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Article abstract

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NOT EVERYTHING IS BLACK AND RED: THE GEOGRAPHIES OF CANADIAN ECONOMIC CHANGE

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Abstract: Canada experienced the strongest economic growth of all G7 countries in 2022. However, economic development is not evenly distributed across the nation. Unlike global cities, economically declining municipalities are often overlooked, contributing to social, cultural, and political repercussions. What are the geographies of regional economic change in Canada? And what demographic and spatial characteristics are associated with economic decline? This study examines the spatial distribution of economic change across Canadian cities and regions from 1981 to 2021, while accounting for municipal boundary adjustments between census periods. The findings of our spatial analyses reveal distinct, complex patterns of socio-economic change, influenced by peripherality at various spatial scales. For instance, cities further from the American border were often found to have experienced undesirable trends in educational attainment and average income, while also experiencing an improvement in unemployment rates. These observations were confirmed through statistical analyses, with stagnation in educational attainment and income trends occurring in rural, peripheral, and demographically shrinking municipalities. Conversely, there is a positive relationship between trends in unemployment rates and population size. The diversity of geographies of economic change demonstrates the need for targeted interventions to mitigate the unique manifestations of decline within communities.

Keywords: economic change, left-behind places, peripherality, Canada

INTRODUCTION

Canada's few global cities are the largest contributors to the national economy. In 2018, Canada's 11 metropolitan areas (as defined by the OECD) generated 64% of the country's gross domestic product, placing it in the top quartile of OECD countries (OECD, 2020). The Greater Toronto Area alone generates 20% of Canada's gross domestic product (Statistics Canada, 2023a). Yet, outside of these prosperous centres, many communities are experiencing economic decline (Hartt, 2021a; Weaver et al, 2024). While there have always been regional inequalities across the Canadian municipal landscape, scholars argue that modern spatial manifestations of globally interconnected growth and decline are different, and possibly more permanent, than in the past (Martinez-Fernandez et al, 2012). Modern globalization has elevated economic restructuring to higher spatial scales, making city and regional boundaries permeable and ill-defined, and increasing the vulnerability of Canadian communities to population and employment decline (Soja, 2000; Alasia et al, 2008). With economic processes further removed from the local level it has become increasingly difficult for local decision makers to guide their economic trajectories (Hartt, 2018). As economic divergence continues to shape uneven development across Canada, residents of municipalities that are "left behind" economically are at risk of becoming politically discontent, which can create political impacts at the regional and national level (Rodríguez-Pose, 2018).

Determining the geographies of economic change in Canada is essential in order to begin to understand how, where, when, and why economic decline occurs. Moreover, spatial economic considerations need to be coupled with a firm comprehension of the demographic and social profile of communities. Together, a clear, multifaceted geographic understanding of decline can lay the foundations for the development of policy and programming interventions to support communities that are struggling economically. To help lay this foundation, we ask: What is the geography of local economic change in Canada? And what demographic and spatial characteristics are associated with economic change?

This research examines long-term economic trajectories in over 500 municipalities across Canada. Specifically, we illustrate the trends of three socio-economic variables to identify spatial patterns. We then conduct statistical analyses to determine the relationship between economic change and demographic and spatial variables. The findings presented in this article contribute to a better understanding of the distinct and dynamic geographies of Canadian economic decline.

Economic divergence and left-behind places

The phenomenon of uneven economic development is not new, nor is it limited to the Canadian context. The economic disparities present across the globe can generally be attributed to long-term economic divergence (Martin et al, 2021). In Canada, many factors have contributed to this divergence through modern globalization (Hartt, 2021a). Government interventions privileged economic development in specific regions, such as in the Windsor-Quebec City trade corridor, known as Canada's heartland (Blank, 2008). Neoliberal policies, such as international trade agreements, made imports and exports more economically efficient than manufacturing within the country (Barnes et al, 2000). Economies of agglomeration resulted in a concentration of industries and services in a small number of Canadian regions (Glaeser & Resseger, 2010). These factors, combined with an economic shift to the service sector, prompted the closure of resource extraction and manufacturing sites across the country (Hartt, 2021a) and led to the emergence of what Moretti calls the "new geography of jobs" (Moretti, 2012; Iammarino et al, 2019). While some communities have managed to flourish in the new economic era, in which economic activity and income are unevenly distributed across space (Venables, 2008), others have grappled with symptoms of economic decline, such as the decrease in quantity and quality of jobs and declining individual and household incomes (Iammarino et al, 2019). Spatial inequalities have been further exacerbated by recent global events, such as the global financial crisis of 2008 and the COVID-19 pandemic (Martin et al, 2021; Etherington et al, 2022).

Economic divergence has led to the existence of what scholars and politicians have dubbed "left-behind places" (Martin et al, Pike et al, 2023). While there is no universal definition for the term, it is often used "to capture the plight of especially former industrial and rural places negatively affected by austerity, globalization, economic and technological change" (Pike et al, 2023: 1). However, scholars are divided as to whether it is truly "places" that are left behind, or rather the residents of these places (Pike et al., 2024; Martin et al., 2021; Overman, 2019). Scholars researching place-based "left-behindness" attribute this phenomenon to spatially differentiated economic change and argue that creating a more spatially even distribution of resources would improve the prosperity of left-behind places (Martin et al., 2021). A person-based approach, on the other hand, focuses on individual inequality, and notes that policy interventions should concentrate on improving individual opportunities instead of attempting to mitigate inequality between places (Overman, 2019).

Left-behind places have recently received more scholarly attention due to the rise in populism across the globe (Rodríguez-Pose, 2018). The dissatisfaction of living in poorer socio-economic conditions, combined with a resentment toward economically successful cities (McKay, 2018) has prompted residents to turn to the ballot-box for a solution (Rodríguez-Pose, 2018). The result has been extreme political changes at the national level, as was the case in the United Kingdom and in the United States. In 2016, residents from both countries cast their ballots in pivotal democratic processes, with the United Kingdom opting to leave the European Union (Brexit) and the United States electing Donald Trump as their 45th President (Rodríguez-Pose, 2018). In both countries, support for populist processes was stronger in industrial regions experiencing economic decline and high unemployment rates (Essletzbichler et al, 2018; Rodríguez-Pose et al, 2023). In the United States, populist voting was more prevalent in declining regions with a larger proportion of white population (Rodríguez-Pose et al, 2023).

The repercussions felt within left-behind places are amplified as they are subject to spatial stigmatization, which refers to the way people are devalued and poorly treated due to the places they are associated with (Slater, 2021). The stigma can exist externally and internally; both people who have never visited and residents living in these communities can perpetuate it (Wacquant, 2008). The stigmatization felt within left-behind places can be internalized by residents and local decision-makers, influencing the way they view their surrounding environment (Bürk, 2013). Some scholars argue that even the term "left-behind places" provokes a negative and homogenous spatial imaginary of decline, which does not consider the different realities of each place (Pike et al, 2024). Furthermore, the term fails to recognize the role played by institutions and policymakers in facilitating the conditions leading to a place being left behind, as well as the agency of residents who attempted to improve the condition of their community (Eisenberg, 2024). These negative imaginaries can shape the collective psychology of places (Wacquant, 2010) which, in turn, can be a catalyst for local socio-political transformation (Watkins, 2015; McKay, 2018).

These implications demonstrate the importance of advancing an evidenced-based discourse regarding economic divergence. Yet, municipal and regional economic decline remain an understudied topic – especially in the Canadian context (Hall & Hall, 2008; Hartt & Hollander, 2018). While some Canadian scholars have studied inequality

at a regional level (Marchand et al, 2020; Breau et al, 2020), fewer studies have focused on uneven development across Canadian municipalities. Without adequate research or policy instruments, communities are left to quietly grapple with these issues, or worse, overlook them as well (Hartt, 2021a). Moreover, Canadian municipalities are at risk of political changes described in the discourse of left-behind places. Studies have identified an urban-rural political divide in Canada, with urbanity influencing voting patterns and levels of place-based resentment (Armstrong et al, 2022; Borwein & Lucas, 2023). These findings, paired with the influence of local economic change on political behaviour (Rodríguez-Pose et al, 2023), reaffirm the need for a deeper understanding of the geography of economic change across Canada.

Two studies that examined economic trends in Canadian municipalities are Weaver et al's (2024) assessment of economic disparity and Filion's (2010) analysis of the demographic and economic trajectories of Canadian mid-sized and large cities. In the former, the authors created four sub-indices (population trend disparity, population dependency, labour trend disparity, and industry diversity disparity) using census data from 2001 to 2016 to determine the spatial distribution of communities at risk and/or experiencing persistent economic decline. They found a weak, positive relationship between economic disparity and peripherality, and caution that blanket policy attempting to mitigate economic challenges in rural communities may not be suitable given the heterogeneity of these places (Weaver et al, 2024). While the study shares valuable insights for policymakers to consider when addressing economic disparities and decline, the study focused on economic trends within a 15-year period. Extending the study period would have allowed for a better examination of the rise of economic divergence, which began in the 1980s (Martin et al, 2021; Iammarino et al, 2019). Furthermore, the authors did not report whether the historical census data was adjusted prior to conducting their study, as Canadian census boundaries are not uniform across census periods. They indicate, however, that only census subdivisions (a proxy for municipalities) that were present in the 2016 Census and at least one other census year were included in their study, which excluded 69 newly created census subdivisions (Weaver et al, 2024).

Filion's (2010) study analyzed demographic and economic change in Canadian cities with a population of at least 60,000 between 1971 and 2006. His findings challenged prominent conceptualizations of Canadian growth dynamics, with the distinction between population and economic trajectories in the heartland and hinterland dissipating. Instead, he highlighted a discrepancy between the trajectories in large cities and smaller cities, regardless of their location in Canada (Filion, 2010). However, limiting the scope of the research to cities with a population over 60,000 excludes many Canadian urban areas, which are often considered to be cities with a population of at least 10,000 (Hartt & Hollander, 2018; Hartt, 2021a). Filion also notes that census boundaries may change over time, but that these adjustments would likely have little effect on population trends in his study.

Methodological limitations in Canadian longitudinal research

Conducting longitudinal studies on Canadian census data is challenging due to adjustments to census boundaries across time. While the geographic units used by Statistics Canada are relatively stable, changes can occur between census periods which affect coding and the survey samples used within each boundary. For instance, if two municipalities undergo an amalgamation, the census boundaries of these two municipalities will be merged, resulting in one municipality for data collection. Smaller geographic units within the municipality, such as census tracts or dissemination areas, may also be adjusted by coding or boundary changes. Therefore, comparing data from various census periods on small geographic scales can lead to inaccuracies, as the geographic boundaries may have been altered over time. Statistics Canada has created tables to identify annual changes to boundaries (including population changes). However, only the tables from 2001 onward are publicly available. This methodological limitation is not exclusive to Canada, with many countries lacking the necessary data to conduct accurate longitudinal studies (Cromley et al, 2009; Gregory & Ell, 2005; Logan et al, 2016).

In the event official, publicly available correspondence files for historical census data are unavailable, some scholars conducting longitudinal analysis exclude geographic areas from their studies which have experienced significant changes to their land area (Hartt, 2019; Filion, 2010), while other scholars have developed their own methodologies to adjust historical census data (Allen & Taylor, 2018; Cromley et al, 2009; Gregory & Ell, 2005). In Canada, Allen and Taylor (2018) created the Canadian Longitudinal Census Tract Database, a set of apportionment tables for census tracts across Canada for each census year between 1971 and 2021. The tables were developed using a combination of map-matching techniques, dasymetric overlays, and population-weighed areal interpolation (Allen & Taylor, 2018). However, since census tracts are only located within municipalities with a core population of over 50,000, they are not useful for studies investigating smaller municipalities. While no similar studies exist with Canadian data, American and British studies have relied on areal weighting, dasymetric methods, estimation-maximization algorithms, or a combination of the three to redistribute census data (Syphard et al, 2009; Gregory & Ell, 2005).

METHODS

A two-phase approach was employed to analyze Canadian economic change. The first phase combines GIS mapping and spatial statistical analysis to determine the geographies of economic change in municipalities across Canada. The second phase uses descriptive, inferential, and correlation analyses to examine the relationship between economic change and spatial and demographic variables. Municipalities with a 1981 population of over 5,000 were included in all analyses to allow for the study of larger rural areas and Canadian cities (Hartt & Hollander, 2018; Seasons, 2003) and to exclude smaller municipalities with incomplete census data.

The primary data used in this study is 1981 and 2021 census data from Statistics Canada, which was analyzed at the census subdivision (CSD) level as a proxy for municipalities. Economic change should be measured using multiple variables, since "left-behindness refers to a set of local conditions that cannot be directly linked to any single economic indicator" (Connor et al, 2024: 40). Furthermore, scholars of urban decline have called for a person-focused approach when determining the well-being of a city (Hollander, 2011; Hartt, 2019). As a result, three socio-economic variables were included in this study: average individual income (adjusted for inflation), unemployment rates, and proportion of population with no academic certificate or diploma. These variables have been commonly used as indicators of regional economic change and economic inequality in existing Canadian and international studies (Filion, 2010; Hartt, 2021a; Weaver et al, 2024; Connor et al, 2024; Comim et al, 2023).

Two demographic variables and one spatial variable were included in this study in order to determine in which communities economic decline is most prevalent. First, total population trends from 1981 to 2021 were calculated using the census boundary adjustment method described below, as economic and population decline have often been found to occur in tandem (Hartt, 2021a; Hollander et al, 2018; Barber, 2023). Second, 2021 populations were used to assess the relationship between population size and economic change. Larger cities benefit from agglomeration economies more often than smal-

Table 1. Error estimates by year for original and adjusted population counts.

	Frequencies of relative error						
Methodology by year-pair	<0.01%	0.01-0.99%	1.00-2.99%	3.00-4.99%	5.00-9.99%	≥10.00%	RMSE
1981 to 1986							
Adjusted counts	0.775	0.081	0.031	0.012	0.010	0.092	1117
Original counts	0.797	0.078	0.023	0.008	0.008	0.086	1861
1986 to 1991							
Adjusted counts	0.119	0.647	0.106	0.028	0.024	0.077	1019
Original counts	0.644	0.028	0.013	0.004	0.004	0.307	17943
1991 to 1996							
Adjusted counts	0.126	0.671	0.114	0.030	0.024	0.035	259
Original counts	0.886	0.035	0.015	0.006	0.007	0.052	2532
1996 to 2001							
Adjusted counts	0.119	0.649	0.120	0.030	0.027	0.055	158
Original counts	0.839	0.025	0.008	0.004	0.006	0.118	30583
2001 to 2006							
Adjusted counts	0.756	0.079	0.038	0.017	0.026	0.084	428
Original counts	0.902	0.027	0.009	0.006	0.005	0.051	21734
2006 to 2011							
Adjusted counts	0.777	0.032	0.019	0.010	0.016	0.146	353
Original counts	0.857	0.023	0.007	0.005	0.003	0.105	1119
2011 to 2016							
Adjusted counts	0.853	0.019	0.015	0.011	0.018	0.085	203
Original counts	0.931	0.016	0.009	0.004	0.006	0.034	299
2016 to 2021							
Adjusted counts	0.811	0.027	0.024	0.012	0.021	0.105	425
Original counts	0.898	0.026	0.017	0.007	0.009	0.043	488

Note: The original census counts and adjusted counts using our adjustment method were compared to the adjusted counts provided by Statistics Canada. The frequencies of relative error illustrate the percentage of counts that fall within a specific range of error, with a value of 1 corresponding to 100%. The RMSE accounts for the severity of the errors, with lower values suggesting greater accuracy.

ler cities, making metropolitan areas more attractive for economic investment (Moretti, 2012). Finally, Statistics Canada's 2021 Index of Remoteness was used to evaluate the relationship between economic change and peripherality. The Index of Remoteness considers the population size of CSDs and their distance to large population centres, with a value of 1 indicating the highest level of remoteness and a value of 0 indicating the lowest level of remoteness (Statistics Canada, 2023b). American studies, among others, have found that economic decline is more persistent in rural areas far from urban centres (Fiorentino et al, 2024; Rodríguez-Pose et al, 2023).

This study utilizes 2021 census data as it was the most recent census data available in Canada at the time of study. However, the authors acknowledge that 2021 socio-economic data may be affected by the economic impacts of the COVID-19 pandemic. In order to determine whether the pandemic strongly influenced the study's findings, a correlation analysis of socio-economic trends and demographic and spatial variables was conducted with both 2016 and 2021 data to allow for a comparison.

Census boundary adjustments

To account for changes in municipal boundaries when collecting historical census data, we developed a data adjustment method. Historical census data was collected at the dissemination area level and joined to a point layer of the centroids of all Canadian dissemination area boundaries using ArcGIS Pro. Dissemination areas are the smallest geographic unit at which census data are publicly available, making them the most precise scale for data collection for this study. The Summarize Within tool was then used to summarize the census data within each 2021 CSD boundary. The average income was summarized by calculating the mean of the dissemination area incomes for each CSD. For the unemployment and educational attainment rates, the number of unemployed individuals and people without a certificate or diploma were retrieved, along with the total number of survey respondents. The data was then summarized by calculating the sum of dissemination area values within each CSD, before calculating the rates for each variable. Municipalities were categorized for each variable based on whether their unemployment rate, educational attainment, and income trends were above or below the national rates of change in the same period (39%, -66%, and 100% respectively).

The data adjustment method developed was validated by comparing population counts from our method with Statistics Canada's adjusted population counts. Adjusted counts for the previous census year are available on each community's census profile for the following census year. As a result, adjusted counts are only available for adjacent census years and not across multiple census years. Following Allen and Taylor (2018), two validation methods were used: frequencies of relative error and root-mean-square error (RMSE). The frequencies of error and RMSE were also calculated for the original population counts for reference. The results of these calculations for all census years within the study period are summarized in Table 1.

The lower RMSE results of the adjusted population counts suggest greater overall accuracy than the original counts. While the adjusted counts have lower frequencies of relative error under 0.01%, this result is to be expected, as the relative error for original counts in CSDs where boundaries were not adjusted is zero. It is important to note that there is no way to accurately validate this method for the average income variable, as population counts are the only data adjusted by Statistics Canada.

RESULTS

This section presents the findings of this study in two phases. The first phase outlines the results of the spatial analyses of changes in unemployment rates, educational attainment, and income between 1981 and 2021. The second phase presents the results of quantitative analyses examining the relationship between economic change and spatial and demographic variables.

Table 2 shows the median 1981 and 2021 unemployment rates, educational attainment, and average incomes for all Canadian municipalities with a 1981 population of over 5,000. It is possible to observe a slight increase in the median unemployment rate across the study period, while the median proportion of population with no certificate or diploma has declined by 66%. The median average income (adjusted for inflation) has nearly doubled between 1981 and 2021.

Geographies of economic change

Figures 1, 2, and 3 illustrate the geography of municipal-level trends for each of the three socio-economic variables. The top maps in each figure identify municipalities with a 1981 population of over 5,000 that experienced rates of change above and below the national level. A layer with Canadian census metropolitan areas was included to identify regions with a population of over 100,000. The bottom maps in each figure are the results of cluster and outlier analyses to determine if any of the socio-economic trends are statistically significantly clustered. Spatial autocorrelation was tested by calculating Global Moran's I to measure distribution and Anselin Local Moran's I to identify local clusters and local spatial outliers. Global Moran's I (Moran, 1950) tests whether variables are randomly distributed, revealing if spatial autocorrelation occurs. Local Moran's I provides detailed evidence of where statistically significant clusters and outliers are situated by assigning one of the following categories to each polygon: high-high cluster (significant cluster of high values), low-low cluster (significant cluster of low values), high-low outlier (high value surrounded primarily by low values), low-high outlier (low value surrounded primarily by high values), and not significant. The Global Moran's I spatial analysis results are outlined in Table 3. The results highlight that every economic change variable was statistically significantly spatially clustered, rejecting the null hypothesis that economic change is spatially random across Canada.

Table 2. Median socio-economic values of Canadian municipalities in 1981 and 2021, and the change between the two census years.

Variables	1981	2021	1981-2021 (%)
Unemployment rate	7.2	8.7	28%
Proportion no certificate	51.2	17.6	-66%
Average income	26223	51550	96%

Table 3. Global Moran's I spatial analysis of economic change variables.

Variables	Moran's I	z-score	p-value
Unemployment rate	0.474	51.55	< 0.001
Proportion no certificate	0.198	21.66	< 0.001
Average income	0.114	12.54	< 0.001

Note: A Moran's I value of 1 indicates perfect spatial clustering, while a value of -1 indicates perfect spatial dispersal. A positive and statistically significant z-score confirms the presence of spatial clustering.

Unemployment rates

The geography of unemployment rate trends relative to the national average, as well as the results of the cluster-outlier analysis, are illustrated in Figure 1. Notably, central municipalities and large cities are more likely to experience rising rates of unemployment relative to the national average. This can be observed through significant clustering of high trends across Southern and Southwestern Ontario, as well as across much of the province of Alberta. The exception is Quebec, where, other than a few municipalities in the Greater Montreal area, lower changes in unemployment rates relative to the national average were more prevalent.

Figure 1. Municipal trends in unemployment rates and cluster and outlier analysis, 1981-2021. on page 16
Note: The top map identifies municipalities that experienced rates of change above and below the national rate (39%). The bottom map presents the results of cluster and outlier analyses, with municipalities in red having experienced higher rates of change and those in blue experienced lower rates of change.

Proportion of population with no certificate or diploma

The geography of trends in the proportion of population with no certificate or diploma paint a different picture (Figure 2), with clustering of lower trends in metropolitan areas across Canada. Once more, Quebec was the exception, with the majority of municipalities experiencing higher trends in the proportion of population with no certificate or diploma. In both cases, it is possible to observe a phenomenon in which trends identified in large, populated areas differ from the trends in municipalities that are considered peripheral on a national scale, but also from peripheral municipalities on a regional scale. For instance, municipalities with higher trends (high-low) are present in the outskirts of the Greater Toronto and Vancouver Areas, and municipalities with lower trends (low-high) are observed in the Greater Montreal Area.

Figure 2. Municipal trends in proportion population with no certificate or diploma and cluster and outlier analysis, 1981-2021. on page 17
Note: The top map identifies municipalities that experienced rates of change above and below the national rate (-66%). The bottom map shows the results of cluster and outlier analyses, with municipalities in red having experienced higher rates of change and those in blue experienced lower rates of change.

Average income

Similar to the previous variable, municipalities that experienced an increase to their average income above the national rate of change are generally less peripheral. Significant clustering of high trends in income can be observed in Southern Ontario, as well as in Winnipeg, Manitoba. Clusters of low trends are prevalent in peripheral Alberta. Once more, clusters of low trends are prevalent in the Greater Montreal Area, as well as in the Greater Vancouver Area. The influence of multi-scale peripherality is apparent when observing trends in average income; municipalities with lower changes in average income surround the city of Toronto and the city of Winnipeg, while municipalities with higher changes in average income can be observed in the outskirts of the Greater Montreal and Vancouver Areas.

Figure 3. Municipal trends in average income and cluster and outlier analysis, 1981-2021. on page 18
Note: The top map identifies municipalities that experienced rates of change above and below the national rate (100%). The bottom map shows the results of cluster and outlier analyses, with municipalities in red having experienced higher rates of change and those in blue experienced lower rates of change.

Table 4. Median socio-economic values for municipalities experiencing low, medium, and high remoteness.

Variable Name	Census year	Low remoteness	Medium remoteness	High remoteness
Unemployment rate	1981	6.2	8.2	8.6
	2021	8.3	9.1	9.8
	1981-2021	45%	14%	20%
Proportion no certificate	1981	49.1	53.3	57.2
	2021	16.0	19.0	23.4
	1981-2021	-67%	-65%	-55%
Average income	1981	26904	25248	26053
	2021	53025	49200	50560
	1981-2021	98%	94%	90%

Note: Low, medium, and high remoteness categories were determined by dividing municipalities into tertiles based on their Index of Remoteness value.

Table 5. Municipal-level socio-economic change and population trends.

Variable Name	Variable Categories	Population Trends		Chi-Square, p-value
		Growing	Shrinking	
Unemployment rate	Lower than national change	230 (51%)	93 (72%)	$\chi 2 = 17.701$ $p < 0.001$
	Higher than national change	219 (48%)	36 (28%)	
Proportion no certificate	Lower than national change	251 (56%)	26 (20%)	$\chi 2 = 51.309$ $p < 0.001$
	Higher than national change	198 (44%)	103 (80%)	
Average income	Lower than national change	326 (53%)	86 (67%)	$\chi 2 = 8.081$ $p = 0.004$
	Higher than national change	213 (47%)	43 (33%)	

Note: A higher chi-square value indicates greater discrepancy between expected and observed values, suggesting that the observed pattern is less likely to occur by chance.

Table 6. Municipal-level socio-economic change and 2021 population size.

Variable Name	Variable Categories	Population Size				Chi-Square, p-value
		Rural	Small Cities	Mid-sized Cities	Large Cities	
Unemployment rate	Lower than national change	113 (60%)	169 (59%)	35 (43%)	6 (29%)	$\chi 2 = 14.630$ $p = 0.002$
	Higher than national change	74 (40%)	119 (41%)	47 (57%)	15 (71%)	
Proportion no certificate	Lower than national change	63 (34%)	153 (53%)	51 (62%)	10 (48%)	$\chi 2 = 24.996$ $p < 0.001$
	Higher than national change	124 (66%)	135 (47%)	31 (38%)	11 (52%)	
Average income	Lower than national change	101 (54%)	148 (51%)	56 (68%)	17 (81%)	$\chi 2 = 13.083$ $p = 0.004$
	Higher than national change	86 (46%)	140 (49%)	26 (32%)	4 (19%)	

Note: A higher chi-square value indicates greater discrepancy between expected and observed values, suggesting that the observed pattern is less likely to occur by chance.

Spatial and demographic characteristics of economic change

Table 4, which categorizes municipalities into tertiles based on their Index of Remoteness value, confirms the relationships observed above between economic change and peripherality. Central municipalities experienced higher median changes in unemployment rates than their more peripheral counterparts. Conversely, highly remote municipalities experienced higher median changes to their proportion of population with no certificate or diploma. As for average income, the higher remoteness values were associated with negligibly lower changes to average income.

Chi-square analyses were conducted to assess the relationship between economic change and municipal population trends (see Table 5). The results of all three tests indicate a statistically significant association between the socio-economic trends and the growth or decline of a community's population. Notably, the findings suggest that there is a disproportionately high number of growing municipalities that have experienced higher changes in unemployment rates (48%) than shrinking municipalities (28%). As for educational attainment, a disproportionately high number of shrinking municipalities have experienced higher changes to the proportion of population with no certificate or diploma than the national average. Similarly, a larger proportion of shrinking municipalities have experienced lower trends in average income (67%) than growing municipalities (53%).

Additional chi-square analyses were conducted to assess the relationship between economic change and 2021 population size (see Table 6). Municipalities were divided into four groups: rural (population under 10,000), small cities (population between 10,000 and 50,000), mid-sized cities (population between 50,000 and 250,000) and large cities (population over 250,000) (Hartt & Hollander, 2018; Seasons, 2003). The findings confirm a statistically significant association between socio-economic change and population size. They suggest that a disproportionate number of mid-sized and large cities have experienced a higher change in unemployment rates than rural communities and small cities. Moreover, a greater number of mid-sized cities experienced a decline in the proportion of population with no certificate or diploma, suggesting that mid-sized cities are attracting and retaining residents with formal education. The results of the average income chi-square analyses reflect the observations made in Figure 3, with a greater number of mid-sized and large cities having experienced lower income trends.

Table 7. Spearman correlations of socio-economic trends (1981-2021), remoteness, and population trends and size

	Index of Remoteness	Population 2021	Population Trends
Index of Remoteness	N/A	-0.529**	-0.611**
Population 2021	-0.529**	N/A	0.609**
Population Trends	-0.611**	0.609**	N/A
Unemployment rate	-0.184**	0.116**	0.189**
Proportion no certificate	0.205**	-0.234**	-0.381**
Average income	-0.057	-0.085*	0.110**

Note: ** denotes statistical significance at the 0.001 level; * denotes statistical significance at the 0.05 level. A value of 1 indicates a perfect positive relationship, while a value of -1 indicates a perfect negative relationship.

Table 8. Spearman correlations of socio-economic trends (1981-2016), remoteness, and population trends and size

	Index of Remoteness	Population 2016	Population Trends
Index of Remoteness	N/A	-0.488**	-0.575**
Population 2016	-0.488**	N/A	0.580**
Population Trends	-0.575**	0.580**	N/A
Unemployment rate	0.069	-0.048	0.032
Proportion no certificate	0.276**	-0.275**	-0.368**
Average income	0.004	-0.089*	0.148**

Note: ** denotes statistical significance at the 0.001 level; * denotes statistical significance at the 0.05 level. A value of 1 indicates a perfect positive relationship, while a value of -1 indicates a perfect negative relationship.

To better understand the effects of spatial and demographic characteristics on socio-economic trends, a correlation analysis was conducted to determine the strength and direction of the monotonic relationship between peripherality, population size, population trends and socio-economic variables (see Table 7). While these findings are not causal, they do identify trends which provide insight into the characteristics of municipalities experiencing economic decline. The findings reaffirm the results of the analyses presented in Tables 4 to 6. There is a significant, positive relationship between unemployment rate trends and total population, as well as a negative relationship between unemployment rate trends and remoteness values. This suggests a higher increase in employment rates in municipalities with larger populations and in less peripheral communities. The strongest significant correlation uncovered in this analysis is a negative relationship between population trends and the change in proportion of population with no certificate or diploma. There is also a negative relationship between the latter and total population, which suggests a higher increase in the proportion of population without a certificate or diploma in shrinking municipalities and in municipalities with smaller populations. The findings for the changes in average income also align with the previous analyses, with a negative correlation with total population and a positive correlation with population trends. The results of the correlation analysis using socio-economic trends between 1981 and 2016 (see Table 8) paint a similar picture. While the relationship between demographic and spatial variables and unemployment rate trends were statistically insignificant, the relationships between these variables and the two other socio-economic trends were similar, if not stronger, than the results displayed in Table 7. It is important to note that while the correlations presented in Tables 7 and 8 are significant, their effect sizes are relatively small.

DISCUSSION

The geographies of economic change across Canada are overlapping and dynamic. The relationships between economic decline, remoteness, and population decline so engrained in the Canadian popular imagination do exist, yet they are much more complex than many might expect. While it was unsurprising that lower educational attainment was tightly linked to remoteness, due in part to higher proportions of older adults in small cities and rural communities (Channer et al., 2020), the findings linking high unemployment rates to more central (i.e., less remote) municipalities, as well as the lack of statistically significant relationship between income and remoteness, is unexpected based on the findings of precedent research (Hartt, 2021a; Desjardins, 2011; Breau & Saillant, 2016). The latter is especially noteworthy as income has not been adjusted to take into account higher costs of living in certain areas.

In both cases, the COVID-19 pandemic played a role in the economic stagnation or decline in large, central cities. In 2021, Canada was still recovering from the economic consequences of the pandemic. It is estimated that 3.4 million jobs were lost at the beginning of the pandemic in Canada, with employment returning to pre-pandemic levels by February 2022 (Clarke & Fields, 2022). However, it is currently unclear if or how the pandemic permanently reshaped Canada's economic landscape. Future research analyzing socio-economic trends using census data from 2016, 2021, 2026 and beyond will be crucial in understanding the severity of these long-term impacts.

Beyond the effects of the COVID-19 pandemic on economic change, less desirable trends in unemployment rates and income in larger cities may be influenced by existing or increasing inequalities within these municipalities. Statistics Canada reported that between 2015 and 2020, income inequality declined more than in any five-year period since 1976, but inequality remained higher in large urban areas compared to small cities and rural communities (Statistics Canada, 2022). Canada's geographic size presents a unique opportunity to reflect on the roles of scale and space with regard to economic geography. For instance, we noted intricate geographies of peripherality across various spatial scales or, in other words, the effects of national and regional remoteness on economic trends. Research that explores Canadian economic change on various spatial scales is necessary in order to understand which neighbourhoods, municipalities, and regions are contributing to patterns observed at larger scales, as well as the social and political factors influencing these findings. The relationships along the municipal urban-rural hierarchy further demonstrate the complexity of spatial economic trends. Unemployment rate marches stepwise across the hierarchy: rural communities outperform small cities, which outperform mid-sized cities, which outperform large cities. Educational attainment and average income do not follow the same pattern. Here Canada's mid-sized cities demonstrate their growing strength, allure, and impact. Mid-sized cities are attracting and retaining educated residents, garnering above average incomes, and (often) have lower costs of living than their bigger city counterparts. The resurgence of mid-sized cities is a reminder of the intertwined demographic and economic pushes and pulls over time. The changing Canadian economic landscapes also reflect cultural and language geographies. Clusters of low educational attainment in Southern Quebec, and in particular the Montreal region may reflect an out migration (and/or lack of in-migration) of highly educated residents.

Our findings offer two important contributions to existing literature on left-behind places. First, our research demonstrates that characteristics of economic decline do not follow distinct geographic patterns. This reaffirms the importance of using multiple economic variables when attempting to determine whether a community is experiencing economic growth or decline (Connor et al, 2024). Se-

cond, our findings bring into question the geographies of political discontent. Left-behind places are often characterized by long-term economic decline. However, despite our research demonstrating that certain characteristics of economic decline are more prevalent in larger, central cities, studies have found that political discontent is most pervasive in rural, peripheral communities (Fiorentino et al., 2024; Rodríguez-Pose et al, 2023). While economic decline is a large contributor to this phenomenon, the urban-rural divide should be further explored as an important catalyst to political discontent.

The complex tapestry of Canada's municipal economic geographies reinforces the importance of a nation-wide municipal discourse. The narrow focus of Canadian media and research on a handful of large cities has impeded much needed conversations about the past, present, and future of regional inequities, lived experiences, and economic realities. In an enormous, diverse country like Canada, fortunes and opportunities can change drastically from one period to the next. Today's boom can be tomorrow's bust. In order to build capacity and resilience to weather and benefit from globally induced change, an understanding of the past and current landscape is needed. Moreover, evidence-informed, inclusive, and bottom-up approaches are necessary to mitigate the unique socio-economic challenges of communities. There are opportunities for policy development, mobility, and adaptation to strengthen economic viability at all spatial scales. Canada's greatest strength and weakness has always been its size and regional differences. Discussions of territorial equity and unity are essential as Canada, and the world, move further into the 21st century.

CONCLUSION

Economic divergence is not a new phenomenon. Yet, up until now, Canadian economic decline has been understudied. Furthermore, performing longitudinal research with Canadian census data is complicated by the adjustment of census boundaries over time. Using a historical census data adjustment method developed with GIS, we demonstrated the geographies of long-term economic change in over 500 Canadian municipalities and identified spatial and demographic characteristics associated with economic decline. The findings demonstrate the heterogeneity of economic change, confirming the need for targeted solutions to mitigate the unique manifestation of local and regional economic decline.

Future research should further investigate the geographies of economic change using a multi-scalar approach. Economic change is not constant across provinces, regions, or even neighbourhoods, due to unique local and regional contexts. Creating location quotients would allow for the analysis of economic trends of any geographic unit relative to its surroundings on various spatial scales (Hartt, 2019; 2021b). Future research should also investigate the economic trajectories of municipalities across several census years in order to better reflect the diversity of economic trends. Since our study used a binary approach to determine whether municipalities experienced economic decline between 1981 and 2021, the findings do not indicate whether a municipality experienced short-term or long-term decline, or even cycles of growth and decline (Hartt, 2018). The creation of a typology of Canadian economic trends would allow for the assessment of the persistence of economic decline, which exacerbates political and social impacts in left-behind places (Connor et al, 2024; Rodríguez-Pose et al, 2023).

There are a few limitations to this study. First, our research does not consider the influence of adjacent municipalities on the economic or socio-economic status of one another. Residents circulate between municipalities to work and shop more than ever before (Hospers & Reverda, 2015), creating an interdependence between the economic vitality of neighbouring communities. This interconnectedness could lead to discrepancies between the socio-economic indicators reported for individual municipalities and the actual economic conditions experienced by residents within those areas. Moreover, census data from the long-form questionnaire (such as the data collected on education), which were only assigned to one-quarter of Canadian private households, is weighted by Statistics Canada in order to represent the entire population (Statistics Canada, 2023). Statistics Canada uses various weighting methods, which have also changed across time. While applying the 2021 weighting methodology to all data would have been ideal for this study, the original census data is not publicly available. Therefore, the data used was weighted using methods specific to each census period, leading to possible inaccuracies.

One major caveat to the analysis is the impact of the COVID-19 pandemic and related interventions (i.e., lockdowns, Canadian Emergency Response Benefit, etc.) on job loss and migration. 2021 unemployment and income rates in particular may have been skewed by the economic impacts of COVID-19. Moreover, COVID-induced migratory movements may have altered the geographies of work, especially remote work. Furthermore, as healthcare is a provincial responsibility, different interventions, policies, and programs may have potentially exacerbated provincial differences. Future data will be essential in identifying and determining short- and long-term economic trends related to the pandemic.

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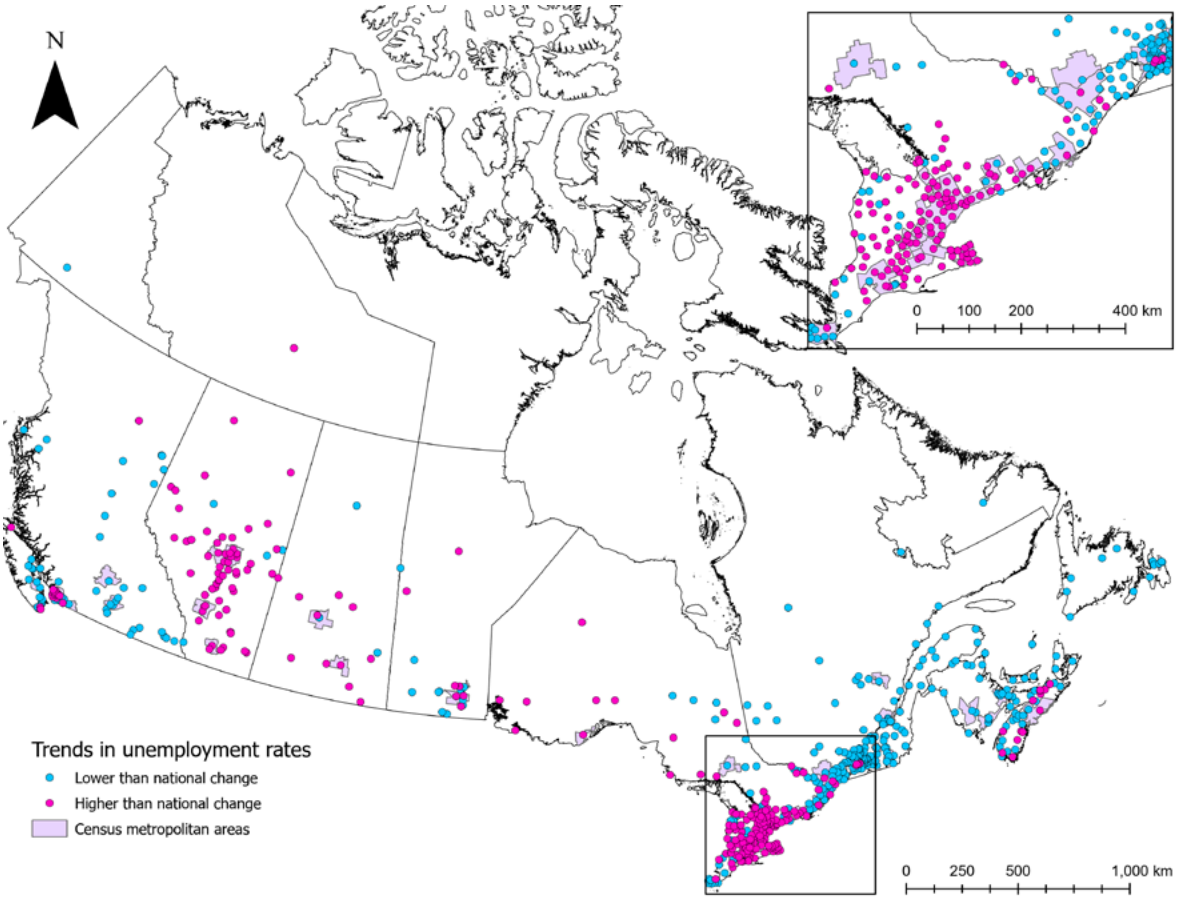
Figure 1. Municipal trends in unemployment rates and cluster and outlier analysis, 1981-2021.



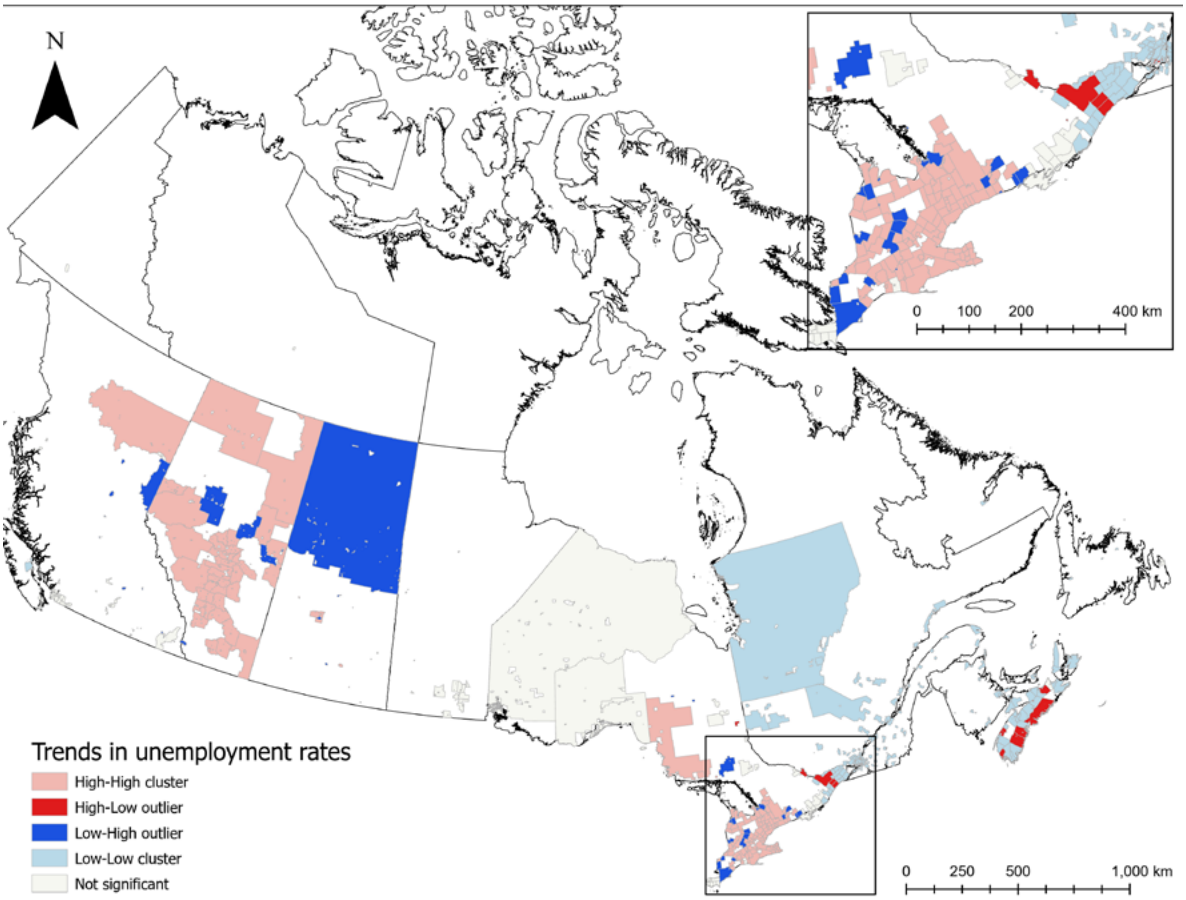
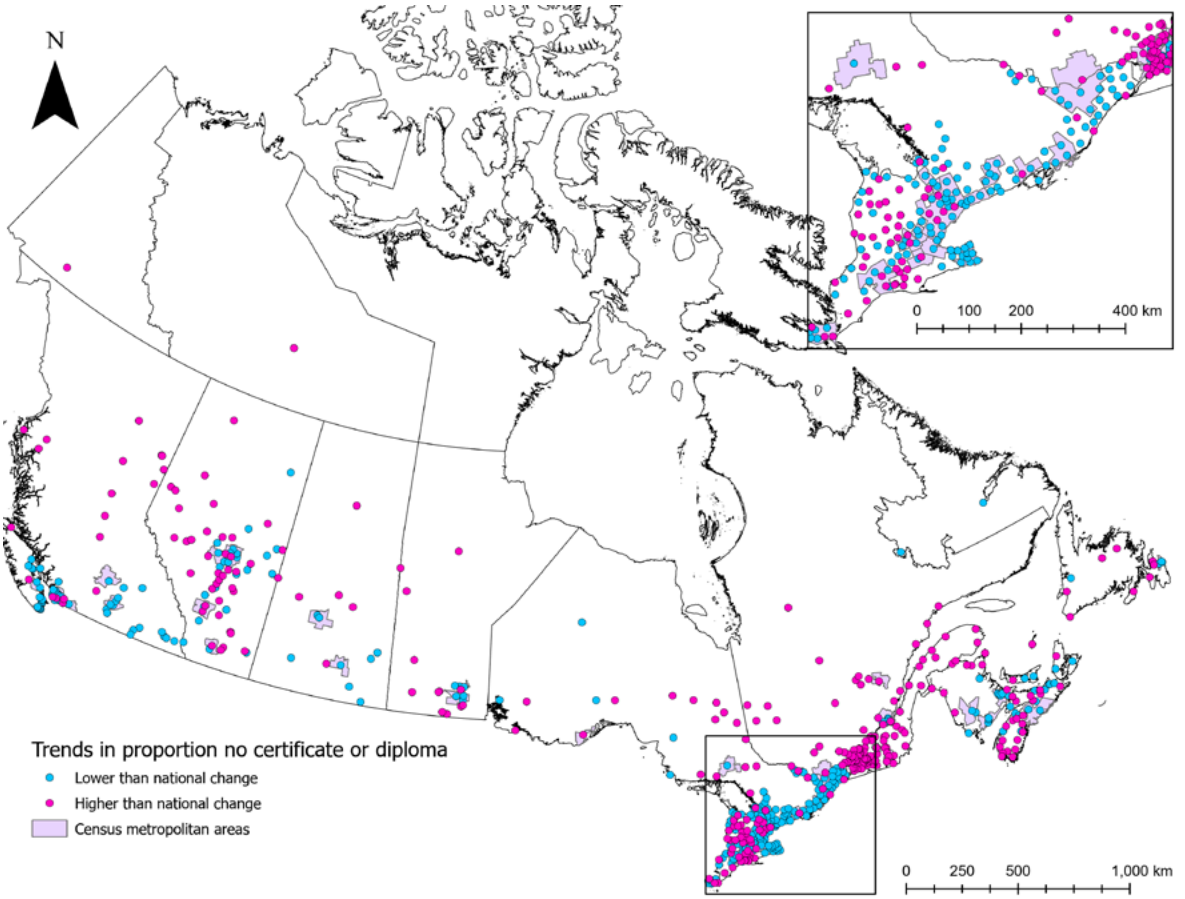


Figure 2. Municipal trends in proportion population with no certificate or diploma and cluster and outlier analysis, 1981-2021.



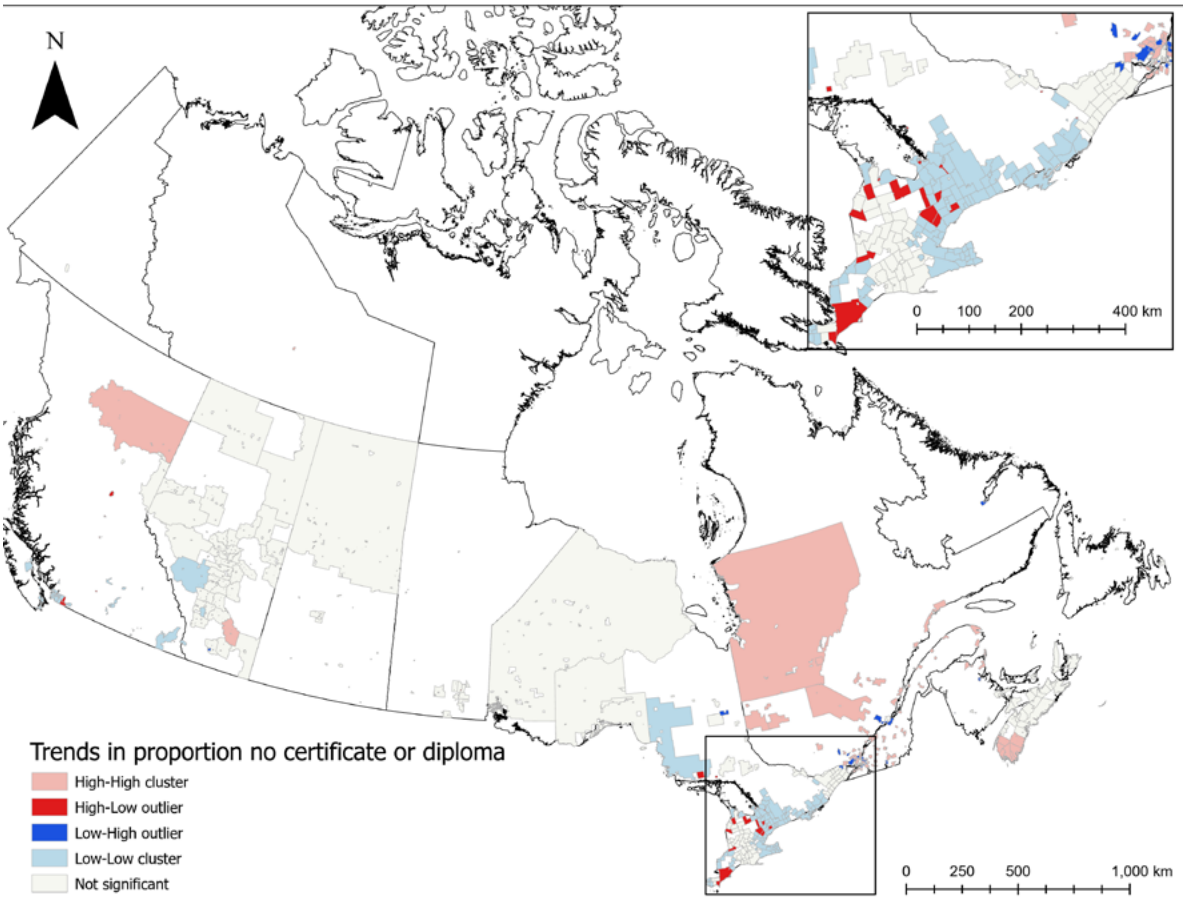


Figure 3. Municipal trends in average income and cluster and outlier analysis, 1981-2021.