

Assignment Three

MINIMUM WAGE INCREASES BY PROVINCE AND IT'S
EFFECTS ON UNEMPLOYMENT IN YOUTHS

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1 Introduction and Literature

Do minimum wage increases put youths at a disadvantage for employment. This is something I had come across when reading the book, "Free to Choose", by Milton Friedman (Friedman et al., 1985). In his book, Friedman mentions that after WWII, the US government had increased minimum wage in an effort to help workers and to offset the effects of wartime inflation on the economy, but inadvertently it caused the unemployment for youths to substantially increase. Essentially, he argues that minimum wage laws result in employers forced to discriminate against workers more. For instance, if minimum wage is higher than the actual value a worker is worth, then the additional amount needed to pay over their value is just charity, which is not very appealing for businesses. Overall, it is argued that minimum wage laws prevent unskilled youths from entering the market and reduces opportunities for youths to work and gain experience to become more skilled workers.

On the other hand, David Card with Alan B. Krueger, published the paper titled, "A Reanalysis of the Effect of the New Jersey Minimum Wage Increase on the Fast-Food Industry with Representative Payroll Data", and found that the effects of a 1992 Federal minimum wage increase in New Jersey, from \$4.25 to \$5.0 per hour, had no indication that it effected fast-food employment losses in New Jersey or in the neighboring state of Pennsylvania where wages remained \$4.25 (Card Krueger, 1998). The paper also covers the effects of a 1996 federal minimum wage increase of \$4.25 to \$4.75, which was binding for Pennsylvania but not New Jersey, since the latter state had already a minimum wage of \$5.05. With this reversed study they had found employment growth had actually increased in the state of Pennsylvania after the minimum wage increase.

Another paper by Card, titled, "Using Regional Variation in Wages to Measure the Effects of the Federal Minimum Wage", further corroborates with their claims with no evidence that a rise in minimum wage created losses in teenage employment (Card, 1992). This paper studied the effects of a federal minimum wage on teenagers' wages employment and school enrollment in 1990.

I aim in this paper to find further evidence for either unemployment increases or decreases from minimum wage increases by using a regression discontinuity design (RDD) to look for casual effects across Canada and it's provinces over time. From my results, it looks to be counter to the literature referred from Card and Kruger's papers, since my results showed higher probabilities of unemployment after treatment with a large portion of these estimations being significant. However, this isn't without some potential issues in my design and setup for the RDD estimation.

2 Summary Statistics

A combination of data was collected from the Labor Force Survey (LFS) and the Government of Canada for minimum wage increases across provinces. The LFS data was cleaned to only include;

- LFSSTAT: Employment Status
- SURVYEAR: Year survey took place
- SURVMNTH: Month survey took place
- PROV: Observations province
- AGE_12: Age in 5 year intervals
- FWEIGHT: Weight of the observation

These variables were then cleaned. LFSSTAT had observations dropped for values of 6 for data before 2017, and observations that equaled 4 were dropped after 2017. Both of these were for observations that were not in the labor force and thus needed to be removed for our new dummy variable, unemployed. Furthermore, AGE_12 was trimmed to only include observations aged 15-19; these would be our youths of interest.

Data for the minimum wage rates by province was found in the Government of Canada’s minimum wage database, which covered general hourly minimum wage rate increases in Canada from 1965 to today. This data set was consolidated into one table consisting of jurisdiction, date of policy change, and the minimum wage increase in dollars. However, Some cleaning was done to this data as well. For instance, duplicate dates with multiple minimum wage increases in a month were dropped with the last increase of the month kept for the analysis. These duplicates were deemed unnecessary since the frequency of the data is monthly, and thus difficult to make distinctions of the effect on unemployment between multiple minimum wage increases in one month. Furthermore, observations from before 1976 were trimmed off to match the existing dates in the LFS dataset and similarly some Jurisdictions were also cut out to match the existing provinces found in the LFS data set; these were Northwest Territories, Yukon, and Nunavut.

Table 1 shows the count of our observations and average unemployment rate for the years 1976 to 2022. I also show the unemployment rate per year by province in Figure 1 for greater granularity.

Table 1: Descriptive Statistic for Labor Force Survey Data from 1976 to 2022

PROV	AGE_12 count	unemployed mean
Alberta	349483	0.14
British Columbia	291827	0.18
Manitoba	249017	0.15
New Brunswick	172021	0.21
Newfoundland	111198	0.29
Nova Scotia	167611	0.21
Ontario	768937	0.18
Prince Edward Island	86054	0.17
Quebec	444259	0.19
Saskatchewan	253679	0.13

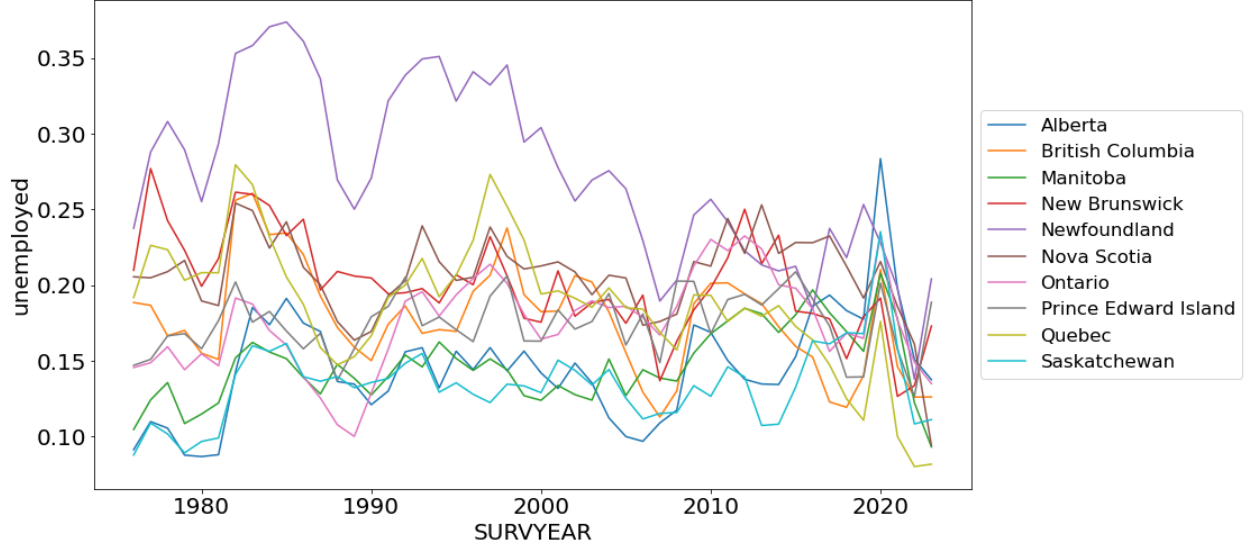


Figure 1: Average Unemployment in Youths from 1976 to 2022 by Province

3 Estimation

The RDD method is a good approach to estimating the casual effect of minimum wage increase on unemployment, because the minimum wage increase is a discontinuous effect and can act as a natural threshold for our continuous assignment variable. The treatment is also assigned in a measurable way, since we can see how unemployment changes before and after the threshold. Additionally, it should also be the case that individuals on either side of the cutoff are identical on average since the cutoff isn't based on any underlying characteristics.

To estimate the causal effect of minimum wage increases on unemployment in each province of Canada from 1976 to 2022, we begin with our outcome variable unemployed, the minimum wage increase as the treatment, and the running variable as time before and after the cut-off date measured in months. Each minimum wage increase from our data set would determine the central and cutoff point and subset the LFS dataset given the respective province of the wage increase. 335 cutoffs for 10 provinces were used to create 2010 estimates for various truncated data sets ranging from 1 to 6 months. It's known in Canada that businesses are informed in advance of minimum wage increases, so the effects of the treatment

should be minimal even at the 1 month point, and looking at Figure 2's sub-plot for month 1, this appears true in most cases, however, a fair amount of coefficients approach 10% to 20% increases in the probability of unemployment. These coefficients although somewhat strong tend to dissipate as the truncated data sets increase in size.

Looking closer at the result of the first truncated month in Figure 3, it becomes clear that a majority of estimations reported a positive effect of unemployment from a minimum wage increase as over 72% of reported coefficients are above 0. Of these, close to 50% reported significance as their t-values returned higher than 2. Compared to the other truncated months, month 1 has the highest reported significant coefficients above 0, and as the months increase, these coefficients and their significance greatly decrease. From these results, I could conclude that unemployment rises for youths after treatment from a minimum wage increase. However, I do have some concerns for coefficients that reported negative effects on unemployment. Looking at Figure 2, I have calculated the percentage of estimations that reported coefficients that were both negative and significant. For all truncated datasets, none of these coefficients returned true. This seems fairly odd considering the large number of estimations made which would make it seem unlikely not to find evidence counter to our arguments. This leads me to believe that there may be some issue in our measurements, the assumptions made for the model, or some bias not being considered.

Looking further at Tables 2 and 3, we can see further evidence of high average coefficients per province, and a high proportion of observations reporting significant per province as well.

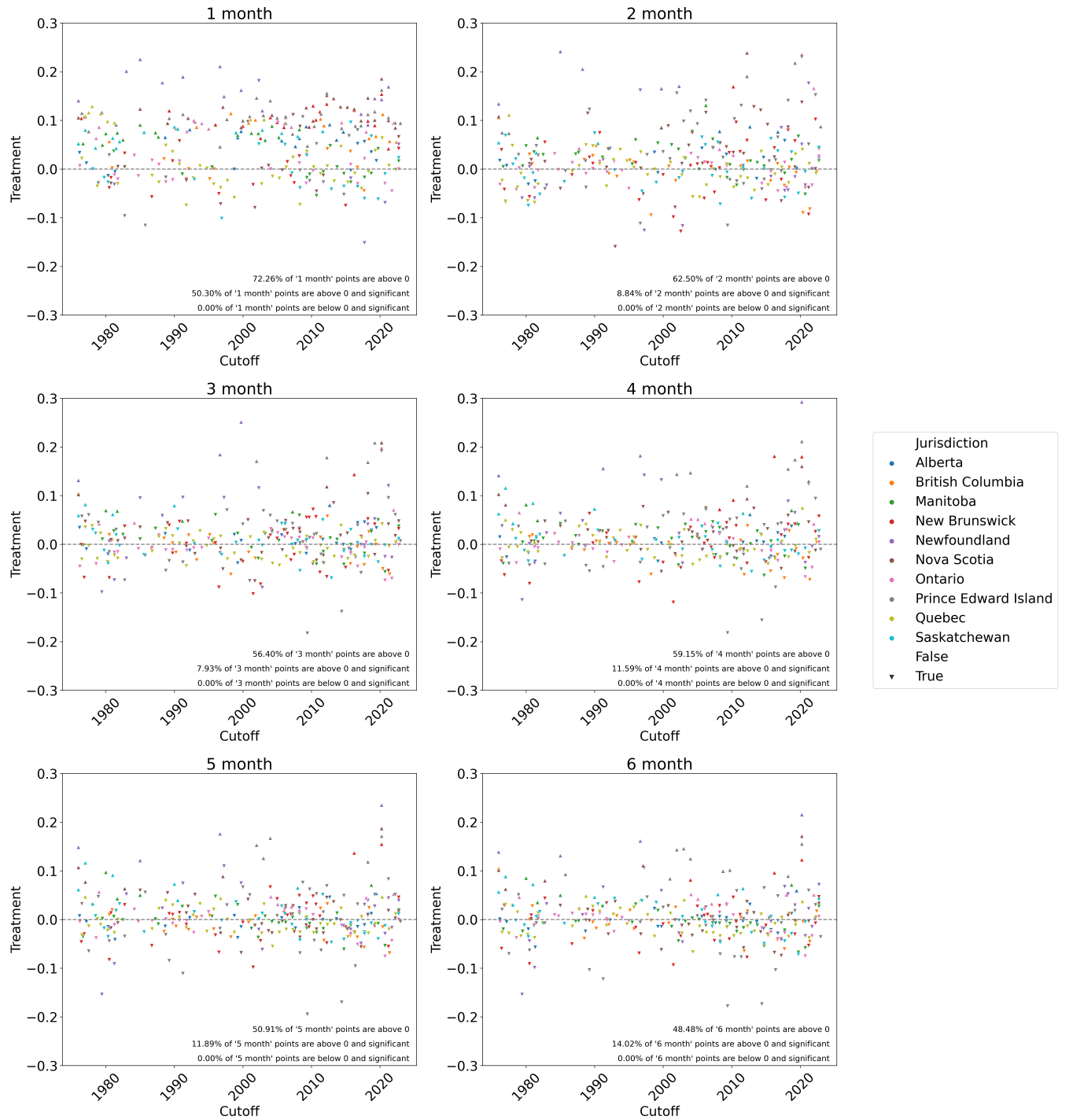


Figure 2: Treatment Coefficients and significance from RDD regressions for 1976 to 2022

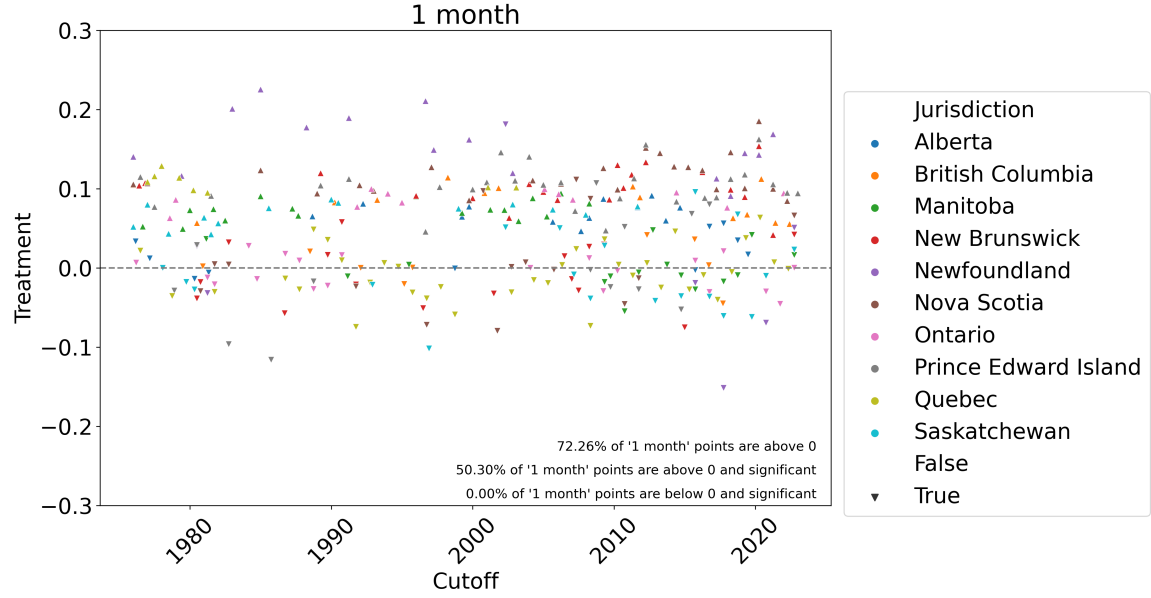


Figure 3: Treatment Coefficients and significance from RDD regressions for 1976 to 2022 (Truncated at 1 month)

Table 2: RDD Estimation Average Treatment Coefficients

	1 month	2 month	3 month	4 month	5 month	6 month
Jurisdiction						
Alberta	0.047	0.025	0.011	0.003	-0.003	-0.005
British Columbia	0.052	-0.002	-0.004	-0.008	-0.006	-0.005
Manitoba	0.037	0.024	0.016	0.011	0.002	-0.004
New Brunswick	0.054	0.014	0.006	0.011	0.001	-0.003
Newfoundland	0.100	0.039	0.047	0.056	0.032	0.030
Nova Scotia	0.073	0.035	0.020	0.025	0.014	0.007
Ontario	0.029	0.004	-0.004	0.003	0.002	0.005
Prince Edward Island	0.070	0.050	0.023	0.023	0.014	0.009
Quebec	0.014	-0.004	-0.005	-0.002	-0.003	-0.006
Saskatchewan	0.025	0.003	0.009	0.011	0.012	0.009

Table 3: RDD Estimations Proportion of Significant T-Values

	1 month	2 month	3 month	4 month	5 month	6 month
Jurisdiction						
Alberta	0.545	0.182	0.045	0.045	0.045	0.045
British Columbia	0.583	0.042	0.042	0.042	0.042	0.042
Manitoba	0.529	0.059	0.118	0.088	0.118	0.118
New Brunswick	0.568	0.054	0.054	0.108	0.054	0.081
Newfoundland	0.652	0.217	0.174	0.174	0.174	0.174
Nova Scotia	0.605	0.079	0.079	0.105	0.132	0.132
Ontario	0.375	0.094	0.094	0.188	0.188	0.250
Prince Edward Island	0.683	0.122	0.098	0.171	0.122	0.220
Quebec	0.182	0.023	0.000	0.045	0.091	0.091
Saskatchewan	0.424	0.091	0.121	0.182	0.212	0.212

4 Conclusion

In conclusion, the debate around the impact of minimum wage increases on youth employment seems more nuanced than I had initially thought. My results for using RDD estimation to determine the casual effects of minimum wage increases on unemployment tended to agree with Milton Friedman’s views. This was seen by the majority of the treated coefficients for my estimations displaying economic and statistical significance for increases in unemployment for minimum wage increases. However, potential issues in the design, measurement, or unseen biases undermine these results. To mitigate these issues, I could run additional tests to sub-sample the truncated data to see if similar estimations occur for smaller samples, and I could also change my running variable to hourly wages instead and see if similar estimations occur there as well. Overall, the estimations I found seemed interesting and indicate some potential that minimum wage increases result in higher unemployment for youths across Canada and its provinces.

References

Friedman, M., Friedman, R. (1985). CHAPTER 4 Cradle to Grave. In *Free to choose: A personal statement.* essay, Penguin Books.

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