



Canadian Labour Market and Skills Researcher Network

Working Paper No. 82

**Why Have Poorer Neighbourhoods Stagnated
Economically, While the Richer have Flourished?
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Cities**

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August 2011

CLSRN is supported by Human Resources and Skills Development Canada (HRSDC) and the Social Sciences and Humanities Research Council of Canada (SSHRC). All opinions are those of the authors and do not reflect the views of HRSDC or the SSHRC.

Why Have Poorer Neighbourhoods Stagnated Economically, While the Richer Have Flourished?

Neighbourhood Income Inequality in Canadian Cities

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Abstract

Higher income neighbourhoods in Canada's eight largest cities flourished economically during the past quarter century, while lower income communities stagnated. This paper identifies some of the underlying processes that led to this outcome. Increasing *family* income inequality drove much of the rise in *neighbourhood* inequality. Increased spatial economic segregation, the increasing tendency of "like to live nearby like", also played a role. In the end, the differential economic outcomes between richer and poorer neighbourhoods originated in the labour market, or in family formation patterns. Changes in investment, pension income, or government transfers played a very minor role. But it was not unemployment that differentiated the richer from poorer neighbourhoods. Rather, it was the type of job found, particularly the annual earnings generated. The end result has been little improvement in economic resources in poor neighbourhoods during a period of substantial economic growth, and a rise in neighbourhood income inequality.

JEL Code: R23 and J31

Keywords: Inequality, Neighbourhood, Poverty

Executive Summary

Rising neighbourhood income inequality can change the face of cities. It can result in some neighbourhoods foregoing the economic benefits of a general improvement in economic conditions. As this paper demonstrates, the rising economic tide of the last quarter century has not lifted all neighbourhoods equally. Unfortunately, Canadian research on neighbourhood poverty, inequality and economic segregation tends to be relatively sparse

As we show more formally in the paper, rising *neighborhood income inequality* can result either from an increase in *family income inequality* in a city as a whole or because of *rising economic segregation*, a change in the correlation between family income and neighborhood income (a growing tendency of “like to live with like”). After documenting a rise in neighbourhood inequality between 1980 and 2005, this paper asks which of these processes played the larger role in that increase. It also asks what role changing government transfers and labour market outcomes played in the economic stagnation observed at the bottom end of the neighbourhood income distribution.

The analysis uses data from the 1981, 1986, 1991, 1996, 2001 and 2006 censuses for the eight largest Canadian cities. A neighbourhood is defined as a census tract, a geographic unit within cities that typically has a population of from 2500 to 8000 people, with an average of about 5300.

Between 1980 and 2005, neighbourhood income inequality (measured by the Gini coefficient) grew only slightly in Ottawa-Gatineau (10 percent) and Quebec City (12 percent), somewhat more in Montreal (22 percent) and in the remaining five large metropolitan regions from 36 percent (Vancouver) to a high of 81 percent (Calgary).

We show that most, but not all, of the increase in neighbourhood inequality was driven by the rise in *family* income inequality. Hence, for most Canadians, the rising *neighbourhood* income gap was mainly a by-product of the rising *family* income gap. The overall rise in neighbourhood inequality would have been fairly modest in the absence of the changes in total family income inequality that occurred over the period. Increasing economic segregation, the increased tendency of “like to live with like”, played a much smaller role.

The rise in neighbourhood income inequality was characterized by a stagnation of average family income in the poorer neighbourhoods, while higher income neighbourhoods registered significant gains. For most cities (excluding Ottawa-Gatineau and Quebec city, where inequality grew little), average family income in the poorest 10% of neighbourhoods changed between –4% and +5% over the 1980 to 2005 period, while incomes in the richest 10% of neighbourhoods rose by 25% to 75%, depending upon the city. Communities at the bottom end of the income distribution benefited little from the substantial overall economic growth registered in Canada. This result was likely driven by a number of factors, primarily those influencing the increase in family income inequality. These factors tend to be based in the labour market and changing family formation patterns.

We show that the differential outcome between richer and poorer neighbourhoods was almost entirely the result of differences in earnings growth among members of the different communities. Earnings stagnated or declined at the bottom of the neighbourhood income distribution, while rising substantially at the top. Changes in the distribution of investment or pension income, government transfers and other sources of income played only a minor role in the rising income gap between richer and poorer neighbourhoods.

This result points to events in the labour market, but changing family formation patterns and family labour market participation may also have played a role. Recent research suggests that much of the rise in family earnings inequality was related to changing family formation patterns; the increased tendency of high (and low) earners to live with partners with similar earnings power.

And it was not differential neighbourhood employment and unemployment trajectories that distinguished richer from poorer neighbourhoods. Unemployment is higher in poorer neighbourhoods, but there was not an increased concentration of unemployment in these communities. Rather, it was the type of job found that mattered. The jobs in which members of poorer communities increasingly found themselves were, in most cities, generating lower annual earnings, unlike those found by the residents of the richer communities.

1. Introduction

This paper marries two strands of research. First, we consider the spatial consequences of rising *family* income inequality on *neighbourhood* inequality, changes in the spatial distribution of income that results from the rising income disparity among families observed in Canada during the 1990s in particular (Heisz 2007; Frenette, Green and Milligan 2007).

The second strand relates to research on neighbourhood poverty and urban economic segregation: a growing tendency of “like to live with like.” The expansion of urban impoverished neighbourhoods in virtually every metropolitan area in the United States over the second half of the last century is well documented (e.g., Jargowsky 1996, 1997, Massey and Denton 1993).¹ Phenomena like out-migration of the more affluent, increased residential sorting by income class, and increasing concentration of poverty have led to concerns regarding the economic health of neighbourhoods at the bottom end of the neighbourhood income distribution. Fueled by William Julius Wilson’s classic study, *The Truly Disadvantaged* (1987), a growing body of literature attempts to find the roles of economic change, settlement patterns, and their relation to the formation of urban ghettos.

As we show more formally below, rising neighborhood inequality can result either from an increase in family income inequality in a city as a whole or because of rising economic segregation, a change in the correlation between family income and neighborhood income (a growing tendency of “like to live with like”).

¹ Recent report from 2000 U.S. census, nevertheless, reveals that the extent of residential segregation by income or the degree of neighbourhood inequality has been stagnated or even decline in the final decade (1990-2000) of the last century (Wheeler and Jeunesse 2007). This may be related to a declining racial and ethnic residential segregation in the last 20 years of the 20th century.

Canadian research on neighbourhood poverty and economic segregation tends to be relatively sparse.² In part, this is due to the fact that the Canadian story differs significantly from that of the U.S. Unlike our southern neighbour, family income inequality did not rise through the 1970s and 1980s and hence placed less upward pressure on neighbourhood inequality.³ This issue has also received less policy or research attention in Canada because economic segregation is often thought to be a consequence of underlying racial cleavages in the U.S. (Kain 1986, Jargowsky 1996) that are not replicated in Canada (Hou and Myles 2004).

Rising neighbourhood inequality can change the face of cities. It can result in some neighbourhoods foregoing the economic benefits of a general improvement in economic conditions. As we will see, the rising economic tide of the last quarter century has not lifted all neighbourhoods equally. If neighbourhoods become increasingly economically homogeneous, as the tendency of “like living with like” increases, then both the positive and negative neighbourhood effects on crime, health and the educational attainment of e children may become more pronounced. While issues of causality remain much disputed, there is clear evidence that low-income individuals who reside in “poor” neighbourhoods have inferior health and other outcomes when compared with low-income individuals living in more affluent, middle class, neighbourhoods (Hou and Myles 2005). A review of neighbourhood effects in Canada (Oreopoulos, 2007) concluded that much of the existing evidence on neighbourhood effects is derived from regression analysis, which in this particular case is prone to bias and misinterpretation. After discounting such work, the author concludes that, while the remaining

² Some exceptions include MacLachlan and Sawada (1997) and Myles, Picot and Pyper (2000). Both studies show a growing trend in income inequality at the census tract scale in most Canadian cities between 1970s and early 1990s. Also see Hatfield (1997) and Lee (2000) for trend on neighbourhood low-income rates.

³ This conclusion varied from city to city; however, as family income inequality did increase in some municipalities during the 1980s (see Myles, Picot and Pyper 2000). For Canada as a whole, family income inequality did not rise during the 1980s, in spite of rising employment earnings inequality, largely because of an increase in the redistributive effects of the tax – transfer system (Picot and Myles 1996, Beach and Slotsve 1996, Heisz 2007).

literature in Canada is sparse, neighbourhood environment matters for an individual's mental health and exposure to crime, but has little effect on future economic outcomes of residents.

Our first objective is to document changes in neighbourhood income inequality in Canada's eight largest cities over the 1980 to 2005 period. We go on to identify the underlying forces that contributed to such growth, notably those related to labour market phenomenon, and changes in government transfers. In the second part of the paper we address the role of economic segregation. Specially, we ask whether a rise in neighbourhood inequality simply reflects an increase in family income inequality in a city as a whole, or is driven by an increased tendency of families to sort themselves into more income-homogeneous communities.

2 Data sources and methods

The data for this paper are drawn from the 20% sample of the 1981, 1986, 1991, 1996, 2001, and 2006 Canadian Censuses of Population. The census micro-data files are used in this research. We focus on the eight largest census metropolitan areas in Canada.⁴ Family income is determined for the economic family,⁵ and "adult equivalent adjusted" to account for economies of scale associated with larger families. In this paper we use the "central variant" approach proposed by Wolfson and Evans (1990) which assigns a weight of 1.0 to the first person, 0.4 to the second family member, and 0.3 to each additional person. Each individual in the family is assigned an "adult equivalent" income, which is essentially a *weighted per-capita* income⁶ that accounts for

⁴ The eight CMAs are Toronto, Montreal, Vancouver, Ottawa-Gatineau, Quebec City, Calgary, Edmonton, and Winnipeg.

⁵ The definition of economic family includes all individuals sharing a common dwelling and related by blood, marriage or adoption.

⁶ To arrive at adult-equivalent-adjusted income, all family incomes are divided by the sum of the "adult equivalent" weights for that family. Since the first person in the family receives a weight of 1.0, the second person 0.4 and all subsequent family members 0.3, the sum of the weights for a family of one is 1.0, a family of two 1.4 and a family

the economies of scale associated with larger families, and assumes equal sharing of resources within a family. Everyone in the same families receives the same “adult equivalent” income. Conceptually, it is the income required by a single adult in order to have the same purchasing power as that available to members of the family (who benefit from economies of scale).

The income units

Unlike previous census studies that permitted analysis only on pre-tax family income, this paper employs post-tax family income. Inequality is better measured using post-tax data, particularly for societies with a progressive tax system. Inequality tends to be much higher if taxes paid are not taken into account. Prior to 2006, Canadian censuses did not collect information on taxes paid. To overcome the lack of information on taxes paid in earlier census years, Frenette, Green, and Milligan (2006, 2007) use a regression-based approach to impute federal and provincial income taxes and added them to the existing census microfiles for the census years between 1980 and 2000⁷. In this paper we take advantage of this recently imputed tax information, along with

of four 2.0. Hence, a family of four requires only twice the family income of a family of one in order to have the equivalent standard of living, not four times the income, due to economies of scale. This adult-equivalent-adjustment process does have the effect of making the family income appear somewhat lower than one might be used to seeing. For example, if a family of four has an unadjusted family income of \$50,000, the adult-equivalent-adjusted income for that family would be \$25,000. The adult-equivalent-adjusted income is a measure of the economic resources available to each member of the family, after adjusting the actual family income for family size, and the effects of economies of scale.

⁷ Using the “T1 family file” (ie a taxation file) maintained at Statistics Canada, for each census income year they estimate a regression equation with taxes paid as the dependent variable. The independent variables include the components of income, and relevant characteristics such as family size. Models are estimated separately for federal taxes and provincial taxes. These estimated regression models are then run using the income components and relevant family characteristics reported in the census to estimate taxes paid for persons over age 15. Taxes paid by

the 2006 census data, which collected taxes paid for the first time, to produce a time series of after-tax data. Moreover, it is worth noting that the period under study covers two complete business cycles. By comparing years that are in similar positions in the business cycles (roughly 1980, 1990, 2000, and 2005), we are able to remove the cyclical effects from the rising neighbourhood inequality trends.⁸

We restrict our analyses to the eight largest census metropolitan areas (CMAs) for two reasons. First, neighbourhood segregation tends to emerge in larger cities where there is a possibility to create “niche neighbourhoods.” Second, the availability of city-specific consumer price indices (CPIs) for the largest cities enables us to estimate changes in real as well as relative income levels at the neighbourhood level. Earnings and income are deflated using the city-specific CPIs.

Neighbourhoods

As in most small area research, we define *neighbourhoods* by census tracts (CTs). Census tracts are small geographic units representing neighbourhood-like communities in census metropolitan areas (CMA) and in census agglomerations (CA) with an urban core population of 50,000 or more. CTs are initially delineated by a committee of local specialists (for example, planners,

individuals are then summed to the family level. An internal validation technique was used, and mean absolute error rate (predicted taxes paid compared to actual) across ten deciles was 1.1%. The mean absolute error at the level of the individual was 5.0%. This approach requires access the micro-data on the T1 family file, and the census.

⁸ Note that inequality tends to rise in economic contractions, and fall in expansions. Fortunately, the beginning and end of the period covered in this study—1980 and 2005—are in similar positions in the business cycle in terms of the unemployment rate. There are of course some variations across cities, but the overall patterns remain unchanged. Nonetheless, it is likely fair to say that the business cycle will have only a minor effect on a comparison of neighbourhood inequality trends for 1980 and 2005. When comparing between the end periods, we focus on the change over the decades; 1980 to 1990, 1990 to 2000. We discard the intermediate years (1985 and 1995) because they were very much affected by the two severe recessions during the early part of these decades.

health and social workers, educators) in conjunction with Statistics Canada. They typically have a population of 2,500 to 8,000.⁹ In 2006, for instance, about 41% of the tracts in any city had between 3,000 and 5,000 persons, and about 68% had range in size from 3,000 to 7,000 people, with an average of roughly 5,300.

With respect to comparability of results over time, we recognize that the indices of neighbourhood inequality are often sensitive to variations in the number and population of tracts. Tracts that are initially homogeneous may become more heterogeneous as populations within tracts increase. Such changes could affect the distribution of neighbourhood income. To maintain an average population size of tracts over time, Statistics Canada subdivided some tracts in the central city if they became too populous. This action would tend to reduce the likelihood that there was a sufficient shift in the average size to significantly influence the comparability of the results over time.

Over the time period studied, we use the CT boundaries as they exist in each year. That is, the number of CTs in a CMA can change with time, mainly through the addition of new tracts in outlying areas (appendix table A1). While a few census tracts split into two over time, most remain longitudinally consistent. That is one of the main advantages to using CTs as neighbourhoods. To determine whether possible changes in the boundaries had a significant effect on the analysis, we also computed the results using a set of fixed CT boundaries, excluding new census tracts that were added, mainly in the suburbs, between 1981 and 2006. The results changed little. They are available on request.

⁹ Nevertheless, CTs in the central business district, major commercial and industrial zones, or peripheral areas can have populations outside of this range.

3 The Rise in Neighbourhood Inequality

Just how different are average family incomes in rich and poor neighbourhoods? In 2005, the richest 5% of neighbourhoods had average after tax family incomes that were roughly 2 to 3 times that of the income in the poorest 5% of neighbourhoods (Table 1). Between 1980 and 2005, this 95/5 ratio increased in the majority of cities. Calgary and Toronto demonstrate the largest neighbourhood income gaps in 2005; the richest 5% had average family incomes 2.9 times that of the poorest neighbourhoods. Quebec City had the lowest gap, with a ratio of 1.9.

Neighbourhood income inequality can rise because incomes among both richer and poorer neighbourhoods increase, but at a much faster rate among the richer, or because incomes are falling in the poorer neighbourhoods, and rising in the richer. These two alternative scenarios hold very different implications for the well-being of poorer neighbourhoods. .

Over the 1980 to 2005 period, there was essentially stagnation in average family incomes among neighbourhoods at the bottom of the distribution. Average family income in the poorest 10% of neighbourhoods changed between -4% and +5% (table 2). The exceptions are Quebec City and Ottawa-Gatineau, where incomes at the bottom rose around 10%, still little change over such a long period. Incomes in the richest 10% of neighbourhoods rose by 25% to 75% over the same period, depending upon the city. Thus, the average family in the poorest neighbourhood had virtually no more purchasing power in 2005 than in 1980, in spite of considerable economic growth over the period.

When indexed by the familiar Gini coefficient (Table 3), neighbourhood inequality rose substantially in six of the eight Canadian cities between 1980 and 2005.¹⁰ Furthermore, the range in inequality increased. In 1980, the city with the highest inequality (Toronto) had a Gini index 1.4 times as high as that of the city with the lowest (Edmonton). By 2005, neighbourhood inequality in Calgary, the city with the highest inequality, was 1.8 times that in Quebec City, that with the lowest.

4 The Contribution of Earnings and Transfers to Rising Neighbourhood Inequality

The basic parameters of the rise in *family* income inequality since 1980 have been well documented. Canada experienced increasing inequality in family *market* incomes over virtually the entire 25 year period. Between the 1980 and the early 90s, however, changes in the distribution of *market* incomes were offset by rising transfers and taxes, so that inequality in final disposable family income remained stable. Thereafter, however, changes in the tax-transfer system failed to keep pace with rising family market earnings inequality, and family disposable income inequality rose. (Heisz 2007; Frenette, Green and Picot 2006; Frenette, Green and Milligan 2007).

¹⁰ To compute the standard inequality indexes such as the Gini indexes, we rank order all neighbourhoods in a city (i.e., census tracts) by their mean neighbourhood after tax family income. Family income is adult equivalent adjusted to account for economies of scale associated with difference in family size. This results in a *per capita* measure, adjusted for family size. The neighbourhoods are population weighted. Hence, this approach is equivalent to computing a distribution of individuals in the city, rank ordered by their average neighbourhood income. Deciles are computed based on this same rank-ordering of neighbourhoods. To calculate exact deciles, families whose income fall at the exact decile cut points (in dollars) between two deciles must be allocated between the higher and lower income deciles. These families are randomly assigned to the two deciles so as to compute exact deciles (i.e., deciles with exactly 10% of individuals in each one)

As we shall see, the story is much the same for *neighbourhood* income inequality. Changes in neighbourhood earnings have driven the rise in neighbourhood inequality, and the transfer system has not offset the earnings induced changes in neighbourhood income. To demonstrate this outcome, we assess the effect of changes over the past quarter century in the distribution among neighbourhoods of various income components on neighbourhood inequality. The income components include employment earnings, government transfers, and investments and capital gains.

Following Lerman and Yitzhki (1985), the overall neighbourhood Gini can be decomposed by underlying income sources. The contribution of any particular income source (Q_k) to total inequality (G) can be partitioned into three factors: the Gini coefficient for the component (G_k), the share of that component in the overall income package (S_k) and the correlation between the component and the overall income package (R_k) as:

$$(1) \quad G = \sum Q_k = \sum G_k \cdot S_k \cdot R_k .$$

That is, overall inequality is determined by *inequality* in the distribution of the component itself, its *share* in the overall income package and its *covariation* with the remaining income components. We consider five income components that constitute family income: (1) employment earnings, (2) government benefits associated with the retired population (i.e., CPP/QPP, OAS and GIS), (3) other government benefits such as social assistance, the child tax credit, and EI payments (4) other income such as investment income and private pensions, and

(5) personal income taxes.¹¹ The last component can be regarded as a negative income. In this decomposition, as before, the census tract is the unit of analysis, and the income components are average neighbourhood values. The neighbourhoods are weighted by their population.

Of the five income components, the “other income” component (investment and private pension) and the retirement related transfers (OAS/GIS and CPP/QPP) are the most unequally distributed among neighbourhoods, with Ginis ranging from .300 to .465, depending upon the city and the year. People in the richer neighbourhoods have far more income from these sources than those in poorer neighbourhoods. This compares with a Gini of only .130 to .225 for the earnings component. However, in 2005 retirement transfers were much more equitably distributed among neighbourhoods than in 1980, thus tending to reduce overall neighbourhood inequality. Furthermore, there was little change in the contribution of the investment/private pension component. Indeed, in Ottawa and Quebec City, investment and private pension income were much more equitably distributed among neighbourhoods in 2005 than in 1980.

Neighbourhood family earnings inequality, in contrast, rose dramatically between 1980 and 2005. In Toronto, the neighbourhood earnings Gini rose by 85% (or .112 points), and in Calgary by 100% (.117 points). The increase in neighbourhood family earnings inequality was smaller in other cities, but still ranged from 30% to 60%. These are enormous increases for an indicator that is very difficult to move. By way of comparison, for Canada as a whole the rise in the family earnings Gini during the 1980s, a decade considered to have experienced a significant rise in earnings inequality, was only 6%, and, during the 1990s, 12% (Heisz 2007).

¹¹ Employment earnings include incomes from both self-employment and paid employment. Other government benefits cover social assistance, EI payments, child tax benefits, family allowances, and other transfers. Other incomes refer to investment income, private pension income, and all other income sources.

A more precise assessment of the contribution of each income component to the rise in the neighbourhood Gini is shown in table 4. For example, in Calgary, neighbourhood income inequality rose by 81%, representing a .087 point rise in the Gini. Rising neighbourhood earnings inequality contributed a .117 point rise in the overall Gini, accounting for more than 100% of the overall rise. But this was offset by taxes, which reduced overall after-tax neighbourhood income inequality by .049 points. The transfer system played little if any role in this story of change. Sometimes reducing, and at other times increasing neighbourhood inequality, the effect was always so small as to be insignificant compared to the earnings component. The cities that experienced large increases in neighbourhood inequality did so because they had large increases in neighbourhood family earnings inequality.

So the main driver of change in neighbourhood outcomes clearly lies in the labour market. This raises the question as to whether these changes resulted from changing *employment* opportunities or changes in earnings among the employed.

5 Differences in the Ability to Locate Work and Earnings in Jobs Held

We use neighbourhood employment rates (proportion of the population with a job), and unemployment rates as of the reference week (in May or June, depending upon the census) to assess changes in job-holding among neighbourhood residents¹². To assesses the impact of changes earnings among the employed we consider average individual annual employment earnings in the neighbourhood *of those employed at some time during the year*. Of course, falling individual earnings among the employed in low-income neighbourhoods could be driven by

¹² The employment can, of course, consist of a job held in any location. It is not restricted to jobs held within the neighbourhood (ie the census tract).

lower hourly wages, fewer hours worked throughout the year, or both. The information necessary to determine the relative importance of each of these factors is not available in the census. In all cases, we focus on prime aged workers, aged 25 to 54. We are seeking a measure of labour market outcomes, and do not want these measures to be influenced by changes in age of retirement patterns, changing preferences of the retired to work part-time, or the tendency of young people to work while in school for example.

With the exception of Ottawa and Quebec city, the two cities that experienced little change in neighbourhood inequality, between 1980 and 2000 employment rates either declined or increased more slowly in the poorest neighbourhoods, while rising, often markedly, in the richer neighbourhoods (table 5). But the poorer employment outcomes in the lower income neighbourhoods were largely a product of the 1980s. Over the 1990 to 2005 period, the poorer neighbourhoods actually gained more than richer ones with respect to employment levels, often dramatically more. This is particularly true in the western cities, where employment rates expanded rapidly in the poorer neighbourhoods (by 5 to 7 percentage points), while changing little in the richer neighbourhoods. This observation is likely driven by the fact that 1990 is a recession year, and employment among the less skilled fall more in recessions, and hence rise faster in recoveries (i.e., the 1990-2000 period) than among the more highly skilled (in the richer neighbourhoods).

Generally speaking, employment and unemployment levels did not become more spatially concentrated in the poorer neighbourhoods over the twenty five year period. With the exception of Toronto, the evidence suggests little change (table 5).

The pattern with respect to earnings is clear and straightforward. With the exception Of Ottawa-Gatineau, the earnings of job holders aged 25 to 54 fell in the poorer neighbourhoods while

rising in the richer neighbourhoods (table 6). And the difference was often dramatic. Earnings among job holders fell by between 5% and 15% in the poorest 10% of neighbourhoods, while rising between 7% and 80% in the richest neighbourhoods. Toronto and Calgary saw earnings fall 6% to 8% at the bottom, while rising 62% to 82% in the richer neighbourhoods. Hence, it is not so much the ability to locate jobs that accounts for the rise in the earnings gap between richer and poorer neighbourhoods, but rather the type of job found, and more specifically, the annual earnings in the jobs held.

6 The Role of Residential Segregation

Rising neighbourhood income disparity may simply reflect the well-documented trend of growing overall family income inequality at the city level. However, this may not always be the case. Rising neighbourhood inequality may also reflect the manner in which poorer and richer families sort themselves into neighbourhoods, independent of family income inequality levels. If low-income families become increasingly concentrated in low-income neighbourhoods, and high income families in high income neighbourhoods (ie if the correlation between family and neighbourhood income rises so that neighbourhoods become more homogeneous with respect to incomes), this too can result in rising neighbourhood income inequality. We refer to this possibility as economic spatial “segregation.”

There is considerable interest in this concept. Planners often strive for heterogeneity in neighbourhoods, neighbourhoods with a mix of low and high income families. Economic heterogeneity dampens “neighbourhood effects”, particularly for poorer families. Neighbourhood effects, driven by peer group effects or local financing possibilities, can result in poorer education, crime and health outcomes for poorer families clustered in poor neighbourhoods. If

economic spatial segregation is increasing and neighbourhoods are becoming more homogeneous with respect to income, then such neighbourhood effects could be increasing.

To untangle the role of economic segregation from that of rising family income inequality in the city as a whole, we start with a standard accounting framework (Allison 1978, Cowell 1995) where total inequality for a metropolitan area (I_T) is a simple additive function of between-neighbourhood (I_B) and within-neighbourhood (I_W) inequality.

$$(2) \quad I_T = I_B + I_W$$

Rearranging the identity equation (2), neighbourhood inequality can be rewritten as:

$$(3) \quad I_B = I_T - I_W = I_T \cdot \left(1 - \frac{I_W}{I_T}\right),$$

which can be expressed as a function of total city-wide inequality (I_T) multiple by the bracketed term $\left(1 - \frac{I_W}{I_T}\right)$. The latter term is the index of neighbourhood economic segregation, and it has the same interpretation as the neighbourhood sorting index (NSI) used by Jargowski (1996), the ratio of the between-tract inequality (I_B) over the total income inequality in a metropolitan area (I_T), that is:

$$(4) \quad NSI = \frac{I_B}{I_T} = \left(1 - \frac{I_W}{I_T}\right).$$

Equation (3) therefore implies that there are two ways neighbourhood inequality can increase: (a) as a result of an increase in city-wide inequality among all families; and (b) as a result of increased neighbourhood sorting, i.e. rising economic segregation

To better understand the “neighbourhood sorting index”, (NSI), we note that the index ranges between 0 and 1. Consider the unlikely event that all neighbourhoods have the same mean income. In this case, the between-tract inequality is zero ($I_B = 0$) and NSI would be zero—there is no sorting of families into poor and rich neighbourhoods. At the other extreme, if families sort themselves such that all families in all neighbourhoods have identical incomes (i.e., $I_W = 0$, no within-neighbourhood variation), then the NSI will be one—maximum neighbourhood economic segregation. In between these values, *for a given level of total city inequality (I_T)*, as neighbourhoods become more internally homogeneous with respect to income, I_W declines, and the index increases in value. Hence, NSI is driven by the degree of internal homogeneity of the neighbourhoods *relative* to total inequality.¹³

We report NSI as well as estimates of between-tract inequality (I_B) and total city inequality (I_T) in Table 7 based on a decomposable inequality measure, the Theil index. We do not use Gini index shown in the previous sections because the Gini index cannot be decomposed as described in equation (2). Overall, neighbourhood sorting indexes are relatively modest as their values are

¹³ Put another way, neighbourhood sorting is seen to increase if inequality between neighbourhoods is rising faster than total urban income inequality. Note that it is also possible that the neighbourhood sorting indexes may rise even if there are no physical moves (sorting) of families among neighbourhoods. This would happen if the distribution of income within neighbourhoods changed in a way such that tracts become more internally homogeneous.

far from one—that is, total segregation. Nevertheless, the results show a clear trend toward increasing economic segregation in virtually all cities over the period. Calgary and Winnipeg saw the largest increase in the economic sorting of richer and poorer families; the NSI rose by 40% (.050) between 1980 and 2005. On the other hand, economic segregation changed little in cities like Ottawa and Quebec, thus contributing to the overall stability in neighbourhood inequality in those cities.

However, we are mainly interested in determining the extent to which the *rising* neighbourhood inequality observed earlier is due to an overall increase in city-level family income inequality, or to rising economic segregation (ie increased neighbourhood sorting). To answer this question, we express equation (3) in log form as:

$$(5) \quad \ln(I_B) = \ln(I_T) + \ln(NSI).$$

The overall change in I_B (in terms of log point) between any two points in time can be expressed as the sum of the change in its components as in:

$$(6) \quad \Delta \ln(I_B) = \Delta \ln(I_T) + \Delta \ln(NSI).^{14}$$

This exercise, based on the Theil index, reveals that rising economic segregation accounted for a significant share (from one-quarter to one half) of rising neighbourhood inequality in all

¹⁴ Note that for small changes in I_B (say an one percentage point increase), the difference in $\log(I_B)$ as in equation (6) can be used to approximate the percentage change in I_B (i.e., $100 \cdot \Delta \ln(I_B) \approx \% \Delta I_B$). However, such approximation becomes less accurate for larger changes, which were observed in most of our cases. Thus, we should not interpret equation (6) as the percentage change in I_B . Instead, we simply interpret equation (6) as the change of inequality (in log points).

metropolitan areas (table 8). In Toronto, for instance, neighbourhood inequality rose by nearly 0.9 log points between 1980 and 2005; and more than one-quarter of the increase (0.23 log points) was associated with a rise in the sorting index. Rising economic segregation played an even more important role in Winnipeg where changes in the sorting index contributed about half of the increase in neighbourhood inequality (i.e., 0.33 out of 0.64 log points) over the entire period. The rise in neighbourhood sorting in the four western cities took place during the 2000 to 2005 period of strong economic growth associated with the commodities boom. The eastern cities saw neighbourhood sorting rise during the 1990s.

6 Conclusion

Neighbourhood clustering by income level has always been a feature of urban life. The supply and demand for more and less costly residential housing means that like attracts like. As a result, whenever total family income inequality rises, neighbourhood income inequality also tends to rise. But neighbourhood inequality can also increase due to changes in economic segregation (“neighbourhood sorting”); changes in the propensity of families with similar income levels to live together in the same neighbourhoods, even in the absence of rising family income inequality.

Between 1980 and 2005, neighbourhood income inequality (measured by the Gini coefficient) grew only slightly in Ottawa-Gatineau (10 percent) and Quebec City (12 percent), somewhat more in Montreal (22 percent) and in the remaining five large metropolitan regions from 36 percent (Vancouver) to a high of 81 percent (Calgary).

We show that most, but not all, of these increases in most cities were driven by the rise in *family* income inequality. Hence, for most Canadians, the rising *neighbourhood* income gap was mainly

a by-product of the rising *family* income gap. The overall rise in neighbourhood inequality would have been fairly modest in the absence of the changes in total family income inequality that occurred over the period. And we may be underestimating the effect of rising family income inequality, relative to that of rising economic segregation. That is because U.S. research suggests that some portion of the rise in neighbourhood economic segregation may itself be driven by rising income inequality (Reardon and Bischoff, 2010). Greater inequality in incomes can lead to greater inequality in the quality of the housing or neighbourhood that individuals can afford, and as a result, greater neighbourhood economic segregation or “sorting”. Empirical research by Reardon and Bischoff indicated a positive association between rising inequality and economic segregation, both the city level, and group-specific level within cities. While establishing causality presents serious challenges, they concluded that it was more likely to run from inequality to segregation, rather than the converse. If true, this would mean that some of the effect on neighbourhood inequality attributed here to rising neighbourhood economic segregation would in fact be driven by rising family income inequality. There are reasons to believe, however, that the association between rising inequality and segregation may be weaker in Canada than the U.S.¹⁵

Rising inequality can manifest itself in many ways, and the degree of concern from a policy perspective can depend upon the path taken. It may be that all communities witness substantial economic growth, but some more than others. Concerns on everyone’s part are likely to be

¹⁵ The effect of rising inequality on economic segregation was much stronger among blacks than whites, and Canadian cities do not have the same interaction between of race and income that one finds in U.S. cities. Furthermore, this effect was much strong in large rather than small cities, and most Canadian cities fall in the latter category. They also found that the effect of rising inequality on segregation was evident mainly among richer rather than poorer neighbourhoods. It tended to drive increased economic sorting that involved richer neighbourhoods much more than poorer ones. This paper is more concerned with the latter than the former. Finally, there may be many other differences between Canadian and American cities such as relative house prices and the degree to which local taxes support the school system that could render the association between inequality and segregation very different in the two countries.

attenuated in this scenario. Alternatively, poorer communities may experience shrinking resources, while richer ones display an expansion. Richer neighbourhoods flourished economically in most Canadian cities over the past quarter century, while economic resources in the poorer communities stagnated. Communities at the bottom end of the income distribution benefited little from the substantial overall economic growth registered in Canada. This result was likely driven by a number of factors, primarily those influencing the increase in family income inequality. These factors tend to be based in the labour market and changing family formation patterns.

We show that the differential outcome between richer and poorer neighbourhoods was almost entirely the result of differences in earnings growth among members of the different communities. Earnings stagnated or declined at the bottom of the neighbourhood income distribution, while rising substantially at the top. Changes in the distribution of investment or pension income, transfers and other sources of income¹⁶ played only a minor role in the rising income gap between richer and poorer neighbourhoods.

This result points to events in the labour market, but changing family formation patterns and family labour market participation may also have played a role. Recent research suggests that much of the rise in family earnings inequality was related to changing family formation patterns; the increased tendency of high (and low) earners to live with partners with similar earnings power. This increased clustering of high (and low) earners within families contributed significantly to rising family earnings inequality. (Fortin and Schirle (2006); Lu, Morissette and Schirle (2009). While the paper did not attempt to separate these effects, we can say that it was

¹⁶ In our analysis, capital gains is included in “other” income, which has a small effect on rising neighbourhood inequality. However, only taxable capital gains are included; those derived from the sale of a main residence are excluded. It is conceivable that a rising income gap between renters and owners stemming from rising house prices could influence neighbourhood inequality. This analysis would not capture such an effect.

not differential neighbourhood employment and unemployment trajectories that distinguished richer from poorer neighbourhoods. Unemployment is higher in poorer neighbourhoods, but there was not an increased concentration of unemployment in these communities. Rather, it was the type of job found that mattered. The jobs in which members of poorer communities increasingly found themselves were, in most cities, generating lower annual earnings, unlike those found by the residents of the richer communities.

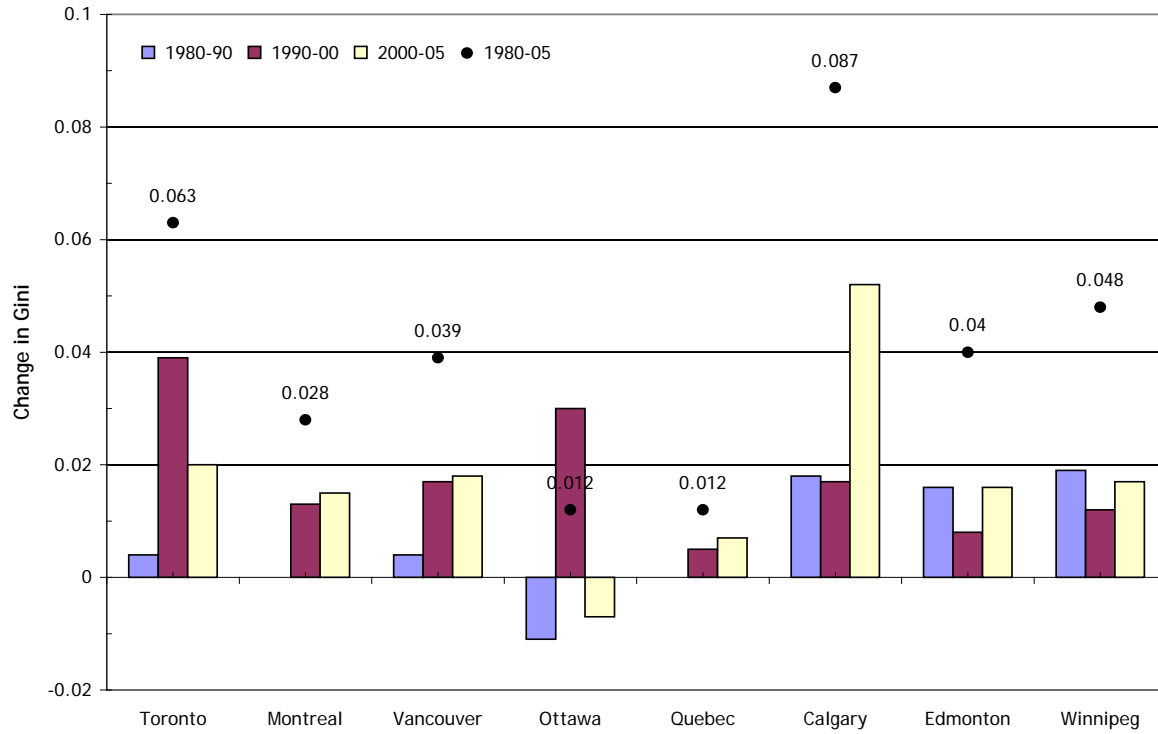
Differences in neighbourhood income levels are the result of historical urban settlement patterns that are, in turn, partially policy-induced (the result of zoning and other regulations governing urban development) as well as driven by normal market forces of supply and demand. However, the stagnation of disposable family income at the bottom of the neighbourhood income distribution since the 1980s, while simultaneously economic resources increased significantly at the top, is mainly a by product of a broader trend of rising family income inequality. This in turn is mainly the result of larger changes in labour markets and family composition.

Table 1
 Adult Equivalent Adjusted Neighbourhood income¹⁷ at various points in the neighbourhood income distribution, 1980 and 2005, in constant 2000 dollars

	P5	P10	P25	P50	P75	P90	P95	----- P95/P5	----- P90/P10	Ratios ----- P50/P5 P95/P50	
In thousands of constant 2000 dollars											
Toronto											
1980	\$21.4	22.9	26.1	29.8	33.7	39.2	44.8	2.1	1.7	1.4	1.5
2005	\$21.4	23.4	27.3	32.6	38.7	50.3	62.2	2.9	2.1	1.5	1.9
Montreal											
1980	18.1	19.6	22.2	24.8	28.4	32.1	37.1	2.0	1.6	1.4	1.5
2005	18.5	21.0	24.4	28.5	32.8	40.5	47.5	2.6	1.9	1.5	1.7
Vancouver											
1980	23.0	24.2	26.1	29.1	32.2	37.4	43.6	1.9	1.5	1.3	1.5
2005	22.9	24.2	27.0	31.5	37.0	43.9	48.7	2.1	1.8	1.4	1.5
Ottawa-Gatineau											
1980	20.3	21.6	24.6	29.1	33.3	36.4	40.4	2.0	1.7	1.4	1.4
2005	23.0	26.0	30.4	35.8	40.9	45.4	50.4	2.2	1.7	1.6	1.4
Quebec City											
1980	18.4	20.5	22.6	24.3	26.8	30.7	34.4	1.9	1.5	1.3	1.4
2005	21.2	23.0	27.2	30.0	33.1	38.8	40.1	1.9	1.7	1.4	1.3
Calgary											
1980	23.8	25.8	28.1	30.7	34.2	38.8	45.4	1.9	1.5	1.3	1.5
2005	24.4	26.6	31.1	38.4	46.1	60.7	71.3	2.9	2.3	1.6	1.9
Edmonton											
1980	23.5	24.4	26.0	29.0	31.7	35.5	39.3	1.7	1.5	1.2	1.4
2005	24.1	26.0	29.5	33.9	38.5	48.0	52.5	2.2	1.8	1.4	1.5
Winnipeg											
1980	17.8	20.0	23.1	25.6	28.1	31.6	33.7	1.9	1.6	1.4	1.3
2005	16.7	19.8	25.1	29.0	34.8	41.0	42.0	2.5	2.1	1.7	1.4

¹⁷ Note that the incomes reported here are “adult equivalent adjusted” (see Data Sources and Methods Section). This income is a measure of the economic resources available to each member of the family, after adjusting for family size, and economies of scale available to larger families. The result is that these income values are much lower than that normally observed at the “family” level, since these are weighted per capita family incomes. For example, if the family income for a family of 4 was \$80,000, the adult equivalent adjusted income would be \$40,000 (see footnote 6)

Figure 1
 Change in Gini coefficients by periods, post-tax equivalent income



Source: Canadian Censuses

Table 2
 Percentage change in mean income by neighbourhood decile, post-tax equivalent income, 1980-2005

	Neighbourhood deciles									
	1	2	3	4	5	6	7	8	9	10
Toronto	-1.2	2.7	4.8	6.7	8.5	10.3	12.3	15.1	20.8	45.7
Montreal	3.3	8.0	10.7	13.4	14.5	15.6	17.1	16.1	19.7	25.6
Vancouver	-1.0	0.1	3.6	5.7	7.3	10.5	13.2	14.1	15.7	22.3
Ottawa-Gatineau	10.2	22.8	23.4	22.4	23.5	22.6	24.3	23.5	24.1	26.8
Quebec city	10.4	17.2	19.3	20.3	22.7	25.3	24.7	22.3	23.6	24.2
Calgary	4.9	6.2	12.1	18.8	23.1	25.6	29.0	33.4	46.7	74.0
Edmonton	3.0	10.1	13.1	13.5	15.1	15.5	18.8	21.2	26.7	35.2
Winnipeg	-4.2	3.0	8.7	10.7	12.2	14.3	16.2	23.7	30.8	27.5

Source: Canadian Censuses

Table 3
 Neighbourhood inequality (Gini coefficients), post-tax equivalent income, 1980-2005

	1980	1985	1990	1995	2000	2005	1980-2005	% change in gini
Toronto	0.128	0.136	0.132	0.151	0.171	0.191	0.063	49%
Montreal	0.124	0.128	0.124	0.135	0.137	0.152	0.028	22%
Vancouver	0.107	0.122	0.111	0.120	0.128	0.146	0.039	36%
Ottawa-Gatineau	0.119	0.115	0.108	0.123	0.138	0.131	0.012	10%
Quebec city	0.098	0.100	0.098	0.103	0.103	0.110	0.012	12%
Calgary	0.107	0.127	0.125	0.138	0.142	0.194	0.087	81%
Edmonton	0.092	0.107	0.108	0.114	0.116	0.132	0.040	43%
Winnipeg	0.106	0.124	0.125	0.136	0.137	0.154	0.048	45%

Source: Canadian Censuses

Table 4

The contribution of income sources to rising neighbourhood inequality^{*}, 1980-2005

	Total changes in neighbourhood Gini		Contribution due to (% of total change explained)					Earnings + taxes combined
	Value	%	Earnings	Old-age transfers	Other transfers	Other incomes	Taxes	
Toronto	0.063	49.2%	0.112 (179%)	-0.001 (-1%)	-0.002 (-3%)	0.003 (5%)	-0.050 (-80%)	0.062 (99%)
Montreal	0.028	22.6%	0.047 (169%)	0.000 (-1%)	0.000 (2%)	0.007 (24%)	-0.025 (-90%)	0.022 (79%)
Vancouver	0.039	36.4%	0.049 (126%)	0.002 (6%)	-0.001 (-3%)	0.013 (35%)	-0.025 (-65%)	0.024 (61%)
Ottawa	0.012	10.1%	0.040 (332%)	-0.001 (-8%)	0.000 (2%)	-0.011 (-95%)	-0.016 (-134%)	0.025 (198%)
Quebec	0.012	12.2%	0.025 (208%)	-0.003 (-23%)	0.001 (9%)	0.001 (12%)	-0.012 (-102%)	0.013 (106%)
Calgary	0.087	81.3%	0.117 (134%)	0.001 (1%)	-0.002 (-3%)	0.020 (23%)	-0.049 (-57%)	0.068 (77%)
Edmonton	0.040	43.5%	0.060 (150%)	-0.002 (-6%)	-0.002 (-6%)	0.003 (8%)	-0.020 (-50%)	0.040 (100%)
Winnipeg	0.048	45.3%	0.066 (137%)	0.004 (8%)	-0.003 (-7%)	0.008 (18%)	-0.026 (-54%)	0.040 (83%)

Source: Canadian Censuses

Table 5

Percentage point change in employment and unemployment rates among 25-54 years by neighbourhood deciles*

Decile	% point change in employment rate			% point change in unemployment rate		
	1980-90	1990-05	1980-05	1980-90	1990-05	1980-05
Toronto						
1	-7.4	1.6	-5.8	9.1	-2.8	6.3
2	-4.3	0.3	-4	6.2	-2.1	4.1
3	-4.7	0.9	-3.8	6	-2.2	3.8
4	-2.1	-0.2	-2.3	5	-1.7	3.3
5	-1.7	0.5	-1.2	4.4	-1.9	2.5
6	-0.1	-0.2	-0.3	4.1	-1.5	2.6
7	0.6	-0.1	0.5	3.1	-1.3	1.8
8	-0.8	0.6	-0.2	2.7	-1	1.7
9	0.5	0	0.5	2.6	-0.6	2
10	2.4	-1.1	1.3	1.9	-0.2	1.7
Montreal						
1	-0.5	4.5	4	5.5	-3.6	1.9
2	1.2	6.8	8	4.5	-5	-0.5
3	2.2	6.8	9	4.9	-5	-0.1
4	3.3	7.3	10.6	3.1	-4.5	-1.4
5	3.8	7.1	10.9	3.1	-4.6	-1.5
6	3.5	7.6	11.1	2.5	-4.4	-1.9
7	4.4	8	12.4	2.1	-4.2	-2.1
8	3.4	7.2	10.6	1.8	-4.1	-2.3
9	3.8	6.6	10.4	2.5	-4	-1.5
10	3.6	3.1	6.7	1.6	-2.1	-0.5
Vancouver						
1	-6.1	5.1	-1	8.4	-7.9	0.5
2	-2.7	2.5	-0.2	5.6	-5.5	0.1
3	0.3	0.2	0.5	4.1	-3.1	1
4	1.4	1	2.4	4.4	-3.1	1.3
5	1.7	0.3	2	2.2	-2.2	0
6	1.4	-0.7	0.7	2.9	-1.6	1.3
7	0.3	-0.1	0.2	2.1	-2.3	-0.2
8	2.1	0.6	2.7	2.2	-2.3	-0.1
9	2.9	-0.1	2.8	2.1	-1.1	1
10	2.4	-1.2	1.2	2.5	-0.9	1.6
Ottawa						
1	2.3	3.1	5.4	0.8	-3.3	-2.5
2	3.9	3.2	7.1	-0.5	-1.9	-2.4
3	4.2	2.3	6.5	0.7	-1.8	-1.1
4	4.4	2.5	6.9	0.4	-1.3	-0.9
5	2.1	2.9	5	1.8	-2	-0.2
6	4.9	1.1	6	0	-1.2	-1.2
7	4.7	2	6.7	0.5	-2.3	-1.8
8	4.1	1.7	5.8	0.8	-1.3	-0.5
9	5	-0.4	4.6	0.3	-0.9	-0.6
10	4.8	0.1	4.9	0.4	-0.6	-0.2

Source: Canadian Censuses

Table 5 (continued)

Decile	% point change in employment rate			% point change in unemployment rate		
	1980-90	1990-05	1980-05	1980-90	1990-05	1980-05
Quebec						
1	4.7	12	16.7	1.6	-6.3	-4.7
2	7.5	9.2	16.7	0.4	-3.9	-3.5
3	7.6	10.6	18.2	-0.8	-3.7	-4.5
4	8.4	9.4	17.8	-0.9	-4.5	-5.4
5	8.6	8.5	17.1	-0.9	-3.1	-4
6	11.2	8.7	19.9	-0.8	-4.9	-5.7
7	8.5	9.4	17.9	-1.1	-3.5	-4.6
8	11.4	5.1	16.5	-3.5	-2.6	-6.1
9	9.8	7.9	17.7	-0.4	-3.9	-4.3
10	8.7	8.1	16.8	-1.6	-3.5	-5.1
Calgary						
1	-4.3	5.5	1.2	7	-6.4	0.6
2	-1.4	4.2	2.8	4.9	-4.5	0.4
3	-1.3	4.5	3.2	5.8	-4.3	1.5
4	0	3.1	3.1	5.1	-4.3	0.8
5	-0.3	4.2	3.9	5	-4.3	0.7
6	-1.5	3	1.5	3.9	-3.7	0.2
7	-1.7	3.1	1.4	4	-3.8	0.2
8	1.4	3.5	4.9	3.8	-3.4	0.4
9	3	1.1	4.1	2.5	-0.8	1.7
10	4.7	0.5	5.2	2.7	-1.7	1
Edmonton						
1	-7.4	6	-1.4	7.1	-6.1	1
2	-1.8	3.9	2.1	5.4	-4.9	0.5
3	0.7	3.5	4.2	4	-3.7	0.3
4	-0.1	2.7	2.6	4.9	-3.7	1.2
5	-0.8	2.8	2	3.2	-3.1	0.1
6	2.3	3.1	5.4	2.9	-3.7	-0.8
7	-0.5	3.2	2.7	4	-3.3	0.7
8	3.5	1.6	5.1	3	-2	1
9	3.4	1.1	4.5	2	-1.7	0.3
10	3.6	0.7	4.3	1.4	-1.5	-0.1
Winnipeg						
1	-10.2	7	-3.2	6.8	-6.7	0.1
2	-2.9	4.2	1.3	4.9	-5.6	-0.7
3	0.1	4	4.1	2.7	-4.3	-1.6
4	1.3	1.7	3	2.2	-2.3	-0.1
5	1.8	1.4	3.2	2.6	-2.1	0.5
6	1.7	3.6	5.3	2.7	-3.1	-0.4
7	4.4	2	6.4	2.1	-2.7	-0.6
8	5.6	4.1	9.7	1.5	-3.2	-1.7
9	5.3	3.5	8.8	1.2	-2.5	-1.3
10	5.2	0.9	6.1	0.9	-0.8	0.1

* Neighbourhood employment rates are measured as the proportion of neighbourhood population with a job in the reference week. The unemployment rates are measured as the proportion of neighbourhood labour force without a job in the reference week. In all cases, we focus on workers 25-54 years old.

Table 6
 Percentage change in mean annual individual wages among 25-54 years by neighbourhood deciles*

Decile	1980-90	1990-05	1980-05	Decile	1980-90	1990-05	1980-05
Toronto				Quebec			
1	-1.25	-4.33	-5.53	1	-14.37	-0.38	-14.69
2	1.61	-3.67	-2.12	2	-9.27	-2.57	-11.61
3	0.04	-1.04	-1.00	3	-9.92	1.01	-9.01
4	0.24	2.33	2.57	4	-9.40	3.35	-6.36
5	-0.07	4.93	4.86	5	-4.79	7.21	2.08
6	2.23	7.96	10.37	6	-6.15	7.63	1.00
7	3.54	8.04	11.87	7	-8.94	7.44	-2.16
8	5.61	12.38	18.68	8	-3.23	3.03	-0.30
9	7.41	16.79	25.45	9	-10.57	12.56	0.66
10	6.02	53.23	62.46	10	-3.33	11.40	7.70
Montreal				Calgary			
1	-4.27	-6.01	-10.02	1	-13.10	5.23	-8.56
2	-6.71	1.65	-5.18	2	-8.47	2.16	-6.50
3	-9.62	4.37	-5.66	3	-9.18	13.17	2.79
4	-5.98	3.97	-2.25	4	-6.78	21.79	13.54
5	-6.97	4.84	-2.47	5	-6.22	24.89	17.12
6	-2.13	4.12	1.90	6	1.10	22.42	23.76
7	-4.75	7.55	2.44	7	-2.93	33.06	29.17
8	-3.03	10.41	7.06	8	0.71	33.62	34.58
9	-4.97	14.19	8.51	9	-0.11	39.31	39.16
10	-1.01	25.42	24.15	10	-1.51	84.01	81.22
Vancouver				Edmonton			
1	-11.20	0.84	-10.45	1	-14.74	8.15	-7.78
2	-10.67	1.03	-9.75	2	-13.65	13.42	-2.07
3	-8.11	1.22	-6.99	3	-10.96	11.66	-0.57
4	-9.11	1.06	-8.15	4	-9.96	14.81	3.37
5	-4.72	2.66	-2.19	5	-5.42	13.12	6.99
6	-3.99	4.62	0.44	6	-13.58	21.04	4.60
7	-1.94	13.64	11.43	7	-8.99	20.93	10.06
8	-1.47	11.12	9.49	8	-7.57	25.14	15.66
9	1.51	8.58	10.22	9	-6.56	26.23	17.96
10	-6.04	34.24	26.13	10	1.76	29.13	31.40
Ottawa				Winnipeg			
1	1.79	-0.47	1.31	1	-8.02	0.45	-7.61
2	4.91	4.22	9.33	2	-5.89	1.81	-4.18
3	5.23	5.78	11.31	3	-3.60	4.76	0.99
4	1.10	7.25	8.43	4	-5.09	2.15	-3.05
5	4.69	10.68	15.87	5	0.24	2.07	2.32
6	3.06	11.28	14.69	6	1.16	6.49	7.73
7	0.91	14.73	15.77	7	-3.63	9.13	5.16
8	5.71	15.44	22.03	8	0.78	13.10	13.98
9	9.00	12.35	22.46	9	3.92	15.36	19.88
10	9.72	23.68	35.70	10	5.10	17.91	23.92

Source: Canadian Censuses

* Refers to persons aged 25-54 with positive annual wages.

Table 7
Neighbourhood segregation indices, 1980-2005

	Theil			Number tracts (10)
	NSI (1)	Betw. CT (I_B) (2)	Total CMA (I_T) (3)	
Toronto				
1980	0.167	0.030	0.180	600
1990	0.158	0.031	0.196	806
2000	0.209	0.056	0.268	928
2005	0.210	0.072	0.343	999
Montreal				
1980	0.162	0.028	0.173	660
1990	0.143	0.023	0.161	742
2000	0.178	0.034	0.191	852
2005	0.185	0.043	0.232	869
Vancouver				
1980	0.119	0.021	0.177	245
1990	0.114	0.021	0.184	298
2000	0.124	0.028	0.226	386
2005	0.140	0.041	0.292	410
Ottawa				
1980	0.130	0.022	0.169	178
1990	0.121	0.019	0.157	211
2000	0.154	0.030	0.195	237
2005	0.141	0.029	0.206	250
Quebec				
1980	0.106	0.016	0.151	126
1990	0.121	0.016	0.132	152
2000	0.125	0.018	0.144	165
2005	0.122	0.020	0.164	166
Calgary				
1980	0.111	0.020	0.180	115
1990	0.136	0.025	0.184	153
2000	0.147	0.034	0.231	193
2005	0.157	0.066	0.420	202
Edmonton				
1980	0.088	0.014	0.160	141
1990	0.116	0.020	0.172	190
2000	0.117	0.022	0.188	205
2005	0.116	0.029	0.251	224
Winnipeg				
1980	0.135	0.021	0.155	134
1990	0.166	0.027	0.163	155
2000	0.175	0.031	0.177	164
2005	0.188	0.040	0.213	167

Source: Canadian Censuses

Table 8

Decomposing change in neighbourhood inequality (Theil index), by CMA

Year	Change in log point			Year	Change in log point		
	Between tract inequality $\Delta \ln(I_B)$	CMA inequality $\Delta \ln(I_T)$	NB sorting index $\Delta \ln(NSI)$		Between tract inequality $\Delta \ln(I_B)$	CMA inequality $\Delta \ln(I_T)$	NB sorting index $\Delta \ln(NSI)$
Toronto				Quebec			
1980-1990	0.033	0.085	-0.055	1980-1990	0.000	-0.134	0.132
1990-2000	0.591	0.313	0.280	1990-2000	0.118	0.087	0.033
2000-2005	0.251	0.247	0.005	2000-2005	0.105	0.130	-0.024
1980-2005	0.875	0.645	0.229	1980-2005	0.223	0.083	0.141
Montreal				Calgary			
1980-1990	-0.197	-0.072	-0.125	1980-1990	0.223	0.022	0.203
1990-2000	0.391	0.171	0.219	1990-2000	0.307	0.227	0.078
2000-2005	0.235	0.194	0.039	2000-2005	0.663	0.598	0.066
1980-2005	0.429	0.293	0.133	1980-2005	1.194	0.847	0.347
Vancouver				Edmonton			
1980-1990	0.000	0.039	-0.043	1980-1990	0.357	0.072	0.276
1990-2000	0.288	0.206	0.084	1990-2000	0.095	0.089	0.009
2000-2005	0.381	0.256	0.121	2000-2005	0.276	0.289	-0.009
1980-2005	0.669	0.501	0.163	1980-2005	0.728	0.450	0.276
Ottawa				Winnipeg			
1980-1990	-0.147	-0.074	-0.072	1980-1990	0.251	0.050	0.207
1990-2000	0.457	0.217	0.241	1990-2000	0.138	0.082	0.053
2000-2005	-0.034	0.055	-0.088	2000-2005	0.255	0.185	0.072
1980-2005	0.276	0.198	0.081	1980-2005	0.644	0.318	0.331

Source: Canadian Censuses

Table 9

Decomposing change in neighbourhood inequality, constant set of metropolitan areas*

Year	Change in log point			Year	Change in log point		
	Between tract inequality $\Delta \ln(I_B)$	CMA inequality $\Delta \ln(I_T)$	NB sorting index $\Delta \ln(NSI)$		Between tract inequality $\Delta \ln(I_B)$	CMA inequality $\Delta \ln(I_T)$	NB sorting index $\Delta \ln(NSI)$
Toronto (n=570)				Quebec (n=125)			
1980-1990	0.125	0.130	-0.006	1980-1990	0.000	-0.119	0.116
1990-2000	0.601	0.350	0.249	1990-2000	0.118	0.093	0.025
2000-2005	0.267	0.277	-0.009	2000-2005	0.105	0.134	-0.025
1980-2005	0.993	0.758	0.234	1980-2005	0.223	0.107	0.116
Montreal (n=630)				Calgary (n=113)			
1980-1990	-0.154	-0.060	-0.097	1980-1990	0.262	0.070	0.196
1990-2000	0.405	0.210	0.197	1990-2000	0.238	0.267	-0.030
2000-2005	0.245	0.206	0.038	2000-2005	0.693	0.625	0.066
1980-2005	0.496	0.356	0.138	1980-2005	1.194	0.962	0.232
Vancouver (n=212)				Edmonton (n=135)			
1980-1990	0.047	0.050	-0.008	1980-1990	0.405	0.101	0.313
1990-2000	0.276	0.230	0.050	1990-2000	0.091	0.112	-0.026
2000-2005	0.394	0.275	0.121	2000-2005	0.197	0.233	-0.035
1980-2005	0.717	0.554	0.163	1980-2005	0.693	0.446	0.253
Ottawa (n=165)				Winnipeg (n=131)			
1980-1990	-0.047	-0.030	-0.016	1980-1990	0.288	0.075	0.219
1990-2000	0.421	0.213	0.211	1990-2000	0.164	0.097	0.063
2000-2005	0.000	0.085	-0.086	2000-2005	0.265	0.192	0.075
1980-2005	0.375	0.268	0.109	1980-2005	0.717	0.364	0.357

Source: Canadian Censuses

Appendix Table A1

Changes in the number and population of census tracts, 1981-2006, major CMAs

City	Average population of census tract (weighted)			Number of census tracts		
	1981	2006	% change	1981	2006	% change
Toronto	4,820	5,067	5.12	600	999	66.50
Montreal	4,125	4,117	-0.19	660	869	31.67
Vancouver	4,916	5,106	3.86	245	410	67.35
Ottawa-Gatineau	3,883	4,455	14.73	178	250	40.45
Quebec City	4,359	4,213	-3.35	126	166	31.75
Calgary	4,822	5,292	9.75	115	202	75.65
Edmonton	4,396	4,562	3.78	141	224	58.87
Winnipeg	4,184	4,088	-2.29	134	167	24.63

Source: Canadian Censuses 1981, 2006

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