

The Minimum Wage, Turnover, and the Shape of the Wage Distribution

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Introduction

- In recent years, the minimum wage has played an increasingly important policy role in the low-wage labor market.
- “Fight for 15” movement in the U.S. and Canada, with the minimum wage in the process of going up to \$15:
 - Alberta (Oct 2018), Ontario (Jan 2019)
 - California (2022), D.C. (2020), Seattle, San Francisco, NYC, etc.
- Our focus here is on the wage distribution, and in particular spillover effects above the minimum that can have an important effect on wage inequality.

Introduction

- There is a sizeable literature examining the impact of minimum wage changes on the wage distribution, mostly for the U.S. and U.K.:
 - U.S.: Grossman (1983), Meyer and Wise (1983), DiNardo, Fortin and Lemieux (1996), Lee (1999), Teulings (2000), Neumark, Schweitzer and Wascher (2004), Autor, Manning and Smith (2016))
 - U.K.: Manning(2003), Machin, Rahman and Manning(2003), Dickens and Manning (2004a,b), Butcher, Dickens and Manning(2012), Stewart(2012)
- But no consensus yet on the magnitude of spillover effects:
 - Using variation in the relative value of the federal minimum wage in low- and high-wage labor markets, Lee (1999) finds large spillover effects that help account for most of the growth in wage inequality in the bottom half of the distribution during the 1980s
 - Using more recent data and variation in state minimum wages, Autor, Manning and Smith (2016) find much smaller spillover effects, and argue this may just reflect measurement error in wages.

Contribution

Revisit these issues using a hazard function representation of the wage distribution. Our methodology, an extension of the estimator developed by Donald, Green and Paarsch (2000):

- Imposes minimal structure on the latent distribution.
- Allows minimum wage effects that are localized (i.e. change shape of distribution near minimum wage, including possible spike and spillovers above).
- Straightforward adjustment for truncation effects, if present.
- Corrects for measurement error by modelling the probability of heaping (concentration of density at integer values of nominal wages)
- Ensures that the density always integrates to one.

Contribution

- In the Canadian LFS (a 6-month panel) we can separate workers into joiners, leavers and stayers.
- This allows us to differentiate among potential explanations for spillover effects:
 - Explanations based on labor reallocation (neoclassical labor-labor substitution or monoposony with movement of worker across firms) imply that the wage distribution of joiners increases relative to leavers during the reallocation
 - No such implication for models based on internal considerations (e.g. Dube et al. 2017)
- Results still tentative at this point, but support explanations based on internal considerations.

Methodology

Wage distribution is modeled using a proportional hazard representation:

$$h(y/x) = h_0(y)exp(x\alpha),$$

- y is the wage.
- x is a vector of covariates, including dummies for educational attainment, age, province of residence, year and quarter.
- Wage support is divided into 10 wage cent bins, with each bin having a baseline hazard.
- The vector α is allowed to vary across five covariate segments, with top-coding at \$20.

Methodology

- Minimum wage effects are introduced as “time-varying” covariates with the following dummies:
 - Dummy for wage bin containing the applicable minimum wage m (i.e. within \$0.10 of m).
 - Dummies for bins \$0.50 cents or more , \$0.30-\$0.50 , and \$0.10-\$0.30 cents below m .
 - Dummies for bins \$0.10 to \$0.30, \$0.30 to \$1, \$1 to \$2, \$2 to \$3 a \$3 to \$4 above m .
- Also include dummies in bins where “bunching” is likely to occur (e.g. nominal wage of \$10).

Minimum Wage Data

- Provincial adult minimum wage in effect on 15th of each month.
- 157 nominal changes over period of study (1997-2016):
 - Many of these changes are small (median of 3.8 percent, mean of 4.3 percent).
 - 47 changes are 5 percent or more, the largest is 18 percent.
- All nominal variables deflated using the CPI.

Data

- Data is from the Labour Force Survey (LFS) masterfiles:
 - Monthly survey of approx. 50,000 households, each of which is followed for six months.
 - Possible to form “mini-panels” of up to six months for each individual.
 - Unless there is a job change, wage data is not updated after the first month.
 - LFS includes a variable on the duration with the current employer (job tenure).
 - We use the in-rotation group in each month to estimate the wage distribution.
- Combination of data on job tenure and job status in future months used to distinguish between job stayers, leavers and joiners.

Estimation

- For each covariate combination, we have data on the number of individuals “entering” a wage bin (i.e. with wages at least as high as a given wage) and the number that have wages that “fail” in that bin.
- Estimate as generalized linear methods (GLM) using the “cloglog” link function on the grouped data.
 - Maximum likelihood approach because many cells have zero failures.

Table 1a: Estimated minimum wage effects for women, LFS public use files 1997-2016

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minimum wage effects:								
More than 50¢ below	-2.123 (0.413)	-1.702 (0.283)	-1.711 (0.317)	-1.590 (0.405)	-1.713 (0.373)	-1.717 (0.345)	-1.601 (0.278)	-1.717 (0.376)
30¢ to 50¢ below	-1.133 (0.341)	-0.824 (0.233)	-0.832 (0.256)	-0.590 (0.371)	-0.918 (0.465)	-0.971 (0.427)	-0.864 (0.372)	-0.922 (0.467)
10¢ to 30¢ below	-0.442 (0.235)	-0.164 (0.118)	-0.173 (0.137)	-0.192 (0.164)	-0.761 (0.171)	-0.823 (0.126)	-0.719 (0.069)	-0.765 (0.174)
At minimum wage	1.697 (0.238)	1.966 (0.129)	1.959 (0.144)	1.837 (0.304)	1.849 (0.350)	1.816 (0.287)	1.917 (0.215)	1.846 (0.352)
10¢ to 30¢ above	0.539 (0.260)	0.799 (0.147)	0.793 (0.167)	0.790 (0.200)	0.776 (0.221)	0.689 (0.181)	0.787 (0.124)	0.773 (0.225)
30¢ to 50¢ above	0.200 (0.165)	0.429 (0.106)	0.425 (0.103)	0.599 (0.126)	0.616 (0.133)	0.550 (0.149)	0.643 (0.144)	0.613 (0.136)
50¢ to \$1 above	0.125 (0.117)	0.316 (0.074)	0.312 (0.073)	0.393 (0.075)	0.364 (0.079)	0.294 (0.078)	0.379 (0.089)	0.361 (0.082)
\$1 to \$1.50 above	0.107 (0.078)	0.256 (0.025)	0.255 (0.026)	0.215 (0.026)	0.195 (0.031)	0.138 (0.073)	0.213 (0.114)	0.193 (0.033)
\$1.50 to \$2.00 above	-0.055 (0.113)	0.047 (0.130)	0.049 (0.126)	0.203 (0.057)	0.233 (0.076)	0.196 (0.096)	0.257 (0.119)	0.233 (0.076)
\$2.00 to \$2.50 above							0.064 (0.062)	
\$2.50 to \$3.00 above							-0.008 (0.035)	
Integer wage in bin				1.816 (0.029)	1.818 (0.029)	1.824 (0.029)	1.824 (0.029)	1.818 (0.029)
Log pseudolikelihood (/1000)	-370900	-368615	-368398	-249299	-247923	-246243	-246228	-247867
Province trends	no	yes	yes	yes	yes	yes	yes	yes
Segments w/ prov-year dummies			1	1	1	1	1	1&2
Interaction w/ first 6 months	no	no	no	no	yes	yes	yes	yes
Prov-wage & year-wage effects	no	no	no	no	no	yes	yes	no

At minimum wage	1.697 (0.238)	1.966 (0.129)	1.959 (0.144)	1.837 (0.304)	1.849 (0.350)	1.816 (0.287)	1.917 (0.215)
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Segments w/ prov-year dummies			1	1	1	1	1
Interaction w/ first 6 months	no	no	no	no	yes	yes	yes
Prov-wage & year-wage effects	no	no	no	no	no	yes	yes

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Province trends	no	yes	yes	yes	yes	yes	yes
Segments w/ prov-year dummies			1	1	1	1	1
Interaction w/ first 6 months	no	no	no	no	yes	yes	yes
Prov-wage & year-wage effects	no	no	no	no	no	yes	yes

Figure 1a: Effect of the minimum wage on wage bin probabilities for women (logs)

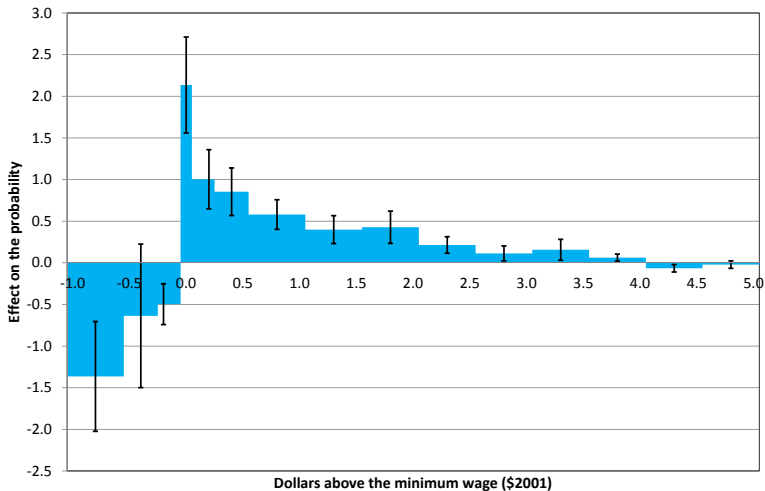


Figure 1b: Effect of the minimum wage on wage bin probabilities for men (logs)

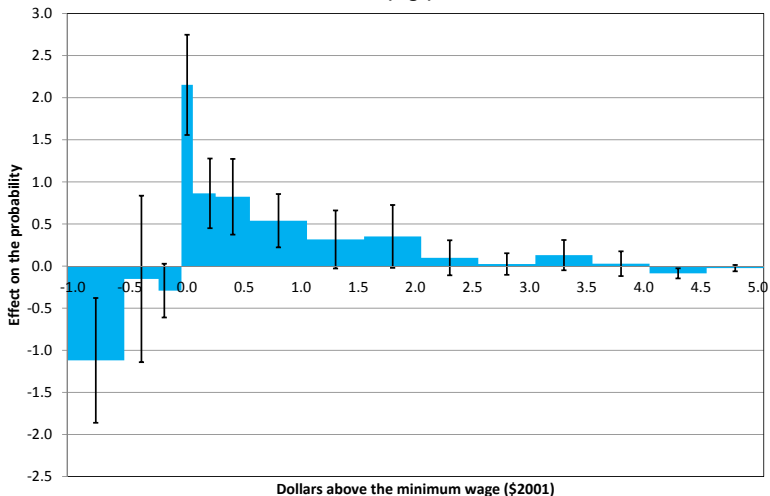
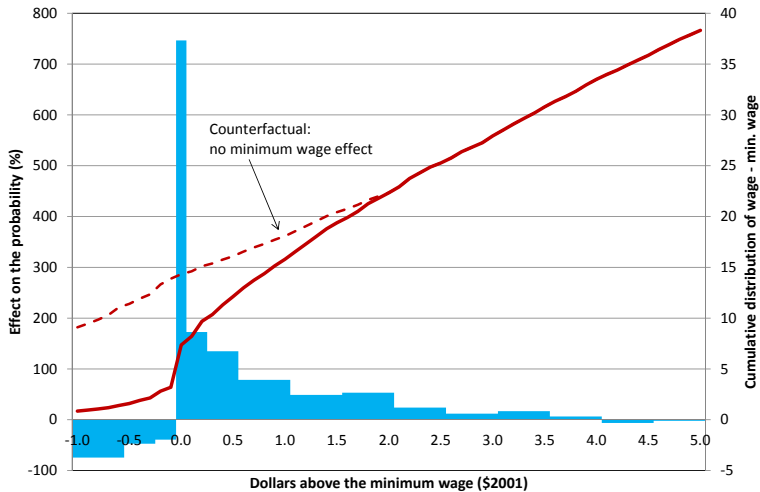


Figure 2a: Effect of the minimum wage on wage bin probabilities for women (% terms)



Conclusion

- Evidence of spillover effects up to \$2-\$2.5 above the minimum wage in both Canada and the United States.
- On average, less than 5 percent of men are at or below the minimum wage, but spillover effects reach out to the 10th-15th percentile of the wage distribution
- On average, slightly more than 5 percent of women are at or below the minimum wage, and spillover effects reach out to about the 20th percentile of the wage distribution.
- A combination of monopsony power and internal considerations can account for this pattern of results and differences in the wage distribution for joiners, stayers and leavers