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The Index of Economic Disparity: Measuring trends in economic disparity across Canadian Census Subdivisions and rural and urban communities

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Abstract

Territorial inequalities have long been a subject of study and concern in Canada. In the face of large structural changes such as industrial shifts and the decarbonization of our economies, there is an urgency to understand such inequalities and design effective policy interventions for those places facing persistent economic decline. This paper shares a novel composite index that measures economic disparity across Canadian Census Subdivisions (CSDs) using Census data from 2001 through 2016 and the 2011 National Household Survey. Named the "Index of Economic Disparity," it is comprised of an equally weighted average of four sub-indices that assign percentile rankings for all CSDs based on whether they experience persistent and substantial decline in key economic areas: population, labour force outcomes, working-age share of population, and industrial diversity. The variation of outcomes across geographies—urban and rural—highlights the importance of place-based policies.

KEYWORDS
census subdivision, economic disparity, remoteness, territorial inequality

Résumé

Les inégalités territoriales sont depuis longtemps un sujet d'étude et de préoccupation au Canada. Face à d'importants changements structurels tels que la désindustrialisation et la décarbonisation de nos économies, il est urgent de comprendre ces inégalités et de concevoir des interventions politiques efficaces pour les territoires confrontés à un déclin économique persistant. Cet article présente un nouvel indice composite qui mesure les disparités économiques entre les subdivisions de recensement canadiennes (SDR) à l'aide des données des recensements de 2001 à 2016 et de l'Enquête nationale auprès des ménages de 2011. Appelé « indice de disparité économique », il est composé d'une moyenne également pondérée de quatre sous-indices qui attribuent des rangs centiles à toutes les SDR selon l'intensité de leur déclin dans des domaines économiques clés:

population, conséquences sur le marché du travail, part de la population en âge de travailler et diversité industrielle. La variation des résultats entre les zones géographiques - urbaines et rurales - souligne l'importance mettre en place des politiques axées sur les spécificités locales.

MOTS CLÉS
disparité économique, éloignement, inégalité territoriale, subdivision de recensement

Key messages

- Communities with higher Index of Remoteness scores tend to have higher Index of Economic Disparity scores indicating that rural communities have been declining/growing more slowly than urban communities.
- Large variation in Index of Economic Disparity scores for more remote rural communities indicates that they are diverse and intra-provincial disparity is explained less by remoteness than by pan-Canadian disparity.
- The results speak to the importance of place-based rural policy.

INTRODUCTION

Increasing territorial inequality and its potential to undermine territorial cohesion and competitiveness is a growing concern (Alasia, 1996, 2004, 2005; Alasia et al., 2008). Across countries in the Organisation for Economic Co-operation and Development (OECD), economic gaps across small regions have increased since 2000, with growing divides between cities and rural communities (OECD, 2020). In Canada, territorial inequalities have long been a subject of study, including deepening rural-urban and east-west divides (Breau & Saillant, 2016). Mechanisms to overcome such inequalities are baked into our federation—from territorial equalization payments to Canada Health and Canada Social transfers. However, in the face of large structural changes such as industrial shifts and the decarbonization of our economies (that will bring significant socio-economic change to different regions) there is an urgency to understand divergences and address "left behind places"—those places facing persistent economic decline (Krawchenko & Gordon, 2021; Martins, 2021).

This paper contributes to this literature by sharing a novel composite index that measures economic disparity across Canadian Census Subdivisions (CSDs) using Census data from 2001 through 2016 and the 2011 National Household Survey (NHS) (see Appendix). Named the "Index of Economic Disparity," it is comprised of an equally weighted average of four sub-indices that assign percentile rankings for all CSDs based on whether they experience persistent and substantial decline in key economic areas: population, labour force outcomes, working-age share of population, and industrial diversity. The final output comes in two variations: i) a provincially/territorially scaled index that highlights within-province/territory economic disparity, and ii) a nationally scaled index that highlights pan-Canadian economic disparity. Both outputs use the 2011 and 2016 Index of Remoteness (Alasia et al., 2017) to explore the relationship between remoteness and economic disparity.

Index construction involves a great deal of choice about what geographies/scales to use and which variables to include. The Index of Economic Disparity offers a synthesized way to depict and understand relative territorial trends and aims to be useable by policymakers and community members. The term "disparity" is used to indicate differences between regions in contrast to the term "inequality" which implies unfairness and injustice. This paper proceeds in four parts: (i) a brief review of relevant literature in order to situate the index, (ii) the methodology and intended use of the Index of Economic Disparity, (iii) results and remoteness analysis, and (iv) limitations and conclusions.

SITUATING THE INDEX OF ECONOMIC DISPARITY

The challenge of entrenched and persistent territorial inequalities makes daily headlines and is a main regional development challenge facing Canada today (Vodden et al., 2019). There is a notable rural-urban divide, with rural parts of Canada demonstrating poorer socio-economic outcomes across a range of indicators compared to their urban counterparts (Breau & Saillant, 2016; Desjardins, 2011). Much of the Canadian scholarship on this topic has tended to focus on in-depth case studies of disparities and economic transitions in specific

communities (Brannen et al., 2009; Frank et al., 2014; Zadek, 2019). At the same time, there has been concern about inequalities within urban systems, including the hollowing out of downtown cores through population and economic decline (Hollander et al., 2018) and the phenomenon of shrinking cities including those linked to resource economies (Hartt, 2021; Jakar & Dunn, 2019; Martinez-Fernandez et al., 2012). These are complex phenomena and there is a great deal of variability in terms of how these trends play out across geographies. Pan-Canadian studies of economic disparities (covering all jurisdictions) are less common and there are very few composite indices on this subject (Oliveira et al., 2022). Some recent examples include the Canadian Marginalization Index (Matheson et al., 2012); the Community Wellbeing Index (Government of Canada, 2020); the Rural Economic Capacity Index (Memorial University, 2022); the Index of Multiple Deprivation (Statistics Canada, 2019); and the Index of Community Vulnerability (Alasia et al., 2008). Each serves different purposes—none directly focus on understanding economic disparities, but all include some economic variables (e.g., economic dependency, material resources, labour force activity and income).

Territorially based indices can usefully provide a snapshot of community conditions in order to help inform policymaking. The Index of Economic Disparity is grounded in understanding of the relative differences in basic socio-economic conditions across communities. It is conceptually underpinned by community economic resilience—a multi-dimensional concept that can be applied across different geographic scales which seeks to understand the nature of socio-economic changes (shocks and stressors) and responses to changes (recovery) (Dinh & Pearson, 2015; Martin & Sunley, 2015). It is a complex concept to measure and there are many debates about how to operationalize it.

The creation of a pan-Canadian index is limited by data availability and required a trade-off between depth and breadth in order to include as many CSDs as possible in the dataset. The resulting four sub-indices measure for economic disparity, outlined below, focusses on population trends, working-age share of population, labour outcome trends, and industry diversity relative to the province/territory and relative to the Canadian average. Each can be interpreted as a potential stressor where there are large relative differences (the following section explains each sub-index in detail). The overall purpose of the index is to facilitate comparisons by ranking, aggregating, and simplifying measurements, where no single indicator can capture a phenomenon (Oliveira et al., 2022).

METHODOLOGY

The Index of Economic Disparity has been created as a simplified index with limited variables in order to provide a robust picture of intra-provincial/territorial and pan-Canadian differences. It is meant to be easy to replicate, keep up to date, and communicate to decision makers. It captures divergent trends in economic variables at the CSD level. CSDs are chosen as the geographic scale of the index for two reasons. First, CSDs are chosen to align with provincially/territorially and locally determined municipalities, as well as Indigenous communities; therefore, CSDs are geographically significant boundaries for policymakers at all levels of government. Second, our preferred measure of remoteness among Canadian communities is the Index of Remoteness, which is measured at the CSD level (Alasia et al., 2017).

The Index of Economic Disparity indicates where, relative to other CSDs, a community's socio-economic well-being is trending. As a measure of disparity in socio-economic performance, two factors are important: relative magnitude and consistency in trends. The sub-indices that comprise the composite index are constructed with these two factors in mind. Each sub-index measures the percent change of a variable and weighs it by the number of times a decline is experienced from one census period to the next. Whereas the percent change measures magnitude of disparity over time, the weights determine whether the percent change is caused by one anomalous period, or a consistent trend. We opt to more heavily weight communities with consistent decline for two reasons. First, we believe that consistent decline is an indicator of adaptive failure insofar as structural and/or policy changes have not been realized to reverse this trend, even temporarily. In particular, we wish to identify communities characterized as “left behind places” (Martins, 2021). Second, weighting by consistency reduces the census-year dependence of index scores. Without a consistency weight, boom/bust communities may be in the upper and lower extremes of the index score distribution depending on whether the most recent census-period was taken during a favourable or unfavourable year.

The index is designed for intra-provincial/territorial and/or national comparisons among CSDs. The percent changes of each sub-index are assigned percentile ranks relative to the desired geography (province/territory or national), then weighted by their consistency score, and again ranked by percentiles to ensure a uniform distribution. The objective of this index is to identify localities experiencing relatively more economic decline in important economic variables than others, which justifies using percentile ranks rather than raw values. There are two variations on the Index of Economic Disparity: (i) relative to province/territory, with percentile ranks assigned within provinces/territories; and (ii) relative to Canada, with pan-Canadian percentile ranks.

The four sub-indices measure disparity in total population trends, working-age share of population, labour outcome trends, and industry diversity. All sub-indices are normalized between 0 and 1 by their percentile ranks. The final index (the Index of Economic Disparity) is constructed by equally weighting each sub-index and assigning each CSD an integer score from 1 to 5.

All relevant variables in the Index of Economic Disparity are from the short-form and long-form Census of Population (2001, 2006, 2011, & 2016), and the 2011 NHS. Only CSDs present in the 2016 Census and at least one other census year are included in the index. For

completeness, "present" implies that the CSD is both in the 2016 Census and is not missing any necessary data such that 2016 cannot be the terminus period of each sub-index. The Index of Economic Disparity compares trends, so more than one period of data is needed. Every effort was made to choose variables that are standardized across all four census periods, although in certain cases, the relevant census variables change in terms of their measurement or name. In these cases, we use the best proxy for a 2016 variable available in previous censuses.

For purpose of analysis, the Index of Economic Disparity is merged with the 2011 and 2016 Index of Remoteness, which measures geographic proximity of CSDs to population centres, services, and absolute population (Alasia et al., 2017). A higher score in the Index of Remoteness indicates a CSD is more remote. In this paper, CSDs are classified as rural based on whether their remoteness score is above a chosen threshold. For robustness, we consider multiple thresholds.

Population Trend Disparity Sub-Index

The Population Trend Disparity Sub-Index measures the relative magnitude and consistency of population changes at the CSD level. The score is standardized from 0 to 1, with a higher value indicating a greater and/or more consistent population decline relative to other communities. The sub-index is constructed in five steps. First, CSD-level population estimates from 1996 to 2016 are taken from each respective short-form census. Second, the percentage change in population ΔPop_{csd} is calculated using the earliest available and non-zero population estimate as the initial period and the 2016 population estimate as the final period:

$$\Delta Pop_{csd} = \frac{Pop_{csd,2016} - Pop_{csd,t}}{Pop_{csd,t}} \text{ where } t \text{ is the earliest census year such that } \exists\ Pop_{csd,t} > 0$$

Third, percent change is converted to a percentile rank $R^{pop}_{csd} = PercRank(\Delta Pop_{csd})$, $R^{pop}_{csd} \in (0,1)$[1]. Two versions of the index are available: one where percentiles are determined by comparing CSDs within each province and or territory, and one where CSDs are compared across Canada. A lower R^{pop}_{csd} indicates a greater population decline compared to the median. Fourth, a continuity score is assigned to each CSD, and used as a weight. The continuity score is assigned as the share of consecutive census periods that experience a decline in population. Formally, the continuity score is defined as $C^{pop}_{csd} = \frac{(N-1)-m_{csd}}{(N-1)}$ for N census years and m_{csd} consecutive census years $i-1$ and i with population growth $\left(\Delta Pop_{csd,i} = \frac{Pop_{csd,i} - Pop_{csd,i-1}}{Pop_{csd,i-1}} > 0\right)$. For instance, if a municipality experiences a decrease in population between each consecutive census year from 1996 to 2016 ($N = 5, m_{csd} = 0$), a full continuity score of 1 is assigned. If the municipality does not experience a population decrease between any two census periods ($N = 5, m_{csd} = 4$), the continuity score is 0. Finally, the reversed score ($1 - R^{pop}_{csd}$) is scaled by the appropriate continuity score C^{pop}_{csd}, and the percentile rank of the scaled score is taken. We reverse the percentile score so a higher value indicates more severe decline. The resulting value $\Psi_{csd} \in (0,1)$ is the Population Trend Disparity Sub-Index:

$$\Psi_{csd} = PercRank\left(C^{pop}_{csd} \times \left(1 - R^{pop}_{csd}\right)\right)$$

The sub-index ranks the magnitude and longevity of decreases in CSD population relative to either Canada or each province/territory. A higher score indicates a relatively more persistent and/or relatively large decrease in population from 1996 to 2016. The Population Trend Disparity Sub-Index Ψ_{csd} will be used as one of the inputs to the final, composite index.

Population Dependency Sub-Index

Population dependency ratios are commonly used to measure the share of non-working-age populations in a given socio-economic region. A population dependency ratio measures the ratio of age groups "likely to be socially and/or economically dependent on working age Canadians" to the working-age population by dividing the dependent age population by the working-age population (Statistics Canada, 2016a–2016m). The population dependency ratio for a CSD in census year i measures the number of dependents for every 100 "workers'" where "dependents" refers to the population under 20 years and over 64 years of age ($Pop^{<20}_{csd,i} + Pop^{>64}_{csd,i}$). "Workers" are the working-age population from 20 years to 64 years of age ($Pop^{20to64}_{csd,i}$). The ratio is formally:

$$PDR_{csd,i} = \frac{Pop^{<20}_{csd,i} + Pop^{>64}_{csd,i}}{Pop^{20to64}_{csd,i}} \times 100$$

The Population Dependency Sub-Index applies the same general methodology as the Population Trend Disparity Sub-Index: the index takes the magnitude of population dependency ratio change, weighs it by consistency, and returns a percentile rank for each CSD between 0 and 1.

After calculating the population dependency ratio $PDR_{csd,i}$ for each census year i, the percent change in population dependency ratio from the earliest available non-zero census year t to 2016 is calculated as:

$$\Delta PDR_{csd} = \frac{PDR_{csd,2016} - PDR_{csd,t}}{PDR_{csd,t}} \text{ where } t \text{ is the earliest census year such that } \exists\ PDR_{csd,t} > 0$$

The percent change is converted to a percentile rank $R^{pdr}_{csd} = PercRank(\Delta PDR_{csd})$, and scaled by the continuity score $C^{pdr}_{csd} = \frac{(N-1)-m_{csd}}{(N-1)}$ where N is the number of census years and m_{csd} are the number of consecutive census years $i-1$ and i where the population dependency ratio decreases ($\Delta PDR_{csd,i} < 0$). The final Population Dependency Sub-Index is constructed by taking the percentile rank of the scaled product:

$$X_{csd} = PercRank\left(C^{pdr}_{csd} \times R^{pdr}_{csd}\right)$$

The resulting index $X_{csd} \in (0,1)$ ranks each CSD by how strongly and consistently its population dependency ratio has increased. A higher score on the index indicates that, relative to the rest of the province or country, the share of those outside the working-age population is increasingly and consistently increasing in a CSD.

Labour Trend Disparity Sub-Index

The Labour Trend Disparity Sub-Index measures the relative magnitude and consistency of decreases in labour force participation, and increases in the unemployment rate. The score is standardized from 0 to 1, with a higher value indicating greater and more consistent decreases in labour force participation (LFP) and/or increases in the unemployment rate. The index is constructed in six steps. First, unemployment and LFP rates are retrieved at the CSD level from the 2001, 2006, and 2016 long-form Census of Population, and the 2011 NHS. Second, the percentage change in LFP and unemployment rate from the earliest available non-zero census period t to 2016 is calculated as:

$$\Delta LF_{csd} = \frac{LF_{csd,2016} - LF_{csd,t}}{LF_{csd,t}} \text{ and } \Delta UE_{csd} = \frac{UE_{csd,2016} - UE_{csd,t}}{UE_{csd,t}} \text{ where } t \text{ is the earliest census year such that } \exists\ LF_{csd,t}, UE_{csd,t} > 0.$$

Third, the percent changes are converted to a percentile rank relative to other CSDs in the province or across Canada: $R^{LF}_{csd} = PercRank(\Delta LF_{csd,t})$ and $R^{UE}_{csd} = PercRank(\Delta UE_{csd,t})$. After adjustment, the unemployment percentiles are reversed such that a higher score is less desirable. Fourth, continuity scores are assigned to each CSD based on consecutive decreases to LFP and increases to unemployment respectively. Formally, the continuity weights for unemployment and LFP are defined as: $C^{LF}_{csd} = \frac{(N-1)-m^{LF}_{csd}}{(N-1)}$ and $C^{UE}_{csd} = \frac{(N-1)-m^{UE}_{csd}}{(N-1)}$ where N is the number of census years while m^{LF}_{csd} and m^{UE}_{csd} are the number of consecutive census periods $i-1$ to i where $\Delta LF_{csd,i} > 0$ and $\Delta UE_{csd,i} < 0$ respectively. Fifth, R^{LF}_{csd} and $(1 - R^{UE}_{csd})$ are scaled by the unemployment and LFP continuity weights, and sixth, the percentile of the scaled score is taken. The resulting measures are sub-indices for unemployment (UE_{csd}) and LFP (LF_{csd}) constructed with the same methodology as the previous sub-indices:

$$LF_{csd} = PercRank\left(C^{LF}_{csd} \times R^{LF}_{csd}\right) \text{ and } UE_{csd} = PercRank\left(C^{UE}_{csd} \times (1 - R^{UE}_{csd})\right)$$

Finally, the LFP decrease percentile and unemployment rise percentile ranks are given equal weight to create a composite index, the Labour Trend Disparity Sub-Index. Formally, the Labour Trend Disparity Sub-Index Λ_{csd} is calculated as the simple average of the unemployment and labour force participation rate:

$$\Lambda_{csd} = \frac{1}{2}(LF_{csd} + UE_{csd})$$

The resulting index $\Lambda_{csd} \in (0,1)$ ranks the magnitude and continuity of decreases to a CSD's LFP and increases in unemployment relative to either Canada or the province/territory of the CSD. A CSD that scores highly in this sub-index has experienced a strong and/or persistent decline in labour force relative to other CSDs in the province/territory or country.

Industry Diversity Disparity Sub-Index

The Industry Diversity Disparity Sub-Index describes the relative degree of industrial specialization in a CSD. The purpose of this sub-index is to give a relative measurement of economic robustness, and identify which communities are least diversified and/or trending away from diversification. It encompasses four considerations: whether a CSD has a dominant industry, the magnitude of the domination, the trend in the

magnitude of the dominant share, and the consistency in this trend. A higher score describes a CSD that is highly dependent and/or becoming more dependent on a specific sector of the economy, rather than diversifying. While a specialized economy may contribute to economic growth, it is also a risk factor for economic fragility because the regional economy is dependent on the volatility of a single industry (O'Hagan & Cecil, 2007). In small, rural communities that rely on a single industry, significant portions of the labour force may be ill-equipped to transition to new industries, especially if the infrastructure for alternative industries is limited. Particularly in resource or agriculture-based industries, small exogenous shocks to commodity prices and weather can cause negative impacts on community welfare when alternative industries are not available to employ a laid-off workforce. For this reason, unlike the previous sub-indices, the magnitude of specialization, rather than just the trend, is an important consideration when measuring disparity in economic robustness.

There are nine steps to the creation of this sub-index. First, seven broad bins are created to encompass the various North American Industry Classification System (NAICS) industries. Whereas the 2011 and 2016 NHS and long-form Census of Population contain the most detailed NAICS industry categories, the 2001 and 2006 Censuses of Population only include seven and ten categories respectively. As such, the 2001 Census industry categories are used and the 2006, 2011, and 2016 variables reorganized into the same categories. Each variable measures the labour force size of the relevant industry. Second, we assign the "largest industry" $L^{ind}_{csd,i}$ of the seven industries for each CSD and census year i by identifying the employed labour force in the largest industry j:

$$L^{ind}_{csd,i} = \max_{j}(Employed_{j,csd,i}), \forall\ j = 1, 2, \ldots 7$$

Third, the largest industry's share of a CSD's experienced labour force (the total labour force across all NAICS industries) in census year i is defined as:

$$S_{csd,i} = \frac{L^{ind}_{csd,i}}{E^{ind}_{csd,i}},\ \text{where } E^{ind}_{csd,i} \text{ is the experienced labour force of a CSD in census year } i.$$

Fourth, it is determined whether the largest industry has a significant enough share to classify as "dominant." The concept of industry specialization is poorly defined in the literature and there are a number of measures proposed, each with their shortcomings (van Egeraat et al., 2018). A common, though arbitrary, location quotient of 1.25 is commonly applied (van Egeraat et al., 2018). For this index, an industry is defined as "dominant" if the share of the largest industry employs more than 28.57% of the experienced labour force. This threshold has been chosen since it is double the share of an industry under a scenario where each industry employs the same amount of the experienced labour force. It is interpreted as double the share an industry should have under a perfectly diversified economy. The dominant industry is defined as:

$$D_{csd,i} = \begin{cases} L^{ind}_{csd,i} & \text{if } L^{ind}_{csd,i} \geq \frac{2}{7} \\ \text{None} & \text{if } L^{ind}_{csd,i} < \frac{2}{7} \end{cases}$$

Fifth, the percent change in largest industry share across census periods ΔLSC_{csd} is calculated as:

$$\Delta \text{LSC}_{csd} = \frac{L^{ind}_{csd,2016} - L^{ind}_{csd,t}}{L^{ind}_{csd,t}} \text{ where } t \text{ is the earliest period such that } \exists\ L^{ind}_{csd,t} > 0.$$

Sixth, a continuity score is assigned based on the number of times the largest industry share of employment increases across census years. The continuity score is important because it gives a basic indication of whether a municipality is diversifying or specializing over time. Formally, the continuity score is defined as $C^{ind}_{csd} = \frac{1 + m^{ind}_{csd}}{N}$ where N is the number of census years and m^{ind}_{csd} is the number of consecutive periods $i - 1$ to i where the employment share of the largest industry increases ($\Delta \text{LSC}_{csd,i} > 0$). Seventh, the number of periods where a dominant industry exists within a CSD is determined and used as a scale factor. If a dominant industry exists for all four census years (2001 through 2016), it earns a score of 4. If there is no dominant industry in any of the census years, the industry earns a score of 0. We formally define the number of periods where a dominant industry exists in a CSD as $M^{ind}_{csd} = \sum_{i \in \mathcal{M}} \mathbb{1}\left[L^{ind}_{csd,i} \geq \frac{2}{7}\right]$, where $\mathcal{M}$ is the set of census periods, and $\mathbb{1}\left[L^{ind}_{csd,i} \geq \frac{2}{7}\right]$ is a binary indicator function that equals 1 if a dominant industry exists $\left(L^{ind}_{csd,i} \geq \frac{2}{7}\right)$ and 0 otherwise. Eighth, the average share of the largest industry across each period is calculated. The simple arithmetic mean of $S_{csd,i}\ \forall i \in \mathcal{M}$ is written as $\overline{S_{csd}}$. This magnitude gives an indication of how dependent a CSD is on a specific industry, which is an important factor to consider when assessing the economic fragility of Canadian communities. Finally, the Industry Diversity Disparity Sub-Index is constructed using the following formula:

$$\Phi_{csd} = PercRank\left[PercRank(\Delta LSC_{csd}) \times C^{ind}_{csd} \times M^{ind}_{csd} \times \overline{S_{csd}}\right]$$

The final index Φ_{csd} is a measure of the relative magnitude, trend, and persistency of industrial specialization in CSDs. If the index score is high, it means that the dominant industry is some combination of relatively trending towards further specialization, consistently trending towards relative specialization, and/or highly dominant as a share of the labour force.

The Industry Diversity Disparity Sub-Index differs marginally from the other sub-indices, and therefore requires additional justification. As mentioned, this sub-index differs from the others by including the average magnitude specialization ($\overline{S_{csd}}$), because the risk of economic fragility from small levels of specialization is less significant than the risk associated with high levels of specialization, particularly in rural communities where volatility in industrial fortunes is so significant (Baldwin & Brown, 2004). The continuity variables C_{csd}^{ind} and M_{csd}^{ind} measure consistency in both the existence of a dominant industry, as well as the direction of the trend.

Composite index construction

There are many different approaches to assigning weights in composite indices, but to minimize personal bias among weights and to ensure full transparency, we follow advice from the OECD *Handbook on constructing composite indicators* (OECD, 2008) and equally weigh each sub-index. The other major consideration for a weighting strategy was factor analysis, but without a thorough theoretical justification, this approach may bias certain variables while being less transparent.

When including the sub-indices, there is a sample-size versus detail trade-off. Whereas there are 5,162 unique CSDs in the 2016 Census (of which 5,093 are in at least one other census year from 2001 to 2011), the number of CSDs with the required data to compute each index is fewer. Initially, an income sub-index was also constructed to measure the trend in the share of real community median income that comes from earnings, rather than government transfers. However, its inclusion decreased the sample size by 29%. The Income Sub-Index and the Labour and Population Dependency Indices were highly correlated. Intuitively, the correlation could be due to an aging population increasing the number of dependents needing government transfers (thus raising the income decline score), and rising unemployment decreasing the median income of a CSD. As such, the Income Trend Disparity Index was a clear choice to omit since its inclusion may bias the composite index to weigh the underlying variables in the Population Dependency and Labour Disparity indices more heavily. Conveniently, the Income Trend Disparity Sub-Index is also responsible for the largest number of missing values in the dataset. In total, 4,301 CSDs have the required data to calculate all four sub-indices.

The final Index of Economic Disparity is derived as a simple arithmetic mean of the four relevant sub-indices (Population Trend Disparity, Population Dependency, Industry Diversity Disparity and, Labour Trend Disparity). The raw score for each CSD is calculated as:

$$\textit{Disparity Score}_{csd} = \frac{\Psi_{csd} + \Lambda_{csd} + X_{csd} + \Phi_{csd}}{4}$$

$\Psi_{csd}, \Lambda_{csd}, X_{csd,}$ *and* Φ_{csd} are the Population Trend Disparity, Labour Trend Disparity, Population Dependency, and Industry Diversity Disparity sub-indices respectively. $\textit{Disparity Score}_{csd}$ is a raw score between 0 and 1, where a higher value indicates that a CSD exhibits strong disparity in some combination of the four sub-indices. To create the final Index of Economic Disparity, a whole number from 1 to 5 is assigned to each CSD based on their $\textit{Disparity Score}_{csd}$. The integer values are assigned as follows:

$$\text{Index of Disparity}_{csd} = \begin{cases} 1 & \text{if } \textit{Disparity Score}_{csd} < 0.2 \\ 2 & \text{if } 0.2 \leq \textit{Disparity Score}_{csd} < 0.4 \\ 3 & \text{if } 0.4 \leq \textit{Disparity Score}_{csd} < 0.6 \\ 4 & \text{if } 0.6 \leq \textit{Disparity Score}_{csd} < 0.8 \\ 5 & \text{if } 0.8 \leq \textit{Disparity Score}_{csd} < 1 \end{cases}$$

Index use and interpretation

In this section, we interpret Index of Economic Disparity scores and lay guidelines for usage and inference. The Index of Economic Disparity scores from 1 to 5 are interpreted as the severity with which a CSD is at risk for and/or experiencing significant and persistent economic decline relative to other Canadian CSDs.

The final index scores have the following meaning:

1. Low risk of economic decline: far less evidence, compared to other CSDs, that the economy is becoming relatively weaker and less stable.
2. Low-Moderate risk of economic decline: less evidence, compared to other CSDs, that the economy is becoming relatively weaker and less stable.
3. Moderate risk of economic decline: moderate evidence, compared to other CSDs, that the economy is becoming relatively weaker and less stable.

4. Moderate-High risk of economic decline: strong evidence, compared to other CSDs, that the economy is becoming relatively weaker and less stable.
5. High risk of economic decline: very strong evidence, compared to other CSDs, that the economy is becoming relatively weaker and less stable.

In each of these circumstances, "relatively" refers to the appropriate region (provincial/territorial or national). The index is constructed with percentile ranks, so CSDs that are unfavourably declining faster and more persistently than others in the four sub-indices tend to fall in the right tail of the distribution (disparity scores of 0.6 and above). CSDs that are persistently trending more favourably with respect to the four sub-indices will be concentrated in the left tail of the distribution (disparity scores of 0.4 and below).

Appropriate usage guidelines should be adhered to for a more detailed interpretation. Foremost, geographically large CSDs may be internally heterogenous, so communities within a CSD may be experiencing different rates of decline/growth. The Index of Economic Disparity score should only be interpreted as representative of the CSD on aggregate, and not necessarily any smaller geographies within it.

Second, the purpose of this index is not to suggest that users can treat similarly ranked communities with similar policy interventions. It is possible for two communities with very different circumstances to be ranked similarly, since the simplified integer scores (1 through 5) are wide bins that capture different underlying conditions. A community performing poorly in two sub-indices and well in two others may be scored similarly to a community performing relatively average across all four sub-indices. Both the example communities have unique circumstances that put them in the same category. Further, the interpretation of raw scores in the left-hand tail of the distribution is not the inverse of those in the right-hand tail. Whereas communities with index scores of 4 or 5 are observed to be experiencing significant and persistent economic decline in some combination of the four sub-indices compared to other CSDs, those with scores of 1 or 2 may also be declining but have inconsistent trends or data quality issues such that the trend is not easily identified from the available data. In this regard, the purpose of the index is to identify communities with strong evidence they have been "left behind," but not to necessarily identify the inverse (communities that are trending most positively well-off). With these caveats explicitly stated, the appropriate use of the Index of Economic Disparity is to flag communities exhibiting strong evidence of persistent and significant decline relative to other CSDs.

Index of Remoteness

The 2016 Statistics Canada Index of Remoteness is used to measure rurality among CSDs. For CSDs without a 2016 Index of Remoteness Score, the 2011 Index of Remoteness score is used if available. The Index of Remoteness assigns CSDs an index score between 0 and 1, where 1 indicates a highly rural community and 0 indicates a very large urban center. The Index of Remoteness has several distinct advantages that make it more useful than other measures of remoteness like Census Metropolitan Influenced Zones (MIZ) or Census Consolidation Subdivisions. First, the index is available at the CSD level, which allows for a straightforward merger with the Index of Economic Disparity. Second, the Index of Remoteness measures proximity of CSDs to all population centres, not just Census Metropolitan Areas (CMAs). The MIZ only defines rurality by a community's proximity and integration to CMAs, meaning all municipalities not integrated with a CMA are described as equally rural (Statistics Canada, 2018).

The Index of Remoteness captures more significant variation in the degree of rurality across Canadian CSDs. The index considers access to services and proximity to all population centers, rather than just CMAs. Alasia et al. (2017) comprehensively discuss the construction of this index. After normalizing scores between 0 to 1, the Index of Remoteness gives a robust, continuous measure of proximity to (and size of) population centres.

RESULTS: ANALYSIS OF DISPARITY AND GEOGRAPHY

The Index of Economic Disparity includes a score for 4,301 CSDs. In the 2016 Census, 5,162 CSDs were enumerated. The 861 missing CSDs can be divided into two groups: CSDs that are new due to updated census boundaries (69 CSDs), and CSDs without sufficient data to calculate all four sub-indices (792 CSDs). Analysis of each category is mentioned in the limitations section. The maps below depict the Index of Economic Disparity relative to provinces and territories (Figure 1a) and relative to Canada (Figure 1b). The majority of the Canadian population lives close to the border with the United States and CSDs in Canada's south are smaller (due to their larger population) and exhibit variation in the index values.

Descriptive statistics for the 4,301 CSDs included in the Index of Economic Disparity help to understand its overall distribution. Figure 2a through 2d summarizes the distribution of Index of Economic Disparity integer scores (1 through 5), and the raw disparity score (0 to 1) underlying percentiles relative to provinces and territories and Canada.

In both the raw scores and the adjusted integer scores, only a small number of CSDs experience significant economic disparity, since an integer score of 4 or 5 is rare. In both the raw scores (Figure 2a and c) and integer scores (Figure 2b and d), the distribution is roughly centered at

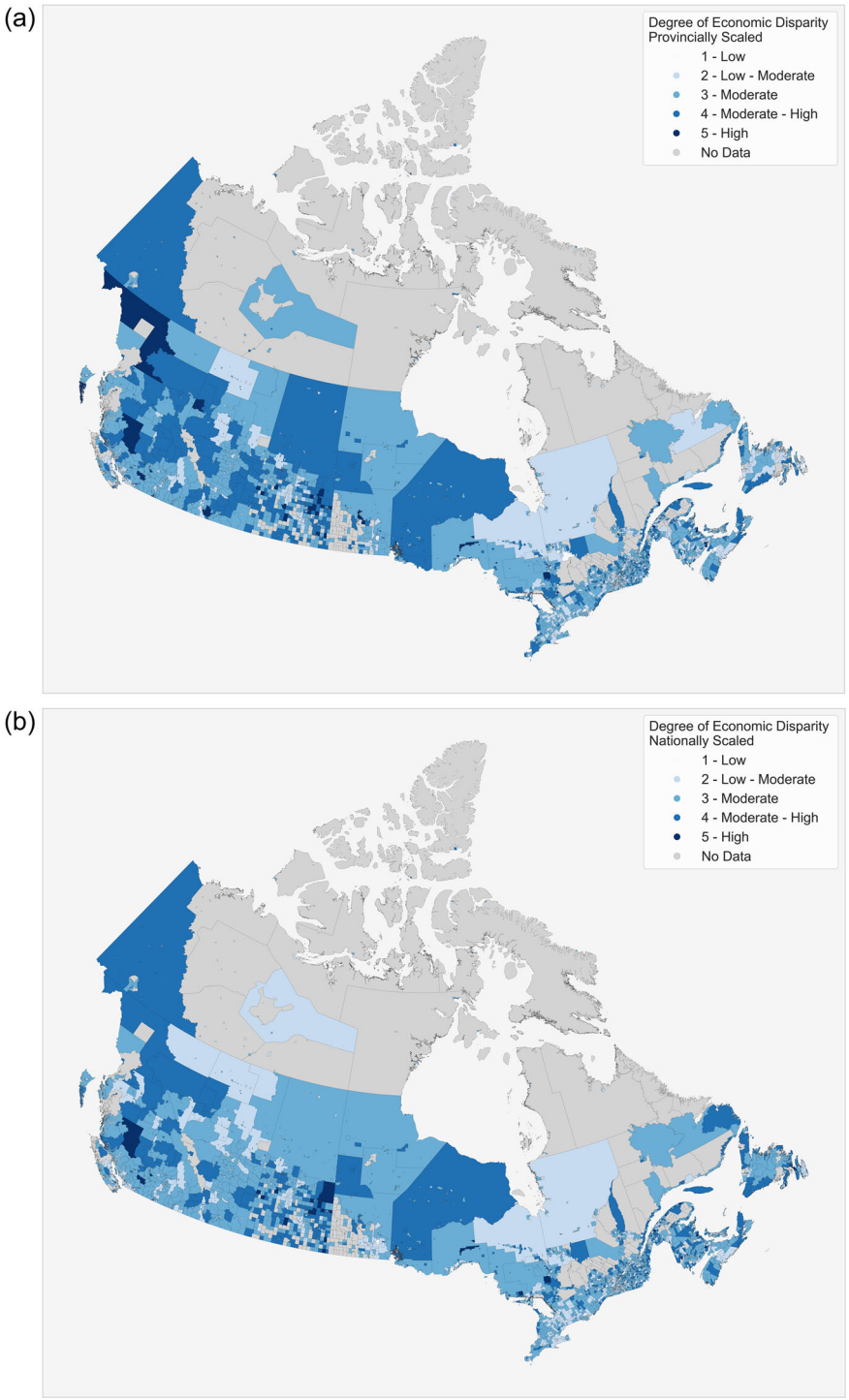

FIGURE 1 (a) Map of Index of Economic Disparity relative to the provinces and territories. (b) Map of Index of Economic Disparity relative to Canada. *Source:* Authors' own elaboration.

scores of 0.5 and 3 respectively. The CSDs with disparity scores above 0.6 (and integer scores above 3) are the CSDs with the most evidence suggesting they are at risk of significant and persistent decline in population, labour force outcomes, industrial diversity, and working-age population share. Table 1 shares the descriptive statistics of the Index of Economic Disparity scores.

There are very few differences between the summary statistics of the national and provincial/territorial Index of Economic Disparity. This indicates that intra-provincial/territorial disparity tends to be relatively similar to pan-Canadian disparity. However, it is worth noting that Figure 2a and b shows that intra-provincial disparity is marginally larger than pan-Canadian disparity, as there is a slightly larger standard deviation and share of CSDs that fall within the 4 and 5 integer. There are two possible explanations for this result. The first is that within some

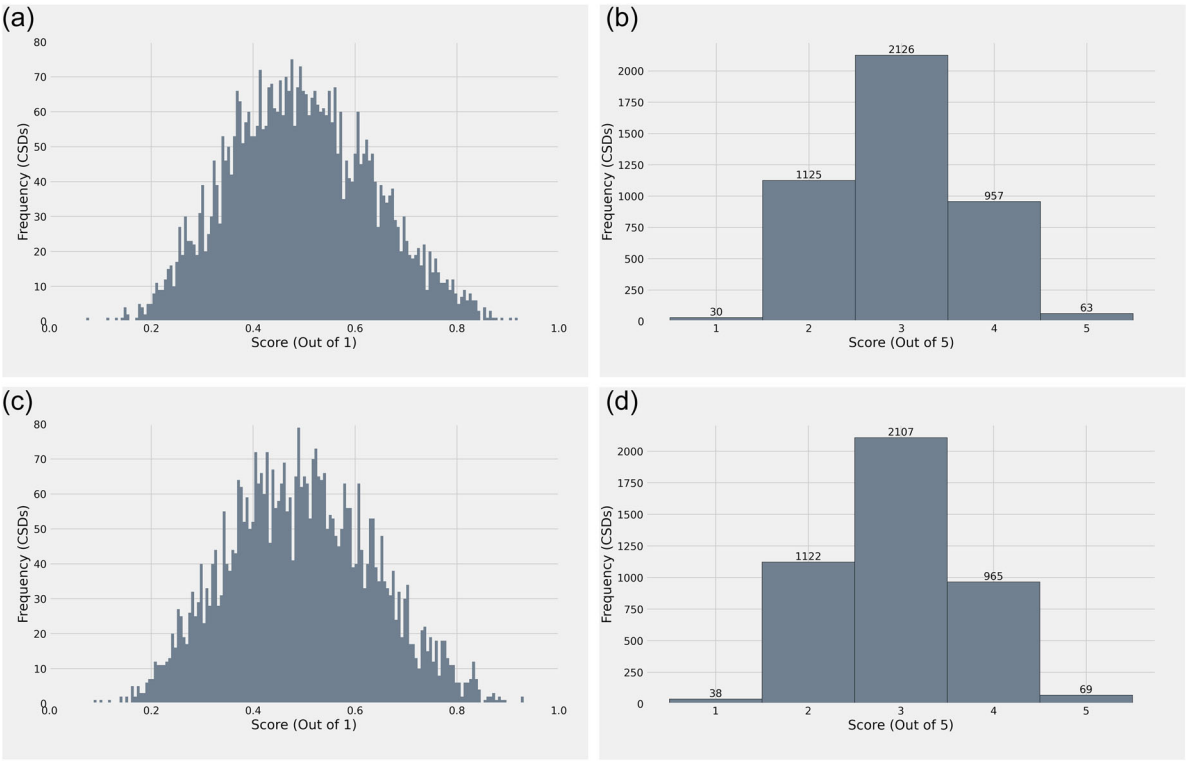

FIGURE 2 (a) Disparity scores, national distributions. (b) Disparity index, national percentiles. (c) Disparity scores, provincial/territorial percentiles. (d) Disparity index, provincial/territorial percentiles. *Source:* Authors' own elaboration.

or all provinces/territories, there is more disparity between the most economically secure CSDs and those that are at risk than there is across the larger sample of all Canadian CSDs. The second explanation is that provincial/territorial percentile ranks are determined using a smaller sample size than for the pan-Canadian percentile ranks, and therefore more disparity may be expected.

Rural-disparity interaction analysis

For all 4,301 CSDs that have both an Index of Remoteness Score (either 2011 or 2016), and an Index of Economic Disparity score, descriptive statistics and an Ordinary Least Squares regression were produced to capture the relationship between economic disparity and remoteness. The sample statistics of the Index of Remoteness are summarized in Section A of Table 1, and the interaction of Index of Economic Disparity integer scores with Index of Remoteness scores is summarized in Sections C and D of Table 1.

In Section C of Table 1, the average Index of Economic Disparity integer score for CSDs that fall above (rural) and below (urban) a remoteness index threshold are separated. In column six, the 90th percentile Index of Remoteness Score (0.5809) is used as a threshold for defining urban/rural CSDs. CSDs with remoteness scores below 0.5809 are classified as "urban," while CSDs above or equal to the threshold are defined as "rural." In each row, we calculate the average Index of Economic Disparity integer score for all the CSDs in the respective urban/rural classification, given the appropriate threshold. The Index of Economic Disparity tends to be greater for communities with higher remoteness scores, but remoteness has neither a strong nor linear relationship with Index of Economic Disparity scores. Moreover, the magnitude with which the more "remote" communities experience a greater average Index of Economic Disparity is small. As the remoteness threshold reaches the 90th percentile, the average of disparity integer scores for CSDs above the threshold decreases from above the 75th percentile. This means that the most remote communities (90th percentile) have a lower average Index of Economic Disparity Index score than the average of communities above the 75th percentile.

This result indicates that some of the most remote CSDs may be experiencing relatively lower risk of persistent economic decline. This is an important result, because it challenges the notion that rural communities are homogenous in experiencing economic decline and disparity compared to the rest of the country. On average, communities that are more remote face higher relative rates of economic disparity, but the magnitude is marginal and the percentiles indicate that the relationship is not linear. Section D in Table 1 offers another way to look at the interaction between remoteness and economic disparity. All CSDs are grouped by their Index of Economic Disparity Integer Score, then two bins

TABLE 1 Summary statistics.

A. Index of Economic Disparity Summary Statistics				
	Relative to provinces and territories		Relative to Canada	
	Disparity Score (Raw)	Disparity Score (Integer Score)	Disparity Score (Raw)	Disparity Score (Integer Score)
N	4301	4301	4301	4301
Mean	0.494552	2.977912	0.494166	2.976285
St. Dev	0.142091	0.764458	0.139008	0.755073
Min	0.087158	1	0.072446	1
25%	0.390974	2	0.391088	2
50%	0.491226	3	0.488773	3
75%	0.593841	3	0.592639	3
Max	0.931086	5	0.919177	5

B. Summary Statistics for Index of Remoteness	
Percentiles	Remoteness score
Average Remoteness Score for all CSD	0.3493
25th Percentile of Remoteness Scores	0.2249
50th Percentile of Remoteness Scores	0.3386
75th Percentile of Remoteness Scores	0.4419
90th Percentile of Remoteness Scores	0.5809
St. Deviation for CSD Remoteness Scores	0.1717

C. Index of Economic Disparity Integer Scores by Remoteness				
	Rural as above 25th Remoteness Percentile	Rural as above 50th Remoteness Percentile	Rural as above 75th Remoteness Percentile	Rural as above 90th Remoteness Percentile
Relative to Provinces and Territories				
Average Integer Disparity Score (Urban)	2.834	2.869	2.939	2.973
Average Integer Disparity Score (Rural)	3.033	3.104	3.117	3.038
Relative to Canada				
Average Integer Disparity Score (Urban)	2.779	2.836	2.928	2.975
Average Integer Disparity Score (Rural)	3.051	3.140	3.150	2.985

D. Remoteness of CSDs in Disparity Integer Scores				
	CSDs in Dataset, Index relative to provinces and territories		CSDs in Dataset, Index relative to Canada	
	CSDs with Integer Scores: 1/2/3	CSDs with Integer Scores: 4/5	CSDs with Integer Scores: 1/2/3	CSDs with Integer Scores: 4/5
Average Index of Remoteness Score	0.322	0.372	0.319	0.383
Median Index of Remoteness Score	0.312	0.365	0.306	0.378

Source: Authors' own elaboration.

are created: CSDs with scores 1, 2, and 3, and CSDs with scores 4 and 5. The mean and median remoteness for each of these bins are calculated and reported. In all cases, the 4 and 5 CSD bin had an average remoteness greater than the CSDs in the 1, 2, and 3 bin. There is a positive correlation between a higher Index of Economic Disparity score and a higher Index of Remoteness score. In this sense, more-remote communities are (on average) experiencing relatively more economic decline compared to the Canadian and/or provincial average. The other interesting result from this table is that the discrepancy in average Index of Remoteness scores for the 1/2/3 CSD bin and the 4/5 CSD bin is greater in the national Index of Economic Disparity than in the provincial Index of Economic Disparity. This leads to the interpretation that remoteness may be a greater determinant of pan-Canadian disparity than it is for intra-provincial/territorial disparity.

The relationship between remoteness and economic disparity is also analyzed by estimating a linear relationship with Ordinary Least Squares regression:

$$Disparity\ Score_{csd} = \beta_1 + \beta_2\ Remoteness_{csd} + u_{csd} \quad (1)$$

$Remoteness_{csd}$ is the remoteness score of a CSD, and $Disparity\ Score_{csd}$ is the raw, continuous Index of Economic Disparity score from 0 to 1.

The results reveal the weakness of the relationship between remoteness and economic disparity among Canadian CSDs. There is no strong relationship between a CSD's remoteness and their raw Index of Economic Disparity score, with only a slight positive trend. This is true for both indices. Section A in Table 2 reports the regression estimates of equation (1) using the provincially relative Index of Economic Disparity. In these results, a 1 unit increase in Index of Remoteness score is associated with a 0.13 increase in an Index of Economic Disparity score at a 1% level of significance. This is a very small correlation considering that the range of the Index of Remoteness is [0,1]. When contextualized with an R-Squared value of 0.02, it is clear that a CSD's Index of Remoteness score is not a strong determinant of whether that CSD is experiencing relatively significant and/or persistent economic decline. The same is true when using the nationally relative Index of Economic Disparity. Section B in Table 2 reports the regression estimates of equation (1) using the nationally relative Index of Economic Disparity. In these results, a 1 unit increase in Index of Remoteness score is associated with a 0.14 increase in Index of Economic Disparity Score at a 1% level of significance. This is consistent with the data in Section D of Table 1, which indicates that remoteness is more correlated with economic disparity when comparing across Canada than it is within provinces/territories. One explanation for why economic disparity within provinces/territories is less associated with remoteness than pan-Canadian disparity is because variation in remoteness is likely much lower within provinces/territories than it is across Canada. Certain provinces and geographical regions are more remote than others, and therefore intra-provincial/territorial variation in economic well-being may not be influenced by remoteness because CSDs face a similar remoteness. If most communities within a province/territory have similar remoteness, then remoteness does not provide enough variation to explain disparity in economic well-being. However, across Canada, there is variation in average remoteness of each province/territory; therefore, it is more likely that remoteness plays a role in inter-provincial disparity. It is still worth noting that even at the national level, the relationship is small in magnitude and has poor explanatory power. When contextualized with an R-Squared value of 0.03, the conclusion is the same as for the provincially relative Index of Economic Disparity: remoteness is not a strong predictor of whether a community is experiencing persistent and/or significant economic decline relative to the rest of the Canada or a relevant province/territory. While on average, communities with higher Index of Remoteness scores tend to have higher Index of Economic Disparity scores, there is immense variation and the relationship is a very weak and non-linear one.

TABLE 2 Regression results: Disparity and remoteness.

A. Relative to provinces and territories						
Method:	Ordinary Least Squares		R-squared:		0.023	
No. Observations:	4301		Adj. r-squared:		0.023	
Df Residuals:	4299		F-statistics:		101.8	
DF Model:	1					
Co-variance type:	Non-robust					
	Coefficient	**Std Err**	**t**	**P > |t|**	**[0.025**	**0.975]**
Intercept	0.4154	0.005	89.634	0.000	0.406	0.424
Remoteness	0.1107	0.012	8.983	0.000	0.087	0.135
B. Relative to Canada						
Method:	Ordinary Least Squares		R-squared:		0.029	
No. Observations:	4301		Adj. r-squared:		0.029	
Df Residuals:	4299		F-statistics:		127.9	
DF Model:	1					
Co-variance type:	Non-robust					
	Coefficient	**Std Err**	**t**	**P > |t|**	**[0.025**	**0.975]**
Intercept	0.4473	0.005	96.414	0.000	0.438	0.456
Remoteness	0.1402	0.012	11.308	0.000	0.116	0.164

Source: Authors' own elaboration.

The results speak to the importance of place-based rural policy, rather than homogenous, uniform policy based on remoteness alone (Markey et al., 2012; Vodden et al., 2019). From the data, it is clear that economic disparity is not uniform across remote communities. Many communities that classify as highly remote ($Remoteness_{csd} > 0.8$) have an Index of Economic Disparity integer score of 1 or 2, indicating that there is little evidence of a relatively persistent and/or significant economic decline in labour outcomes, population, industrial diversity, and working-age share of population (e.g., Quaqtaq, Village nordique Quebec). Likewise, there are plenty of communities that are close to population centres ($R_{i,t} < 0.2$) that experience Index of Economic Disparity integer scores of 4. The community of Saint-Charles-Borromée, Quebec is strongly influenced by the CMAs of Montreal and Trois-Rivières, so it has a low Index of Remoteness score ($R_{csd,2016} = 0.1097$). Despite this, Saint-Charles-Borromée has an Index of Economic Disparity score of 4.

Limitations

Data quality concerns limit both the reliability and interpretability of index scores. The typical caveats of Census sampling and non-sampling error should be stressed when interpreting results. All data used in the Population Trend and Population Dependency sub-indices is from the short-form Census of Population, which only contains non-sampling errors such as non-response, coverage, and processing error. The Labour Trend Disparity and Industry Diversity Disparity sub-indices require estimates from the long-form Census and 2011 NHS, which sample a representative fraction of Canadian households. Non-sampling error is addressed in both the short-form and long-form Census through data adjustments based on response-rates, the Dwelling Classification Survey, and the Census Undercoverage Study; however, sampling-error remains a problem for Census variables only found in the long-form Census and 2011 NHS. In particular, the voluntary 2011 NHS had a substantially lower response rate that exacerbates sampling error. The low response rate results in more CSDs with censored/omitted data and wider confidence intervals.

These data limitations impact the Index of Disparity in three ways. First, confidence intervals are calculated for long-form Census and NHS variable estimates, but only point-estimates are used in the Index of Disparity. In this regard, the margin of error for point-estimates is not propagated in the final Index of Disparity scores. Second, percentile ranks in the Index of Disparity may be biased if non-sampling error is systematic across CSDs. Finally, imprecise and missing data in the 2011 NHS will bias the consistency weight for each sub-index. In 2011, 20% fewer CSDs have labour force and occupation data than the average across 2001, 2006, and 2016. By construction, CSDs missing 2011 data will have a reduced consistency weight, and hence a lower index score. As aforementioned, the interpretation of index scores (1 through 5) reflects this limitation, as those with lower index scores are not necessarily avoiding decline, but rather lack consistent evidence of it. While the interpretation of the results does not change, NHS reliability is a significant limitation that may prevent the index from confidently identifying communities that are significantly declining but lack the necessary data to consistently measure the decline.

There are 861 CSDs in the 2016 Census that do not have Index of Economic Disparity scores. Of the 861, 69 CSDs were newly created in 2016 and therefore do not have at least one other census period to use to detect decline. Of the new CSDs, 49 are in Manitoba, representing 21% of total CSDs in the province. A jurisdictional scan reveals that in 2015, Manitoba underwent major revisions to municipal boundaries that resulted in these new CSDs. The remaining 792 missing CSDs lack sufficient response rates to long-form Census questions so crucial data is censored; therefore, these CSD lack the required data to compute an Index of Disparity score. The communities tend to be overwhelmingly rural with low populations. Of the 792 CSDs that lack data to create an Index of Disparity score, the average population is less than 100 residents. These communities have an average Index of Remoteness score of 0.432, which is above the average of 0.349. This result has important implications. Foremost, it limits the overall validity of the Index of Economic Disparity, because the sub-indices are constructed using ordinal percentile rankings, and with missing communities being largely small and rural, each CSDs placement in ordinal rankings may be systematically biased. Secondly, this result speaks to a larger systemic issue concerning rural data in Canada (Rich et al., 2021). For many communities, socio-economic statistics like unemployment rates, labour force participation rates, incomes, and employment share by industry are unavailable for policymakers. If economic policy is place-based, small communities that lack sufficient data may find themselves left out of targeted policy.

Finally, it is important to discuss regionalism and note that Census subdivision borders are porous and the socio-economic trends of neighbouring or nearby CSDs may be causally interconnected. Individuals may live and work in different CSDs, and age-based migration may occur such that working-age individuals and retired individuals self-select into distinct CSDs within a geographically proximate area. In this regard, it is possible for a community to have young adults leave to work in nearby communities, decreasing population and labour force participation (LFP), and attract wealthy retirees, increasing the population dependency ratio. The result is a well-off, older community that would receive a high Index of Disparity score. This is not out of alignment with the interpretation of the index: a community losing its working-age population and labour force may experience a loss of services and become more reliant on neighbouring communities, even if the population is wealthy. Nonetheless, without further context, a simplified index score will similarly classify communities of significantly different wealth and characteristics. The size of communities and their interaction with other communities (agglomeration economies) are important considerations in order to understand industrial specialization (Shearmur & Polèse, 2005). However, interaction effects were beyond the scope of this analysis and considered an important extension of future research.

While beyond the scope of this paper, future research should address this with multi-scalar analysis of Index of Disparity scores for CSDs within Census Agglomerations (CAs) and to nearby CMAs. The index was not constructed at the geographical level of CAs and CMAs because of limited sample size (35 CMAs and 117 CAs), geographical coverage, and the issue of CAs masking the heterogeneous conditions of smaller CSDs within the larger geography. Nonetheless, comparing the sub-indices and the input variables of a CSD to other CSDs belonging to the same CA can provide insight into whether a decrease in working-age population and LFP for one CSD is offset by another neighbouring CSD. Coupling analysis at both the CSD and CA level could explain whether high index scores are due to the inherent decline of a CSD or whether the cause is population self-selection and economic restructuring of community networks within a CA.

Indigenous communities

The results of the index have specific limitations for First Nation and Inuit communities regarding both Census quality and index interpretability. Indigenous communities tend to have lower response rates to Census enumeration, and as a result, Census profiles for these communities are less likely to have all the information required to calculate an index score. Of the 861 CSDs in the 2016 Census that are missing an index score, 47% are Indigenous communities. Even among Indigenous CSDs with an index score, the interpretation of these scores may be different from non-Indigenous communities. For instance, high population dependency ratios among Indigenous CSDs are more likely to be driven by youth population than the elderly population. While the average population dependency ratio of Indigenous communities (1.44) is relatively similar to non-Indigenous communities (1.24), the ratio of population under 14 years to population over 65 years is more than 450% greater for Indigenous communities (5.21) than non-Indigenous CSDs (0.92).

CONCLUSION

Three important results emerge from the relationship between remoteness and trends in economic disparity. First, communities with higher Index of Remoteness scores tend to have higher Index of Economic Disparity scores, indicating that, on average, rural communities have been declining or at least growing more slowly than urban communities. Second, this relationship is weak, and there is immense variation. While it is descriptively true that rural communities experience higher disparity on average, remoteness is a poor determinant of an Index of Economic Disparity score; therefore, blanket policy oriented towards rural communities may be unsuitable. The large variation in Index of Economic Disparity scores for rural communities indicates that rural communities are far from homogenous, and if policy aimed at developing rural economies is not specific to the community, scarce resources may be misallocated. A third result is that intra-provincial/territorial disparity is less explained by remoteness than pan-Canadian disparity. This is perhaps because variation in remoteness is lower within provinces/territories than across them, since some provinces/territories tend to be uniformly more remote. Communities within a province/territory face more similar remoteness than communities across all of Canada; therefore, remoteness is less likely to be a factor that determines inter-community economic disparity within a province/territory than it is across Canada.

There are a number of future considerations stemming from this work. The COVID-19 pandemic presents a challenge for the Index of Economic Disparity when it is extended to include the 2021 Census. The impacts of the pandemic and pandemic-related policies are likely to have drastically affected labour force outcomes, industrial diversity, and even inter-community migration. While these may add volatility to index scores, we believe the index is equipped to deal with some of these concerns. First, any shock to labour force outcomes and industrial composition will not significantly change percentile orderings so long as the shock affects communities relatively equally. Second, if the communities were not uniformly impacted by the pandemic, then those that receive a sudden reversal of trend due to the anomalous census period will inversely experience a decrease in consistency score. This prevents any communities from “jumping” to the right-hand tail of the distribution from one anomalous period of severe decline. Upon the release of the 2026 Census, data from the 2021 Census will only be used in the consistency weights and one portion of the Industry Diversity Disparity Index. Nonetheless, a potential revision to reduce the importance of the current census year would be to replace the current percent change calculation with an average annual change, and to revise the consistency weights accordingly; however, this approach may exacerbate data quality issues with the NHS or older census periods. Another future consideration for this work is how to understand the interactions between communities given that place does indeed matter. This index views CSDs relative to trends in other communities, but as otherwise isolated. However, labour markets, firms, and people move and interact, and these interaction effects are important to understand community economic resilience. We set this as a challenge for future research.

Finally, indices, such as the one shared here, are purposefully simplifying in order to facilitate comparisons, ranking, aggregating, and measurement (Oliveira et al., 2022). Many governments across Canada have their own internal indices that they use for decision making and that are not shared publicly because of the negativity that may be associated with being identified as a lagging community. They are used, for example, to identify communities that may have lower capacity to apply for funds and that need stronger support. Indices provide a snapshot of complex phenomena and are one analytical tool that should best be used alongside others in order to understand complex phenomena.

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ENDNOTE

[1] The percentile rank used in this paper is calculated as the average of two percentile scores: weak (the percent of values less than or equal to the specified score) and strict (the percent of values strictly less than the specified score).

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APPENDIX: CENSUS DATASETS

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