald*. December 20, 2015. Accessed June 15, 2015. http://calgaryherald.com/news/local-news/development-battle-brewing-as-chestermere-attempts-to-annex-land-to-block-development.

Hodge, Gerald, and Ira M. Robinson. *Planning Canadian Regions*. Vancouver: University of British Columbia Press, 2002.

Kanbur, Ravi, and Michael Keen. "Jeux Sans Frontieres: Tax Competition and Tax Coordination When Countries Differ in Size." *The American Economic Review* 83(4) (September 1993): 877-892.

Laux, Frederick A. *Planning Law and Practice in Alberta, 3rd Edition*. Edmonton: Juriliber Limited, 2010.

LeSage, Edward C. Jr., and Melville L. McMillan. *Alberta: Municipal System Overview*. Edmonton: Western Centre for Economic Research, University of Alberta, 2008.

LeSage, Edward C. Jr., and Stefanick Lorna. "New Regionalist Metropolitan Action: The Case of the Alberta Capital Region Alliance." Presentation at the Canadian Political Science Association meetings. Winnipeg. June 2004.

McMillan, Melville, and Bev Dahlby. "Do Local Governments Need Alternative Sources of Tax Revenue? An Assessment of the Options for Alberta Cities." *School of Public Policy SPP Research Papers* 7(26) (September 2014).

_____. "Do Municipal Governments Need More Tax Powers? A Background Paper on Municipal Finance in Alberta." *The School of Public Policy SPP Research Papers* 7(33) (November 2014).

McNally, George Frederick. *Report of the Royal Commission on the Metropolitan Development of Calgary and Edmonton*. Edmonton: Province of Alberta, 1956.

Plunkett, T.J., and James Lightbody. "Tribunals, Politics, and the Public Interest: The Edmonton Annexation Case." *Canadian Public Policy / Analyse de Politiques* 8(2) (Spring 1982): 207-221.

Pryor, Robin J. "Defining the Rural-Urban Fringe." *Social Forces* 47(2) (November 1968): 202-215.

Sancton, Andrew "The Governance of Metropolitan Areas in Canada" *Public Administration and Development* 25 (2005): 321

Shah, Anwar M. "Empirical Tests for Allocative Efficiency in the Local Public Sector" *Public Finance Review*, 1992, (20, 3), 359-377.

Statistics Canada. *Building Permits, Publication 64-001-XWF*.

_____. *Table 327-0046 - New housing price index, monthly (index, 2007=100)*. Accessed November 25, 2015.