

The Effects Of Pay Transparency On The U.S. Labor Market

Raymond He & Suryansh Upmanyu

September 27, 2024

University of Texas at Austin

*Effective January 1, 2021, Part 2 of the Equal Pay for Equal Work Act, C.R.S. § 8-5-101 et seq., **requires employers to include compensation in job postings**, notify employees of promotional opportunities, and keep job description and wage rate records. - Colorado Department of Labor and Employment*

Pay Transparency's Legislative Setting

- **Colorado:** January 1st, 2021
- **Jersey City, New Jersey:** April 13th, 2022
- **Ithaca City, New York:** September 1st, 2022
- **New York City, New York:** November 1st, 2022
- **Westchester County, New York:** November 6th, 2022
- **California:** January 1st, 2023
- **Washington:** January 1st, 2023
- **Albany, New York:** March 9th, 2023
- **New York:** September 17, 2023
- **Hawaii:** January 1st, 2024
- **Washington, D.C.:** June 30th, 2024
- **Illinois:** January 1st, 2025
- **U.S. Federal Government:** [Under discussion](#)

1. **Compliance:** Does wage information increase due to pay transparency laws?
2. **Effectiveness:** Are pay transparency laws effective in reducing:
 - The gender wage gap?
 - Wage dispersion?
3. **Consequences:** Do other labor market outcomes change?

1. **Pay transparency in other countries:** Denmark (Bennedsen et al., 2022), Canada (Baker et al., 2023), UK (Duchini et al., 2020), Austria (Gulyas et al., 2023), Germany (Seitz and Sinha, 2023), US (Obloj and Zenger, 2022)
 - **Mixed Effects:** Depends on how transparent the information is and whether employees are willing to inquire about wage information
 - PT in job postings can provide more transparent information without requiring job seekers to ask for it.
2. **Pay transparency in the U.S.:** Arnold et al. (2022), Feng (2024)
 - Focus on short-term effects of pay transparency in job postings in Colorado
 - We extend the analysis to California, Washington, and New York
 - We also plan to study the effects on the gender wage gap using ACS data

- **Online job postings:** Lightcast (formerly EMSI Burning Glass Technologies)
- $> 45,000$ online job boards and individual websites
- $\approx 75\%$ of the universe of online job postings in the U.S.
- January 1st, 2018 - December 31st, 2023
- $n \approx 204$ million job postings (post-cleaning)

Data Cleaning Procedure

Empirical Evidence

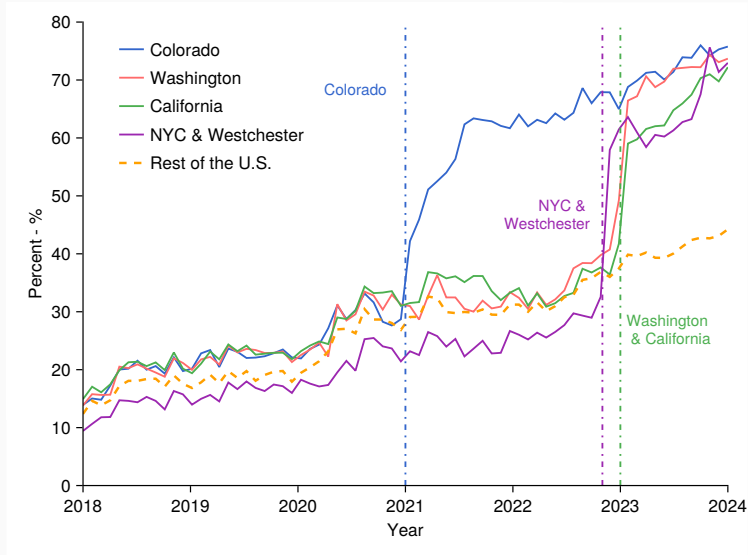


Figure 1: Treated Units Saw An Increase In Job Postings Containing Wage Information

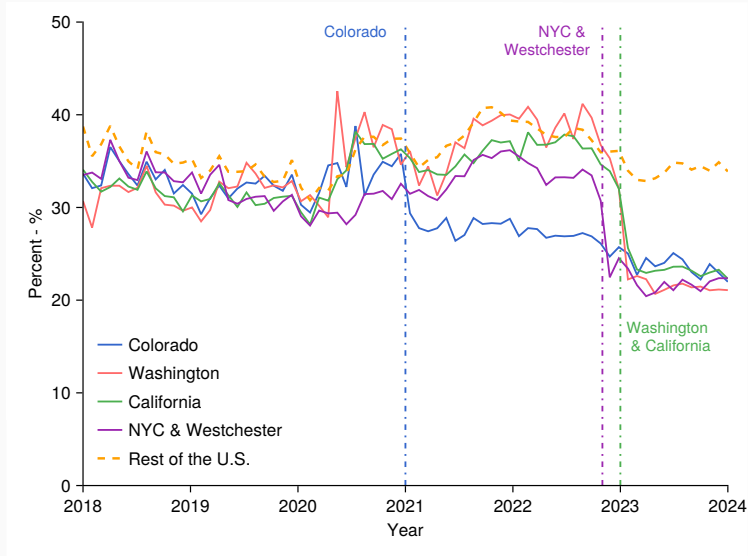


Figure 2: Job Information In The Form Of Point Wage Offers Reduces

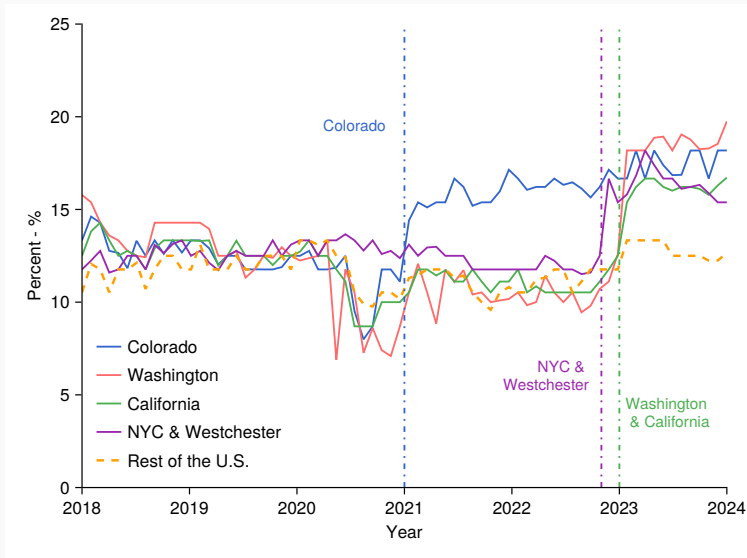


Figure 3: The Median Wage Range Width Increases

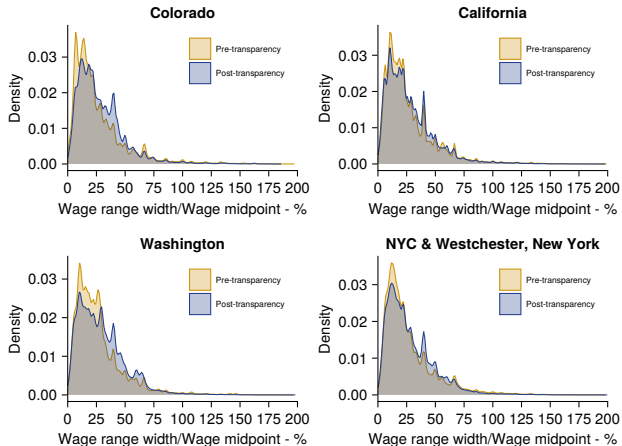


Figure 4: There Are More Wage Offers With Broader Wage Ranges Post Pay Transparency

Summary Statistics

Jurisdiction	% Wage Info	% Point Offers	Median Range Width
Colorado	23.30%	32.99%	11.86%
California	23.83%	32.53%	11.76%
Washington	23.40%	33.40%	11.76%
New York City + Westchester	16.65%	31.74%	12.50%
Rest Of The U.S.	20.52%	34.94%	11.76%

Table 1: 2018-2020 Wage Statistics

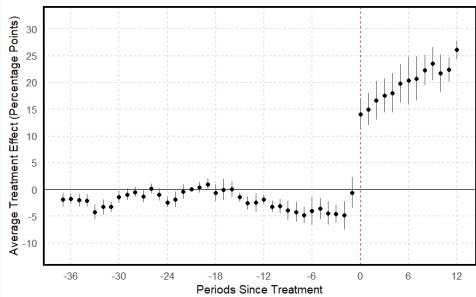
Firm Names

Distribution Of Firms

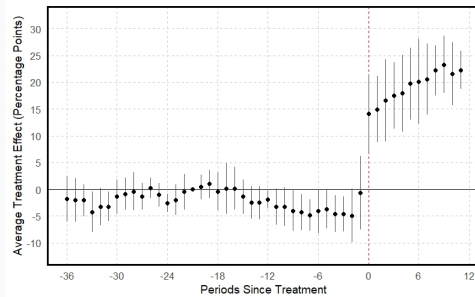
$$y_{ct} = \lambda_c + \theta_t + \sum_{\tau=-36}^{-2} \delta_{\tau} \mathbb{I}(t - t_c = \tau) + \sum_{\tau=0}^{12} \phi_{\tau} \mathbb{I}(t - t_c = \tau) + \nu_{ct}.$$

1. **Estimators:** (i) Two Way Fixed Effects, (ii) Callaway and Sant'Anna (2021), (iii) Sun and Abraham (2021), and (iv) Borusyak et al. (2024) estimators
2. **Groups (c):** (i) County or (ii) City Level
3. **Frequency (t):** Monthly
4. With and without **Population weights**
5. With and without **Anticipation Effects**
6. With and without **Control Variables:** (i) county GDP, and (ii) county unemployment rate/ labor market tightness

Outcome: Percent Of Postings With Wage Information



(a) Two Way Fixed Effects



(b) Callaway Sant'Anna

Figure 5: County Level, Monthly, No Controls, Allowing For Anticipation Effects

Anticipation Effects

With Controls

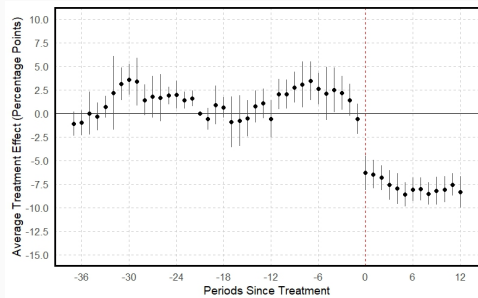
City Level

Alternative Estimators

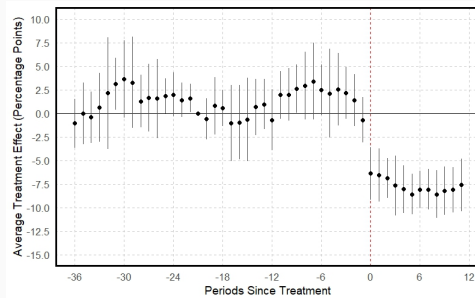
Population Weights

Heterogeneous Effects

Outcome: Percent Of Wage Offers In Terms Of Point Wages



(a) Two Way Fixed Effects



(b) Callaway Sant'Anna

Figure 6: County Level, Monthly, No Controls, Allowing For Anticipation Effects

Anticipation Effects

With Controls

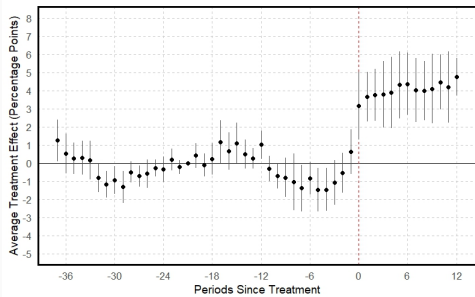
City Level

Alternative Estimators

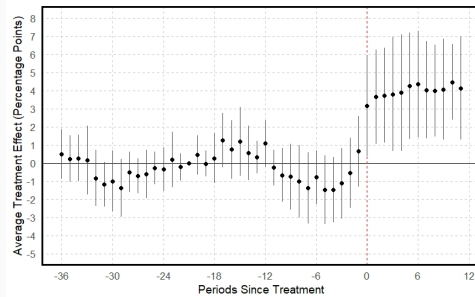
Population Weights

Heterogeneous Effects

Outcome: Median Range Width



(a) Two Way Fixed Effects



(b) Callaway Sant'Anna

Figure 7: County Level, Monthly, No Controls, Allowing For Anticipation Effects

Anticipation Effects

With Controls

City Level

Alternative Estimators

Population Weights

Heterogeneous Effects

Summary: Average Treatment Effects

Outcome	ATT (p.p.)	2018-2020 Mean(%)	ATT (%)
% Posts With Wage Info	22.212*** (1.824)	23.980	92.627
% Point Offers	-8.342*** (0.847)	31.097	-26.825
Median Range Width	3.877*** (0.740)	11.764	32.956

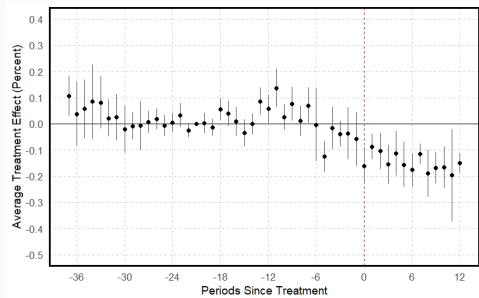
Table 2: TWFE, County Level, Monthly, With Anticipation Effects, With Population Weights

Composition Effects (Industries)

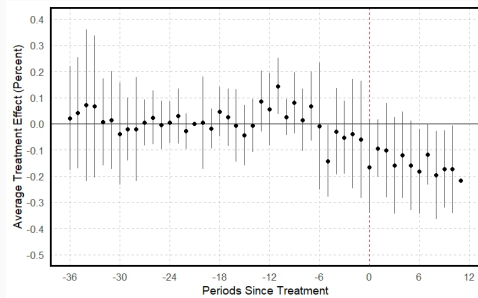
Composition Effects (Occupations)

Posted Wages

Outcome: Number Of Vacancies



(a) Two Way Fixed Effects



(b) Callaway Sant'Anna

Figure 8: County Level, Monthly, No Controls, Allowing For Anticipation Effects

Anticipation Effects

With Controls

City Level

Alternative Estimators

Population Weights

Heterogeneous Effects

Next Steps: Gender Wage Gap And Wage Dispersion

- Pay transparency laws are an important tool in reducing the gender wage gap
- Plan: Use ACS data and the methodology of Goldin (2014)
- 2023 ACS data releases on October 17, 2024

- We analyze the effects of pay transparency laws that require employers to provide wage information in job postings.
- We find that although more job postings contain wage information now, compliance is not perfect.
- We also find fewer point wage offers and broader wage ranges.
- Suggestive evidence that this happens due to larger effects in higher-skilled occupations and industries.
 - These jobs are more likely to have broader wage ranges in the first place.

Thank You!

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Arnold, David, Simon Quach, and Bledi Taska, “The impact of pay transparency in job postings on the labor market,” *Available at SSRN 4186234*, 2022.

Baker, Michael, Yosh Halberstam, Kory Kroft, Alexandre Mas, and Derek Messacar, “Pay transparency and the gender gap,” *American Economic Journal: Applied Economics*, 2023, 15 (2), 157–183.

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- Bennedsen, Morten, Elena Simintzi, Margarita Tsoutsoura, and Daniel Wolfenzon**, “Do firms respond to gender pay gap transparency?,” *The Journal of Finance*, 2022, 77 (4), 2051–2091.
- Borusyak, Kirill, Xavier Jaravel, and Jann Spiess**, “Revisiting event-study designs: robust and efficient estimation,” *Review of Economic Studies*, 2024, p. rdae007.
- Callaway, Brantly and Pedro HC Sant’Anna**, “Difference-in-differences with multiple time periods,” *Journal of Econometrics*, 2021, 225 (2), 200–230.
- Duchini, Emma, Stefania Simion, and Arthur Turrell**, “Pay transparency and cracks in the glass ceiling,” 2020.
- Goldin, Claudia**, “A grand gender convergence: Its last chapter,” *American economic review*, 2014, 104 (4), 1091–1119.

Gulyas, Andreas, Sebastian Seitz, and Sourav Sinha, “Does pay transparency affect the gender wage gap? Evidence from Austria,” *American Economic Journal: Economic Policy*, 2023, 15 (2), 236–255.

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Obloj, Tomasz and Todd Zenger, “The influence of pay transparency on (gender) inequity, inequality and the performance basis of pay,” *Nature Human Behaviour*, 2022, 6 (5), 646–655.

Seitz, Sebastian and Sourav Sinha, “Pay transparency, workplace norms, and gender pay gap: early evidence from Germany,” *Workplace Norms, and Gender Pay Gap: Early Evidence from Germany (February 25, 2022)*, 2023.

Sun, Liyang and Sarah Abraham, “Estimating dynamic treatment effects in event studies with heterogeneous treatment effects,” *Journal of Econometrics*, 2021, 225 (2), 175–199.

Appendix

Table 3: Number of Job Postings in Lightcast Data (Jan 2018 - Dec 2023)

	Number	% of All
All	235,637,477	100.00%
Remove internships	232,658,048	98.74%
Remove missing information	228,515,838	96.98%
Remove postings from Craigslist	219,453,588	93.13%
Remove military & unclassified occupations	212,122,347	90.02%
Remove irrecoverable firm names	204,989,211	86.99%

- Modify vacancies whose remuneration structure follows a pay schedule, e.g. in teaching, firefighting, etc.
- Address the concerns of Batra et al. (2023) that Lightcast data is unsuitable for the analysis of wages.
 - Jump in wage information post-2017 comes from the addition of Indeed and SimplyHired to Lightcast's job sources
- Identify job postings with imputed wages (Lafontaine et al., 2023) and reclassify them as having no wage information.

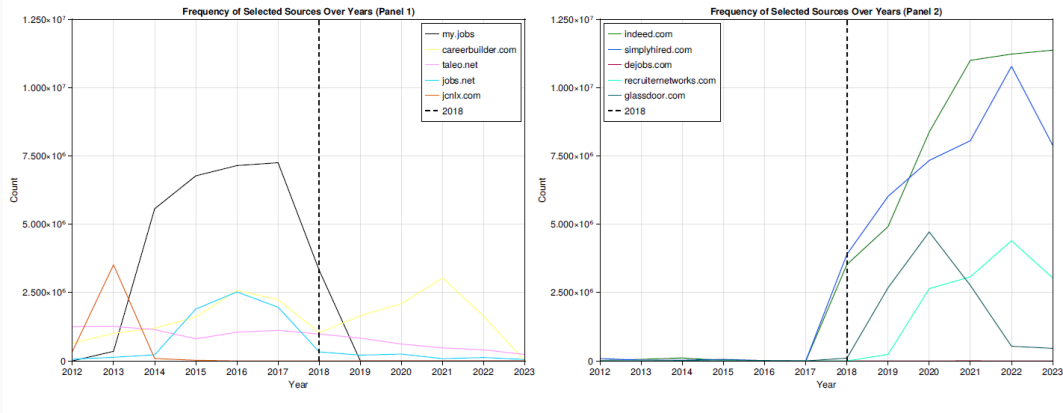


Figure 9: There Is A Change In Job Source Composition In 2018

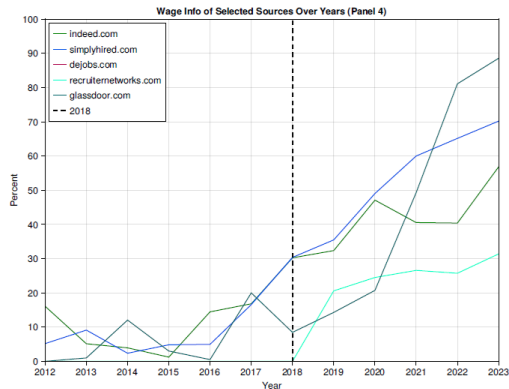
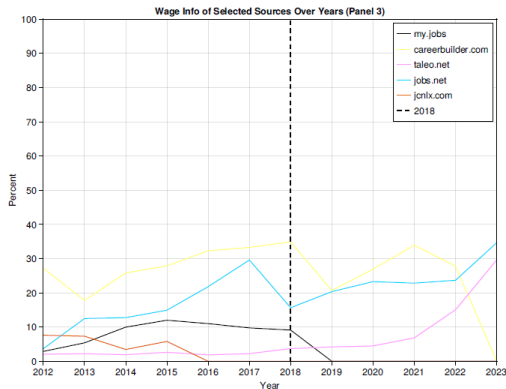


Figure 10: Indeed and SimplyHired Contain More Wage Information In Job Postings

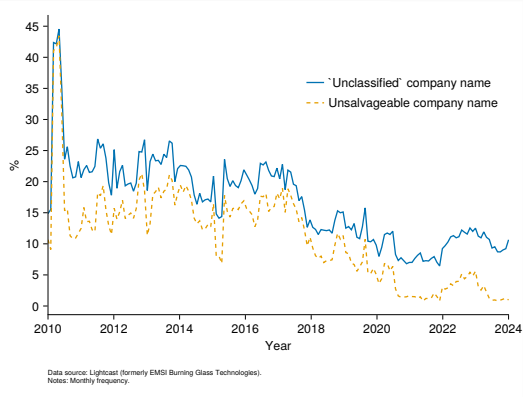


Figure 11: Job Postings Without Employer Information

- Unsalvageable: firm names like "NA", "unknown" etc

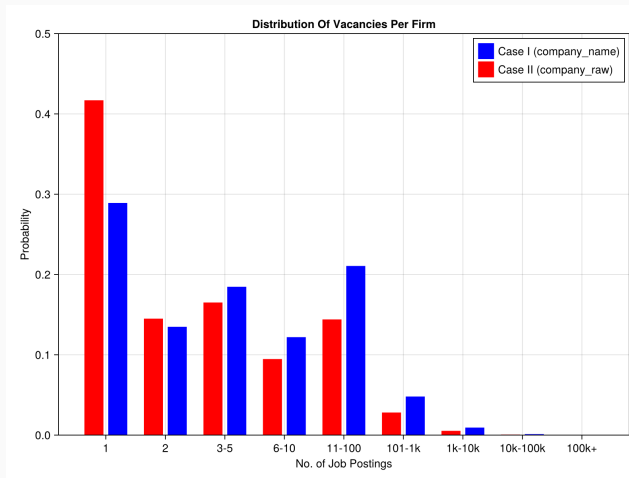
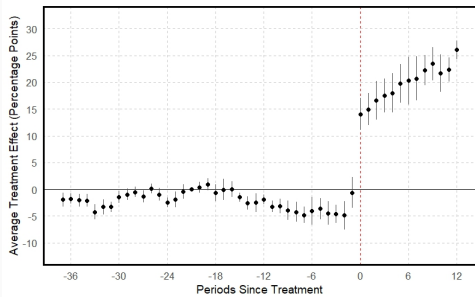
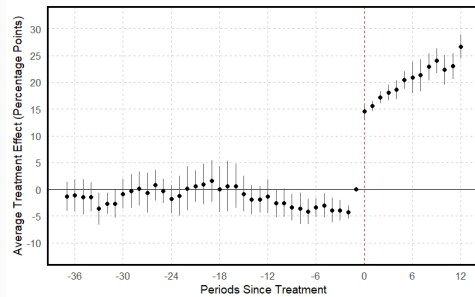


Figure 12: The Median Firm Has Between 2-5 Job Postings

Outcome: Percent Of Postings With Wage Information



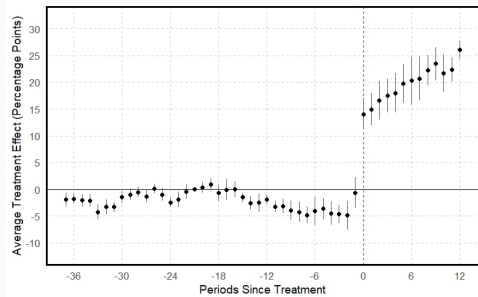
(a) With Anticipation Effects



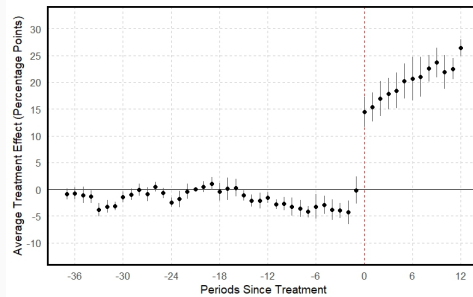
(b) Without Anticipation Effects

Figure 13: TWFE, No Controls, County Level, Monthly

Outcome: Percent Of Postings With Wage Information



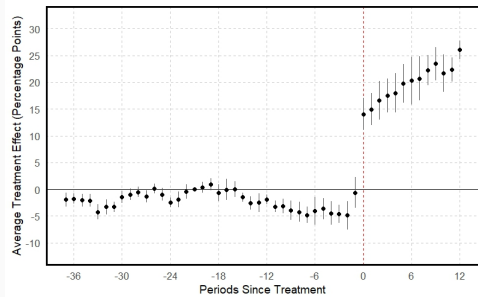
(a) Without Controls



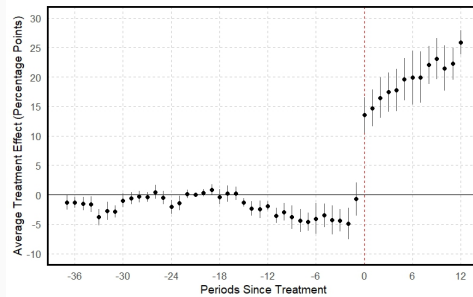
(b) With Controls

Figure 14: TWFE, Allowing For Anticipation Effects, County Level, Monthly

Outcome: Percent Of Postings With Wage Information



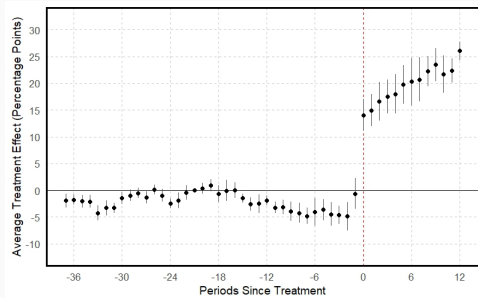
(a) County Level



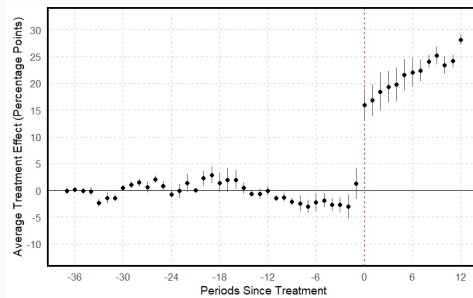
(b) City Level

Figure 15: TWFE, Allowing For Anticipation Effects, Without Controls, Monthly

Outcome: Percent Of Postings With Wage Information



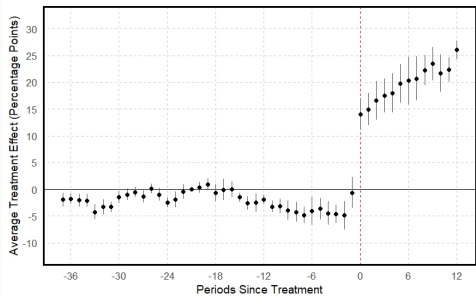
(a) Two Way Fixed Effects



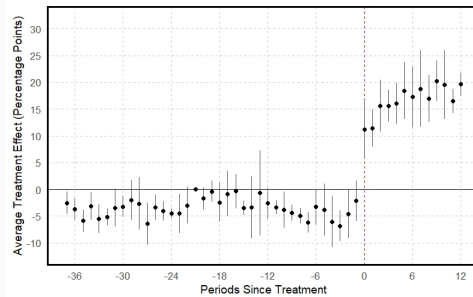
(b) Sun and Abraham

Figure 16: County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Percent Of Postings With Wage Information



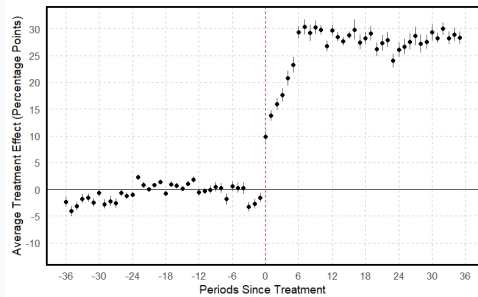
(a) With Population Weights



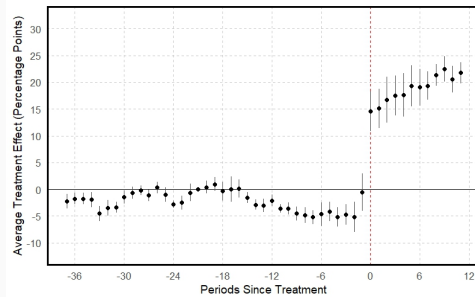
(b) Without Population Weights

Figure 17: TWFE, County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Percent Of Postings With Wage Information



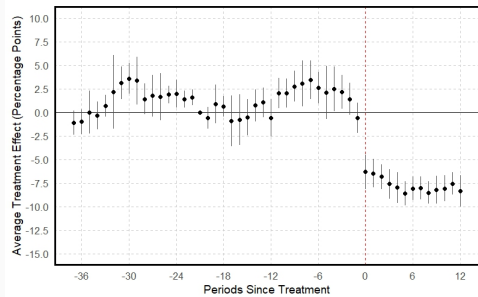
(a) Colorado



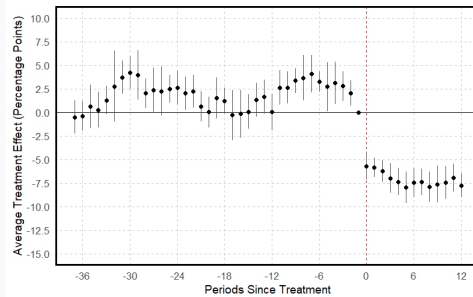
(b) California & Washington

Figure 18: TWFE, County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Percent Of Wage Offers In Terms Of Point Wages



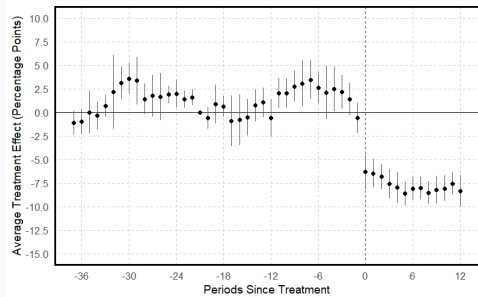
(a) With Anticipation Effects



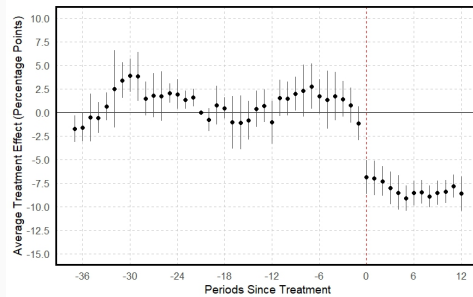
(b) Without Anticipation Effects

Figure 19: TWFE, No Controls, County Level, Monthly

Outcome: Percent Of Wage Offers In Terms Of Point Wages



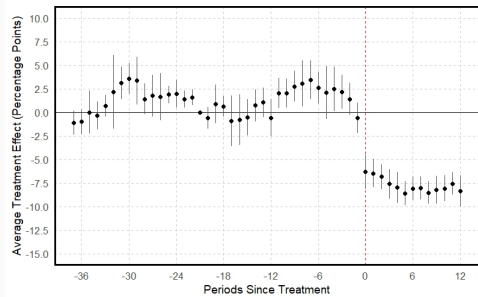
(a) Without Controls



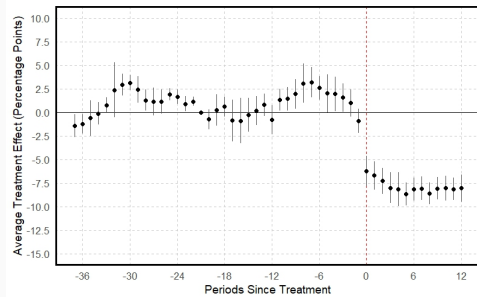
(b) With Controls

Figure 20: TWFE, Allowing For Anticipation Effects, County Level, Monthly

Outcome: Percent Of Wage Offers In Terms Of Point Wages



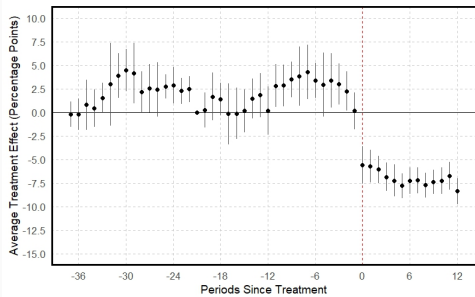
(a) County Level



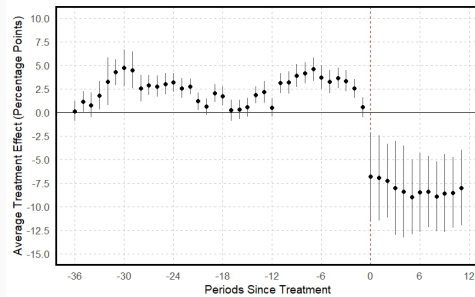
(b) City Level

Figure 21: TWFE, Allowing For Anticipation Effects, Without Controls, Monthly

Outcome: Percent Of Wage Offers In Terms Of Point Wages



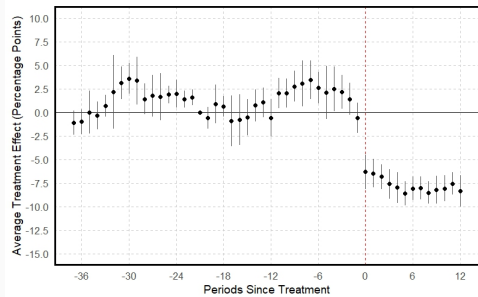
(a) Sun and Abraham



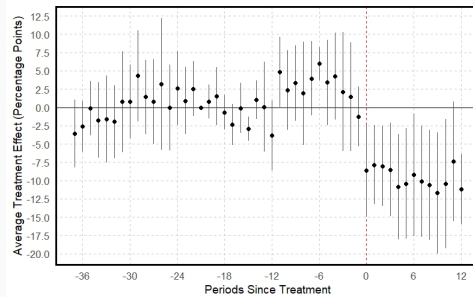
(b) Borusyak et al.

Figure 22: County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Percent Of Wage Offers In Terms Of Point Wages



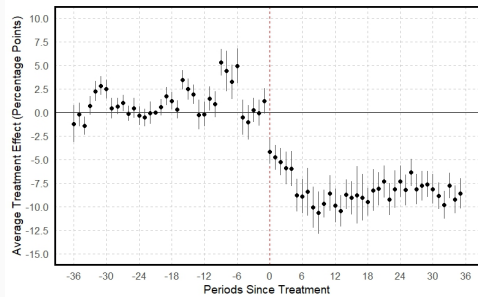
(a) With Population Weights



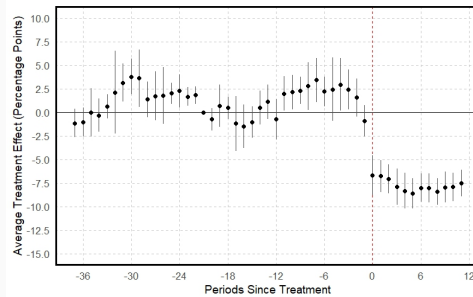
(b) Without Population Weights

Figure 23: TWFE, County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Percent Of Wage Offers In Terms Of Point Wages



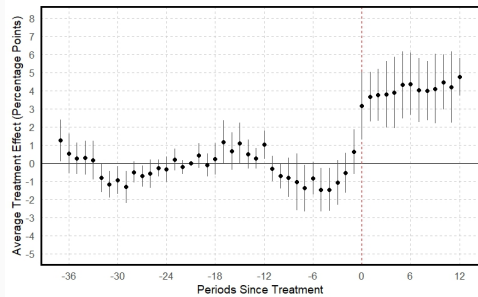
(a) Colorado



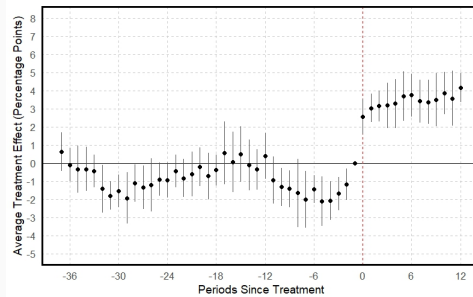
(b) California & Washington

Figure 24: TWFE, County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Median Range Width



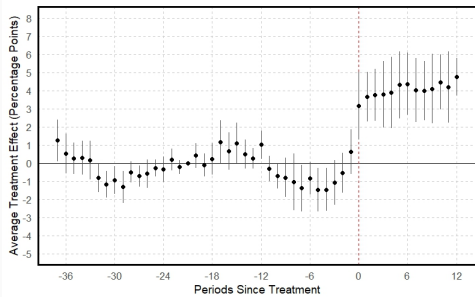
(a) With Anticipation Effects



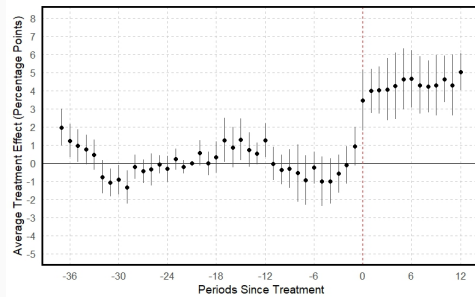
(b) Without Anticipation Effects

Figure 25: TWFE, No Controls, County Level, Monthly

Outcome: Median Range Width



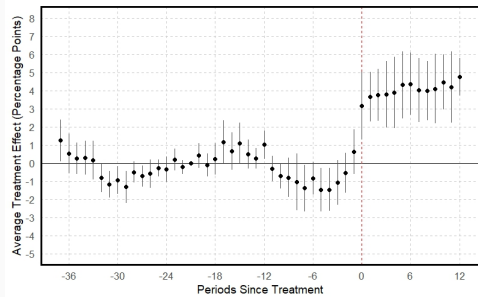
(a) Without Controls



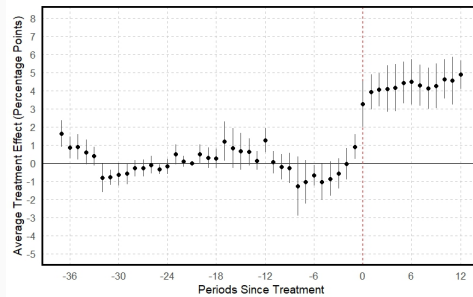
(b) With Controls

Figure 26: TWFE, Allowing For Anticipation Effects, County Level, Monthly

Outcome: Median Range Width



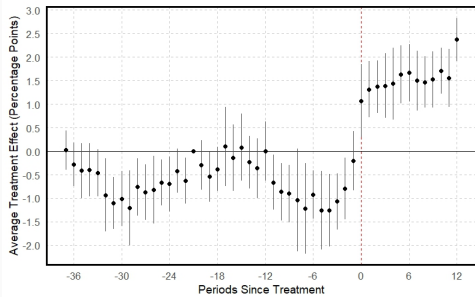
(a) County Level



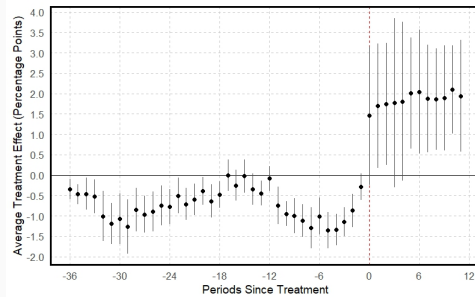
(b) City Level

Figure 27: TWFE, Allowing For Anticipation Effects, Without Controls, Monthly

Outcome: Median Range Width



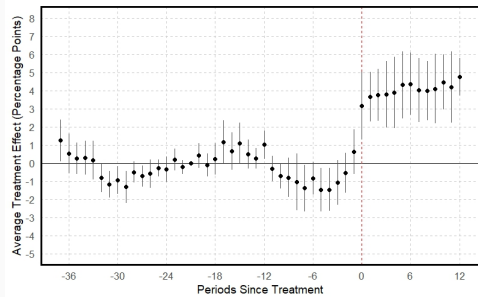
(a) Sun and Abraham



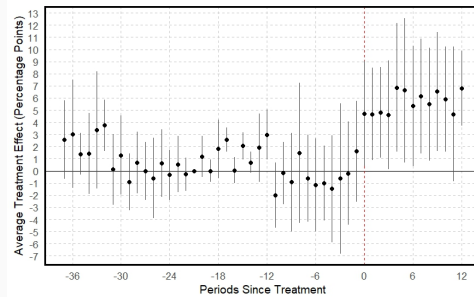
(b) Borusyak et al.

Figure 28: County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Median Range Width



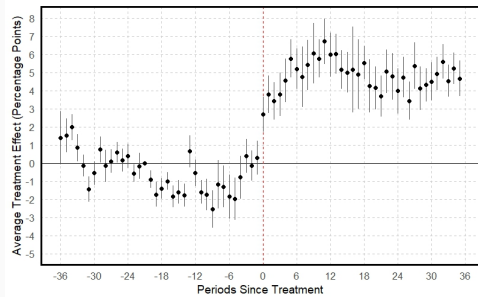
(a) With Population Weights



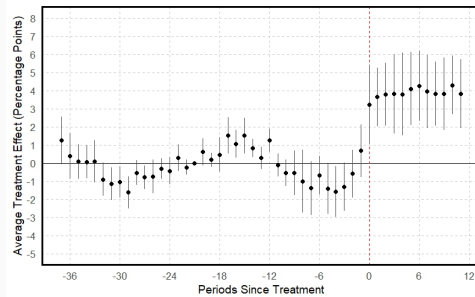
(b) Without Population Weights

Figure 29: TWFE, County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Median Range Width



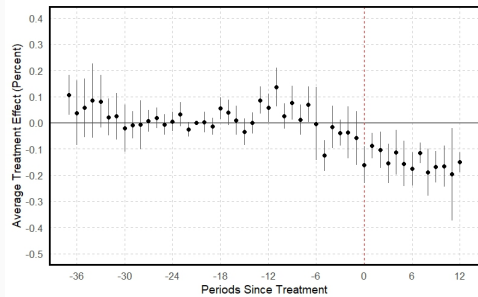
(a) Colorado



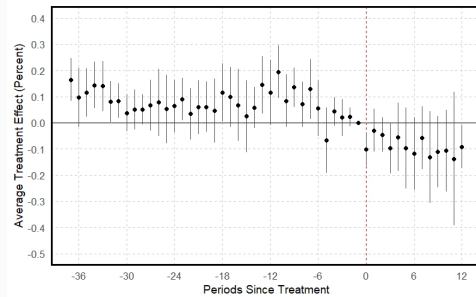
(b) California & Washington

Figure 30: TWFE, County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Number Of Vacancies



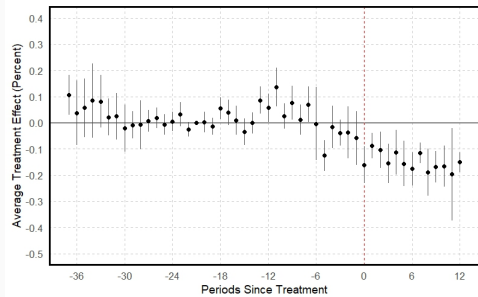
(a) With Anticipation Effects



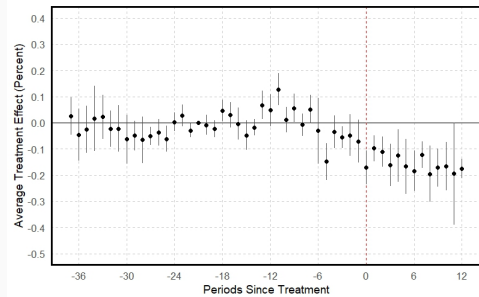
(b) Without Anticipation Effects

Figure 31: TWFE, No Controls, County Level, Monthly

Outcome: Number Of Vacancies



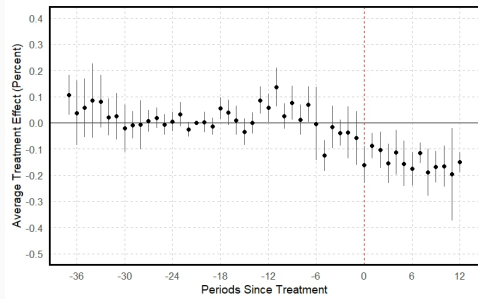
(a) Without Controls



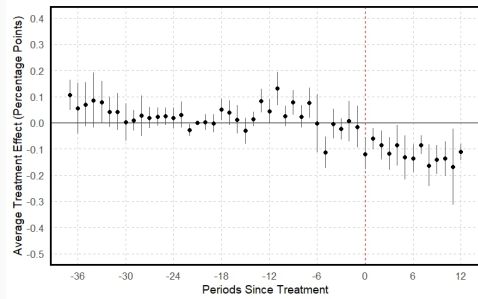
(b) With Controls

Figure 32: TWFE, Allowing For Anticipation Effects, County Level, Monthly

Outcome: Number Of Vacancies



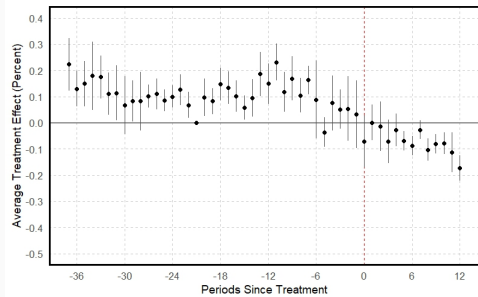
(a) County Level



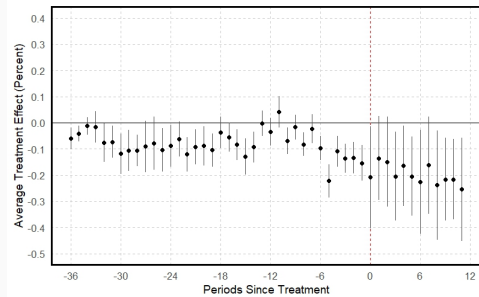
(b) City Level

Figure 33: TWFE, Allowing For Anticipation Effects, Without Controls, Monthly

Outcome: Number Of Vacancies



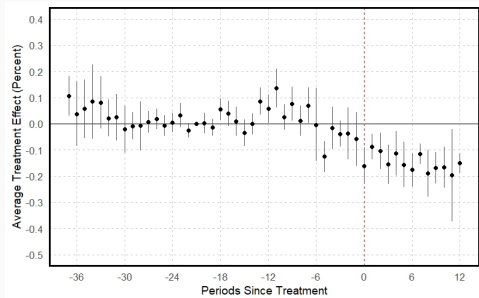
(a) Sun and Abraham



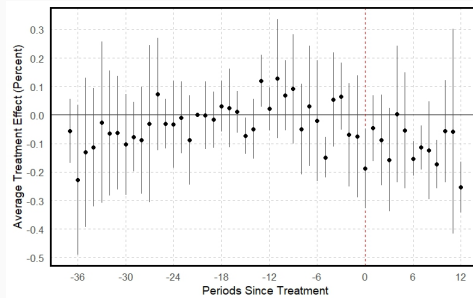
(b) Borusyak et al.

Figure 34: County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Number Of Vacancies



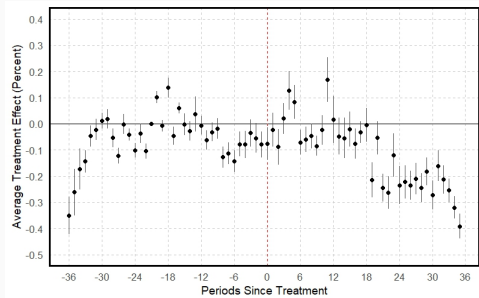
(a) With Population Weights



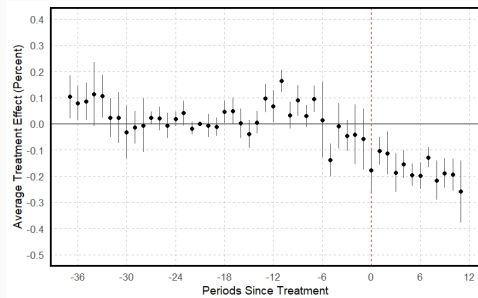
(b) Without Population Weights

Figure 35: TWFE, County Level, Monthly, No Controls, Allowing For Anticipation Effects

Outcome: Number Of Vacancies



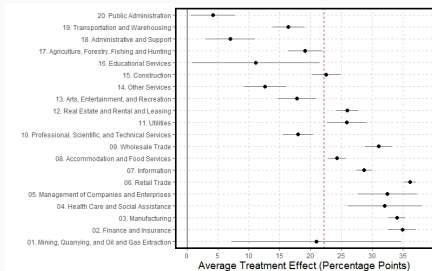
(a) Colorado



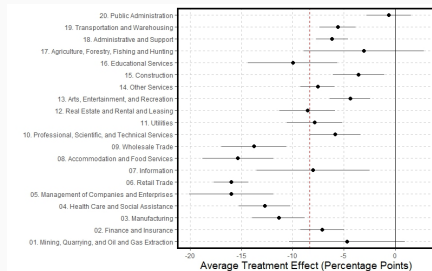
(b) California & Washington

Figure 36: TWFE, County Level, Monthly, No Controls, Allowing For Anticipation Effects

Heterogeneous Effects Across Industries



(a) Effect On Wage Information

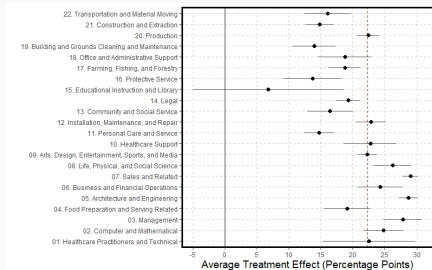


(b) Effect On Point Offers

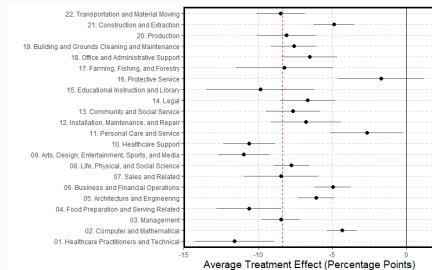
Figure 37: ATT Is Larger In Industries That Have Less Wage Info Before Treatment

- Industries are ordered in decreasing order of the amount of wage information before pay transparency (Public Admin had highest, Mining had lowest wage info)
- The red dashed line gives the aggregate ATT found in the previous slides

Heterogeneous Effects Across Occupations



(a) Effect On Wage Information



(b) Effect On Point Offers

Figure 38: ATT Is *Slightly* Larger In Industries That Have Less Wage Info Before Treatment

- Occupations are ordered in decreasing order of the amount of wage information before pay transparency (Transportation had highest, Healthcare had lowest wage info)
- The red dashed line gives the aggregate ATT found in the previous slides

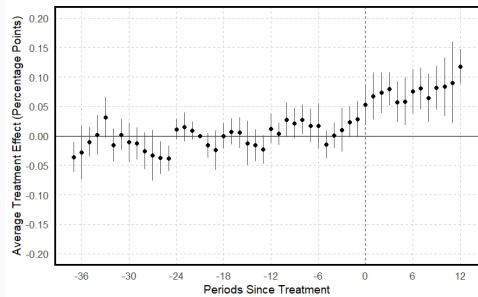
P(Uninformative range size) Across Occupations (SOC 6)

	California	Colorado	NYC & Westchester	Washington
P(range>50%) - pre	9.99%	7.66%	9.31%	8.07%
P(range>50%) - post	9.70%	8.02%	9.76%	10.28%
p.p change	-0.28%	0.37%	0.45%	2.20%

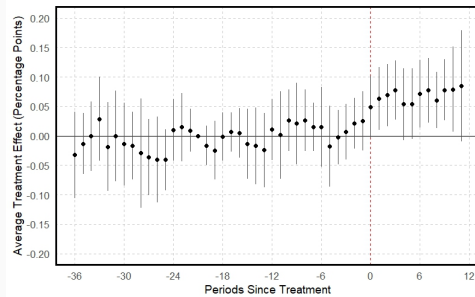
where for example,

- 50% range width: \$75,000 – \$125,000 (relative to the midpoint = \$100,000)

Outcome: Posted Wages



(a) Two-Way Fixed Effects



(b) Callaway Sant'Anna

Figure 39: County Level, Monthly Frequency, No Controls, Allowing For Anticipation Effects