Effects of a Minimum Wage Increase on Restaurants: Price Pass Through and Beyond

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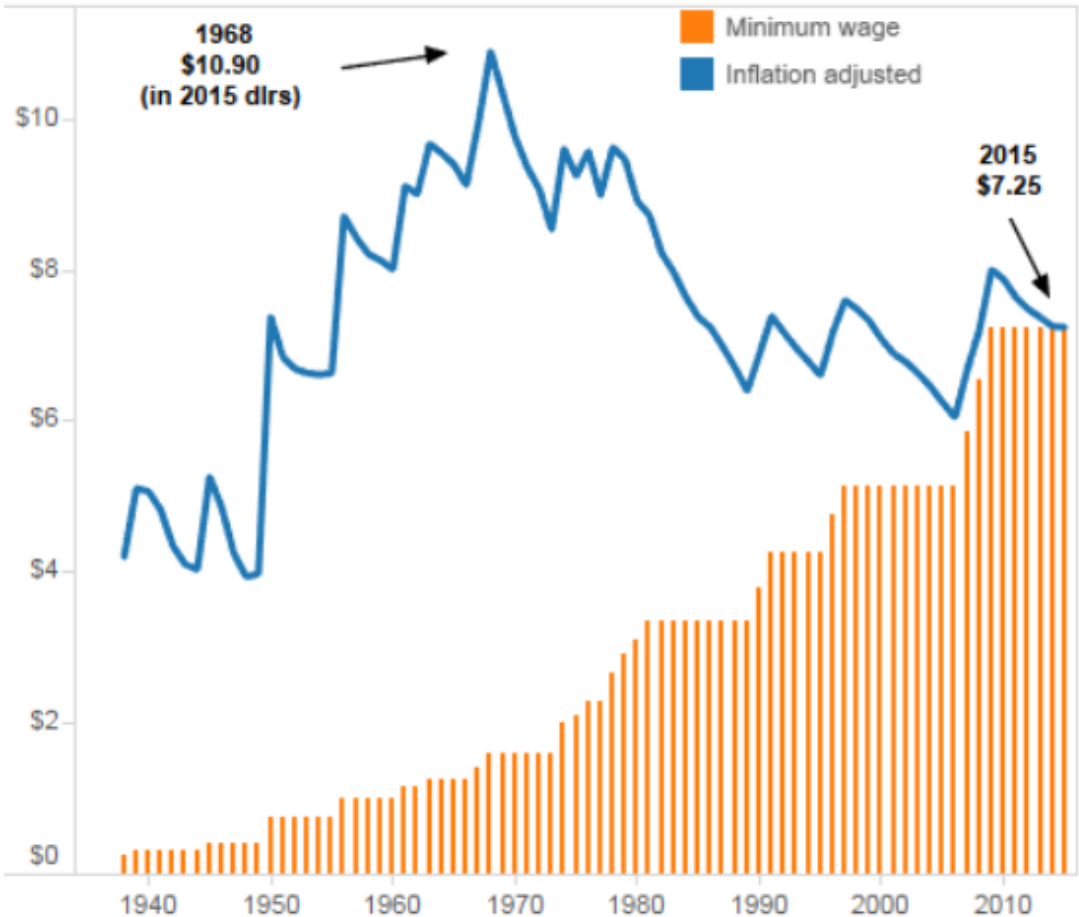
Overview

- How do restaurant prices change in response to increases in the minimum wage?
- How is customer perceived quality of restaurants affected by a minimum wage increase?
- Do border effects have an impact on price pass through?

Minimum Wage Background

Minimum wage adjusted for inflation over time



Published by CNBC, source: BLS

This Study

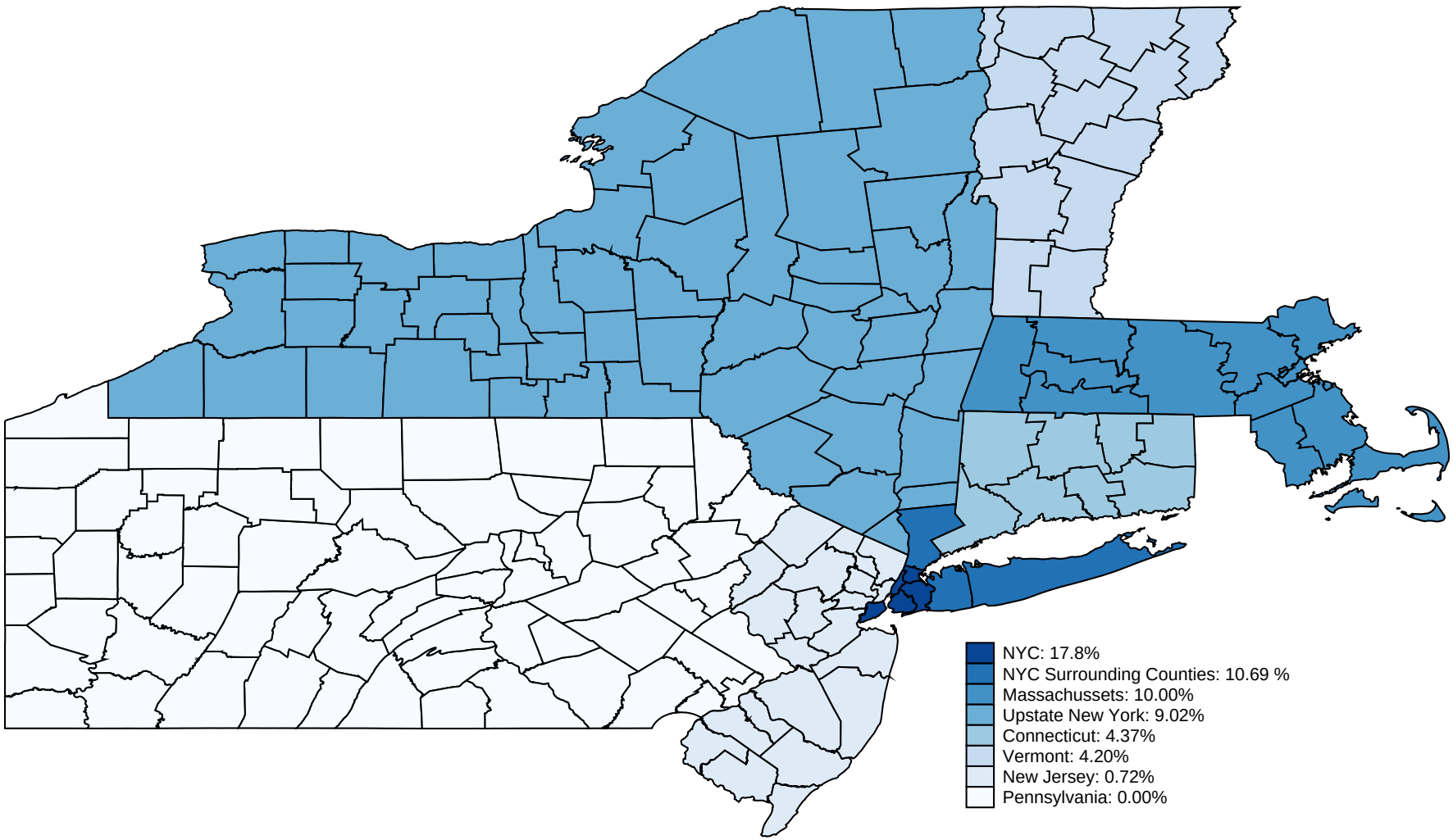
- Six contiguous East Coast states increased minimum wage at the start of 2017
- Variation in minimum wage across states and within states
- Analyze full menus from two online sources
- Analyze restaurant specific characteristics
  - Quality
  - Border effects

Minimum Wage Laws

	Regular Minimum Wage			Tipped Minimum Wage		
Area	'16	'17	%Δ	'16	'17	%Δ
NYC & FF	$10.50	$12.00	14.29%	-	-	-
NY Upstate & FF	$9.75	$10.75	10.26%	-	-	-
NYC & Lg	$9.00	$11.00	22.22%	$7.50	$7.50	0.00%
NYC & Sm	$9.00	$10.50	16.67 %	$7.50	$7.50	0.00%
NYC MSA	$9.00	$10.00	11.11%	$7.50	$7.50	0.00%
NY Upstate	$9.00	$9.70	7.78%	$7.50	$7.50	0.00%
Connecticut	$9.60	$10.10	5.21%	$6.07	$6.38	5.11%
New Jersey	$8.38	$8.44	0.72%	$2.13	$2.3	0.00%
Massachusetts	$10.00	$11.00	10.00%	$3.00	$3.75	25.00%
Pennsylvania	$7.25	$7.25	0.00%	$2.83	$2.83	0.00%
Vermont	$9.60	$10.00	4.2%	$4.80	$5.00	4.2%

NY Schedule

Minimum Wage Change By County



Data

Yelp

- Basic restaurant info, item and price info
- Star rating
- Quarterly data: Apr ‘16, Jul ‘16, Oct ‘16, Jan ‘17, Apr ’17

Grubhub

- Basic restaurant info, item and price info
- Monthly data: Dec ‘16, Jan ‘17, Feb ‘17, Mar ‘17, Apr ’17

ReferenceUSA

- Business data
- Sales, employees, restaurant type, franchise status

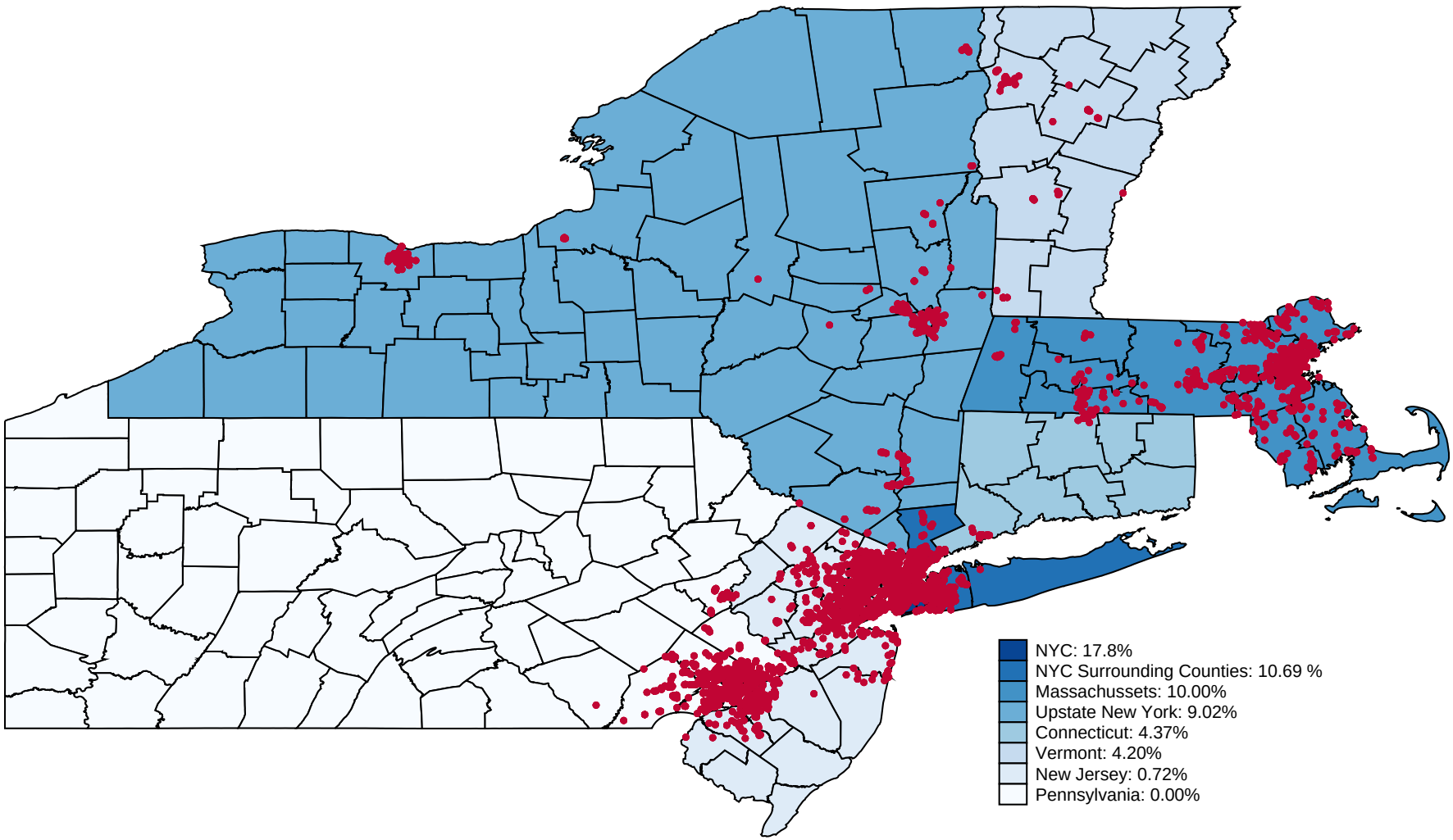
Sample of Restaurants

Source	N	%LS	% Chain	% Small	Price
RUSA	89,114	19.94	14.06	75.72	-
Yelp (All)	35,502	17.01	11.82	75.13	-
Yelp (Prices)	7,901	5.49	1.77	78.40	9.37
Grubhub	5,351	6.48	2.01	86.19	8.66

Sample Size by Min Wage Group

Area	% Increase	Yelp Restaurants	Grubhub Restaurants
NYC & FF	14.29%	25	34
NY Upstate & FF	10.26%	3	13
NYC & Lg	22.22%	610	407
NYC & Sm	16.67 %	2,408	2,266
NYC MSA	11.11%	425	341
NY Upstate	7.78%	378	207
Connecticut	5.21%	57	93
New Jersey	0.72%	1,479	792
Massachusetts	10.00%	1,391	550
Pennsylvania	0.00%	1,072	647
Vermont	4.2%	50	2
Total		7,901	5,351

Sample of Yelp Restaurants



Expected Price Pass Through

Assumptions:

- Factor markets competitive
- Product monopolistically competitive
- Firms have constant returns to scale production function

Price Pass Through:

$$(\% \Uparrow \text{MW}) \; x \; (\frac{MWCosts}{LaborCosts}) \; x \; (\frac{LaborCosts}{TotalCosts})$$

$$(10\%) \; x \; (17\text{-}33\%) \; x \; (33\%) = 0.56\text{-}1.09\%$$

Model of Price Pass Through

$$\Delta \ln p_{ijkt} = \sum_{h=0}^{2} \beta_h \Delta \ln mw_{kt-h} + \gamma \Delta \ln p_{ijkt-1} + \boldsymbol{X}_j \boldsymbol{\lambda} + \epsilon_k + \epsilon_t + \epsilon_{ijkt} \tag{1}$$

i = item

j = restaurant

k = minimum wage group

t = observation period

$\boldsymbol{X}_j$= vector of covariates: chain, LS, employees, sales, total items

Price Pass Through of a 10% MW Increase

	(1) Yelp	(2) Yelp	(3) GH	(4) GH
Oct − Jan	0.0707*	0.0708**		
	(0.0309)	(0.0291)		
Dec − Jan			0.140***	0.165***
			(0.0135)	(0.0141)
Jan − Feb			0.219**	0.244**
			(0.0595)	(0.0607)
Feb − March			0.255**	0.280**
			(0.0632)	(0.0700)
Total Pass Through	0.071	0.071	0.614	0.689
Controls	No	Yes	No	Yes
Observations	1571872	1571872	1465718	1465718

Standard errors in parentheses
* $p < .10$, ** $p < .05$, *** $p < .001$

Price Pass Through By Item Type

Grubhub

	(1) Popular	(2) Side	(3) Sandwich	(4) Pizza	(5) Entre	(6) Desert	(7) Drink
Dec − Jan	0.142**	0.0997**	0.313***	0.213**	0.218***	0.0877	0.101**
	(0.0463)	(0.0294)	(0.00973)	(0.0689)	(0.0108)	(0.0498)	(0.0347)
Jan − Feb	0.550**	0.0878**	0.354**	0.326**	0.233***	0.167**	0.413**
	(0.218)	(0.0243)	(0.0790)	(0.103)	(0.0285)	(0.0653)	(0.110)
Feb − Mar	0.492*	0.210**	0.434**	0.325**	0.213**	0.241*	0.362*
	(0.227)	(0.0416)	(0.0850)	(0.0624)	(0.0659)	(0.126)	(0.169)
Total	1.184	0.397	1.101	0.864	0.664	0.496	0.876
Observations	86259	172901	201821	70966	270068	33805	111161

Standard errors in parentheses
* $p < .10$, ** $p < .05$, *** $p < .001$

Min Wage Impact on Yelp Star Ratings

$$\Delta \ln(exact\_stars_{jkt}) = \beta \ln mw_{kt-h} + \gamma stars\_apr16_{jkt} + \boldsymbol{X}_j \boldsymbol{\lambda} + \epsilon_k + \epsilon_t + \epsilon_{ijkt} \quad (2)$$

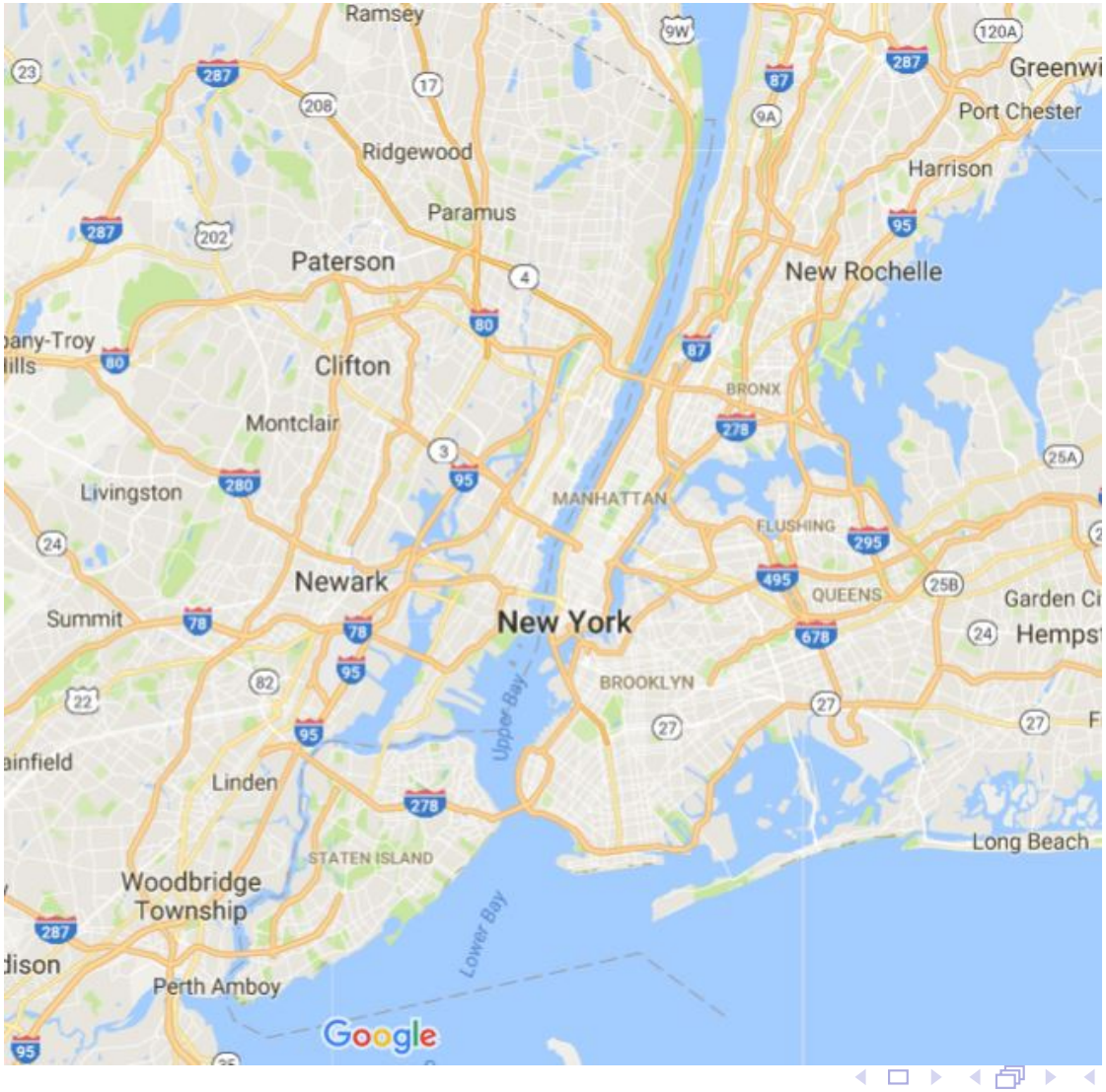
$exact\_stars_{jkt}$: average star rating to the tenth

$stars\_apr16_{jkt}$: rounded average star rating

Min Wage Impact on Yelp Star Ratings

	(1) All	(2) <=3	(3) 3.5	(4) 4	(5) >4
Oct − Jan	-0.00839	-0.242***	0.0370*	0.0793**	0.194*
	(0.00901)	(0.0318)	(0.0147)	(0.0224)	(0.0685)
Observations	13531	3249	4800	4523	959

Border Effects



Border Effects

$$\begin{aligned}\Delta \ln(p_{ij,Oct-Feb}) =& \alpha_0 + \alpha_1 \mathbb{1}(NY = 1) \\ &+ \alpha_2 D_j + \alpha_3 [D_j * \mathbb{1}(NY = 1)] \\ &+ \gamma X_{ij} + \epsilon_{ij}\end{aligned}$$

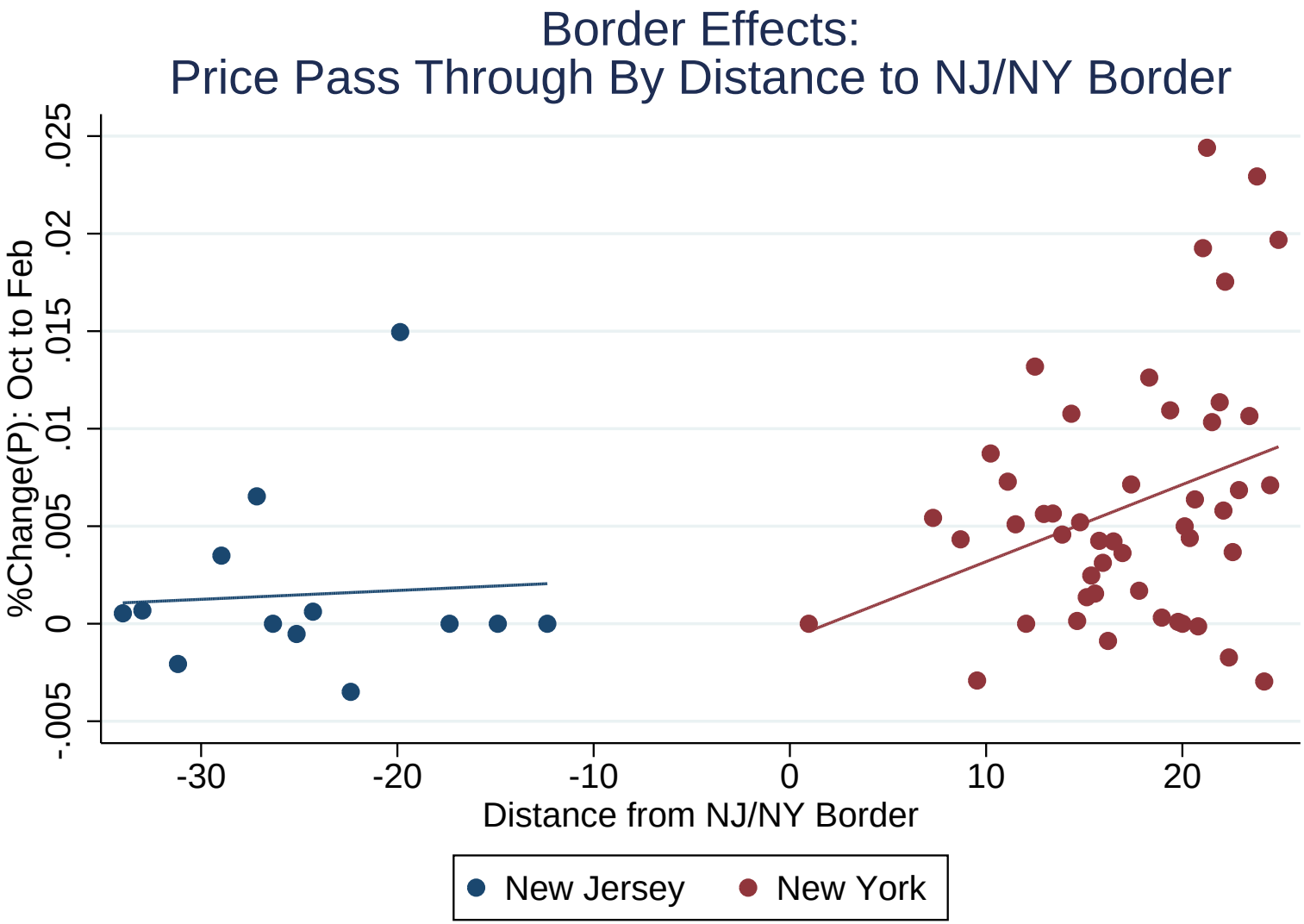
D_j: minutes to a competitor across the border

$\mathbb{1}(NY = 1)$: indicator function for state

NY: $\Delta \ln(p_{ij,Oct-Feb}) = (\alpha_0 + \alpha_1) + (\alpha_2 + \alpha_3) D_j + \gamma X_{ij} + \epsilon_{ij}$

NJ: $\Delta \ln(p_{ij,Oct-Feb}) = (\alpha_0) + (\alpha_2) D_j + \gamma X_{ij} + \epsilon_{ij}$

Border Effects



Border Effects: Results

	(NJ) *Oct − Feb*	(NJ) *Oct − Feb*	(NJ) *Jul − Oct*	(NY MSA) *Oct − Feb*
Constant (α_0)	.00261	.00268	-.000689	.00198
	(.00145)	(.00146)	(.000873)	(.00318)
NYC (α_1)	-.00339**	-.00410**	.00218**	-.00589
	(.00160)	(.00161)	(.000961)	(.00329)
Distance (α_2)	.0000454	.0000683	-.0000366	.000245
	(.0000566)	(.0000568)	(.0000339)	(0.000168)
NYC $\times$ Distance (α_3)	.000350***	.000322***	.0000461	.000293*
	(.0000678)	(.0000679)	(.0000405)	(.000177)
Observations	80402	80402	80402	23368

Border Effects: Interpretation

For restaurants in NYC within 20 minutes of the NJ border...

- On average, a 1 minute increase in the distance from the NJ border
  $\Rightarrow$ .03 percentage point increase in $\%\Delta$ price
- On average, a 10 minute increase in the distance from the NJ border
  $\Rightarrow$ .3 percentage point increase in $\%\Delta$ price

Av($\%\Delta(p)$) for all items in NYC from Oct to Feb = 0.80

Conclusion

How do restaurant prices change in response to increases in the minimum wage?

- Significant price pass through consistent with literature
- Heterogeneity across restaurant characteristics
- Heterogeneity across item type

How is customer perceived quality of restaurants affected by a minimum wage increase?

- Good restaurants get better
- Bad restaurants get worse

Do border effects have an impact on price pass through?

- Yes, in areas with a minimum wage increase

Minimum Wage Laws: Fight for 15 Schedule

Area	201 7	2018	2019	2020	2021	2022
NYC & FF	$12.00	$13.50	$15.00			
NY Upstate & FF	$10.75	$11.75	$12.75	$13.75	$15.00	
NYC & Lg	$11.00	$13.00	$15.00			
NYC & Sm	$10.50	$12.00	$13.50	$15.00		
NYC MSA	$10.00	$11.00	$12.00	$13.00	$14.00	$15.00
NY Upstate	$9.70	$10.40	$11.10	$11.80	$12.50	...

Back