Is it time to start worrying more about growing regional inequalities in Canada?

Sébastien Breau (McGill University), Nick Burkhart (UCLA), Michael Shin (UCLA), Yannick Marchand (McGill University), Jeff Sauer (McGill University)

13 November 2019

Abstract: Much has been written recently about the rise of within-country inequality and growing imbalances of regional fortunes in the US and EU. In this paper, we apply a novel geo-visualization technique that combines local indicators of spatial association (LISAs) with directional statistics to a unique dataset in order to explore the spatial dimensions of regional income inequalities in Canada from 1981 to 2016. After describing a pattern of growing spatial divergence among regions, we briefly discuss the need for the federal government to explore new types of place-sensitive development policies.

Introduction

As the dust from the 2019 federal election in Canada settles, scholars and political analysts will spend the next few years sifting through the data in an effort to understand what happened. One thing the results confirmed is that while hanging on to power, Justin Trudeau's liberal minority government will have to navigate deepening political rifts across the country. From the resurgence of the Bloc and a new form of nationalism in Quebec to a growing sense of alienation and resentment over equalization payments and stalled oil pipeline projects in the west, regional fault lines are growing.

To be sure, given the country's vast geography, regionalism has always been part and parcel of the political and social landscape of Canada. Canada is a "country of regions" as Resnick (2000) reminds us. These days, something is making familiar regional tensions feel distinctly different. In his latest book, Savoie (2019) seems to put his finger on it when he suggests the country is suffering from a democratic deficit. National institutions have been drifting for too long, he argues, unable to "accommodate differing regional circumstances and to promote regional equality" (p. 6). While much of his book is dedicated to explaining how British historical experiences shaped Canada's national institutions, he does not spend much time on the question of regional inequalities per se. Using this as our point of departure, our contribution in this paper is to describe the evolution of regional inequalities in Canada over the last four decades.

The great inversion: Trajectories of regional inequality in Canada

Canada, like three-quarters of OECD countries, has seen a significant rise in income inequality over the last few decades. Since the mid-1990s alone, income inequality for the country as a whole has increased by 11%, which is considerably more than the 2% average rise in inequality across OECD countries (OECD 2014). That places Canada with now the 12th highest level of inequality among member countries. Figure 1 illustrates this increase by tracking a standard metric of inequality (i.e., the Gini coefficient) at the national-level using two different data sources from 1981 to 2016. The top red line shows the Gini coefficient based on 5-year interval Census data while the blue line shows the Gini coefficient for combined annual income data from the Survey of Consumer Finances (SCF), Survey of Labour and Income Dynamics (SLID) and the Canadian Income Survey (CIS). Both of these indicators follow roughly the same upward trajectory throughout the 1990s before levels of inequality peak in the mid-2000s and subsequently drop-off (slightly) in response to the compression of wages associated with the Great Recession.

Figure 1: National-and regional-level trajectories of inequality, 1981 to 2016
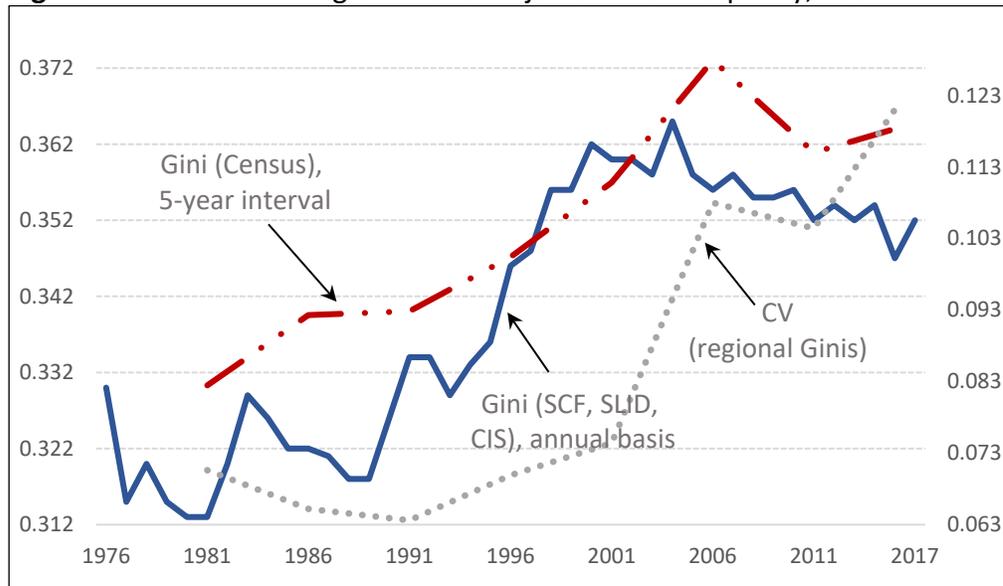

From our perspective, the more interesting trend is captured by the third (i.e., bottom dashed grey) line presented in Figure 1 which gives us a first glimpse of the regional trajectories of inequality in Canada by plotting the coefficient of variation for Gini coefficients across Census Divisions (*n*=284). These regional inequality measures are constructed from the confidential 20% micro-data files of the

Census of Population (from 1981 to 2016[1]). To ensure their comparability over time, the boundaries of each CD have been standardized using a GIS.[2] What is interesting to observe here is the change in the trajectory of the coefficient of variation. Throughout the 1980s, the negative sloping portion of the curve tells us there is less variability in levels of inequality across regions. Things change dramatically in the 1990s: as inequality at the national-level starts to increase, so do inter-regional differences in inequality. Even as inequality metrics begin to level-off at the national scale by the mid-2000s, values for inter-regional inequality levels continue to diverge throughout the 2011 and 2016 period. This switch from convergence to divergence among regional fortunes has also been observed in the US (see, for instance, Moretti 2012) and in the EU where Iammarino et al. (2017) and Storper (2018) use the term 'great inversion' to describe similar dynamics (more on this below).

To explore the spatial dimension of problem in more detail, in Figure 2 we map the values of regional inequality by centering them on the same Gini coefficient value of 0.327 (the national-level average for 1981). Here, red shaded areas represent CDs with higher than average levels of inequality while blue shaded CDs represent lower than average levels of inequality. The darker the shade, the more pronounced are the levels of inequality (either higher or lower). The upper left-hand inset of each map also provides greater visual detail for regions within the Quebec-City-Windsor corridor

Figure 2: Regional Gini coefficients, 1981 (left) and 2016 (right)
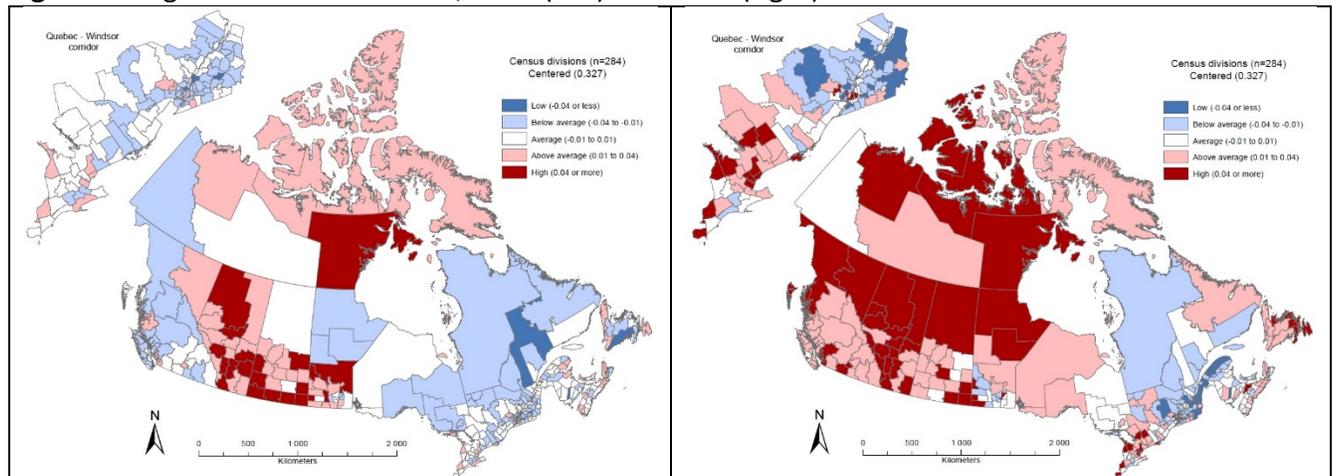

---

where about half of Canada's population resides, including eight of the country's twelve largest metropolitan centres (i.e., Toronto, Montreal, Ottawa-Gatineau, Quebec City, Hamilton, Kitchener-Cambridge-Waterloo, London and St. Catharines-Niagara).

A quick glance at the two maps suggests that overall, higher levels of inequality are now more prevalent across the country (i.e., there is generally more red in 2016 which is consistent with the findings reported above). More interesting, however, are the underlying spatial patterns which are apparent. In particular, two patterns of significant spatial clustering in regional levels of inequality stand out. The first one is the marked contrast in levels of inequality between regions located in the western provinces (where inequality tends to be much higher) and those in the eastern parts of the country (i.e., regions east of the Ottawa River – which demarcates the boundary between the provinces of Ontario and Quebec – where inequality is generally lower). The second noticeable pattern is between urban and rural regions where inequality is typically much higher in large urban centres (with the exception of some northern rural CDs). If we compare the two maps over time, we also get a sense that these east-west and urban-rural divides are growing which suggests spatially integrated dynamics (e.g., processes of diffusion or contagion) are at work. In other words, trajectories of inequality in one region appear to be related to those of neighbouring regions.

In order to investigate such dynamics and see if there are indeed growing regional divides in patterns of inequality, we turn to exploratory space-time data analysis (ESTDA) methods and an innovative geo-visualization technique introduced by Rey et al. (2011) and Murray et al. (2012). This approach, called directional local indicators of spatial association (LISAs), starts by comparing two Moran scatter plots which provide static snapshots of how regional inequality is spatially autocorrelated at the beginning and end of the period of study (see Figure 3). Here, the value of each regional Gini coefficient is plotted on the x-axis against its spatially lagged value on the y-axis. In computing the Moran's I values, we used a k-6 nearest neighbour spatial weights matrix to define the nature of spatial dependence between regions (i.e., a spatial connectivity histogram tells us that most regions across the country have between 5 and 6 neighbours). Comparing the scatter plots, we see clearly that the Moran's I values (which is the slope of the regression line fitted in each plot) increase from 1981 to 2016 (from 0.475 to 0.557), suggesting an increase in the clustering of inequality across space.

We can also learn more about the type of spatial clustering by looking at where the regional values fall within the four quadrants in each plot. In quadrant I (north east), we find regions that have above average values of inequality surrounded by other regions that also have higher levels of inequality. Quadrant II (north west) contains regions that have lower than average values of inequality surrounded by regions with higher than average inequality. Quadrant III (south west) includes regions with below average values of inequality surround by other relatively low levels of inequality. Finally, quadrant IV (south east) consists of regions with relatively high levels of inequality but surrounded by regions with below average Gini coefficient values. Of particular interest to us are the north east (QI) and south west (QIII) quadrants because they indicate the spatial clustering of high-high and low-low income inequality values which correspond to the pockets of dark red and blue shaded areas of the maps shown in Figure 2.

Figure 3: Moran scatter plots for regional Gini coefficients, 1981 (left) and 2016 (right)
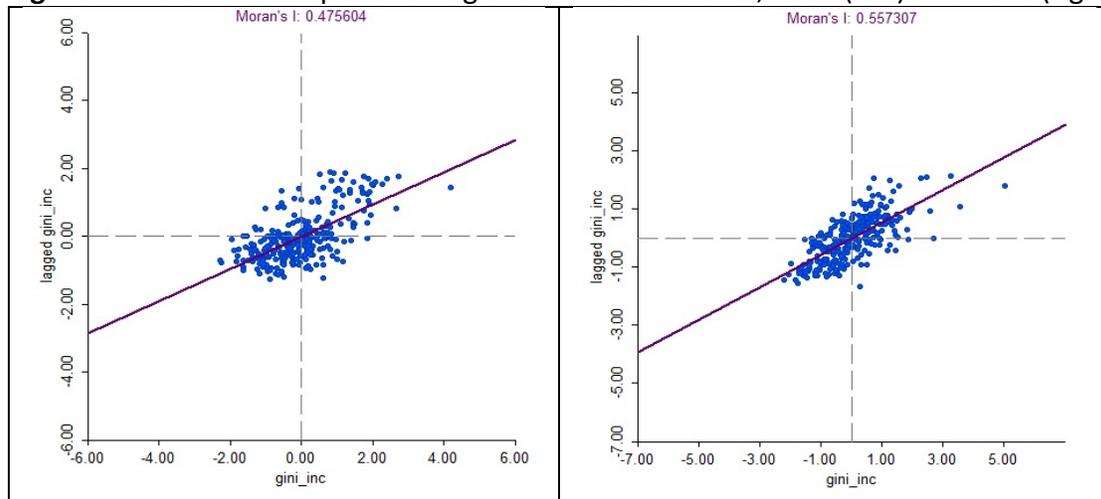
Moving beyond the static cross-sectional view described above requires us to use directional movement vectors to track changes in regional patterns of inequality over time. These vectors are shown in Figure 4, starting with the plot on the left-hand side which shows the unstandardized movement vectors for each region. The length of each vector is an indication of the magnitude of change in a region's level of inequality from 1981 to 2016 and the direction of that change is given by where the arrowhead ends up pointing. While the unstandardized directional Moran scatter plot shows movement both within and across quadrants, a lack of a common starting point makes substantive interpretation difficult. Therefore, on the right hand side of Figure 4, we have normalized

the vectors to their origin so that they reflect the movement in a region's distribution of income from its initial position back in the 1981. This makes the interpretation of the standardized directional LISA plot more intuitive.

Figure 4: Directional Moran scatter plots of regional inequality: (a) non-standardized and (b) standardized
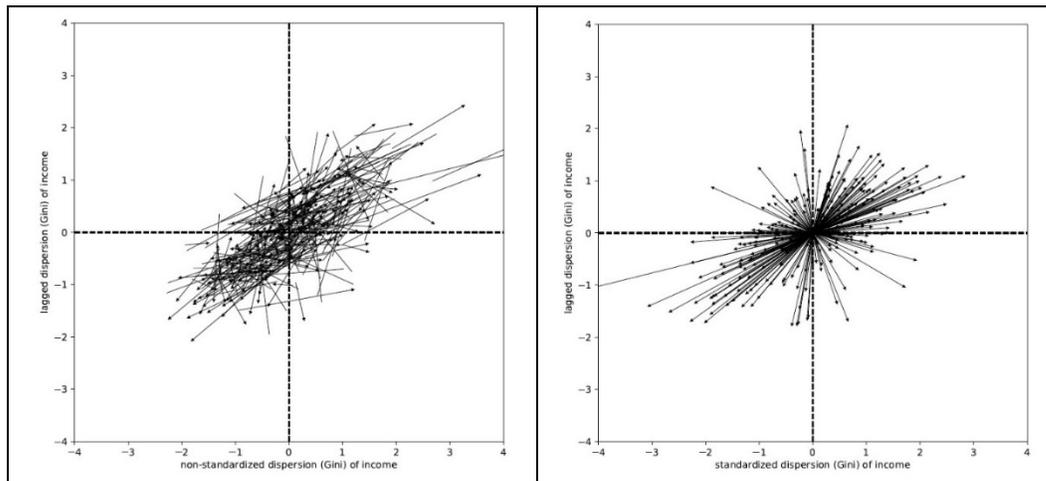

Here, the first quadrant (north-east) shows positive co-movements (or relative gains) of a region and its neighbours in the distribution of inequality. In other words, these are regions whose level of inequality has increased over time surrounded by other regions who have also experienced growing levels of inequality. The opposite trajectory is depicted in QIII (south-west) which shows negative co-movements (or relative declines) of regions in the spatial distribution of inequality (i.e., low-inequality regions that become relatively more equal over time surrounded by similarly lower inequality regions). Movements within these two quadrants therefore reflect the strengthening or emergence of positive spatial clustering (either by 'gaining' or 'losing' ground, in relative terms, within the distribution) and are indicative of the growing importance of spatial dependence in income distribution dynamics across Canadian regions.

With the help of a circular histogram, we can also develop a rose diagram which more neatly summarizes the vector directions (or movement orientations) of regional trajectories of inequality (see Figure 5). Here, the directional vectors are placed into one of $P = 8$ segments (or cuts) based on angular motion. It is clear that the highest frequencies are again found in segments 1 and 3, indicating that the predominant direction of change involves both upward and downward movements in the

regional distribution of incomes (i.e., regions experiencing increasing – or decreasing – levels of inequality surrounded by regions with similar occurrences).

Figure 5: Rose diagrams of regional inequality
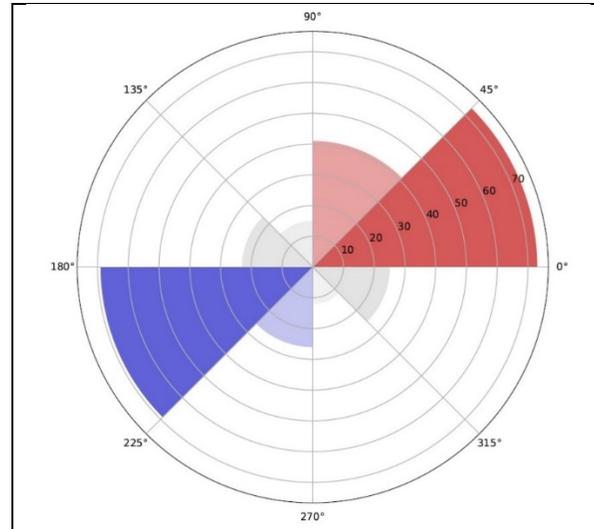
Implications of growing inter-regional inequalities

The directional LISAs applied here prove to be a useful tool in highlighting the growing imbalances and spatial clustering of regional trajectories of inequality in Canada. Should we be worried about such polarization? Recent work by Connolly et al. (2019) point to the existence of significant variations across regions in terms of inter-generational mobility, with high inequality regions typically associated with lower income mobility. Likewise, Breau (2015) and Marchand et al. (2019) show that there are important differences in the factors driving the deepening east-west and urban-rural divides, and that inequality can have negative consequences on economic growth especially once regional inequality becomes structurally embedded. If such patterns of inter-regional inequality persist, we can therefore only expect current economic, social and political tensions will become more acute in the future, placing an even greater strain on the Canadian federation.

From a policy perspective, the question is then what, if anything, can be done to help ease such regional tensions? We saw earlier that national institutions have been drifting for too long when it comes to addressing regional circumstances. From the 1960s to the 1980s, the federal government tried an alphabet soup of different regional development initiative, starting with the Agricultural Rehabilitation and Development Act (ARDA) and the Fund for Rural Economic Development (FRED), to

the creation of the Department of Regional Economic Expansion (DREE) and the Department of Regional Industrial Expansion (DRIE) (see Savoie 2017 for a more detailed history of regional development policies in Canada). While these policy initiatives were designed on an equity-basis and meant to redress some of the regional imbalances that existed at the time, by the late-1980s they were largely abandoned as the policy focus shifted to addressing problems in the manufacturing sector which on the whole are mainly concentrated in central Canada (see Breau et al. 2018). Since then, a multitude of regional development agencies have been established in different parts of the country to serve as the main conduit of development policy. These, however, have evolved over the years to pursue different sets of objectives (from encouraging entrepreneurial activities to greater industrial diversification) that are not necessarily geared towards equity concerns and alleviating regional inequalities. Given the growing spatial polarization we have described, perhaps it is time to start looking at new kinds of place-based or place-sensitive development policies which combine both efficiency and equity notions. Bradford (2011) was an early proponent of these approaches in Canada and the idea is gaining traction in Europe where similar inter-regional inequalities are also on the rise (e.g., Iammarino et al. 2019). With evidence of growing regional inequalities mounting, now all we need is the political will required to explore a potential policy reorientation.

References

Bradford, N. (2011) Public policy in Canada – Bringing place in?, published in S. Chisholm (Ed.) *Investing in better places: International perspectives*, The Smith Institute.

Breau, S. (2015), Rising inequality in Canada: A regional perspective, *Applied Geography*, 61: 58-69.

Breau, S., B. Toy, M. Brown, R. Macdonald, and O. T. Coomes (2018), In the Footsteps of Mackintosh and Innis: Tracking Canada's Economic Centre of Gravity since the Great Depression, *Canadian Public Policy*, 44: 356-367.

Connolly, M., Corak, M., and C. Haeck (2019) Intergenerational mobility between and within Canada and the United States, *Journal of Labor Economics*, 37: S595-S641.

Iammarino, S., Rodriguez-Pose, A. and M. Storper (2019) Regional inequality in Europe: Evidence, theory and policy implications, *Journal of Economic Geography*, 19: 273-298.

Iammarino, S., Rodriguez-Pose, A. and M. Storper (2017) Why regional development matters for Europe's economic future. *European Commission Worker Paper 07/2017*.

Marchand, Y., Dube, J., and S. Breau (2019) Exploring the causes and consequences of regional income inequality in Canada. *Working Paper*.

Moretti, E. (2012), *The new geography of jobs*, Boston: Houghton Mifflin Harcourt.

Murray, A.T., Liu, Y., Rey, S. J. and L. Anselin (2012) Exploring movement object patterns. *Annals of Regional Science*, 49: 471-484.

OECD (2014) Economic Surveys – Canada, Paris: OECD.

Resnick, P. (2000) *The politics of resentment: British Columbia regionalism and Canadian unity*. UBC Press.

Rey, S. J., Murray, A. T., and L. Anselin (2011) Visualizing regional income distribution dynamics. *Letters in Spatial and Resource Sciences*, 4: 81-90.

Savoie, D. (2019) *Democracy in Canada – The disintegration of our institutions*. McGill-Queen's University Press.

Savoie, D. (2017) *Looking for bootstraps – Economic development in the Maritimes*. Nimbus Publishing.

Storper, M. (2018) Separate worlds? Explaining the current wave of regional economic expansion. *Journal of Economic Geography*, 18: 247-270.