The effect of increasing Minimum Wage on Employment Rate

Introduction

The relationship between minimum wage and employment is a subject of extensive debate and scholarly exploration within the realm of labor economics. The fundamental objective of minimum wage policies is to safeguard workers from receiving unfairly low remuneration, ensuring that full-time employees earn wages above the low-income cut-off. Essentially, the aim is to guarantee a decent standard of living for workers.

While the overarching goal of implementing minimum wage regulations is to improve the quality of life for full-time workers, it is crucial to acknowledge the potential impact on employment dynamics. In competitive labor market models, the introduction of a minimum wage often correlates with a decrease in employment, potentially leading to job losses. In essence, the minimum wage will elevate the living standards of some individuals while diminishing those of others. Contrastingly, in a monopsony labor market, the imposition of a minimum wage has the potential to boost employment levels and enhance the standard of living for workers. Recognizing the type of market at play and comprehending the nuanced effects of minimum wage on employment is essential for informed policymaking, aiding the government in striking a balance between ensuring fair wages and supporting overall economic well-being.

In this article, I employ a strategy akin to Card and Krueger (1994) to examine the correlation between employment and minimum wage. Therefore, I will assess two distinct time periods in neighboring provinces, Ontario and Quebec, by utilizing a flexible difference-in-differences method. During both periods, the minimum wage remained consistent across the two provinces initially. However, there was a subsequent increase in the minimum wage for $0.25 in Ontario, while Quebec remains unaffected in the first period. In the second period, Ontario raised the minimum wage by $0.25 more than the minimum wage in Quebec after both provinces increased their wages. Following this adjustment, it becomes evident that a higher minimum wage is associated with a lower employment rate. Significantly, a more pronounced disemployment effect is observed for 15-19-year-old females with 0-8 years of education, a demographic that constitutes a substantial portion of minimum wage employees.

Past Research

Numerous studies argue that the employment impact of increased minimum wage in Canada generally suggest a modest negative effect. For instance, Swidinsky (1980) identified a significant disemployment effect on teenagers. Additionally, Campolieti, M., Fang, T., & Gunderson, M. (2005) found that as the minimum wage increased, the employment of low-wage youth decreased.

In contrast, in the United States, Card and Krueger (1994) identified a positive relationship between employment and the minimum wage, contradicting many Canadian findings. Consequently, I aim to employ a similar methodology as Card and Krueger, adapting it to

Canadian data to explore the relationship between employment and minimum wage. In other words, I will employ the difference-in-difference method to assess the impact of an increased minimum wage on employment. My aim is to determine if I can observe a negative relationship, aligning with the findings of the majority of Canadian studies on this subject.

Empirical Analysis

I will employ a flexible difference-in-differences method to assess the impact of the minimum wage on employment on two neighboring provinces, Ontario and Quebec. For the employment rate, I will utilize two measurements: one derived from Statistics Canada (2023) and the other calculated from the provided dataset. I will group the dataset by individuals' age group, sex, education level with their survey month and year, calculating their employment rate based on their labor force status. Additionally, I will use linear regression to identify the demographic that constitutes a substantial portion of minimum wage employees and assess the impact of the minimum wage on their employment.

Given that Statistics Canada does not provide the employment rate grouped by education level, I will separately calculate the impact of the minimum wage on the entire population using both the Statistics Canada dataset and our dataset. In essence, I will conduct three regressions to explore the influence of the minimum wage.

During the analysis, I have selected two periods. The first period is when both Ontario and Quebec had a minimum wage of $7.75 starting in November 2006. Subsequently, Ontario abruptly increased its minimum wage to $8 in February 2007, while Quebec maintained the same minimum wage until April 2007. The second period begins in January 2008 when both provinces had an identical minimum wage of $8. In March 2008, Ontario increased its minimum wage to $8.75, when Quebec only increased its minimum wage to $8.5. Subsequently, I will assess the impact of the minimum wage change until July 2008. I will evaluate these two time periods separately and assess whether the results are consistent with each other.

During analysis, I will use a flexible difference-in-difference. In other words, I will use time fix effect to replace the indicator variable that denotes whether the time is after the minimum wage changed.

$$Employment\ Rate = \beta_0 + \beta_{1i} Month_i + \beta_2 * ON + \beta_3 * ON * Post + \varepsilon_p$$

$\beta_{1i} Month_i$: a cohort of time fixed effect

ON = 1 indicates that the employment rate is calculated in Ontario.

Post = 1 indicates the period when the employment rate is calculated after the minimum wage has changed.

ε_p : the error term is cluster at the provincial level

Results

Applying a linear regression model to individuals' hourly wage reveals that all coefficients are greater than 0 with a p-value smaller than 0.01 (refer to Table S in the appendix). Thus, the model suggests that the population with the lowest average income corresponds to individuals with all these indicator variables equal to 0, particularly 15-19-year-old females with 0-8 years of education, indicating a high likelihood of working for minimum wage.

Subsequently, I employ a flexible difference-in-difference approach to assess the impact of minimum wage on employment, as detailed in Table 1. Columns (1) to (3) specifically examine the effect of the initial minimum wage increase on employment during the first time period (2006 November to 2007 April), while Columns (4) to (6) focus the second time period (2008 January to 2008 July). Columns (1) and (4) utilize the employment rate data from Statistics Canada (2023), whereas the remaining columns rely on our proprietary dataset.

It is noteworthy that all coefficients in the table are negative, with p-values smaller than 0.01, indicating a consistent pattern where an increase in minimum wage is associated with a decrease in the employment rate. This finding aligns with the conclusions drawn from various Canadian studies, suggesting that minimum wage adjustments tend to have a modest impact on employment (Benjamin et al., 2017).

Notably, the coefficients in Column 3 are larger than those in Column 2, and the coefficients in Column 6 are larger than those in Column 5. This discrepancy arises because Columns 3 and 6 focus on specific population groups—15-19-year-old females with 0-8 years of education—rather than the entire population. Consequently, I can assert that the effect of minimum wage on employment is more pronounced for this specific population group.

Furthermore, the table presents the elasticity values for each group. It is evident that for the entire population, the elasticity ranges from -0.78 to -0.02, whereas for the 15-19-year-old females group with 0-8 years of education, the elasticity varies between -2.89 and -3.06. Notably, the elasticity values for this specific group are considerably higher compared to most studies on the minimum wage, which typically range from -0.1 to -0.3 for teenagers (Neumark, 2014). This discrepancy may be attributed to the nuanced control variables in my study, where I not only consider age group but also account for educational level and gender. As Neumark suggests, low-paying jobs requiring low skills are most likely to decline with increased minimum wages, contributing to a more substantial elasticity in the employment rate for this specific population.

Table 1: The impact of increasing Minimum Wage on Employment Rate measured through flexible Difference-in-Differences (DinD)

	First Period (2006 November to 2007 April)			Second Period (2008 January to 2008 July)		
	1	2	3	4	5	6
	Statistics Canada	all workers	15-19-year-old females with 0-8 years of education.	Statistics Canada	all workers	15-19-year-old females with 0-8 years of education.
DinD	-0.00498***	-0.00210***	-0.0277***	-0.000408***	-0.0156***	-0.0346***
	8.62E-06	3.49E-06	4.66E-10	6.38E-06	1.55E-05	1.65E-09
Constant	0.587***	0.671***	0.281**	0.595***	0.681***	0.406**
	0.000846	0.00367	0.0118	0.000129	0.00103	0.0133
Elasticity	-0.263	-0.097	-3.056	-0.023	-0.779	-2.898
Observations	1,493	1,489	12	1,481	1,727	14
R-squared	0.156	0.005	0.984	0.151	0.008	0.736

Notes: All specifications incorporate year dummy variables and employ provincial-level clustering. Columns (1) to (3) pertain to the first time period (2006 November to 2007 April), while Columns (4) to (6) focus on the second time period (2008 January to 2008 July). Columns (1) and (4) utilize the dataset from Statistics Canada (2023), while the rest use our dataset. Columns (2) and (5) encompass the entire population in each time period, whereas Columns (3) and (6) narrow down to the 15-19-year-old females group with 0-8 years of education. Coefficients denote the estimated changes in the employment rate associated with the increase in minimum wage. Standard errors are reported beneath the coefficients.

Significance levels are denoted as follows: ***p < 0.001, **p < 0.01, *p < 0.05.

Conclusion

Similar to many Canadian studies, our research reveals a disemployment effect resulting from an increase in the minimum wage. However, the magnitude of our effects surpasses that of most studies conducted in Canada. Specifically, I have identified an elasticity ranging from -0.02 to -0.79 for the entire population, and an elasticity of approximately -3 for the 15-19-year-old female group with 0-8 years of education. This disparity in results can be attributed to our comprehensive control variables, encompassing age, educational background, and gender.

It's worth noting that the elasticity for the entire population exhibits considerable variability. This may be attributed to omitted variables or limitations in the size of employment rate data, which is available for province rather than smaller entities like cities. Future research could expand on our methodology by incorporating more granular employment rate data, allowing for a more detailed examination of the effects. For instance, utilizing the dataset that provides employment rates by city instead of province.

In conclusion, the evidence indicates that an increase in the minimum wage is associated with a decrease in employment. Consequently, policymakers should exercise caution when contemplating minimum wage hikes.

Reference

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Appendix:

Table S: Impact of individual's characteristics on Hourly Wage

	Hourly Wage	
	Coefficients	Standard Errors
Male	4.201***	0.364
age: 20-24	1.096***	0.323
age: 25-29	4.911***	0.323
age: 30-34	7.298***	0.363
age: 35-40	8.695***	0.38
age:40-44	9.417***	0.391
age: 45-49	10.16***	0.429
age: 50-54	10.45***	0.429
age: 55-59	9.918***	0.444
Some secondary	2.017***	0.223
Grade 11 to 13, graduate	3.856***	0.2
Some post secondary	4.652***	0.246
Postsec. cert/dipl	7.022***	0.282
Bachelors degree	12.71***	0.396
Graduate degree	16.47***	0.441
Constant	0.742	0.477
Observations	11,071,150	
R-squared	0.344	
Year FE	Yes	
Cluster	Province	

Notes: The table displays Ordinary Least Squares (OLS) coefficients for Hourly Wage, considering an individual's sex, age, and educational level. The data is clustered at the provincial level, and year fixed effects are included, spanning the period from 2001 to 2019.Each row represents a dummy variable for a specific category. The coefficients represent the average impact of the dummy variable on Hourly Wage. Standard errors are reported on the right of coefficients. The omitted dummy variables are for the age group 15-19 and education level 0-8 years. Therefore, the constant signifies that in 2001, 15-19 years old females with 0-8 years of education earned $0.742 per hour.

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

STATA Codes:

```
clear all

capture log close

cd "C:\Users\23639\OneDrive - University of Toronto\桌面\university of toronto\Third Year\ECO339\Final Project"

use lfs0119rr.dta,clear


* What types of workers work for low wages?

gen male = (sex == 1)

drop if hrlyearn ==.

reg hrlyearn male i.age_12 i.educ90 i.survyear, cluster(prov)

outreg2 using "summary", keep(hrlyearn male i.age_12 i.educ90) addtext(Year FE, Yes, Cluster, Province) replace


* female age 15-20 edu lower than secondary


* Flexible D-in-D

* Period 1

* Starts at: November 2006 for $7.75

* ON:$8  starting from Feburary 2007

* Ends at: April 2007

use lfs0119rr.dta,clear

drop if survyear != 2006 & survyear != 2007

drop if prov != 24 & prov != 35

drop if survyear == 2006 & survmnth < 11

drop if survyear == 2007 & survmnth >= 5

drop if lfsstat ==.

gen lfs = (lfsstat < 3)

collapse (mean)lfs, by (survyear survmnth prov age_12 sex educ90 minwage)
```

```
merge m:1 prov sex survmnth using Employment1105.dta
replace employment = employment / 100
gen d1 = (survyear == 2007 & survmnth >= 2)
gen ON = (prov == 35)
gen DinD = d1*ON
reg employment i.survmnth ON DinD, cluster(prov)
outreg2 using "a", ctitle("Statistics Canada") keep(DinD) replace
reg lfs i.survmnth ON DinD, cluster(prov)
outreg2 using "a", ctitle("all") keep(DinD) append
reg lfs i.survmnth ON DinD if (sex == 2 & age_12 == 1 & educ90 == 1), cluster(prov)
outreg2 using "a", ctitle("work for low age") keep(DinD) append

* Period 2
* Starts at: January 2008 for $8
* ON:$8.75  starting from March 2008
* Ends at: July 2008
use lfs0119rr.dta,clear
drop if survyear != 2008 | (survmnth > 7)
drop if prov != 24 & prov != 35
drop if lfsstat ==.
gen lfs = (lfsstat < 3)
collapse (mean)lfs, by (survyear survmnth prov age_12 sex educ90 minwage)
merge m:1 prov sex survmnth using Employment0106.dta
replace employment = employment / 100
gen d3 = (survmnth >= 3)
gen ON = (prov == 35)
gen DinD = d3*ON
diff lfs, t(ON) p(d3) cluster(prov)
```

```
reg employment i.survmnth ON DinD, cluster(prov)
outreg2 using "a", ctitle("Statistics Canada") keep(DinD) append
reg lfs i.survmnth ON DinD, cluster(prov)
outreg2 using "a", ctitle("all") keep(DinD) append
reg lfs i.survmnth ON DinD if (sex == 2 & age_12 == 1 & educ90 == 1), cluster(prov)
outreg2 using "a", ctitle("work for low age") keep(DinD) append
```