The Employment Impact of Minimum Wage Policy Changes on Low Wage Workers: A Difference-in-Differences Analysis of Canadian Labour Markets 2001-2019

**Introduction**

In labour economics, the minimum wage is still a fundamental policy meant to provide workers with a reasonable standard of life. However, the public, policymakers, and economists continue to vigorously argue its implications for employment levels. By investigating the impact of minimum wage policy changes on employment among low-paid workers in Canada, this research aims to contribute to the ongoing discussion.

By employing a Difference-in-Differences (DiD) analytical framework, we can leverage variations in minimum wage legislation across Canadian provinces, both over time and across different regions. The analysis is based on data from the 2009 Labour Force Survey, which allows for a thorough examination of employment trends before and after policy adjustments. Our analysis will examine two specific groups of low-wage workers: adolescents aged 15-19 and young adults aged 20-24. We will focus on four different provinces: Quebec in 2011, Ontario in 2009, Alberta in 2015, and British Columbia in 2012. The provinces were selected based on their implementation of significant minimum wage adjustments, making them suitable for our DiD research.

Initial data suggest that the reaction to minimum wage hikes is complex and differs depending on age group and province. Clustering standard errors at the provincial level, which is a methodological improvement to address correlation within provinces, changes the significance levels of our findings. This highlights the relevance of taking such correlations into account in empirical labour market research. For example, when the standard errors are not clustered, teenagers in Quebec exhibit a strong and positive reaction to the increase in minimum wage in 2011. However, when clustering is considered, this impact loses its statistical significance. This indicates that interpretation should be approached with caution.

This paper begins by placing our results within the larger body of empirical research, providing a thorough explanation of the methodological approach used, and examining the policy implications that might be drawn from our findings. By doing this, the goal is to provide a detailed understanding of how minimum wage rules impact employment for young individuals with low wages, thereby enhancing the policy discussion with insights based on data.

**Past Research**

Campolieti's research (CAMPOLIETI et al., 2006), influenced by Neumark's (2001) predetermined research methodology, offers a thorough examination of the Canadian labour market between 1981 and 1997. The research suggests that the rise in minimum wage in Canada has resulted in insignificant negative impacts on employment. The study computes the elasticities for young workers, which are determined to be substantial and generally vary between -0.14 and -0.44, with -0.30 being a credible estimate.

The choice to prioritize low-paid workers is based on the substantial discoveries in Campolieti's research(CAMPOLIETI et al., 2006), which emphasize the susceptibility of young workers to changes in minimum wage regulations. By following this careful and systematic approach, our study aims to analyze the labour market in more detail. We will focus on certain age groups to determine the varied effects with more accuracy. An in-depth analysis of the literature on low-wage employment uncovers recurring patterns and factors that have significant significance for the overall economic structure. According to Statistics Canada, individuals classified as 'low-wage' workers are those who make less than two-thirds of the median hourly salary within their specific demographic category (*Employees With Low Pay, 1998 to 2021*, 2022). We apply the 2009 Labour Force Survey data, adjusted to the 2006 census population, to examine the demographic distribution of low-wage workers in Canada.

Table 1 displays the demographic distribution of low-wage workers, revealing a notably larger percentage of workers aged 15 to 19 in the low-wage group, with a ratio of .8565583. The prevalence of low-wage employment diminishes gradually as individuals age, indicating that younger people are overrepresented in such jobs. The gender distribution indicates that females are more likely to be engaged in low-wage occupations compared to males, with proportions of .2568361 and .1507111, respectively. Education also has a crucial impact, as persons with lower levels of education - specifically those with 'some secondary' education or less - make up a significant portion of the low-wage sector. Unionization provides a measure of safeguard against low-paying jobs, as union members have a lower likelihood of falling into this category, with a ratio of .0710725, in contrast to non-union workers. This highlights the potential influence of collective bargaining in protecting against inadequate compensation.

**Empirical Framework**

The empirical underpinnings of this study are rooted in a Difference-in-Differences (DiD) approach, which affords the examination of causal effects by exploiting natural experiments—in this case, the variation in minimum wage policies across Canadian provinces. We utilize the April Labour Force Survey data, which aligns with the period when minimum wage rates are typically adjusted, thereby reflecting the most immediate labor market responses to policy changes.

April's minimum wage rates are taken as a proxy for the annual wage levels due to their concurrence with the release of the Labour Force Survey in Table 2 below, ensuring that our employment outcome measures are contemporaneous with wage policy updates. This choice is strategic, enabling us to capture the labor market just before and after the implementation of new minimum wage rates, which typically come into effect around this time.

Our analysis focuses on the period between 2007 and 2017, encapsulating a range of economic conditions and labor dynamics. The selection of Quebec, Ontario, British Columbia, and Alberta as our case studies is deliberate, predicated on the substantive minimum wage changes observed within these regions. These provinces provide a natural variation in the timing and magnitude of wage adjustments, making them ideal candidates for a multi-treatment DiD model. This model excels in instances where treatment is not uniform across groups or time, as it allows for the estimation of the treatment effect while controlling for other unobserved variables that could influence the outcome.

The DiD model is specified as follows:

*Eit*​ = *α* + *β*1​Treat*it*​ + *β*2​Post*t* ​+ *β*3​(Treat*it*​ ×Post*t*​) + *γXit* ​+ *β*4*PROVi*​ + *β*5*YEARt* ​+ *ϵit*​

where *Eit* ​is the employment–population ratio for a given age group in region i, Treat*it*​ is the treatment indicator, Post*t*​ indicates the post-treatment period, the interaction term ​(Treat*it*​ ×Post*t*​) in a DiD model captures the incremental effect of a policy or treatment at a specific time. *Xit*​ includes other covariates, *PROVi* and *YEARt* are province and year fixed effects, and *ϵit*​​ is the error term.

Controlling for province and year fixed effects allows us to mitigate the impact of unobserved heterogeneity across regions and time. We further account for potential autocorrelation within provinces by clustering standard errors at the provincial level, providing robustness to our estimates. This methodology is designed to yield insights into the impact of minimum wage increases on employment rates among low-wage workers, with a particular focus on the heterogeneous effects across different age groups. Through this lens, we aim to contribute to the ongoing discourse on the optimal structuring of wage policy to support labor market health and worker welfare.

**Results**

The empirical analysis of the minimum wage policy changes and their impact on employment among low-wage workers in Canada reveals a complex narrative, affirmed by both statistical and visual evidence. Our Difference-in-Differences (DiD) approach rests on the foundational assumption of parallel trends. See Graph 1 below, the DiD plots serve as a preliminary check for this assumption, indicating that before the implementation of minimum wage increases, employment trends for young workers in the treated provinces—Quebec, Ontario, Alberta, and British Columbia—moved in near alignment with those in provinces not subject to the policy changes during the same periods.

This roughly parallelism in pre-treatment trends suggests that the provinces were on a comparable trajectory regarding the employment of young workers, thus satisfying the critical condition for the DiD methodology to yield valid causal inferences. The subsequent divergence in trends post-treatment, as illustrated in the DiD plots, visually captures the essence of the policy's impact. For instance, the noticeable increase in employment rates among teens in Quebec post-2011 aligns with the positive interaction term from Table 3 (0.0838∗∗) suggesting an employment-enhancing effect of the minimum wage increase for this demographic. This positive trend stands in contrast to the decline observed in Alberta post-2015, where the employment rates for teens dropped, mirroring the negative coefficient reported in the table (−0.0936∗∗).

The magnitude and direction of these divergences are not uniform across provinces or age groups, indicating the presence of distinct regional labor market dynamics and demographic sensitivities to wage policy alterations. In particular, the contrasting responses between teens and young adults highlight the variability in employment elasticity within these age cohorts.

Delving deeper into the regression results from Table 3, the significant coefficients for the interaction term in Quebec and Ontario suggest that minimum wage increases in these provinces were associated with an upward shift in employment for the specified age groups. However, when standard errors are clustered at the province level to account for within-province correlation, some of these effects become statistically insignificant, which underscores the importance of considering potential intraprovincial economic interdependencies.

In Alberta and British Columbia, the trends and corresponding coefficients indicate a more traditional economic narrative, wherein increased minimum wages are followed by a reduction in employment among teens. These findings contribute to a growing body of literature that documents the heterogeneous impacts of minimum wage policies, challenging the notion of a one-size-fits-all effect on employment.

The results from our study suggest that the effect of minimum wage changes on employment can be both positive and negative, with variations contingent upon regional economic conditions and demographic characteristics. This nuanced understanding of the policy’s impact is critical for policymakers who must balance the goal of raising worker earnings against the potential for reduced employment opportunities.

**Conclusions**

Our study's results contribute to a complex tapestry of existing literature on the minimum wage's employment effects, displaying both conformity and divergence in findings. In line with studies by authors like Card and Krueger (Card & Krueger, 2000), our analysis for Quebec and Ontario indicates that increases in the minimum wage can coincide with employment growth among young workers, challenging the traditionally espoused negative correlation. Notably, the size of the estimated positive effects, particularly in Quebec, is significant, aligning with the upper bounds of effects reported in more optimistic research.

Conversely, the negative impacts observed in Alberta and British Columbia resonate with the classical viewpoint and the findings of Neumark (Neumark, 2019), reaffirming the potential for minimum wage increases to contract employment, especially among teens. However, the magnitude of these effects varies, with Alberta showing more pronounced employment reductions than British Columbia, underscoring the role of regional economic variances.

The comparative significance of our results lies not just in their direction but also in their magnitude, suggesting that the relationship between minimum wage policies and employment is not uniform but context-dependent. This underscores the necessity for nuanced policy-making that considers the diversity of local labor market conditions and demographic sensitivities.

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**Reference**

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