Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Drivers of Provincial Sectoral Wage Dispersion in Canada, 2001–2023

Mahmut Zeki Akarsu

m.z.akarsu@pusan.ac.kr

Pusan National University

Erdem Seçilmiş

Hacettepe University

Hasnat Dewan

Thompson Rivers University

Research Article

Keywords: Wage Inequality, Sectoral Wage Inequality, Unemployment, Economic Policy, Canadian Economy

Posted Date: July 28th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10310797/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Drivers of Provincial Sectoral Wage Dispersion in Canada, 2001–2023

Abstract

This paper constructs a new province-level dataset of employment-weighted between-sector wage dispersion to examine the evolution of sectoral wage inequality in Canada between 2001 and 2023. Using two-way fixed effects models, the analysis investigates how unemployment, immigration intensity, trade openness, inflation, per capita income, and union density are associated with provincial sectoral wage dispersion. The results show that unemployment is the most consistent correlate of between-sector wage inequality: higher unemployment is generally associated with wider sectoral wage dispersion. The relationship is stronger in province-years with higher immigration intensity, while union density appears to moderate the positive association between unemployment and wage dispersion. Counterfactual simulations further illustrate that moving from a low-unemployment scenario of 4% to a severe-recession scenario of 15% is associated with an increase of about 1.18 points in the rescaled sectoral wage Gini, roughly equivalent to a 5% increase. These findings suggest that labour-market slack and institutional conditions are important for understanding the structure of sectoral wage inequality across Canadian provinces. The paper contributes to the literature by introducing a transparent measure of employment-weighted between-sector wage dispersion and by showing how this measure varies with provincial labour-market conditions.

Keywords: Wage Inequality, Sectoral Wage Inequality, Unemployment, Economic Policy, Canadian Economy
JEL Code: D63, J61, O47

1 Introduction

The classical assumption of perfectly competitive labor markets is grounded in the law of one price, according to which a worker's wage is determined solely by their individual skill characteristics, regardless of the employer or sector in which they are employed (Berlinski, 2008; Prado et al., 2021). In practice, however, substantial wage differentials persist even among workers with comparable observable characteristics performing similar occupations. These persistent wage differentials have contributed to making wage inequality one of the defining features of contemporary economies, generating significant economic, social, and political concerns worldwide. According to the Global Wage Report 2024–25 (International Labour Organization, 2024), almost 22% of wage workers in low-income countries earn less than half of their country's median hourly wage, while this proportion declines to 17, 11, and 3% in lower-middle-income, upper-middle-income, and high-income countries, respectively.

The existing literature highlights several forces behind wage inequality, including de-unionization, stagnant minimum wages, job polarization, technological change, and globalization (Breau and Rigby, 2010; Acemoglu, 1999; Goos et al., 2009; Autor et al., 2008). However, these forces are unlikely to affect all dimensions of inequality uniformly, since aggregate wage inequality reflects the combined effects of both within-sector and between-sector wage dispersion. While a large strand of the literature focuses on firm-level and skill-adjusted wage premia using matched employer-employee data (e.g., OECD (2021); Barth et al. (2016); Du Caju et al. (2010); Abowd et al. (1999)), another line of research emphasizes broader structural inequality arising from sectoral composition, industrial transformation, and inter-industry wage differentials (e.g., Briskar (2020); Mokre and Rehm (2020); Magda et al. (2011); Krueger and Summers (1988)). From this perspective, wage inequality reflects not only differences in individual worker characteristics, but also how economic activity, productivity, and labor demand are distributed across sectors and regions. This perspective is particularly important in the Canadian context, where provinces differ substantially in industrial composition, exposure to trade, resource dependence, demographic structure, and labor market institutions, yet the structural determinants of sectoral wage inequality across

provinces remain relatively underexplored in the existing literature. More broadly, the regional dimension of inequality has often been treated as a "black box" in the literature (Rodríguez-Pose and Tselios, 2009), since national-level analyses may obscure substantial spatial heterogeneity in industrial structures and labor market dynamics. In the Canadian case, aggregate inequality trends may conceal pronounced provincial disparities associated with differences in sectoral specialization, resource dependence, and institutional arrangements (Breau, 2015).

Motivated by this gap, this paper examines between-industry wage dispersion, which we refer to throughout the paper as *sectoral wage inequality*, across Canadian provinces over the period 2001–2023. In contrast to the dominant micro-level literature focusing on within-firm and within-sector wage premia among observationally similar workers, this study adopts a broader structural perspective centred on wage differences across industries within provincial labour markets. To do so, we construct employment-weighted sectoral wage inequality indices that measure how average wages are distributed across industries within each province-year. By linking these measures to macroeconomic conditions, demographic change, labour-market institutions, and trade exposure, the paper documents how between-sector wage dispersion varies across provincial economic environments. The study therefore provides a complementary macro-structural perspective on the regional dynamics of wage inequality in Canada, while remaining distinct from worker-level analyses of individual wage dispersion.

Using these provincial sectoral wage inequality indices, we examine the associations between sectoral wage dispersion and a set of macroeconomic and labour-market variables, including per capita income, unemployment, immigration intensity, inflation, trade openness, and union density. We also test whether the unemployment–inequality relationship differs across labour-market contexts by interacting unemployment with union density and immigration intensity. This allows us to assess whether labour-market slack is more strongly associated with sectoral wage dispersion in contexts where institutional protection is weaker or where demographic adjustment is more pronounced. In addition, we estimate lagged specifications and period-specific models around major economic shocks, including the 2008 financial crisis and the COVID-19 pandemic. These spec-

ifications are designed to assess the stability of the main empirical relationships rather than to establish definitive causal effects.

The remainder of this paper is organized as follows. Section 2 provides a comprehensive literature review, contextualizing Canadian sectoral wage inequality within the broader frameworks of institutional change, globalization, and labor market dynamics. Section 3 discusses the conceptual foundations of sectoral wage inequality and explains why it should be considered a distinct dimension of wage inequality. Section 4 outlines the data and methodology, detailing the construction of the employment-weighted sectoral Gini indices and the econometric specifications employed. Section 5 presents the empirical findings and discussion, identifying the key macroeconomic and institutional determinants of wage dispersion across provinces. Section 6 introduces a counterfactual simulation model to quantify the simulated sensitivity of sectoral wage inequality to varying unemployment scenarios. Finally, Section 7 concludes with a summary of the study's contributions and their implications for policy.

2 Literature Review

2.1 Inter-Industry Wage Differentials and Sectoral Wage Inequality

The literature on inter-industry wage differentials has long documented the existence of persistent wage hierarchies across sectors. Seminal contributions by Krueger and Summers (1986, 1988), Dickens and Katz (1986), and Katz et al. (1989) demonstrate that workers with similar observable characteristics often receive systematically different wages depending on the industries in which they are employed. These findings challenge the predictions of perfectly competitive labor market models and instead support explanations based on efficiency wages, rent-sharing, and labor market segmentation.

An important debate within this literature concerns whether sectoral wage differentials primar-

ily reflect differences in worker characteristics, often referred to as composition effects,[1] or genuine industry-specific wage premia. In this context, high-productivity industries may simply employ more skilled workers, causing average wages to differ across sectors even in the absence of sector-specific wage-setting mechanisms. To distinguish composition effects from genuine sectoral wage premia, many studies employ conditional wage models based on matched employer–employee data. Studies based on linked employer-employee datasets generally find that substantial wage differentials persist even after worker characteristics are taken into account (Abowd et al., 1999; Card et al., 2013; Barth et al., 2016; Song et al., 2019; OECD, 2021).[2] These findings suggest that industry-specific institutions, bargaining structures, productivity regimes, and rent-sharing mechanisms play an important role in wage determination.

Cross-country evidence further suggests that these sectoral wage hierarchies are remarkably persistent across institutional settings and over time. Studies focusing on European economies show that sectors such as finance, mining, and utilities consistently appear among the highest-paying industries, whereas retail trade, textiles, and low-productivity services remain among the lowest-paying sectors (Dell'Aringa and Pagani, 2007; Du Caju et al., 2010). More recent research argues that inter-industry wage differentials are not merely temporary deviations, but relatively stable structural features of capitalist economies. Mokre and Rehm (2020) , for example, interpret sectoral wage differences as fluctuating around persistent "gravitational centers" associated with differences in profitability and sectoral accumulation dynamics. This perspective implies that wage inequality is closely linked to broader processes of structural transformation and uneven economic development rather than solely to individual worker productivity.

However, OECD (2021) emphasizes that a substantial share of wage inequality arises within industries rather than between broad sectors, particularly through firm-level wage premia linked to productivity, profitability, and market power. Nevertheless, between-industry differentials become

[1] Composition effects arise when workers with different levels of education, experience, or skills are unevenly distributed across industries.

[2] This literature attempts to determine whether equally qualified workers receive systematically different wages across industries after controlling for observable (e.g., education, experience, occupation) and unobservable (e.g., ability or motivation) worker characteristics.

more important at finer levels of industrial disaggregation, suggesting that sectoral structures remain important for understanding aggregate inequality dynamics. While this literature provides important insights into conditional wage premia among observationally similar workers, it is less suited to explaining broader structural transformations associated with industrial composition and regional economic change.

2.2 Technological Change, Globalization, and Structural Transformation

A large body of research links rising wage inequality to technological change, globalization, and labor market polarization. Autor et al. (2003) argue that technological change disproportionately substitutes for routine middle-skill tasks while complementing abstract and high-skilled occupations. Similarly, Autor et al. (2008) and Goos et al. (2009) show that job polarization has transformed the occupational structure of advanced economies, contributing to widening wage differentials across sectors and labor market segments. Michaels et al. (2014) further demonstrate that information and communication technology adoption increases demand for high-skilled labor while reducing employment shares in routine occupations. These processes are closely linked to structural transformation because industries differ in technological intensity, productivity growth, and exposure to automation. As a result, high-productivity and knowledge-intensive sectors may experience faster wage growth than sectors reliant on routine or low-skilled labor. Acemoglu (1999) argues that skill-biased technological change increases demand for skilled workers, thereby contributing to widening wage inequality. Consequently, productivity gains concentrated in technologically advanced industries may generate uneven sectoral wage dynamics.

Globalization and trade integration may reinforce these dynamics. Helpman et al. (2010, 2017) demonstrate that international trade reallocates labor toward more productive exporting firms and sectors, increasing wage dispersion across firms and industries. Jaumotte et al. (2013) similarly conclude that technological progress and financial globalization are important drivers of inequality, while trade openness produces uneven distributional effects depending on labor-market structures and institutional settings. These mechanisms imply that technological change and globalization

are likely to generate uneven regional outcomes through differences in industrial specialization and sectoral composition. These dynamics are particularly important in the Canadian context. Breau and Rigby (2010) show that import competition from low-income countries disproportionately suppresses wages for less-educated workers, especially in labour-intensive manufacturing regions. Green and Sand (2015) find that employment polarization in Canada has existed since the 1980s, while wage polarization became more pronounced after the mid-2000s, partly driven by resource booms and commodity cycles. These findings suggest that technological change, globalization, and resource dependence affect Canadian provinces unevenly through differences in industrial specialization and regional economic structures.

2.3 Regional Inequality and the Canadian "Black Box"

Despite the growing literature on wage inequality, the regional dimension of inequality remains comparatively underexplored. Rodríguez-Pose and Tselios (2009) argue that regional inequality often constitutes a "black box" within the broader inequality literature because national-level analyses may conceal substantial spatial heterogeneity in labor market conditions, industrial structures, and institutional arrangements. Similarly, Moretti (2012), Storper (2013), and Iammarino et al. (2019) emphasize that agglomeration dynamics, uneven technological concentration, and regional divergence increasingly shape inequality across space. From this perspective, aggregate national indicators may obscure important sub-national disparities associated with uneven economic development and structural transformation.

This issue is particularly important in the Canadian context. Canadian provinces differ substantially in industrial composition, exposure to trade, demographic structure, resource dependence, and labor market institutions. Breau (2015) demonstrates that national trends in Canadian wage inequality conceal substantial regional disparities across provinces.[3] Resource-intensive west-

[3] Breau (2015) documents that while the national Gini coefficient in Canada increased by 7% between 1996 and 2006 at the national level, this aggregate trend masks substantial provincial disparities. During the same period, earnings inequality rose by as much as 10.8% in Alberta and 9.4% in Ontario, whereas provinces such as Prince Edward Island and New Brunswick experienced modest declines or relative stability.

ern provinces, manufacturing-oriented regions, and service-dominated urban economies exhibit markedly different labor market dynamics and wage structures. Provincial differences in unionization, minimum wages, immigration intensity, and industrial specialization further contribute to uneven inequality outcomes across regions. These findings suggest that Canadian wage inequality is shaped not only by individual characteristics and labor market outcomes but also by place-based factors linked to regional industrial structures, institutional arrangements, and exposure to trade and technological change.

Regional resource booms provide an important example of this spatial heterogeneity. Fortin and Lemieux (2015) show that resource booms in provinces such as Alberta, Saskatchewan, and Newfoundland and Labrador raised wages and reduced lower-tail inequality among less-educated workers. Similarly, Marchand (2015) finds that energy-driven growth in Western Canada generated uneven gains across sectors and income groups. Together, these studies suggest that the distributional consequences of economic growth depend critically on the regional industrial base and the sectors through which growth occurs.

2.4 Unemployment, Institutions, and Sectoral Wage Dynamics

Another consistent theme in the literature is the relationship between unemployment and inequality. Studies examining regional wage dynamics in Canada generally find that unemployment is strongly associated with wider wage disparities. Using microdata from 1996, 2001, and 2006, Breau (2015) finds that inequality increased more sharply in western provinces and that unemployment was a statistically significant determinant of wage dispersion. Earlier work by MacPhail (2000) similarly identifies unemployment as an important driver of inequality, while microsimulation evidence from Erksoy (1994) suggests that high unemployment substantially reduces earnings at the bottom of the distribution. Johnson (1995) further shows that cyclical unemployment widens income inequality in Canada.[4] These studies imply that labour-market slack may intensify sectoral

[4]Complementing these findings, Mocan (1999) emphasizes the role of structural unemployment, demonstrating that increases in the structural (long-term) component of unemployment have a substantial and persistent aggravating impact on income inequality—specifically by increasing the income share of the richest quintile at the expense of the

wage inequality by disproportionately affecting vulnerable sectors and low-paid workers.

At the same time, labour-market institutions may moderate these effects. Card et al. (2003, 2020) document the long-run decline in union density in Canada and emphasize the historical equalizing role of collective bargaining. Fortin and Lemieux (2015) further show that increases in provincial minimum wages contributed to reducing lower-tail wage inequality during the 2000s. International evidence also suggests that stronger redistribution systems and labour-market protections can mitigate the inequality effects of unemployment shocks (Dabla-Norris et al., 2015). In a similar vein, Engbom and Moser (2022) argue that minimum-wage institutions and redistributive policies remain central to limiting inequality in increasingly polarized labor markets.

Immigration and firm dynamics further complicate these relationships. Picot and Hou (2016), and Moore and Pacey (2003) show that immigration influenced Canadian wage inequality through differences in earnings trajectories between immigrants and native-born workers. Using administrative tax records, Dostie et al. (2023) find that firm-specific wage premiums explain a substantial share of both earnings inequality and immigrant wage convergence. Together, these findings underscore the role of labour-market institutions, firm heterogeneity, and demographic change in shaping wage inequality across sectors and regions.

While existing Canadian research identifies a wide range of determinants of wage inequality —including unemployment, labour-market institutions, immigration, technological change, trade exposure, and resource dependence — most studies focus either on individual-level earnings inequality or on conditional wage differentials among workers. As a result, the determinants of between-industry wage inequality remain less well understood in the Canadian context, despite substantial regional variation in industrial composition and economic structure. This gap is particularly important because structural shifts in provincial industrial composition may alter aggregate wage inequality even when within-industry wage dispersion remains unchanged. These observations raise a broader conceptual question: why should sectoral wage inequality be considered a distinct and policy-relevant dimension of inequality?

bottom sixty percent of the population

3 Why Sectoral Wage Inequality?

The focus on sectoral wage inequality is motivated by the fact that aggregate wage dispersion reflects both within-sector and between-sector differences. A long tradition in labour economics assumes that wages are determined in competitive labour markets, implying that workers with similar observable characteristics should receive similar pay regardless of the sector or employer in which they work. However, empirical evidence shows that wage differences persist across firms, sectors, and industries even after accounting for worker characteristics (Yeaple, 2005). This suggests that wage inequality cannot be understood solely through individual-level characteristics, but must also account for structural differences across employers and sectors.

Recent research further supports this perspective. OECD (2021) show that firm- and sector-level wage premiums account for an important share of overall wage dispersion across countries. This implies that between-group wage differences, including differences across sectors, represent a meaningful component of the broader inequality structure. In the Canadian context, this perspective is particularly relevant because provinces differ substantially in industrial composition, resource dependence, trade exposure, and labour-market institutions.

For this reason, we construct an employment-weighted measure of sectoral wage inequality. This measure allows each sector to contribute to the overall index in proportion to its employment share. As a result, larger sectors have greater influence on the index, while smaller and more volatile sectors do not disproportionately affect the measure. The index therefore captures the structural importance of sectoral wage differences within each provincial labour market.

At the same time, this measure should be interpreted carefully. It does not capture wage inequality within sectors or among individual workers. Instead, it captures between-sector wage dispersion, showing how unequal average wages are across industries within a province-year. In this sense, sectoral wage inequality provides a complementary perspective rather than a substitute for individual-level wage inequality measures. This distinction is important because both between-sector and within-sector wage differences are necessary for a comprehensive understanding of wage inequality (Akarsu and Seçilmiş, 2025).

4 Data and Methodology

4.1 Data and Variables

This study uses annual provincial-level data from Statistics Canada covering the period 2001 to 2023. The dataset includes ten variables: *sectoral wage inequality*, *GPD (current)*, *unemployment rate*, *immigration*, *emigration*, *inflation (CPI)*, *exports*, *imports*, *union density*, and *population*. The three northern territories are excluded due to data limitations and their relatively small population sizes. Summary statistics for the main variables are reported in Table 1.

Table 1: Descriptive Statistics of Key Variables (2001–2023)

Variable (unit)	N	Mean	Std. Dev.	Min	Median	Max
Sectoral Wage Gini Index	230	0.250	0.010	0.200	0.250	0.290
Unemployment Rate (%)	230	7.98	2.88	3.60	7.70	16.70
GDP (current million CAD)[a]	230	180,750.55	213,184.99	4,521.90	63,407.25	852,729.20
Immigration (persons)[b]	230	27,899	38,761	89	12,310	227,424
Inflation Index (CPI) (2015=100)[c]	230	123.03	16.27	96.70	122.20	164.10
Exports (thousands CAD)[d]	220	96,630	115,941	2,324	36,092	445,757
Import (thousands CAD) [d]	220	97,178	111,168	3,069	40,133	451,416
Population (thousands)[e]	230	3,477.54	4,112.19	136.67	1,167.55	15,608.37
Unionization Rate (%)[f]	230	32.08	4.78	22.50	31.20	41.10

Sources: [a] GDP: Statistics Canada Table 36-10-0222-01; [b] Immigration/Emigration: Table 17-10-0040-01; [c] Inflation: Table 18-10-0005-01 (CPI, 2015=100); [d] Exports and Import: Table 12-10-0088-01; [e] Population: Table 17-10-0005-01; [f] Unionization: Table 14-10-0070-01; [g] Author's calculations from wage and GDP data (Table 14-10-0204-01 and Table 36-10-0222-01).

Our core variable of interest is sectoral wage inequality, measured by an employment-weighted Gini coefficient constructed from average weekly earnings across industries using Statistics Canada Table 14-10-0204-01. This dataset reports average weekly earnings and employment levels by province and NAICS industry classification. The use of weekly earnings is consistent with Fortin and Lemieux (2015), although we rely on grouped sectoral data rather than individual-level microdata. Importantly, the wage figures exclude overtime compensation and refer to employees in permanent positions, which improves comparability across provinces and sectors. Because the index is based on average sectoral wages and sectoral employment shares, it should be interpreted as a measure of between-sector wage dispersion rather than overall individual-level wage inequality.

The sectoral wage inequality index is constructed using average weekly earnings and employment data for 19 NAICS-based industry sectors.[5] These sectors include Forestry, Logging and Support (NAICS 113–115); Mining, Quarrying and Oil and Gas Extraction (NAICS 21); Utilities (NAICS 22); Construction (NAICS 23); Manufacturing (NAICS 31–33); Trade (NAICS 41, 44–45); Transportation and Warehousing (NAICS 48–49); Information and Cultural Industries (NAICS 51); Finance and Insurance (NAICS 52); Real Estate and Rental and Leasing (NAICS 53); Professional, Scientific and Technical Services (NAICS 54); Management of Companies and Enterprises (NAICS 55); Administrative and Support, Waste Management and Remediation Services (NAICS 56); Educational Services (NAICS 61); Health Care and Social Assistance (NAICS 62); Arts, Entertainment and Recreation (NAICS 71); Accommodation and Food Services (NAICS 72); Other Services (Except Public Administration) (NAICS 81); and Public Administration (NAICS 91). These sectors are reported at a consistent level of aggregation throughout the sample period, ensuring comparability over time.

While this approach does not permit analysis of individual-level wage dispersion, it provides meaningful insights into the structural component of wage inequality arising from differences in average wages across industries.

4.2 Methodology

4.2.1 Employment-Weighted Gini Coefficient for Sectoral Wage Inequality

To address the absence of publicly available provincial sectoral wage inequality measures, we construct a novel dataset based on the employment-weighted Gini coefficient across industry sectors. While most previous studies rely on individual-level microdata from the LFS or tax records (e.g., LAD), we adopt a grouped-data approach for two reasons. First, employment-weighted Gini coefficients are widely accepted in cross-sector and inter-group inequality research (Milanovic, 2013).

[5] Aggregate categories, including Industrial Aggregate Excluding Unclassified Businesses, Goods-Producing Industries, and Service-Producing Industries, are excluded from the analysis because they represent broad composite groupings rather than distinct industries. Including these aggregates would result in double counting, as they are constructed from the underlying sectoral categories already included in the calculation of the sectoral wage inequality index.

Second, this approach offers full transparency and replicability using public data — critical for studies aiming to inform regional policy.

What we contribute in this paper is the construction of a new measure of employment-weighted sectoral wage inequality across Canadian sectors, which, to our knowledge, has not previously been calculated. While individual-level wage inequality measures are extremely powerful, a sector-based approach provides complementary insights because sectoral wage inequality is strongly influenced by structural differences across industries, such as productivity, technological adoption, unionization, and task composition. Our approach weights sectoral wages by the number of workers, allowing us to capture the structural component of sectoral wage inequality that arises from differences in the size and wage structure of each sector.

There is strong theoretical and empirical motivation for analysing wage inequality through sectoral and task-based differences. Katz et al. (1999) show that technological change affects sectors unevenly, contributing to widening wage gaps between groups of workers. Similarly, Acemoglu and Restrepo (2022) document that sectors with greater adoption of automation and task-replacing technologies experience different wage dynamics for high-skill and routine tasks. These findings suggest that structural differences across sectors, especially in technology, productivity, and task composition, can contribute to wage dispersion. This provides the conceptual basis for focusing on between-sector wage inequality as a complementary dimension of the broader wage distribution.

Our employment-weighted sectoral Gini captures a meaningful dimension of the wage distribution by focusing on wage differences across sectors while accounting for the relative size of each sector in the labor market. This is important because larger sectors contribute more to the overall wage structure than smaller sectors. Therefore, our measure does not replace individual-level measures of wage inequality; rather, it complements them by isolating the between-sector component of wage inequality. This component is particularly relevant in recent research, where sectoral wage gaps are increasingly linked to structural changes in production, technological transformation, and differences in sectoral productivity.

To explain our calculation method, we begin with the unweighted Gini coefficient calculated

across sectors within each province-year:

$$G_{pt} = \frac{1}{2m^2 \bar{n}_{pt}} \sum_{a=1}^{m} \sum_{b=1}^{m} |n_{apt} - n_{bpt}|, \tag{1}$$

where G_{pt} denotes the unweighted sectoral Gini coefficient for province p in year t, m is the number of sectors, and n_{apt} and n_{bpt} are the average weekly wages in sectors a and b, respectively. $\bar{n}_{pt}$ denotes the simple average of sectoral wages in province p and year t.

However, the unweighted Gini coefficient treats all sectors equally, regardless of their employment size. This may overstate the influence of small sectors with unusually high or low wages and understate the role of sectors that employ a large share of workers. To better reflect the actual structure of the provincial labor market, we therefore compute an employment-weighted sectoral Gini coefficient:

$$\tilde{G}_{pt} = \frac{\sum_{a=1}^{m} \sum_{b=1}^{m} w_{apt} w_{bpt} |n_{apt} - n_{bpt}|}{2 \sum_{a=1}^{m} w_{apt} n_{apt}}, \tag{2}$$

where $w_{apt} = \frac{N_{apt}}{N_{pt}}$ and $w_{bpt} = \frac{N_{bpt}}{N_{pt}}$ denote the employment shares of sectors a and b, respectively. The denominator represents twice the employment-weighted average sectoral wage. This formulation ensures that sectors employing larger shares of workers exert greater influence on the inequality measure, thereby reducing potential distortions from small and volatile sectors. As noted by Milanovic (2013), and consistent with the weighted logic of the Gini coefficient rooted in Corrado Gini's original formulation (Dodge, 2008), accounting for population or employment weights is essential when comparing inequality across groups.

Thus, $\tilde{G}_{pt}$ should be interpreted as a measure of employment-weighted between-sector wage inequality within each Canadian province-year. It captures how unequal average wages are across sectors, while giving greater importance to sectors that account for larger shares of employment. However, it does not capture wage dispersion within sectors. For this reason, our measure provides a focused indicator of sectoral wage inequality rather than a complete measure of overall wage inequality.

We selected this dataset because it provides consistent sector-level wage and employment information over more than two decades, making it possible to track structural wage patterns across provinces. Alternative sources such as the Labour Force Survey or administrative tax data offer valuable individual-level information, but they are less straightforward for constructing a long-run, publicly replicable, province-sector panel with consistent industrial coverage. By using employment-weighted Gini coefficients based on sectoral average wages, our approach captures the between-sector component of wage dispersion while accounting for the relative size of each sector in provincial employment. This measure is therefore best understood as a transparent, policy-relevant complement to household- or individual-level inequality measures.

4.2.2 Econometric Specification and Robustness Strategy

Variable construction

The analysis uses a balanced panel of Canadian provinces observed over time. The dependent variable is the provincial *sectoral–wage–inequality index*, measured by the Gini coefficient. To improve interpretability we rescale the Gini index by 100, so that

$$\text{SectoralWageInequality}_{it} = 100 \times \text{Gini}_{it},$$

and regression coefficients can be interpreted in percentage–point changes.

Some macroeconomic variables are also constructed for this study. To construct these variables we use basic arithmetic formulas. Let GDP_{it} and Population_{it} denote provincial gross domestic product and population. Then the *per–capita income* is defined as

$$\text{PerCapitaIncome}_{it} = \frac{\text{GDP}_{it}}{\text{Population}_{it}}.$$

The *unemployment rate*, denoted $\text{UnemploymentRate}_{it}$, is the provincial unemployment rate expressed in percentage points. The *immigration rate* measures immigrant inflows relative to popu-

lation and is defined as

$$\text{ImmigrationRate}_{it} = \frac{\text{Immigrants}_{it}}{\text{Population}_{it}} \times 100.$$

Inflation is the consumer price index. *Trade openness* measures external economic exposure as the ratio of exports and imports to GDP:

$$\text{TradeOpenness}_{it} = \frac{\text{Exports}_{it} + \text{Imports}_{it}}{\text{GDP}_{it}} \times 100.$$

Finally, *union density* is the share of unionized workers in the provincial labour force. Moreover, all variables are also lagged covariates in some models to mitigate simultaneity bias and capture delayed macroeconomic effects. In some robustness checks we also construct two–year lags.

Table 2: Summary Statistics For Final Variables

Variable	**N**	**Mean**	**SD**	**Min**	**Median**	**Max**
Wage Gini	230	24.6	1.390	20.1	24.7	28.9
Log Personal Income	220	10.9	0.183	10.5	10.9	11.5
Unemployment Rate	230	7.980	2.880	3.600	7.700	16.7
Immigration Rate	230	0.696	0.427	0.061	0.663	2.160
Inflation	230	123.0	16.3	96.7	122.0	164.0
Trade Openness	220	119.0	22.3	86.9	115.0	185.0
Unionization	230	32.1	4.780	22.5	31.2	41.1

Table 2 reports the summary statistics for all variables employed in the empirical analysis, encompassing both our constructed measures and standard controls.

Baseline fixed–effects specification

The core empirical models relates provincial sectoral wage inequality use *two–way fixed–effects panel regressions*. Let i index provinces and t index years. The baseline specification is

$$\begin{aligned}\text{WageInequality}_{it} = \alpha_i + \gamma_t + \beta_1 \log(\text{PerCapitaIncome})_{i,t} + \beta_2 \,\text{UnemploymentRate}_{i,t} \\ + \beta_3 \,\text{ImmigrationRate}_{i,t} + \beta_4 \,\text{Inflation}_{i,t-1} + \beta_5 \,\text{TradeOpenness}_{i,t} \\ + \beta_6 \,\text{UnionDensity}_{i,t} + \epsilon_{it}.\end{aligned} \tag{3}$$

where α_i are province fixed effects, which absorb time-invariant provincial characteristics such as geography, long-run industrial structure, and persistent institutional differences, while γ_t are year fixed effects, which absorb common national shocks. The coefficient β_2 captures the conditional association between unemployment and sectoral wage inequality, after controlling for province and year fixed effects and the other covariates included in the model.

In addition to this baseline model, we estimate two interaction specifications that allow the effect of unemployment to depend on either immigration intensity or union density. First, an *unemployment–immigration interaction* augments equation (3) with the product of unemployment and the immigration rate,

$$\begin{aligned}\text{WageInequality}_{it} = \alpha_i + \gamma_t + \beta_1 \log(\text{PerCapitaIncome})_{i,t} + \beta_2 \,\text{UnemploymentRate}_{i,t} \\ + \beta_3 \,\text{ImmigrationRate}_{i,t} + \beta_4 \,\text{Inflation}_{i,t} + \beta_5 \,\text{TradeOpenness}_{i,t} + \beta_6 \,\text{UnionDensity}_{i,t} \\ + \delta \,\text{UnemploymentRate}_{i,t} \times \text{ImmigrationRate}_{i,t} + \epsilon_{it}.\end{aligned} \tag{4}$$

Here the coefficient δ captures whether the unemployment effect on inequality varies with immigration intensity. Second, an *unemployment–union interaction* interacts unemployment with union

density:

$$\begin{aligned}\text{WageInequality}_{it} = \alpha_i + \gamma_t + \beta_1 \log(\text{PerCapitaIncome})_{i,t} + \beta_2 \,\text{UnemploymentRate}_{i,t} \\ + \beta_3 \,\text{ImmigrationRate}_{i,t} + \beta_4 \,\text{Inflation}_{i,t} + \beta_5 \,\text{TradeOpenness}_{i,t} + \beta_6 \,\text{UnionDensity}_{i,t} \\ + \delta \,\text{UnemploymentRate}_{i,t} \times \text{UnionDensity}_{i,t} + \epsilon_{it}. \quad (5)\end{aligned}$$

This specification tests whether strong labour unions mitigate or amplify the unemployment–inequality relationship through the coefficient δ.

Lagged specifications

Although contemporaneous models estimated with Driscoll–Kraay standard errors account for cross-sectional dependence and serial correlation in the error structure, they do not eliminate concerns about simultaneity or reverse timing. For this reason, we also estimate lagged specifications in which explanatory variables enter the model with a one-year lag. These models do not fully solve endogeneity concerns, but they provide a useful check on whether the main results are sensitive to the timing of the covariates and whether labour-market conditions are associated with sectoral wage inequality with some delay.

Sample splits and heterogeneity

To provide a deeper understanding of the mechanisms driving wage dispersion, we examine how the effects of key explanatory variables vary across distinct institutional and demographic environments. Specifically, we estimate models conditioned on local labor market characteristics, assessing whether macroeconomic drivers exert differential impacts in provinces with high versus low union density, as well as in contexts of varying immigration intensity. This heterogeneity analysis allows us to isolate how labor market shocks and structural conditions jointly shape the distribution of wages across Canadian provinces.

Furthermore, we investigate the temporal stability of these relationships by stratifying the data

into distinct economic periods. To capture the impact of major structural shocks, we partition the sample into pre- and post-2008 (Global Financial Crisis) and pre- and post-2020 (COVID-19 pandemic) periods. We also perform decade-specific estimations (2000s, 2010s, and 2020s) to track the evolving influence of unemployment and other control variables over time. We adopt this split-sample approach rather than relying on pooled interaction models based on the diagnostic framework established by Chow (1960). Preliminary Chow tests confirmed the presence of significant structural breaks in the data, indicating that a split-sample estimation is the econometrically superior method for obtaining reliable, unbiased coefficients across distinct economic regimes.

Robustness checks

To ensure that our findings are not driven by outliers or particular modelling choices, we undertake several robustness checks. First, we add *province specific linear trends* that capture unobserved longrun shifts not absorbed by the fixed effects. Second, we reestimate the baseline model after dropping the financial crisis years (2008–2009) and the COVID–19 period (2020–2021) to verify that the results are not dominated by extraordinary macro shocks. Third, we Winsorise the continuous variables at the 1st and 99th percentiles to mitigate the influence of extreme observations. Fourth, we reestimate all models after excluding Ontario, the largest province, to ensure that one jurisdiction does not drive the results. Finally, because the Driscoll–Kraay covariance matrix may not be feasible for very short subsamples, we compute HC1 standard errors clustered by province as a fallback.

5 Findings and Discussion

5.1 Descriptive Analysis

We begin by presenting the descriptive patterns of sectoral wage inequality in Canada. Since publicly available measures of provincial between-sector wage dispersion are limited, a central contri-

bution of this study is the construction of an employment-weighted sectoral wage inequality index using sector-level wage and employment data. As described in Equation 2, this measure accounts for the relative employment size of each sector, allowing larger sectors to contribute proportionally more to the overall index. This provides a useful indicator of structural wage dispersion across sectors within each province-year.

The construction of this dataset is important for the empirical analysis that follows. It allows us to examine how macroeconomic, demographic, and institutional factors are associated with sectoral wage inequality across Canadian provinces. At the same time, the measure should be interpreted carefully. It captures between-sector wage dispersion, rather than individual-level wage inequality or within-sector wage differences. Therefore, it provides a complementary perspective on wage inequality by focusing on the sectoral structure of provincial labour markets.

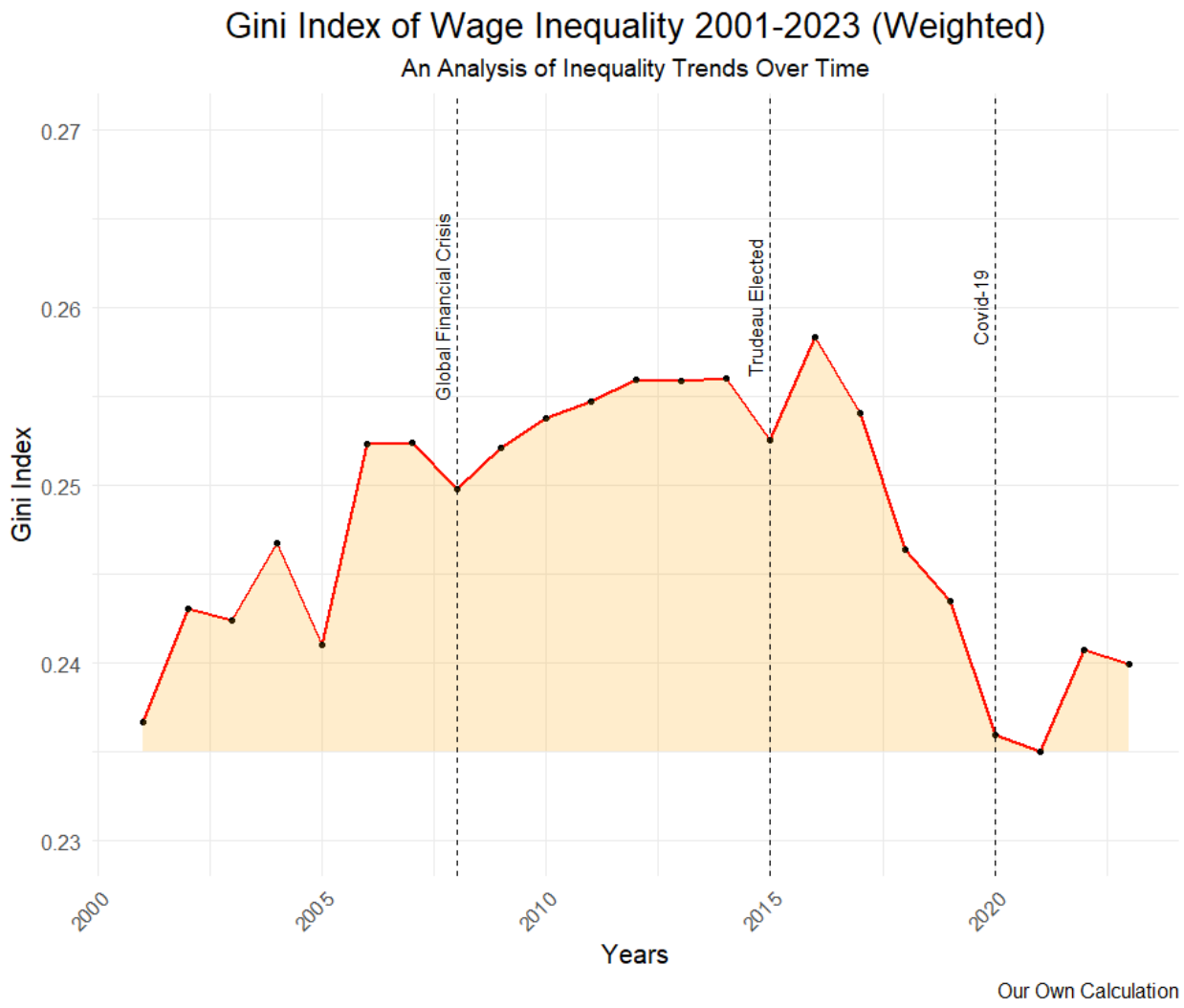


Figure 1: Sectoral Wage Inequality in Canada Over Time

Figure 1 shows the evolution of employment-weighted sectoral wage inequality in Canada between 2001 and 2023. The index remained relatively stable for much of the 2000s and early 2010s, fluctuating around 0.25–0.26 Gini points. After the mid-2010s, sectoral wage inequality declined noticeably, reaching approximately 0.235 by 2020–2021 before increasing slightly in the final years of the sample.

This decline after the mid-2010s coincides with a period of broader policy changes and redistributive initiatives in Canada. Previous studies suggest that the Trudeau administration introduced several policies aimed at reducing poverty and inequality, including changes related to transfers, unemployment insurance, pensions, and wage policies (Xuereb et al., 2023; Béland et al., 2022).

In addition, Riddell (2022) notes that minimum wages increased sharply in Canada after 2015, which may have affected the lower part of the wage distribution. However, because Figure 1 is descriptive and our empirical strategy does not directly identify the causal effect of these policies, the post-2015 decline should be interpreted as a suggestive pattern rather than definitive evidence of policy impact.

The pattern around the COVID-19 period also requires cautious interpretation. Figure 1 does not show a sharp increase in sectoral wage inequality in 2020 or 2021. Instead, the index declined during the first years of the pandemic and then partially increased in 2022 and 2023. This suggests that the pandemic period may have disrupted the sectoral wage structure, but the direction and persistence of its effect are not straightforward from the descriptive evidence alone. Previous research shows that COVID-19 had unequal labour-market effects, particularly for low-wage workers and workers in sectors such as hospitality and services (Béland et al., 2022; Riddell, 2022). Therefore, the pandemic may have affected sectoral wage dispersion through several channels, including employment losses, sectoral composition effects, and policy responses. Nevertheless, our descriptive evidence does not support a strong claim that COVID-19 clearly increased sectoral wage inequality in Canada.

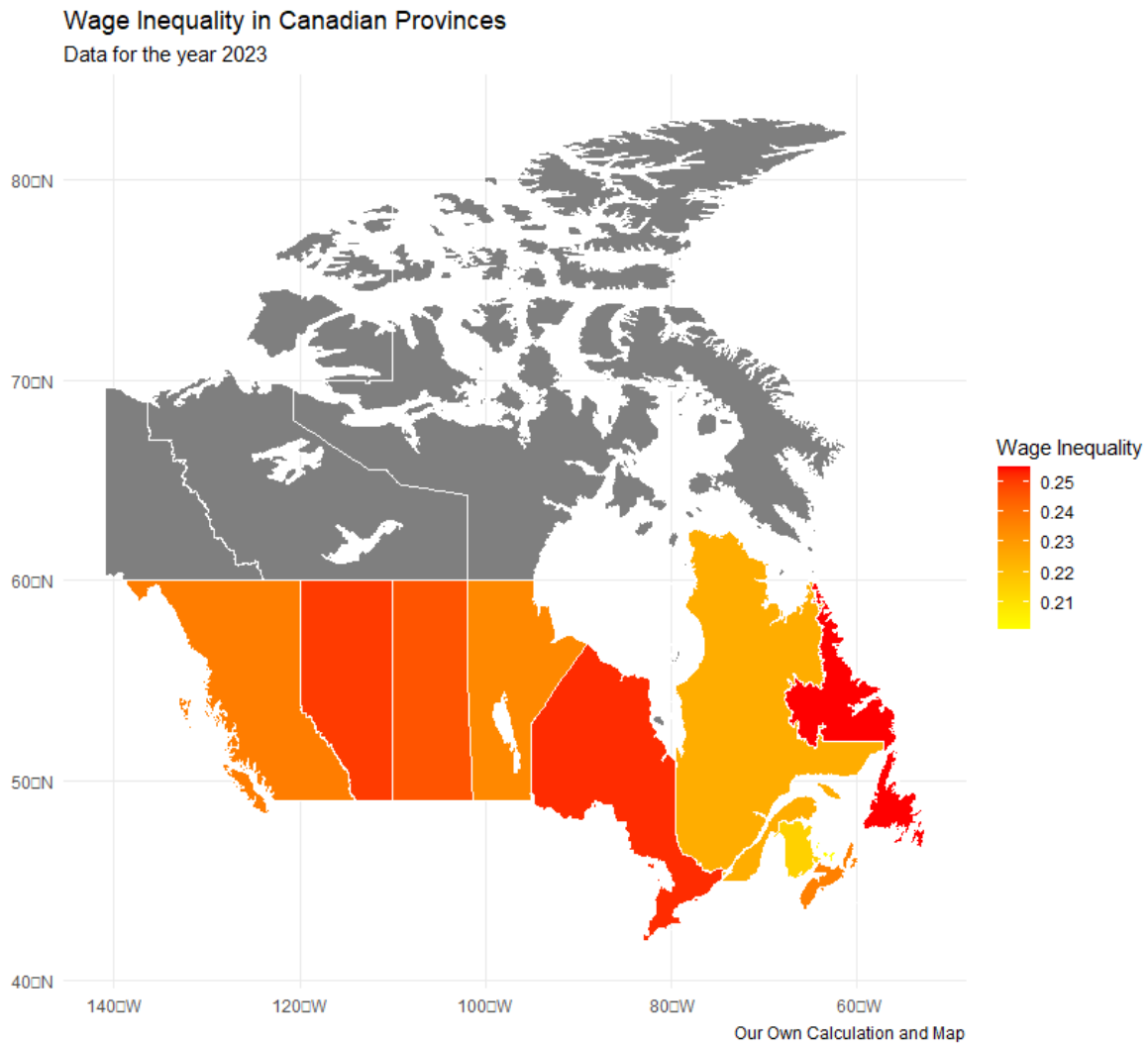


Figure 2: Sectoral Wage Inequality in Canadian Provinces in 2023

Sectoral wage inequality was also calculated separately for each Canadian province between 2001 and 2023. The three northern territories, Yukon, Northwest Territories, and Nunavut, are excluded due to data limitations and their relatively small population sizes. As shown in Figure 2, sectoral wage inequality varied across provinces in 2023, ranging from approximately 0.20 to 0.26 Gini points. The full province-year dataset is reported in Appendix Table A1 and Figure A1. These results indicate that sectoral wage inequality declined in most provinces after the mid-2010s, although the timing and magnitude of the decline differed across provinces.[6]

[6]Saskatchewan appears to be an exception to the broader post-2015 decline observed in many provinces. One possible explanation is that minimum-wage growth in Saskatchewan was slower than in several other provinces, which

In 2023, Prince Edward Island had the lowest sectoral wage inequality, with a Gini coefficient of approximately 0.20, while Newfoundland and Labrador recorded the highest value, at around 0.255. Ontario and British Columbia recorded values of approximately 0.24 and 0.25, respectively. Over the full sample period, Newfoundland and Labrador experienced the highest observed level of sectoral wage inequality, reaching approximately 0.29 in 2006. In Ontario, sectoral wage inequality peaked at around 0.275 in 2013 and 2016, before declining and remaining below 0.25 after 2017. The increase in Ontario's minimum wage in 2018 may have contributed to changes in wage dynamics, although our sector-level measure does not allow us to isolate the separate effect of this policy.

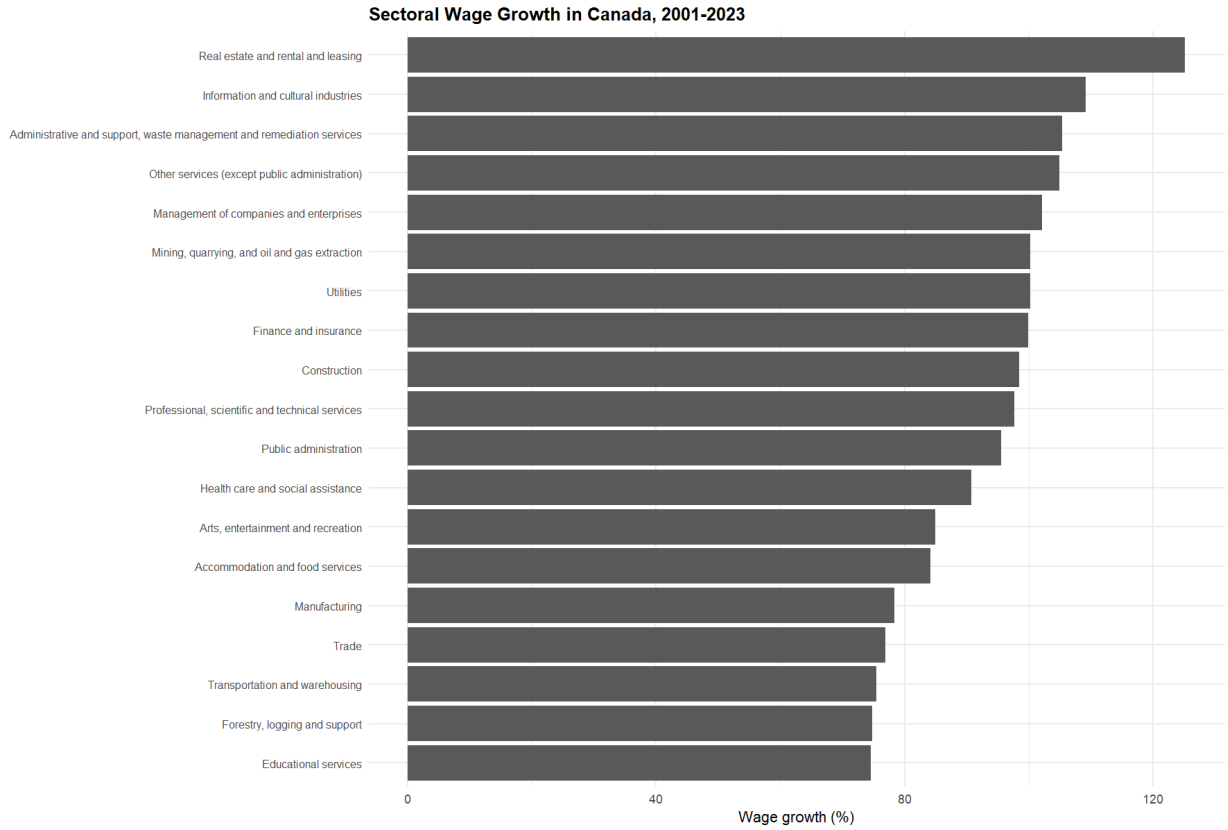


Figure 3: Nominal Wage Growth by Sector in Canada, 2001–2023

Figure 3 presents sectoral wage growth in Canada between 2001 and 2023. To calculate these

may have limited downward pressure on wage dispersion. In addition, Legree et al. (2016) emphasize that declining unionization in Saskatchewan weakened workers' bargaining power, which may also have contributed to higher sectoral wage dispersion. These explanations are suggestive and should not be interpreted as direct causal evidence.

changes, we first compute wage growth for each sector within each province by comparing the sectoral wage level at the beginning and end of the sample period. We then construct a Canada-wide measure by calculating the employment-weighted average wage for each sector-year across provinces. In this calculation, each province-sector wage is weighted by the corresponding level of employment, and the weighted sum is divided by total employment in that sector across provinces. This approach provides a national picture of nominal wage growth by sector while accounting for differences in employment size across province-sector groups.

The results show substantial variation in nominal wage growth across sectors. The real estate sector experienced the highest wage growth over the period, which may be related to the expansion of Canada's real estate market and the growing economic importance of this sector. This interpretation is consistent with Zhou (2020), who show that real estate accounted for approximately 12% of Canadian GDP in 2019. By contrast, forestry recorded one of the lowest rates of wage growth in our results. This is notable because Morissette et al. (2013) report that forestry was among the higher-paying sectors in Canada in the late 1990s. Taken together, these patterns suggest that the relative wage position of sectors changed considerably between 2001 and 2023, reflecting broader structural shifts in the Canadian economy.

Overall, the descriptive evidence points to three main patterns. First, sectoral wage inequality in Canada remained relatively stable during the 2000s and early 2010s before declining after the mid-2010s. Second, there is meaningful provincial variation in sectoral wage inequality, with some provinces showing persistently higher levels of between-sector wage dispersion than others. Third, sectoral wage growth differed substantially across industries, indicating that changes in the relative wage position of sectors are an important component of Canada's evolving wage structure. These descriptive patterns motivate the econometric analysis in the next section, where we examine how unemployment, immigration, trade openness, inflation, per capita income, and union density are associated with provincial sectoral wage inequality.

5.2 Econometric Analysis

After constructing the sectoral wage inequality dataset, we examine how macroeconomic, demographic, and institutional factors are associated with sectoral wage inequality across Canadian provinces. The analysis focuses on per capita income, unemployment, immigration, inflation, trade openness, and union density. Rather than interpreting these models as identifying definitive causal effects, we use them to assess conditional associations between provincial labour-market conditions and between-sector wage dispersion. This approach allows us to identify which macroeconomic and institutional variables are most consistently related to sectoral wage inequality across provinces and over time.

Table 3: Two-Way Fixed Effects Models of Wage Inequality

	Basic	Unemp × Immig	Dynamic	Unemp × Union	Lagged Vars
Per capita income	−3.401***	−2.952***	−1.926***	−4.114***	
	(0.464)	(0.448)	(0.489)	(0.436)	
Unemployment rate	0.107***	0.015	0.097***	0.599**	
	(0.036)	(0.045)	(0.027)	(0.245)	
Immigration rate	0.025	−1.841**	0.127	0.229	
	(0.278)	(0.783)	(0.191)	(0.309)	
Inflation	−0.024	−0.029	−0.000	−0.015	
	(0.029)	(0.031)	(0.025)	(0.032)	
Trade openness	−0.023**	−0.016**	−0.012*	−0.025***	
	(0.010)	(0.006)	(0.006)	(0.010)	
Union density	−0.049	−0.111***	−0.043	0.051	
	(0.034)	(0.039)	(0.033)	(0.059)	
Unemp × Immig		0.231**			
		(0.092)			
Wage Gini (lag)			0.399***		
			(0.054)		
Unemp × Union				−0.016**	
				(0.008)	
Per capita income (lag)					−1.759***
					(0.643)
Unemployment rate (lag)					0.195***
					(0.042)
Immigration rate (lag)					0.040
					(0.214)
Inflation (lag)					−0.030
					(0.030)
Trade openness (lag)					−0.020
					(0.014)
Union density (lag)					−0.047
					(0.054)
Num. Obs.	220	220	210	220	220
R^2	0.194	0.259	0.319	0.227	0.155
R^2 Adj.	0.036	0.109	0.177	0.069	−0.012
AIC	382.2	365.6	325.6	375.1	390.2
BIC	405.9	392.8	352.3	402.3	414.0
RMSE	0.56	0.54	0.51	0.55	0.57

Notes: Driscoll–Kraay (HC2) standard errors.
All models include Province and Year fixed effects (TWFE).
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.
There is no Multicollinearity (VIF) issue in the models.

Table 3 reports the results from the main two-way fixed effects models. Several variables are statistically associated with sectoral wage inequality across Canadian provinces. The most consistent result concerns unemployment. Across the baseline, dynamic, unemployment–union, and lagged specifications, higher unemployment is generally associated with higher sectoral wage inequality. This suggests that labour-market slack is an important correlate of between-sector wage dispersion in Canada. However, the estimates should be interpreted as conditional associations rather than definitive causal effects, since unobserved time-varying provincial factors may also influence wage structures.

Per capita income is also negatively and statistically associated with sectoral wage inequality in the main specifications. This suggests that, conditional on province and year fixed effects, increases in provincial economic capacity are associated with lower between-sector wage dispersion. One possible interpretation is that richer provincial economies may have broader wage growth across sectors or more diversified economic structures. However, because this relationship may also reflect broader structural differences across provinces, the coefficient should not be interpreted as evidence that income growth mechanically reduces wage inequality.

The interaction terms provide further insight into how the unemployment–inequality relationship varies across different labour-market contexts. The unemployment $\times$ immigration coefficient is positive and statistically significant, indicating that the association between unemployment and sectoral wage inequality is stronger when immigration intensity is higher. This finding is consistent with earlier evidence suggesting that immigration flows and labour-market conditions jointly shape wage structures in Canada (Moore and Pacey, 2003; Picot, 2020). Importantly, this result should not be read as evidence that immigration itself increases inequality. Rather, it suggests that labour-market slack may have stronger distributional consequences in contexts where immigrant inflows are larger and where workers may be more unevenly distributed across sectors.

In contrast, the unemployment $\times$ union density interaction is negative and statistically significant. This suggests that stronger union density may weaken the positive association between unemployment and sectoral wage inequality. The result is consistent with the broader literature on the equalizing role of unions in the Canadian labour market (Card et al., 2003; Das et al., 2024). A plausible interpretation is that unions may help stabilize wage structures during periods of labour-market stress by limiting downward wage pressure in more vulnerable sectors. Nevertheless, because the model estimates conditional associations, this finding should be interpreted as evidence of a moderating relationship rather than direct causal proof that unions reduce the inequality effect of unemployment.

Trade openness is negatively associated with sectoral wage inequality in several specifications. The coefficient is negative and statistically significant in the baseline, unemployment $\times$ immigra-

tion, dynamic, and unemployment $\times$ union models, while the lagged specification also shows a negative coefficient but without statistical significance. This pattern suggests that greater external economic exposure is not necessarily associated with wider between-sector wage dispersion in the Canadian provincial context. One possible explanation is that trade exposure may be linked to productivity gains or broader wage growth in tradable sectors. However, the relationship likely depends on provincial industrial structure and the composition of export- and import-oriented sectors.

Taken together, the results in Table 3 indicate that unemployment is one of the most consistent correlates of sectoral wage inequality across Canadian provinces. The association between unemployment and wage dispersion appears to be conditioned by demographic and institutional factors, particularly immigration intensity and union density. The findings also suggest that per capita income and trade openness are negatively associated with sectoral wage inequality in several specifications. Overall, the results highlight the importance of considering labour-market slack together with provincial economic structure, immigration intensity, and institutional protections when evaluating the evolution of sectoral wage inequality.

Table 4: Heterogeneous Effects of Unemployment on Wage Inequality
by Union Density and Immigration Intensity

	Union Density Split				**Immigration Intensity Split**			
	High Union Baseline	High Union + Unemp×Union	Low Union Baseline	Low Union + Unemp×Union	High Immig Baseline	High Immig + Unemp×Immig	Low Immig Baseline	Low Immig + Unemp×Immig
Unemployment	0.003	1.718***	0.248***	0.529*	0.147**	0.030	0.016	−0.031
	(0.087)	(0.581)	(0.055)	(0.314)	(0.073)	(0.080)	(0.097)	(0.109)
Per capita income	−3.819***	−4.479***	−7.694***	−7.501***	−4.859***	−3.200***	−3.305*	−3.369**
	(1.335)	(1.111)	(1.281)	(1.181)	(1.050)	(0.786)	(1.755)	(1.491)
Immigration rate	0.085	0.351	1.030**	0.925**	0.266	−1.910***	−0.776**	−1.786**
	(0.624)	(0.542)	(0.465)	(0.398)	(0.278)	(0.686)	(0.365)	(0.820)
Inflation	0.066	0.077	−0.072*	−0.069*	−0.026	−0.029	−0.001	−0.036
	(0.056)	(0.057)	(0.037)	(0.037)	(0.044)	(0.045)	(0.084)	(0.089)
Trade openness	−0.040*	−0.033*	−0.010	−0.013	−0.041***	−0.029**	−0.015	−0.008
	(0.021)	(0.017)	(0.013)	(0.011)	(0.013)	(0.014)	(0.011)	(0.009)
Union density	−0.068	0.383**	−0.139**	−0.058	0.029	−0.003	−0.249***	−0.277***
	(0.071)	(0.164)	(0.064)	(0.098)	(0.067)	(0.078)	(0.089)	(0.083)
Unemp × Union		−0.046***		−0.011				
		(0.016)		(0.012)				
Unemp × Immig						0.224***		0.175
						(0.078)		(0.129)
Observations	110	110	110	110	110	110	110	110
R^2	0.196	0.265	0.417	0.420	0.248	0.303	0.239	0.254
AIC	200.3	192.4	135.9	137.2	181.5	175.1	175.1	174.9
BIC	219.2	214.0	154.8	158.9	200.4	196.7	194.0	196.5
RMSE	0.56	0.54	0.42	0.42	0.52	0.50	0.50	0.50

*p<0.1; **p<0.05; ***p<0.01. Standard errors are Driscoll–Kraay, robust to spatial and serial correlation. All models include *Province and Year fixed effects (TWFE)*. High/low groups are split at the median of union density or immigration intensity across province-year observations.
There is no Multicollinearity (VIF) issue in the models.

Given the central role of unemployment in the main specifications, we next examine whether its association with sectoral wage inequality differs across provinces with different institutional and demographic characteristics. We stratify the sample into high- and low-union-density provinces and into high- and low-immigration-intensity provinces. This allows us to assess whether the unemployment–inequality relationship varies across different provincial labour-market environments.

Table 4 suggests meaningful heterogeneity across provinces. In high-union-density provinces, the coefficient on unemployment is not statistically significant in the baseline split-sample specification. This suggests that stronger union environments may weaken the extent to which unemployment is associated with wider sectoral wage dispersion. During periods of economic weakness, unions may help preserve wage floors and reduce the widening of sectoral wage gaps. The interaction results are broadly consistent with this interpretation, since the unemployment $\times$ union term is negative in the relevant specifications.

In low-union-density provinces, unemployment is more clearly associated with higher sectoral wage inequality. This suggests that where union density is weaker, labour-market slack may translate more directly into wider wage dispersion across sectors. These findings are consistent with the view that organized labour can play an important role in moderating wage inequality. In line with Kuhn (1998), who emphasizes the wage effects of unions in Canada, our results suggest that union institutions remain relevant for understanding how labour-market shocks are distributed across sectors.

Table 4 also examines heterogeneity by immigration intensity. In high-immigration provinces, unemployment is positively and statistically associated with sectoral wage inequality. This may reflect the fact that labour-market slack can have stronger distributional consequences in provinces where labour supply pressures and sectoral segmentation are more pronounced. This interpretation is consistent with the literature on immigrant labour-market adjustment and occupational downgrading (Dustmann et al., 2013). However, the result should not be interpreted as evidence that immigration mechanically increases inequality. Rather, it suggests that the inequality-related

consequences of unemployment may be stronger in labour markets where immigrant inflows are larger and where workers may be unevenly distributed across sectors.

By contrast, in low-immigration provinces, neither the baseline unemployment coefficient nor the unemployment $\times$ immigration interaction is statistically significant. This suggests that the relationship between unemployment and sectoral wage inequality is weaker or less stable in provinces with lower immigration intensity. Overall, the split-sample results indicate that the unemployment–inequality relationship varies across provincial labour-market contexts and is shaped by both institutional and demographic conditions.

Table 5: Period-Specific Effects of Unemployment on Wage Inequality
Pre/Post 2008, Pre/Post 2020, and by Decade

	Pre/Post Crisis Splits				**By Decade**	
	Pre-2008	Post-2008	Pre-2020	Post-2020	2000s	2010s
Unemployment	0.461***	0.122***	0.125***	−0.097	0.312***	0.222***
	(0.065)	(0.043)	(0.047)	(0.148)	(0.096)	(0.036)
Per capita income	3.800**	−3.105	−3.023***	2.950***	−1.477	0.140
	(1.615)	(1.918)	(0.656)	(0.824)	(3.304)	(2.167)
Immigration rate	−0.202	−0.112	0.065	−0.605	0.778**	0.361
	(0.585)	(0.399)	(0.340)	(0.475)	(0.310)	(0.362)
Inflation	−0.337***	0.037	−0.051**	0.107	−0.188**	−0.034
	(0.064)	(0.037)	(0.023)	(0.082)	(0.071)	(0.031)
Trade openness	−0.021	−0.026**	−0.032***	−0.021**	−0.051***	−0.020
	(0.015)	(0.011)	(0.011)	(0.008)	(0.013)	(0.014)
Union density	−0.154***	−0.032	−0.045	−0.345***	−0.109***	0.096**
	(0.048)	(0.047)	(0.041)	(0.079)	(0.024)	(0.043)
Observations	70	150	190	30	90	100
R^2	0.264	0.145	0.237	0.390	0.314	0.176
R^2 Adj.	−0.058	−0.062	0.076	−0.475	0.074	−0.088
AIC	101.8	250.7	322.6	17.2	145.3	143.4
BIC	117.5	271.8	345.3	27.0	162.8	161.6
RMSE	0.45	0.53	0.55	0.26	0.50	0.46

*p<0.1; **p<0.05; ***p<0.01. Standard errors are Driscoll–Kraay, robust to spatial and serial correlation. All specifications include Province and Year fixed effects (TWFE). Sample restricted to the indicated time periods. There is no Multicollinearity (VIF) issue in the models.

Chow Test Results (2008 Break): F-Stat = 5.931, P-Value < 0.001, indicating a structural break in 2008.

We also examine whether the estimated relationships vary across major economic periods. The sample is divided into pre- and post-2008 periods, pre- and post-2020 periods, and decade-specific subsamples. This strategy is motivated by major macroeconomic shocks, including the Global Financial Crisis and the COVID-19 pandemic, as well as by the observed decline in sectoral wage inequality after the mid-2010s shown in Figure 1. Because the 2015–2020 period is too short for a separate fixed-effects regression with sufficient statistical power, we rely on broader period-specific models to assess temporal variation.

The period-specific results suggest that unemployment is positively associated with sectoral wage inequality in several subsamples, particularly before and after the 2008 financial crisis and during the 2000s and 2010s. However, the post-2020 estimates are less stable, which is expected given the very small number of observations in that subsample. Therefore, the COVID-period results should be interpreted cautiously and should not be treated as a central finding of the paper.

The role of union density also appears to vary over time. In earlier periods, union density is more clearly associated with lower sectoral wage inequality, while its coefficient becomes less stable in some later specifications. This pattern may reflect changes in union coverage, bargaining power, and broader labour-market institutions over time. It is consistent with the argument that the equalizing role of unions may depend on the broader institutional and macroeconomic environment (Visser et al., 2019).

Although we do not estimate a separate model for the 2015–2020 interval, the downward trend in the sectoral wage Gini shown in Figure 1 suggests that this period may have coincided with a more equalizing wage environment. Policy changes such as the Canada Child Benefit and targeted tax relief for middle-income earners may have contributed to broader redistributive dynamics during this period (Government of Canada, 2016a,b; Finance Canada, 2016). However, because our dependent variable measures between-sector wage dispersion rather than disposable household income inequality, this interpretation should be treated as suggestive. Future research with longer post-2015 data could examine this period more directly.

Overall, the econometric results point to unemployment as a consistent correlate of provincial

sectoral wage inequality. The results also show that the unemployment–inequality relationship is conditioned by immigration intensity, union density, and period-specific economic conditions. The evidence therefore supports a cautious interpretation: labour-market slack is closely related to sectoral wage dispersion, but its distributional consequences depend on the institutional, demographic, and economic context of each province.

5.3 Robustness Checks

We assess the stability of the main findings using several complementary robustness exercises. Table 6 reports alternative specifications that examine whether the baseline results are sensitive to dynamic persistence, alternative lag structures, province-specific trends, crisis-period observations, extreme values, or the influence of Ontario. Specifically, the robustness analysis includes dynamic specifications with a lagged dependent variable, models with province-specific linear trends, specifications using two-year lags, models excluding the Global Financial Crisis and COVID-19 years, winsorized estimates, and models estimated after excluding Ontario.

Table 6: Robustness Checks – Wage Inequality (Gini)

Variable	1. Dyn	2. Dyn	3. Prov	4. Prov	5. L2	6. L2	7. No Crisis	8. No Crisis	9. Win	10. Win	11. Drop ON	12. Drop ON
Dynamic Panel Variables												
Lagged Wage Gini (t-1)	0.394***	0.424***										
	(0.044)	(0.046)										
Lag 1 Variables (L1) – Columns 1–4, 7–8, 11–12												
Per Capita Income (L1)	−0.225	−0.403	−1.388**	−2.148***			−1.607**	−2.834***			−1.078	−1.817*
	(0.629)	(0.778)	(0.624)	(0.722)			(0.657)	(1.061)			(0.970)	(0.993)
Unemployment Rate (L1)	0.113***	0.209	0.119***	0.463**			0.143**	0.758***			0.104***	0.520***
	(0.033)	(0.131)	(0.044)	(0.179)			(0.062)	(0.270)			(0.038)	(0.190)
Immigration Rate (L1)	−0.777***	0.054	−1.502***	0.151			−2.000***	0.015			−1.516***	0.272
	(0.297)	(0.169)	(0.461)	(0.219)			(0.423)	(0.324)			(0.350)	(0.280)
Inflation Rate (L1)	−0.023	−0.019	−0.035	−0.026			−0.040	−0.029			−0.022	−0.015
	(0.032)	(0.029)	(0.036)	(0.033)			(0.049)	(0.043)			(0.050)	(0.048)
Trade Openness (L1)	−0.008	−0.011	−0.014	−0.021			−0.008	−0.017			−0.015	−0.023
	(0.010)	(0.010)	(0.011)	(0.013)			(0.009)	(0.011)			(0.013)	(0.015)
Union Density (L1)	−0.054	−0.014	−0.098**	0.008			−0.102	0.074			−0.132**	−0.008
	(0.042)	(0.051)	(0.045)	(0.069)			(0.079)	(0.076)			(0.065)	(0.092)
Interaction Terms (L1)												
Unemp × Immig Rate (L1)	0.100***		0.191***				0.219***				0.201***	
	(0.034)		(0.049)				(0.060)				(0.043)	
Unemp × Union Density (L1)		−0.002		−0.009				−0.017*				−0.011**
		(0.004)		(0.005)				(0.009)				(0.005)
Lag 2 Variables (L2) – Columns 5–6												
Per Capita Income (L2)					−0.534	−1.093						
					(1.174)	(1.339)						
Unemployment Rate (L2)					0.178***	0.409***						
					(0.050)	(0.150)						
Immigration Rate (L2)					−1.041**	0.183						
					(0.481)	(0.155)						
Inflation Rate (L2)					0.023	0.029						
					(0.042)	(0.038)						
Trade Openness (L2)					−0.025*	−0.030*						
					(0.015)	(0.016)						
Union Density (L2)					−0.123***	−0.054						
					(0.034)	(0.036)						
Unemp × Immig Rate (L2)					0.139***							
					(0.048)							
Unemp × Union Density (L2)						−0.006						
						(0.005)						
Winsorized Variables (Win) – Columns 9–10												
W. Per Capita Income (L1)									−1.413*	−2.116***		
									(0.736)	(0.793)		
W. Unemployment Rate (L1)									0.100**	0.418**		
									(0.044)	(0.169)		
W. Immigration Rate (L1)									−1.445***	0.168		
									(0.479)	(0.212)		
W. Inflation Rate (L1)									−0.038	−0.030		
									(0.036)	(0.034)		
W. Trade Openness (L1)									−0.012	−0.019		
									(0.013)	(0.015)		
W. Union Density (L1)									−0.070	0.033		
									(0.045)	(0.061)		
W. Unemp × W. Immig Rate (L1)									0.190***			
									(0.055)			
W. Unemp × W. Union Density (L1)										−0.008		
										(0.005)		
Num. Obs.	220	220	220	220	210	210	180	180	220	220	198	198
R^2	0.316	0.305	0.199	0.164	0.200	0.182	0.283	0.252	0.181	0.145	0.182	0.141
AIC	347.7	351.1	380.2	389.7	357.6	362.3	293.2	300.9	369.6	379.2	337.6	347.2
BIC	378.2	381.7	407.4	416.8	384.3	389.1	318.7	326.5	396.7	406.4	363.9	373.5
RMSE	0.51	0.52	0.55	0.57	0.55	0.55	0.52	0.53	0.54	0.55	0.55	0.56

Notes: All specifications include Province and Year fixed effects (TWFE). Standard errors are Driscoll–Kraay (maxlag = 4), robust to spatial and serial correlation. Columns (1)–(2): Dynamic panel (Dyn). Columns (3)–(4): Province-specific linear time trends (Prov). Columns (5)–(6): All regressors lagged two periods (L2). Columns (7)–(8): Exclude financial crisis and COVID years (No Crisis). Columns (9)–(10): All variables winsorized (Win). Columns (11)–(12): Exclude the province ON (Drop ON).
L1: Lag 1. L2: Lag 2. W.: Winsorized. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

The robustness checks generally support the stability of the main unemployment result. Across most specifications, unemployment remains positively associated with sectoral wage inequality. This pattern is observed in the dynamic models, the province-trend specifications, the two-year lag models, the no-crisis sample, the winsorized specifications, and the models excluding Ontario. Although the magnitude and statistical precision of the coefficients vary across specifications, the positive direction of the relationship is largely consistent with the baseline results. This suggests that the unemployment finding is not driven by a single modelling choice, a specific period, extreme observations, or the inclusion of Ontario.

The dynamic specifications also indicate that sectoral wage inequality exhibits persistence over time. The coefficient on the lagged dependent variable is positive and statistically significant, suggesting that previous levels of between-sector wage dispersion are strongly associated with current levels. This is consistent with the idea that sectoral wage structures adjust gradually rather than immediately. However, the dynamic models are used here as robustness checks rather than as a separate causal framework.

The interaction results provide additional, although more nuanced, evidence. The unemployment and immigration interaction remains positive and statistically significant in several robustness specifications. This supports the interpretation that the association between unemployment and sectoral wage inequality may be stronger in contexts with higher immigration intensity. By contrast, the unemployment and union density interaction is generally negative, but its statistical significance is less stable across specifications. This pattern is consistent with the view that union density may moderate the inequality-related consequences of unemployment, although the robustness evidence for this mechanism is weaker than for the unemployment and immigration interaction.

The two-year lag specifications provide further evidence that labour-market conditions may be related to sectoral wage inequality with some delay. Unemployment remains positively associated with wage dispersion when explanatory variables are lagged by two years. Trade openness also remains negatively signed in these specifications, although its magnitude and statistical sig-

nificance vary across models. These results suggest that the main findings are not driven only by contemporaneous correlations.

The no-crisis specifications show that the main results are not solely explained by the Global Financial Crisis or the COVID-19 period. Similarly, the winsorized estimates suggest that the findings are not primarily driven by extreme observations. Finally, the models excluding Ontario show that the results are not dependent on Canada's largest provincial economy. The positive association between unemployment and sectoral wage inequality remains broadly similar after Ontario is removed from the sample.

Overall, the robustness checks indicate that the positive association between unemployment and sectoral wage inequality is relatively stable across alternative modelling choices. The unemployment and immigration interaction also receives support across several specifications, while the moderating role of union density is directionally consistent but less statistically stable. Therefore, the robustness analysis strengthens the main conclusion that labour-market slack is closely associated with between-sector wage dispersion in Canadian provinces. At the same time, because the analysis is based on a limited number of provinces and observational panel data, these results should be interpreted as evidence of empirical stability rather than definitive proof of causality.

6 Simulation

The empirical results indicate that unemployment is the most consistent correlate of sectoral wage inequality across Canadian provinces during the 2001–2023 period. To illustrate the economic magnitude of this relationship, we conduct a simple scenario-based simulation using the estimated unemployment coefficient from the baseline two-way fixed effects model. The purpose of this exercise is not to provide a causal forecast, but to show how the observed sectoral wage Gini would change mechanically under alternative unemployment scenarios, holding the estimated relationship fixed. Specifically, we compare a low-unemployment scenario of 4% with a severe-recession scenario of 15%.

To quantify this illustrative relationship, we calculate the simulated sectoral wage Gini coefficient ($\tilde{G}_{it}$) for each province i and year t under alternative unemployment scenarios using the following adjustment:

$$\tilde{G}it = Git + \hat{\beta}2 \times (U^{target} - Uit) \tag{6}$$

where G_{it} represents the observed sectoral wage inequality index and U_{it} is the observed unemployment rate. The term U^{target} denotes the scenario unemployment rate, fixed at 4% for the low-unemployment scenario and 15% for the severe-recession scenario. The coefficient $\hat{\beta}_2$ is taken from the baseline TWFE specification in Equation (6). This exercise preserves the observed province-year structure of the data while applying the estimated unemployment–inequality association to alternative unemployment values.

The lower and upper values used in the simulation are chosen to represent plausible labour-market scenarios in the Canadian context. The 4% scenario approximates a low-unemployment environment close to estimates of full employment or the historical natural rate of unemployment (Osberg, 2020). The 15% scenario represents a severe labour-market shock, broadly comparable to the elevated unemployment rates observed during the COVID-19 period (Jones et al., 2023). These values are not intended to define exact structural thresholds. Rather, they provide transparent reference points for illustrating how sensitive sectoral wage inequality may be to large changes in labour-market slack.

The adjustment coefficient $\hat{\beta}2$ corresponds to the estimated coefficient for $\text{UnemploymentRate}_{it}$ from the baseline TWFE specification. Using the baseline estimate of approximately 0.107, the simulation applies the estimated conditional association between unemployment and sectoral wage inequality to each province-year observation. The resulting values should therefore be interpreted as model-based illustrative scenarios rather than causal predictions of what would necessarily occur under different unemployment rates.

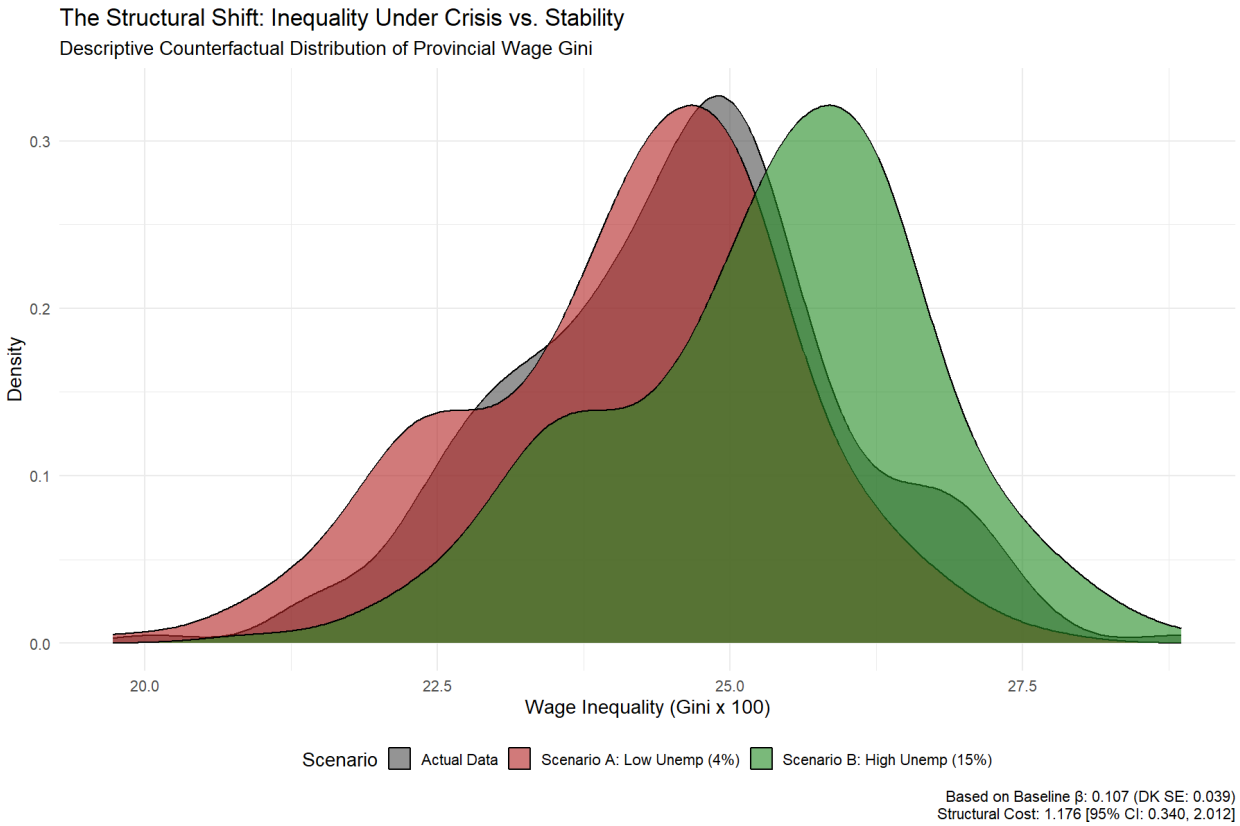


Figure 4: Simulation Result

Table 7: Scenario-Based Simulation Results

Metric	Value
Wage Gini under observed unemployment	24.568
Wage Gini under 4% unemployment scenario	24.143
Wage Gini under 15% unemployment scenario	25.319
Simulated difference	**1.176**

Note: Counterfactual scenarios hold unemployment at 4% or 15%. The simulated difference is based on the estimated unemployment coefficient from the baseline TWFE model and should be interpreted as an illustrative model-based scenario, not as a causal estimate.

Figure 4, together with Table 7, illustrates that the impact of unemployment on sectoral wage inequality in Canada is both direct and substantial. We implement a set of counterfactual "what-if" simulations to assess how wage dispersion would have evolved under alternative labour-market regimes in which the national unemployment rate is fixed at either 4% (low-unemployment scenario) or 15% (severe recession scenario). Our counterfactual results indicate that, if Canada

moved from a low-unemployment economy (4%) to a high-unemployment economy (15%), the sectoral wage Gini index would rise by approximately 1.176 points, corresponding to a simulated deterioration of about 4.9%. At first glance, a 1.18-point increase may appear modest; however, Gini is a relatively "sticky" indicator that typically adjusts only slowly over time. In many advanced economies, annual changes tend to be on the order of a few tenths of a Gini point at most, implying that a 1-point increase can represent more than a decade of normal inequality growth compressed into a very short period. Such an abrupt shift constitutes a sizeable distributional shock, underscoring that a 1.18-point rise in Gini is far from negligible in inequality terms.

The simulation also helps place the magnitude of the unemployment coefficient in policy perspective. Even relatively small changes in inequality can have meaningful welfare implications, and previous research emphasizes that reductions in inequality may generate social benefits beyond changes in average income (Lakner et al., 2022). In this context, the simulation suggests that persistent labour-market slack may be associated with a non-trivial increase in between-sector wage dispersion. This reinforces the broader empirical message of the paper: maintaining stable labour-market conditions may matter not only for employment and output, but also for the structure of wage inequality across sectors. However, because the simulation is based on an observational TWFE estimate, the policy implications should be interpreted cautiously.

7 Conclusion

This study contributes to the literature on Canadian labour economics by constructing and analysing a new province-level dataset of employment-weighted sectoral wage inequality for Canadian provinces from 2001 to 2023. The index captures between-sector wage dispersion by combining average weekly earnings across industries with sectoral employment shares. By focusing on this structural component of wage inequality, the paper complements individual-level and household-level studies of wage dispersion. The analysis shows how provincial sectoral wage inequality varies over time and how it is associated with unemployment, immigration intensity, trade openness, per capita

income, and union density.

First, the descriptive analysis shows that sectoral wage inequality in Canada changed meaningfully over the sample period. Before the mid-2010s, the employment-weighted sectoral Gini remained relatively stable at around 0.255, while it declined to approximately 0.235 in the post-2015 period. This decline coincides with a period of policy changes and broader redistributive efforts in Canada. However, because the analysis does not directly identify the causal effect of these policies, this pattern should be interpreted as suggestive rather than definitive evidence of policy impact. Future research with longer post-2015 data and more direct policy measures could examine this relationship more precisely.

Second, the econometric results indicate that unemployment is one of the most consistent correlates of sectoral wage inequality across Canadian provinces. In the baseline, dynamic, lagged, and robustness specifications, higher unemployment is generally associated with higher between-sector wage dispersion. This suggests that labour-market slack is closely related to the structure of wage inequality across sectors. One possible interpretation is that periods of higher unemployment place stronger downward pressure on wages in more vulnerable or lower-wage sectors, thereby widening wage differences across industries. However, these estimates should be interpreted as conditional associations rather than definitive causal effects.

Third, the results suggest that the relationship between unemployment and sectoral wage inequality depends on broader labour-market conditions. The unemployment–immigration interaction is positive in the main specifications, suggesting that the association between unemployment and sectoral wage inequality is stronger in provinces or periods with higher immigration intensity. This should not be interpreted as evidence that immigration mechanically increases inequality. Rather, the result indicates that labour-market slack may have stronger distributional consequences when combined with larger labour-supply adjustments or sectoral segmentation. In contrast, the unemployment–union density interaction is negative in the main models, suggesting that stronger union density may moderate the positive association between unemployment and sectoral wage inequality. This finding is consistent with the broader view that labour-market institutions can

influence how economic stress is distributed across workers and sectors.

Fourth, the period-specific and robustness analyses indicate that the main unemployment result is relatively stable across alternative specifications, although the size and precision of the estimates vary across periods and models. The results also suggest that the equalizing role of union density may have changed over time, with stronger evidence in some earlier periods and less stable estimates in later specifications. This pattern is consistent with the idea that the role of unions depends on the broader institutional and macroeconomic environment. At the same time, the post-2020 estimates should be interpreted cautiously because the COVID-19 subsample is short and contains relatively few observations.

The counterfactual simulation provides an additional illustration of the potential importance of labour-market conditions. When unemployment is fixed at 4% in the lower-unemployment scenario and 15% in the severe-recession scenario, the simulated difference in the sectoral wage Gini is approximately 1.18 points on the rescaled index. This exercise suggests that persistent labour-market slack can be associated with a meaningful increase in between-sector wage dispersion. However, the simulation should be interpreted as a model-based illustration rather than a direct causal estimate.

The findings are also relevant in light of current debates about technological change and the future of work. Rapid advances in artificial intelligence may reshape labour demand across sectors and occupations. Recent studies suggest that AI-related automation could expose some workers and sectors to labour-market disruption (Briggs and Dong, 2025; Mehdi and Frenette, 2024). In light of our results, this implies that policies aimed at limiting unemployment and supporting worker transitions may be important for preventing future increases in sectoral wage dispersion. The results therefore point to the importance of labour-market stabilization, active labour-market policy, and institutional protections during periods of technological adjustment.

The study also has important scope conditions. Our measure captures the between-sector component of wage inequality using sector-level average wages and employment weights. This is useful because it highlights structural wage differences across industries and accounts for the relative

size of each sector in provincial employment. At the same time, it does not measure within-sector wage dispersion or individual-level inequality. The index may also partly reflect employment-composition effects, since changes in the employment shares of sectors can influence the weighted measure. For this reason, the sectoral wage inequality index should be understood as a complementary measure that captures one important dimension of wage inequality rather than a substitute for individual-level wage inequality measures.

Future research could extend this approach by combining sector-level measures with microdata, allowing researchers to distinguish more clearly between within-sector inequality, between-sector inequality, occupational mobility, and employment-composition changes. Such work could also examine whether specific groups of workers are more likely to experience occupational downgrading or wage losses during periods of labour-market stress. Nevertheless, the evidence presented in this paper suggests that unemployment, union density, immigration intensity, and trade exposure are important factors for understanding the evolution of sectoral wage inequality across Canadian provinces. Overall, maintaining stable labour-market conditions and strengthening institutions that protect workers may help limit future increases in between-sector wage dispersion.

Bibliography

Abowd, J. M., Kramarz, F., and Margolis, D. N. (1999). High wage workers and high wage firms. *Econometrica*, 67(2):251–333.

Acemoglu, D. (1999). Changes in unemployment and wage inequality: An alternative theory and some evidence. *American economic review*, 89(5):1259–1278.

Acemoglu, D. and Restrepo, P. (2022). Tasks, automation, and the rise in us wage inequality. *Econometrica*, 90(5):1973–2016.

Akarsu, M. Z. and Seçilmiş, E. (2025). Wage inequality among immigrants. *International Migration Review*, pages 1–34.

Autor, D. H., Katz, L. F., and Kearney, M. S. (2008). Trends in U.S. wage inequality: Revising the revisionists. *The Review of Economics and Statistics*, 90(2):300–323.

Autor, D. H., Levy, F., and Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly Journal of Economics*, 118(4):1279–1333.

Barth, E., Bryson, A., Davis, J. C., and Freeman, R. (2016). It's where you work: Increases in the dispersion of earnings across establishments and individuals in the united states. *Journal of Labor Economics*, 34(S2):S67–S97.

Béland, D., Dinan, S., Rocco, P., and Waddan, A. (2022). Covid-19, poverty reduction, and partisanship in canada and the united states. *Policy and Society*, 41(2):291–305.

Berlinski, S. (2008). Wages and contracting out: does the law of one price hold? *British Journal of Industrial Relations*, 46(1):59–75.

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

Breau, S. and Rigby, D. L. (2010). International trade and wage inequality in canada. *Journal of Economic Geography*, 10(1):55–86.

Briggs, J. and Dong, S. (2025). How will AI affect the global workforce? Accessed: 2025-12-11.

Briskar, J. (2020). *Essays on Collective Bargaining, Wage Inequality and Firm Dynamics*. PhD thesis, The University of Edinburgh, School of Economics, Edinburgh.

Card, D., Heining, J., and Kline, P. (2013). Workplace heterogeneity and the rise of west german wage inequality*. *The Quarterly Journal of Economics*, 128(3):967–1015.

Card, D., Lemieux, T., and Riddell, W. C. (2003). Unionization and wage inequality: a comparative study of the us, the uk, and canada.

Card, D., Lemieux, T., and Riddell, W. C. (2020). Unions and wage inequality: The roles of gender, skill and public sector employment. *Canadian Journal of Economics/Revue canadienne d'économique*, 53(1):140–173.

Chow, G. C. (1960). Tests of equality between sets of coefficients in two linear regressions. *Econo-*

metrica: Journal of the Econometric Society, pages 591–605.

Dabla-Norris, E., Kochhar, K., Suphaphiphat, N., Ricka, F., and Tsounta, E. (2015). Causes and consequences of income inequality: A global perspective. IMF Staff Discussion Note SDN/15/13, International Monetary Fund, Washington, DC.

Das, A., Hudson, I., and Hudson, M. (2024). Unionization rates, inequality, and poverty in canadian provinces 2000–2020. *Capital & Class*, page 03098168241269173.

Dell'Aringa, C. and Pagani, L. (2007). Collective bargaining and wage dispersion in europe. *British Journal of Industrial Relations*, 45(1):29–54.

Dickens, W. T. and Katz, L. F. (1986). Inter-industry wage differences and industry characteristics. Nber working paper, National Bureau of Economic Research, Cambridge, MA.

Dodge, Y. (2008). *Gini Index*, pages 231–233. Springer New York, New York, NY.

Dostie, B., Li, J., Card, D., and Parent, D. (2023). Employer policies and the immigrant–native earnings gap. *Journal of Econometrics*, 233(2):544–567.

Du Caju, P., Lamo, A., Poelhekke, S., Kátay, G., and Nicolitsas, D. (2010). Inter-industry wage differentials in eu countries: What do cross-country time varying data add to the picture? *Journal of the European Economic Association*, 8(2-3):478–486.

Dustmann, C., Frattini, T., and Preston, I. P. (2013). The effect of immigration along the distribution of wages. *Review of Economic Studies*, 80(1):145–173.

Engbom, N. and Moser, C. (2022). Earnings inequality and the minimum wage: Evidence from brazil. *American Economic Review*, 112(12):3803–3847.

Erksoy, S. (1994). The effects of higher unemployment on the distribution of income in canada: 1981-1987. *Canadian Public Policy/Analyse de Politiques*, pages 318–328.

Finance Canada (2016). Canada pension plan enhancement: Federal–provincial agreement.

Fortin, N. M. and Lemieux, T. (2015). Changes in wage inequality in canada: An interprovincial perspective. *Canadian Journal of Economics/Revue canadienne d'économique*, 48(2):682–713.

Goos, M., Manning, A., and Salomons, A. (2009). Job polarization in europe. *American economic review*, 99(2):58–63.

Government of Canada (2016a). Budget 2016: Growing the middle class.

Government of Canada (2016b). Canada child benefit (ccb): Backgrounder.

Green, D. A. and Sand, B. M. (2015). Has the canadian labour market polarized? *Canadian Journal of Economics/Revue canadienne d'économique*, 48(2):612–646.

Helpman, E., Itskhoki, O., Muendler, M.-A., and Redding, S. J. (2017). Trade and inequality: From theory to estimation. *The Review of Economic Studies*, 84(1):357–405.

Helpman, E., Itskhoki, O., and Redding, S. (2010). Inequality and unemployment in a global economy. *Econometrica*, 78(4):1239–1283.

Iammarino, S., Rodriguez-Pose, A., and Storper, M. (2019). Regional inequality in europe: Evidence, theory and policy implications. *Journal of Economic Geography*, 19(2):273–298.

International Labour Organization (2024). Global wage report 2024–25: Is wage inequality decreasing globally?

Jaumotte, F., Lall, S., and Papageorgiou, C. (2013). Rising income inequality: Technology, or trade and financial globalization? *IMF Economic Review*, 61(2):271–309.

Johnson, S. (1995). More evidence on the effect of higher unemployment on the canadian size distribution of income. *Canadian Public Policy/Analyse de Politiques*, pages 423–428.

Jones, S. R., Lange, F., Craig Riddell, W., and Warman, C. (2023). The great canadian recovery: The impact of covid-19 on canada's labour market. *Canadian Journal of Economics/Revue canadienne d'économique*, 56(3):791–838.

Katz, L. F. et al. (1999). Changes in the wage structure and earnings inequality. In *Handbook of labor economics*, volume 3, pages 1463–1555. Elsevier.

Katz, L. F., Summers, L. H., Hall, R. E., Schultze, C. L., and Topel, R. H. (1989). Industry rents: Evidence and implications. *Brookings Papers on Economic Activity. Microeconomics*, 1989:209–290.

Krueger, A. B. and Summers, L. H. (1986). Reflections on the inter-industry wage structure. Nber working paper, National Bureau of Economic Research, Cambridge, MA.

Krueger, A. B. and Summers, L. H. (1988). Efficiency wages and the inter-industry wage structure. *Econometrica*, 56(2):259–293.

Kuhn, P. (1998). Unions and the economy: what we know; what we should know. *Canadian*

Journal of Economics, pages 1033–1056.

Lakner, C., Mahler, D. G., Negre, M., and Prydz, E. B. (2022). How much does reducing inequality matter for global poverty? *The Journal of Economic Inequality*, 20(3):559–585.

Legree, S., Schirle, T., and Skuterud, M. (2016). Can labour relations reform reduce wage inequality. *Income Inequality: The Canadian Story. Montreal: The Institute for Research on Public Policy*, pages 399–434.

MacPhail, F. (2000). What caused earnings inequality to increase in canada during the 1980s? *Cambridge Journal of Economics*, 24(2):153–175.

Magda, I., Rycx, F., Tojerow, I., and Valsamis, D. (2011). Wage differentials across sectors in europe: An east–west comparison 1. *Economics of Transition*, 19(4):749–769.

Marchand, J. (2015). The distributional impacts of an energy boom in western canada. *Canadian Journal of Economics/Revue canadienne d'économique*, 48(2):714–735.

Mehdi, T. and Frenette, M. (2024). *Exposure to Artificial Intelligence in Canadian Jobs: Experimental Estimates*. Statistics Canada= Statistique Canada.

Michaels, G., Natraj, A., and Van Reenen, J. (2014). Has ict polarized skill demand? evidence from eleven countries over twenty-five years. *Review of Economics and Statistics*, 96(1):60–77.

Milanovic, B. (2013). Global income inequality in numbers: in history and now. *Global Policy*, 4(2):198–208.

Mocan, H. N. (1999). Structural unemployment, cyclical unemployment, and income inequality. *The Review of Economics and Statistics*, 81(1):122–134.

Mokre, P. and Rehm, M. (2020). Inter-industry wage inequality: Persistent differences and turbulent equalisation. *Cambridge Journal of Economics*, 44(4):919–942.

Moore, E. G. and Pacey, M. A. (2003). Changing income inequality and immigration in canada, 1980-1995. *Canadian Public Policy/Analyse de Politiques*, pages 33–52.

Moretti, E. (2012). *The New Geography of Jobs*. Houghton Mifflin Harcourt, Boston.

Morissette, R., Picot, W., and Lu, Y. (2013). *The evolution of Canadian wages over the last three decades*. Statistics Canada Ottawa.

OECD (2021). *The Role of Firms in Wage Inequality: Policy Lessons from a Large Scale Cross-*

Country Study. OECD Publishing, Paris.

Osberg, L. (2020). Full employment in canada in the early 21st century. In *Aggregate demand and employment*, pages 116–141. Edward Elgar Publishing.

Picot, G. (2020). *Immigration, poverty and income inequality in Canada*. Institute for Research on Public Policy.

Picot, G. and Hou, F. (2016). Immigration, poverty and income inequality in canada. In Green, D. A., Riddell, W. C., and St-Hilaire, F., editors, *Income Inequality: The Canadian Story*, volume 5, pages 175–211. Institute for Research on Public Policy, Montreal, QC.

Prado, S., Lundh, C., Collin, K., and Enflo, K. (2021). Labour and the 'law of one price': regional wage convergence of farm workers in sweden, 1757–1980. *Scandinavian Economic History Review*, 69(1):41–62.

Riddell, W. C. (2022). The labor market in canada, 2000–2021. *IZA World of Labor*.

Rodríguez-Pose, A. and Tselios, V. (2009). Mapping regional personal income distribution in western europe: Income per capita and inequality. *Czech Journal of Economics and Finance*, 59(1):41–70.

Song, J., Price, D. J., Guvenen, F., Bloom, N., and von Wachter, T. (2019). Firming up inequality. *The Quarterly Journal of Economics*, 134(1):1–50.

Storper, M. (2013). *Keys to the City: How Economics, Institutions, Social Interaction, and Politics Shape Development*. Princeton University Press, Princeton, NJ.

Visser, J. et al. (2019). Trade unions in the balance. *ILO ACTRAV working paper*, pages 9–11.

Xuereb, S., Fisher-Post, M., Delorme, F., and Lajoie, C. (2023). Income inequality in canada at the national and subnational levels 1982-2021. *World Inequality Lab Report*.

Yeaple, S. R. (2005). A simple model of firm heterogeneity, international trade, and wages. *Journal of international Economics*, 65(1):1–20.

Zhou, S. X. (2020). A study of the Canadian property boom. Master's thesis, MIT Sloan School of Management, Massachusetts Institute of Technology. DSpace@MIT.

Appendix 1

Extra Tables and Figures

Figures

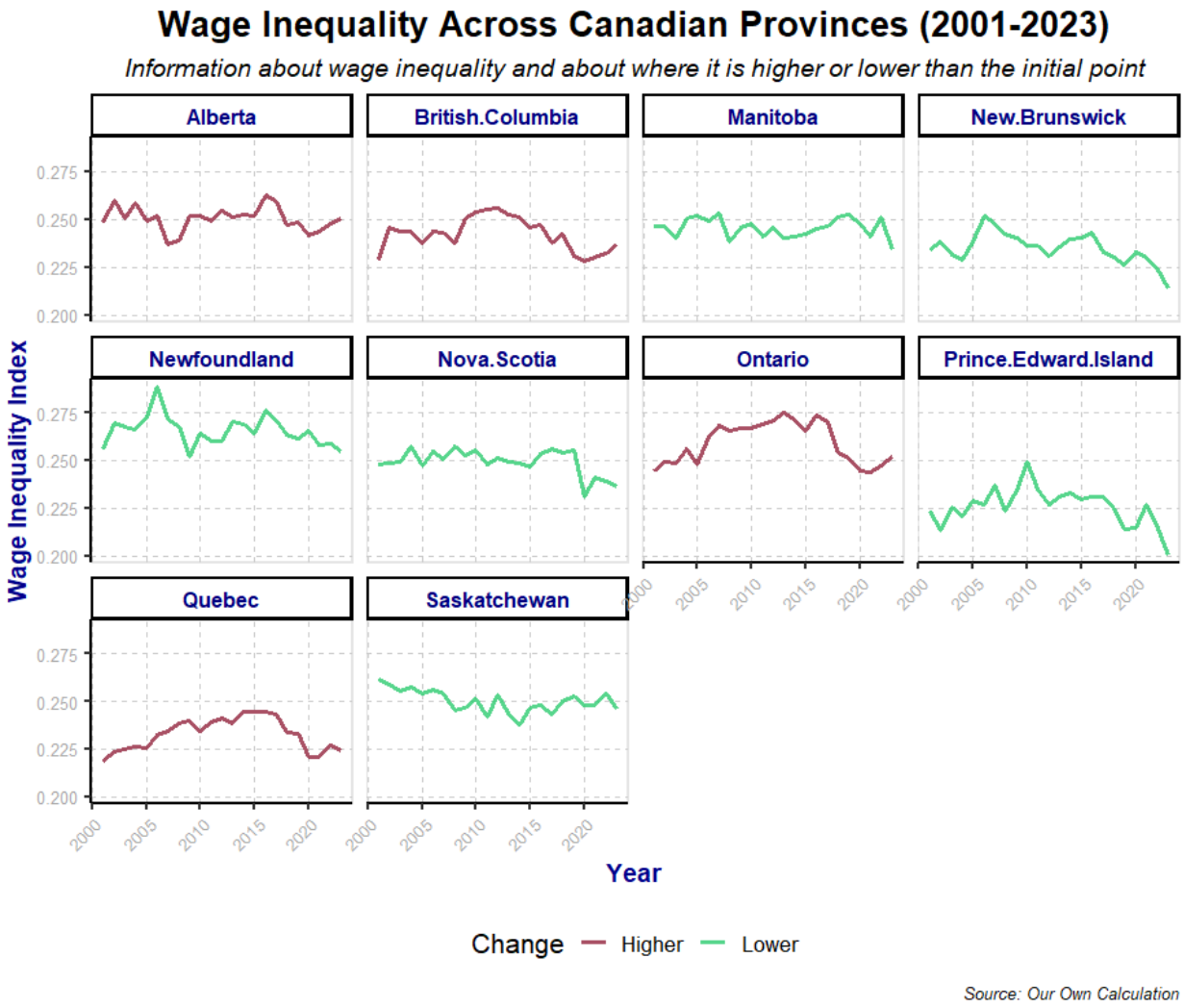


Figure A1: Sectoral Wage Inequality Across Canadian Provinces (2001-2023)

The figure illustrates the trends in sectoral wage inequality across Canadian provinces from 2001 to 2023, highlighting whether sectoral wage inequality in each province has increased or decreased compared to its level at the start of the period (2001). Provinces are categorized into two groups based on the change from the initial point:

- **Provinces in green**: sectoral wage inequality in these provinces has decreased by 2023 relative to the starting year (2001). This includes Newfoundland, Nova Scotia, New Brunswick, Saskatchewan, Prince Edward Island, and Manitoba, indicating a narrowing gap in wage distribution over time.

- **Provinces in red**: These provinces, such as Alberta, British Columbia, Ontario, and Quebec, have seen an increase in sectoral wage inequality compared to 2001, suggesting a widening gap between higher and lower earners over time.

Each subplot provides a province-specific trend line, allowing easy comparison of the evolution of sectoral wage inequality within provinces. The overall pattern suggests that while some provinces have made strides in reducing wage disparities, others have experienced an upward trend in inequality.

Tables

Table A1: Wage Inequality Across Canadian Provinces

Province	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Canada	0.2367	0.2431	0.2424	0.2468	0.2410	0.2523	0.2524	0.2498	0.2521	0.2538	0.2547	0.2559	0.2559	0.2560	0.2525	0.2583	0.2541	0.2464	0.2435	0.2360	0.2350	0.2408	0.2400
Newfoundland	0.2560	0.2695	0.2679	0.2661	0.2724	0.2886	0.2719	0.2673	0.2522	0.2640	0.2602	0.2599	0.2703	0.2688	0.2644	0.2765	0.2712	0.2635	0.2617	0.2653	0.2582	0.2585	0.2548
Prince Edward	0.2236	0.2136	0.2257	0.2208	0.2292	0.2271	0.2371	0.2236	0.2342	0.2490	0.2350	0.2272	0.2312	0.2327	0.2295	0.2311	0.2309	0.2252	0.2143	0.2147	0.2266	0.2163	0.2008
Nova Scotia	0.2482	0.2483	0.2491	0.2576	0.2472	0.2548	0.2506	0.2575	0.2527	0.2554	0.2481	0.2513	0.2493	0.2485	0.2467	0.2531	0.2559	0.2539	0.2551	0.2310	0.2410	0.2389	0.2366
New Brunswick	0.2340	0.2386	0.2315	0.2289	0.2382	0.2520	0.2481	0.2421	0.2407	0.2362	0.2362	0.2309	0.2354	0.2398	0.2403	0.2432	0.2327	0.2302	0.2263	0.2329	0.2302	0.2248	0.2143
Quebec	0.2190	0.2237	0.2248	0.2261	0.2258	0.2323	0.2343	0.2388	0.2400	0.2343	0.2395	0.2413	0.2387	0.2450	0.2448	0.2448	0.2433	0.2338	0.2329	0.2208	0.2206	0.2270	0.2245
Ontario	0.2443	0.2492	0.2489	0.2561	0.2483	0.2618	0.2682	0.2654	0.2668	0.2670	0.2693	0.2709	0.2749	0.2709	0.2653	0.2740	0.2704	0.2537	0.2513	0.2446	0.2436	0.2471	0.2521
Manitoba	0.2464	0.2463	0.2405	0.2502	0.2518	0.2494	0.2536	0.2386	0.2460	0.2479	0.2410	0.2456	0.2406	0.2412	0.2425	0.2454	0.2462	0.2516	0.2527	0.2476	0.2408	0.2514	0.2344
Saskatchewan	0.2613	0.2588	0.2552	0.2574	0.2539	0.2559	0.2539	0.2453	0.2469	0.2514	0.2417	0.2533	0.2439	0.2380	0.2468	0.2479	0.2430	0.2502	0.2525	0.2479	0.2483	0.2540	0.2461
Alberta	0.2486	0.2601	0.2506	0.2585	0.2495	0.2518	0.2372	0.2390	0.2516	0.2520	0.2489	0.2547	0.2515	0.2523	0.2518	0.2625	0.2594	0.2473	0.2484	0.2415	0.2441	0.2482	0.2502
British Columbia	0.2287	0.2460	0.2436	0.2438	0.2374	0.2440	0.2432	0.2375	0.2503	0.2541	0.2552	0.2559	0.2523	0.2511	0.2458	0.2469	0.2376	0.2421	0.2309	0.2284	0.2304	0.2322	0.2373