

The Devil is in the Details: Sub-minimum Wage Provisions of Local Minimum Wages

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In the United States, local minimum wage ordinances are becoming increasingly popular, and ordinance provisions vary across jurisdictions. This paper uses fixed effects and synthetic control analysis to uncover the effects of a local minimum wage law in the Albuquerque/Bernalillo region of New Mexico. Using data from the Current Population Survey (CPS) this paper explores the prevalence of sub-minimum wages following an increase in the local minimum wage. Following the minimum wage increase, the proportion of the workforce earning less than the minimum wage increased. While the increase was most pronounced in food service occupations, subminimum wages became more prevalent for workers in all occupations. By exempting tipped workers from coverage, the ordinance provided an “out” for employers of many food-service and restaurant workers. In this policy environment, many employers who previously paid the regular minimum wage shifted toward the tipped minimum wage. This led to a decrease in hourly earnings for workers who customarily earn tips. These results suggest that sub-minimum wage provisions can offset potential gains to workers. This finding sheds light on an under-explored area of minimum wage legislation and provides information to lawmakers crafting minimum wage legislation.

Sub-minimum wage provisions allow employers to pay lower wages to workers who customarily receive tips. These laws allow payment of a lower hourly wage but mandate that employers “make up the difference” if the wage plus tips is below the prevailing minimum wage. This would not harm workers who earned the tipped minimum wage before the minimum wage increase but if the minimum wage increase leads employers to switch to the tipped sub-minimum wage, these workers would effectively receive a pay cut. Because restaurant workers represent a large proportion of

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minimum wage earners, minimum wage laws that exempt tipped employees may have a different labor market effect than those that do not.

The purpose of this research is to further illuminate the impact of city- and county-wide minimum wage ordinances by studying the effect of the Albuquerque/Bernalillo minimum wage laws of 2012-2013. To explore the impact of minimum wage ordinances, I utilize publicly available data from the Current Population Survey to estimate the impact on employment and wages. My work contributes to the existing body of minimum wage research by exploring the extent to which employers exploit sub-minimum provisions of municipal minimum wage laws. While legal, these actions run contrary to the intent of minimum wage legislation and may serve to offset or negate wage gains in the food-service industry.

Review of the Literature

Since Card and Krueger's (1994) landmark paper on the impact of minimum wages on employment in Pennsylvania and New Jersey fast food restaurants, the difference-in-differences and fixed effects models have been the identification strategy of choice in the minimum wage literature. Recent developments have raised issues surrounding the ability of these models to control for time-variant differences in patterns of growth between treated and control regions (Allegretto et al., 2013; Neumark & Wascher, 2017). Numerous approaches have been developed to supplement or augment the traditional difference-in-differences methodology including the synthetic control estimator which has been used in a number of recent minimum wage studies (Reich et al., 2018; Sabia et al., 2012). This paper utilizes both fixed effects and synthetic control estimators and finds a large degree of similarity between the estimates.

Over the past two decades, minimum wage research has evolved in response to developments in both methodology and policy. On the methodological side, the popular two-way fixed effects model developed in the 1990s has been criticized for its inability to effectively control for differences between treated and control regions. Influential research by Addison, Blackburn, and Cotti (2009), Allegretto, Dube, and Reich (2011) and Dube, Lester, and Reich (2010) has revealed that by failing to account for spatial heterogeneity, the panel data approach commonly used in minimum wage studies produces downwardly biased estimates. States enacting higher minimum wage laws typically have more polarized labor markets characterized by relatively slow growth in the low-skill labor market. Differences in rates of employment growth between treated and control states are often time variant, and when treated areas experience systematically lower levels of growth, the counterfactual created by untreated states will over-estimate the expected level of employment. As a result, minimum wage estimates are often incorrect and downward biased (Allegretto et al., 2013)

Researchers have employed a variety of approaches to control for spatial heterogeneity including the use of contiguous counties or commuting zones that span policy boundaries (Dube, Lester, & Reich, 2010; 2016), use of region-specific time trends (Allegretto, Dube, & Reich, 2011), triple difference methods (Clemens & Strain, 2017; 2018; Clemens & Wither, 2019) and synthetic control estimation

(Allegretto, Godoy, & Reich, 2018; Jardim, et al., 2017). While many of these approaches yield estimates of employment elasticities that are indistinguishable from zero, notable estimates of negative employment effects remain. Namely, Jardim et al. (2017) find large negative employment effects following the implementation of Seattle's citywide minimum wage, and the research of Clemens and Wither (2019) reveals that minimum wage increases can reduce employment growth, even after differences in underlying employment trends are accounted for. Additionally, some concern remains that the use of region-specific linear time trends or region-specific time fixed effects eliminates both useful and confounding variation in the data, thus biasing results toward zero (Neumark, Salas, & Wascher, 2014).

On the policy side, recently passed state and municipal minimum wages have provided economists with the opportunity to study nuances of minimum wage impact. While for many years, variation in minimum wages was limited to the Federal level, an increasing number of states and municipalities are now passing minimum wage laws. City and county minimum wage laws are particularly interesting because they alter the labor market landscape of small geographic areas. If firms respond to these higher minimum wage laws by moving across city lines, the labor market impacts of the minimum wage may be amplified. Additionally, research shows that firms respond to higher minimum wages by raising prices (Hirsch, Kaufman, & Zelenska, 2015; Romich, Allard, Obara, Althausen, & Buszkiewicz, 2018), a fact that may put these firms at a competitive disadvantage if consumers are easily able to shop in nearby cities with lower minimum wages and hence lower prices.

In 2003, San Francisco, California and Santa Fe, New Mexico became the first cities to enact citywide minimum wages. Between 2012 and 2015, thirty-three additional municipalities followed suit. Research on the effects of these laws is now emerging. The majority of the work has focused on Santa Fe (Hollis, 2015; Schmitt & Rosnick, 2011); San Francisco (Dube, Naidu, & Reich, 2007); San Jose (Allegretto & Reich, 2018) and Seattle (Allegretto, Godoy, & Reich, 2018; Reich, Allegretto, & Godoy, 2017; Jardim, et al., 2017). Like other recent minimum wage literature, studies of municipal minimum wages focus on both identifying affected employees and establishing a valid counterfactual. While some studies employ the standard two-way fixed effects model (Hollis, 2015; Yelowitz, 2005), others have employed more sophisticated methods such as synthetic control and factor models to critically evaluate the suitability of the control group (Allegretto, Godoy, & Reich, 2018; Jardim et al., 2017).

In a thorough but highly criticized study of the Seattle minimum wage, Jardim et al. (2017) utilize workers compensation data to investigate changes in earnings, employment and hours worked for all low paid jobs at single site establishments in Seattle. Using synthetic control and interactive fixed effects models, they find that the Seattle minimum wage raised hourly wages for workers while dramatically reducing their employment opportunities. Disemployment effects were larger at higher levels of the minimum wage, suggesting non-linearity in the labor market response. The authors find that the first increase in the Seattle minimum wage—from \$9.47 to \$11.00 per hour—did not reduce employment. However, the second increase—from \$11.00 to \$13.00 per hour—resulted in substantial disemployment. Finding employment elasticities as large as -2.6, the authors conclude that the

magnitude of employment loss from the second minimum wage increase was significant enough to reduce payroll expenses for employers of low-wage labor.

This study has been criticized for producing improbable results and for being impossible to replicate due to the confidentiality of the dataset used. Namely, the findings suggest that the minimum wage increase led to disemployment effects much larger than the range typically found in the literature, while also identifying effects of the minimum wage at earnings levels well beyond those typically impacted by the minimum wage (Zipperer & Schmitt, 2017). By restricting themselves to single-site employers, they excluded the experience of as much as 48 percent of the Seattle low-wage workforce (West, 2017). Because minimum wage increases may affect small and large employers differently, their results may be negatively biased.

Reich, Allegretto, and Godoy (2017) examined the effect of the Seattle minimum wage on food services workers using the Quarterly Census of Employment and Wages (QCEW), a commonly used and widely available dataset. Using the synthetic control methodology, they found that the Seattle minimum wage increased earnings for workers in restaurants (elasticity 0.098) but that the earnings increase was much higher for workers in limited services restaurants (elasticity 0.229). The Seattle minimum wage ordinance introduced a tip-credit provision in 2015 that set the minimum wage for tipped workers at \$10.00. Before this, tipped workers were entitled to the citywide minimum wage of \$9.47 per hour, so although the minimum wage ordinance allowed a tip-credit, tipped employees earning minimum wage received a mandated raise. The employment elasticities identified in the study were statistically indistinguishable from zero in all specifications. In limited services restaurants, the coefficient was negative but imprecisely estimated.

Using an event study and synthetic control estimates, Allegretto et al. (2018) investigate the effect of citywide minimum wage laws on earnings and employment for food services workers in six cities. Overall, they find minimum wage elasticities ranging between 0.13 and 0.25 suggesting that a 10 percent increase in the minimum wage increases earnings in the restaurant sector by 1.2 to 2.5 percent. These findings are misleading and perhaps understated however, because two of the six cities researched allowed for deeply reduced minimum wages for tipped employees. In contrast to the experience in Seattle, where the minimum wage law created a tipped wage provision by legislating smaller wage increases for tipped workers, in Chicago and Washington DC, the minimum wage legislation did not require raises for tipped employees. This situation—mirrored in Albuquerque/Bernalillo—may have been responsible for the statistically insignificant increases in wages for food services workers in these cities. Unlike the results in Jardim et al. (2017), this study finds no statistically significant changes in employment. No work has yet focused on the Albuquerque/Bernalillo minimum wage ordinances, nor have any studies explored the ways in which a deeply discounted tipped minimum wage impacts earnings gains for low paid workers that rely on tips.

Policy and Context

This paper looks at the effect of minimum wage increases in two municipalities in New Mexico: Bernalillo County and the City of Albuquerque². Both municipalities passed minimum wage ordinances in 2005 but these minimum wages had been surpassed by State and Federal minimums so were no longer binding. In 2012-2013, both municipalities amended their minimum wage ordinances to raise minimum wages above the State and Federal levels. In November 2012 the City of Albuquerque passed a ballot measure to raise the minimum wage for most employees working within city limits. The 13.3% increase from \$7.50 to \$8.50 went into effect on January 1, 2013 and is indexed for inflation. The city also amended its minimum wage ordinance to raise pay for tipped employees.³ Under the new ordinance, tipped employees would be paid a minimum of \$3.83 per hour in 2013, and 60% of the non-tipped minimum thereafter (City of Albuquerque, 2014). Prevailing minimum wage levels between 2008 and 2019 are presented in Table 1.

Bernalillo County raised the minimum wage effective in July of 2013. The amendment to the 2006 ordinance raised the minimum wage to \$8.00 per hour and indexed the nominal value to the Consumer Price Index. No changes were made to the tipped minimum wage rate at the county level (Bernalillo County, 2013). The Bernalillo County minimum wage covers all workers living in unincorporated areas of the county. In 2010, Bernalillo County had 662,564 residents. 545,852 (82%) of these were residents of Albuquerque, 107,147 (16.2%) resided in unincorporated areas of the county, and the remaining 9,565 (1.4%) lived in other incorporated areas of the county (Mid-Region Council of Governments, n.d.). So while the nominal values of the minimum wages in the two municipalities differ, businesses in both areas were subjected to increases in the minimum wage at roughly equal intervals.⁴ The data do not provide fine enough geographic delineation to allow me to differentiate Albuquerque city from the remainder of Bernalillo County but this should not cause issue because the majority of Bernalillo residents live in the city of Albuquerque. Thus, while 98.6% of Bernalillo County residents were eligible for a higher minimum wage in 2013, 82% were eligible for the slightly higher Albuquerque minimum wage.

² Bernalillo county is home to the city of Albuquerque.

³ The New Mexico minimum wage ordinance does not specify a tipped minimum wage. Employees who customarily receive tips are covered under Federal minimum wage law, which has been set at \$2.13 per hour since 1996. In the case that an employee's cash wages plus tips fall short of the minimum wage, employers are supposed to make up the difference so that the employee receives a wage that is at least equal to the highest minimum wage to which they are entitled.

⁴ Albuquerque minimum wage increases began on January 1 of each year. The first Bernalillo County increase became effective on July 1, 2013.

Table 1 | Prevailing minimum wages (2008-2019)

Year	Relevant minimum wages by jurisdiction							
	USA		New Mexico		Albuquerque		Bernalillo County	
	Regular	Tipped	Regular	Tipped	Regular	Tipped	Regular	Tipped
2008	6.55	2.13	6.50	2.13	7.15	2.13	6.55	2.13
2009	7.25	2.13	7.50	2.13	7.50	2.13	7.25	2.13
2010	7.25	2.13	7.50	2.13	7.50	2.13	7.50	2.13
2011	7.25	2.13	7.50	2.13	7.50	2.13	7.50	2.13
2012	7.25	2.13	7.50	2.13	7.50	2.13	7.50	2.13
2013	7.25	2.13	7.50	2.13	8.50	3.83	8.00	2.13
2014	7.25	2.13	7.50	2.13	8.60	5.16	8.50	2.13
2015	7.25	2.13	7.50	2.13	8.75	5.25	8.50	2.13
2016	7.25	2.13	7.50	2.13	8.75	5.25	8.65	2.13
2017	7.25	2.13	7.50	2.13	8.80	5.30	8.70	2.13
2018	7.25	2.13	7.50	2.13	8.95	5.35	8.85	2.13
2019	7.25	2.13	9.00	2.35	9.20	5.50	9.05	2.13
2020	7.25	2.13	9.00	2.35	9.35	5.50	9.20	2.13
2021	7.25	2.13	10.50	2.55	10.50	6.30	9.35	2.13

Source: Bernalillo County, City of Albuquerque; The tipped minimum wage applies to workers who regularly and customarily receive (Bernalillo County, 2013) tips in the course of their jobs; if total hourly earnings are less than the regular minimum wage for tipped employees, employers are to make up the difference. Minimum wage increases are indicated in bold.

Each minimum wage law covers different groups of workers and depending on circumstance and location, a given worker living in New Mexico may be covered by the Federal, state or local ordinance.⁵ The Albuquerque City and Bernalillo County ordinances have the most extensive coverage of the minimum wage laws, while the New Mexico State minimum wage law has the lowest coverage. While all three laws exempt Federal employees, registered apprentices, and salespeople working on commission, the New Mexico law also exempts domestic employees, certain categories of agricultural workers and most teenagers (New Mexico State, 2020). Both the Albuquerque and Bernalillo ordinances allow a \$1.00 per hour credit to the minimum wage for employers providing at least \$2,500 per year in health care or childcare benefits to workers (Bernalillo County, 2013; City of Albuquerque, 2014). Details on coverage and exclusions of the New Mexico, Bernalillo and Albuquerque ordinances can be found in Appendix 1.

Data and Sample Selection

I use data from the Current Population Survey (CPS) to investigate minimum wage impacts on employment and the prevalence of subminimum wage earnings. To create the dataset, I started with the full sample and dropped members of the armed forces and those who live in institutionalized group quarters to yield the civilian non-institutionalized sample. Then, to eliminate workers who are not covered by the minimum wage laws in Albuquerque/Bernalillo, I drop employees of state or Federal governments, unpaid workers in family businesses, the self-employed and those working

⁵ The city of Santa Fe also has a citywide minimum wage that is indexed to inflation. The Santa Fe rate increases on January 1 each year and ranged between \$9.50 per hour in 2009 to \$10.84 per hour in 2015.

fewer than three hours per week. I constructed a treatment variable equal to 1 if the individual was a resident of Bernalillo County.

Table 2 | Table of descriptive statistics for Bernalillo County and control regions

Descriptive Sample Characteristics, 2009 - 2019			
	Bernalillo	New Mexico Control	US Control Counties
Employment-to-population	0.513	0.442	0.552
<i>standard error</i>	(0.50)	(0.50)	(0.50)
Unemployment	0.039	0.041	0.039
	(0.19)	(0.20)	(0.19)
Labor force participation	0.553	0.483	0.591
	(0.50)	(0.50)	(0.49)
Teenagers	0.074	0.083	0.076
	(0.26)	(0.28)	(0.27)
Male	0.473	0.482	0.472
	(0.50)	(0.50)	(0.50)
Black	0.035	0.021	0.156
	(0.18)	(0.14)	(0.36)
Hispanic	0.445	0.378	0.128
	(0.50)	(0.48)	(0.33)
Native American	0.059	0.201	0.010
	(0.24)	(0.40)	(0.10)
Non-citizens	0.012	0.009	0.009
	(0.11)	(0.09)	(0.09)
Food service occupations	0.080	0.062	0.055
	(0.27)	(0.24)	(0.23)
Earning less than MW	0.057	0.046	0.029
	(0.23)	(0.21)	(0.17)
Average wage	15.63	15.63	15.90
	(8.66)	(8.60)	(9.04)
Median wage	13.62	13.80	14.00
Sample Sizes:			
Employment & demographics	60,568	84,332	5,285,038
Food service & less than MW	7,652	9,191	728,811
Wages	5,873	7,740	566,787

Note: Sample means with standard errors in parentheses. Sample sizes vary by variable as response rates vary by question.

To estimate a counterfactual, I compare employment outcomes in Bernalillo to two different control groups. The first consists of the remaining areas of New Mexico that were not subject to changes in minimum wage between 2009 and 2019. This excludes the counties of Santa Fe and Dona Ana but includes all areas of the state that are not large enough for independent inclusion in the CPS. The second control group consists of all US counties that are large enough for independent inclusion in the CPS and that were not subject to changes in municipal or state minimum wages over the time period surveyed. This group contains 98 counties in 22 states⁶. With respect to employment, unemployment and labor force participation, Bernalillo County more closely mirrors that of the

⁶ States that did not experience changes in the minimum wage between 2009 and 2019 include Alabama, Georgia, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Mississippi, New Hampshire, New Mexico, North Carolina, North Dakota, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, Wisconsin and Wyoming.

broadier US control group than that of surrounding New Mexico. However, both Bernalillo and the remainder of New Mexico have slightly lower average and median hourly wages than does the US control group. Employment, demographic and wage data for treatment and control groups are presented in Table 2.

Measuring the Impact of the Ordinance

To assess the statistical significance of the legislations impact, I organize the data as a county/year panel and begin by fitting a simple regression of the form:

$$(1) Y_{it} = \alpha + \beta Treat_{it} + \delta X_{it} + \varepsilon_{it}$$

Where Y_{it} is the outcome variable of interest and $Treat_{it}$ is a binary treatment variable equal to 1 if the respondent was a resident of Bernalillo County following the implementation of the minimum wage ordinance. X_{it} is a vector of demographic covariates including race, gender and marital status. β is our coefficient of interest and can be interpreted as the change in the dependent variable that occurred following the implementation of the ordinance. Elasticities are estimated with the following model:

$$(2) \ln Y_{it} = \alpha + \beta \ln MW_{it} + \delta X_{it} + \varepsilon_{it}$$

Here Y_{it} is the log of the proportion of the workforce earning subminimum wages and X_{it} is the vector of demographic covariates discussed above. Variable $\ln MW_{it}$ is a treatment variable equal to the natural log of the minimum wage in county i in year t . For this paper, I define the minimum wage as the slightly lower Bernalillo County minimum wage. β is our coefficient of interest and can be interpreted as the elasticity of the dependent variable with respect to the minimum wage.

I test the robustness of the regression model by fitting additional models containing county and year fixed effects, and/or county specific linear time trends. Although race and gender are fixed attributes for individuals, the percentage of individuals of a given race or gender within a county will change over time. The coefficients on these covariates allow me to control for race and gender through changes in the relative racial and gender compositions of the different counties.

To supplement the fixed effects estimates, I employ the synthetic control methodology developed by Abadie, Diamond and Hainmueller (2010). The synthetic control estimator is an extension of the difference-in-difference estimator that accommodates differing pre-treatment trends between treated and control units. Like difference-in-differences models, the synthetic control model estimates the treatment effect by comparing pre- and post-treatment differences in treated and control regions. However, unlike the difference-in-differences model, in which all control units are weighted equally, the synthetic control model assigns weights to each potential control region such that the pre-treatment difference between the treatment and control regions are minimized. The trajectory of the outcome variable is then monitored post-treatment to determine the effect of

treatment. This allows for easy visual identification of a treatment effect by establishing a common pre-treatment trend in the variable of interest.

In creating the synthetic control group, I include as possible donors all counties in the 20 U.S. states that did not experience a minimum wage increase between 2009 and 2019 and whose populations were large enough for independent inclusion in the CPS.⁷ Each county in the donor pool is assigned a weight between 0 and 1. These weights are chosen to minimize the difference between the treatment and control group in the pre-treatment period with respect to key variables. I chose to minimize the yearly pre-treatment differences of the dependent variable as well as mean values of key demographic variables. Inference is performed by examining adjusted p-values as outlined in Abadie et al. (2010).

I implement the synthetic control estimator using the `synth_runner` package for Stata created by Galiani and Quistorff (2017). The estimates generated are based on a summative factor model of the form:

$$(3) Y_{it} = \sum_{t=1}^T \alpha_{it} D_{it} + Y_{it}^N$$

In this model, Y_{it} is our outcome variable of interest (proportion of the workforce earning sub-minimum wages), α_{it} is a time-varying treatment effect and D_{it} is a dummy variable indicating that unit i is treated in time t . The variable Y_{it}^N is the estimated level of the outcome variable as estimated by post-treatment level in the synthetic control group. Values for the α_{it} and the corresponding p-values are reported separately.

To uncover the relationship between the minimum wage increase and labor market outcomes in Bernalillo/Albuquerque, I begin by identifying the impact of the minimum wage hike on the distribution of wages for low wage workers. I follow this with an in-depth discussion of changes in the prevalence of sub-minimum wage earnings among workers covered by the ordinance. I then investigate the degree to which the higher minimum wage resulted in changes to employment for teens and food service workers in Albuquerque and Bernalillo.

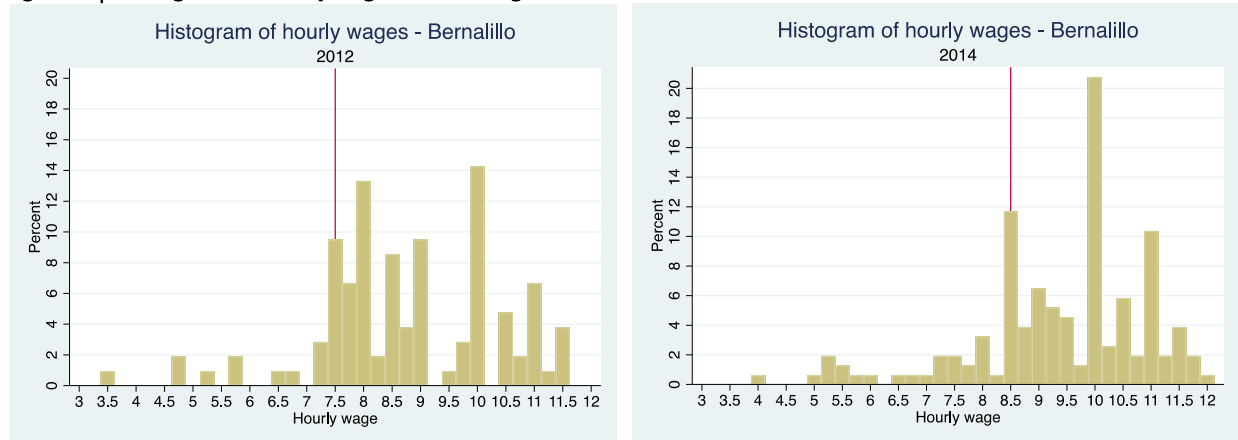
Impact on Subminimum Wage Earnings

The Bernalillo/Albuquerque minimum wage ordinance was successful at shifting the wage distribution of low wage workers, although evidence suggests that many workers continued to earn sub-minimum wage earnings. This may have resulted from non-compliance or from an expanded reliance on the sub-minimum wage provisions of the law. Histograms of wages for workers reporting

⁷ Synthetic control states include Alabama; Georgia; Idaho; Iowa; Kansas; Louisiana; Maine; Mississippi; New Hampshire; North Carolina; North Dakota; Oklahoma; Pennsylvania; South Carolina; Tennessee; Texas; Utah; Virginia and Wisconsin.

hourly earnings of \$12 or less are presented in Figure 1. In the left-hand panel, the pre-treatment distribution of low-wage earnings reveals a binding minimum wage of \$7.50 per hour with additional spikes at \$8.00, \$8.50, \$9.00 and \$10.00 per hour. The right-hand panel shows that post-ordinance, the low-wage distribution shifted rightward with a spike at the new minimum wage of \$8.50. From these histograms, it is apparent that the ordinance placed a binding constraint on employers but that compliance was not perfect. Wages below \$8.50 per hour persisted after the minimum wage was raised.

Figure 1 | Histogram of hourly wages for low wage workers



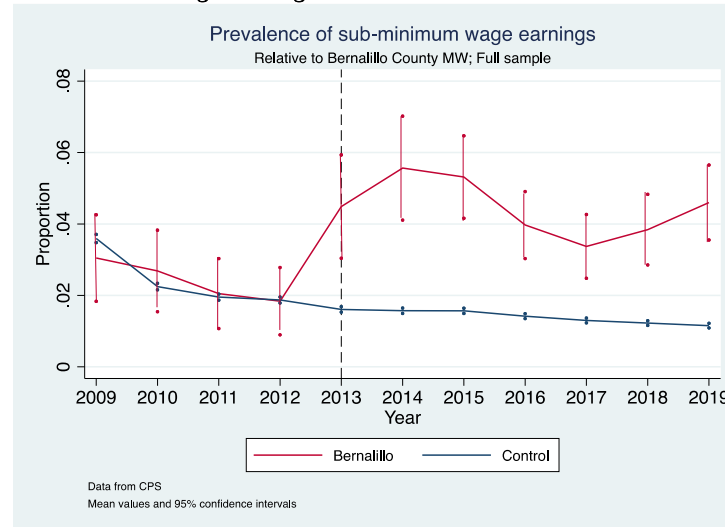
Note: Data from CPS. Distribution of hourly earnings for workers reporting wages of less than \$12 per hour. Vertical lines represent the prevailing minimum wage. The Bernalillo minimum wage was implemented in July 2013 so the higher minimum applied for roughly half of the year. The 2012 histogram shows the pre-treatment distribution and 2014 represents the post-treatment distribution.

The Albuquerque/Bernalillo minimum wage laws are unusual among municipal minimum wages in the fact that they allow for a significantly reduced sub-minimum wage for tipped employees. Both San Francisco and San Jose ordinances require employers to pay tipped workers at the same minimum wage rate as non-tipped workers, while in Seattle, the minimum wage law created a tipped wage provision by limiting the raise required for tipped workers. This contrasts sharply to the requirements of the Albuquerque/Bernalillo ordinances that allow employers to pay deeply discounted minimum wage rates for workers who customarily receive tips. The tipped minimum wage in Albuquerque increased from \$2.13 in 2012 to \$3.38 in 2013 and was set at 60% of the regular minimum wage thereafter. In Bernalillo, tipped workers were entitled only to the Federal tipped minimum wage of \$2.13. This legislative provision provided an “out” for employers of tipped workers. Although the histograms do not show a spike at \$2.13 or \$3.83 specifically, the payment of subminimum wages became more widespread following the minimum wage increase (figure 2)⁸. Before the passage of the ordinance in 2013, the proportion of sub-minimum wage earners in

⁸ For the purpose of this paper, I define the minimum wage as the *lower* of the Albuquerque/Bernalillo minimum wage laws.

Bernalillo County closely tracked that in the remainder of the United States⁹. Beginning in 2013, the proportion of sub-minimum wage earners in Bernalillo County increased sharply giving rise to a gap between Bernalillo and the comparison group that persisted for the remainder of the observation period.

Figure 2 | Prevalence of sub-minimum wage earnings over time in Bernalillo and control counties



Note: Proportion of all workers earning less than minimum wage in Bernalillo and Control counties. Mean values and 95% confidence intervals shown. Minimum wage defined as the Albuquerque minimum wage rate. This will overstate the jump in sub-minimum wage payments, but results are robust to the use of the lower Bernalillo County wage rate.

Minimum wages are designed to prevent the payment of very low wages to unskilled workers. However, when there is widespread noncompliance with the law, or when key groups of workers are exempt from coverage, vulnerable workers may not receive the benefit of the higher wage floor. In Albuquerque/Bernalillo, the payment of subminimum wages became more widespread following the passage of the ordinance and this change can be explained in part by non-compliance and in part by an expanded use of the lower tipped minimum wage. I attempt to separate the effects of non-compliance from the expansion of the tipped minimum wage by examining the impact of the ordinance on wages and subminimum wages for the full sample, food service workers and for workers that do not customarily receive tips or commission.

Table 3 presents the regression estimates of the minimum wages impact on the prevalence of subminimum wages for the full sample. The top panel presents the results from equation (1) and the coefficients can be multiplied by 100 and interpreted as the percentage point change in the prevalence of subminimum wage earnings following the implementation of the higher minimum wage in 2013. The bottom panel contains the elasticities calculated from equation (2) and can be

⁹ The comparison group consists of the 98 US counties that did not experience a minimum wage increase during the sample period.

interpreted as the percentage change in the proportion earning subminimum wages that results from a percentage change in the minimum wage.

Table 3: Minimum wage effects on the prevalence of subminimum wage earnings in the full sample.

	(1)	(2)	(3)	(4)
Treatment effect	0.006***	0.006***	0.006***	0.005***
Standard error	(0.000)	(0.000)	(0.000)	(0.000)
P	0.000	0.000	0.000	0.000
95% CI	(0.005 - 0.006)	(0.005 - 0.006)	(0.005 - 0.006)	(0.004 - 0.006)
Observations	1,543	1,543	1,543	1,543
R-squared	0.097	0.363	0.372	0.500
Elasticity	4.366***	4.814***	5.331***	4.991***
Standard error	(0.454)	(0.934)	(0.755)	(1.178)
P	0.000	0.000	0.000	0.000
95% CI	(3.469 - 5.262)	(2.971 - 6.656)	(3.840 - 6.822)	(2.665 - 7.316)
Observations	1,364	1,364	1,364	1,364
R-squared	0.114	0.376	0.384	0.480
Model Controls:				
County & year fixed effects	N	Y	Y	Y
Demographic controls	N	N	Y	Y
County specific time trends	N	N	N	Y

Standard errors clustered by county

*** p<0.01, ** p<0.05, * p<0.1

The results show that the prevalence of subminimum wages increased by a small but statistically significant margin following the minimum wage increase. The coefficient estimates range from 0.5% to 0.6% and are robust to the inclusion of covariates, fixed effects and region-specific time trends. This implies that overall, there was a roughly one-half percentage point increase in the prevalence of sum-minimum wage earnings throughout the county. While small in magnitude, the elasticities are much larger, ranging from 4.4 to 5.3 suggesting that that a 10% increase in the minimum wage led to an increase of 44 - 53% in the proportion of workers earning wages below the required minimum.

This does not necessarily imply non-compliance with the ordinance. There are three important exemptions from the law that deserve exploration: tipped workers, salespeople earning commission, and employees who also receive at least \$2,500 per year in health or childcare benefits. To explore these possible legitimate avenues of non-compliance, I investigate the effect of the ordinance on two additional groups of workers: food service workers and those who do not report earning tips or commissions¹⁰. Regression results with 95% confidence intervals for these two groups are presented in table 4 and table 5.

¹⁰ The CPS contains a variable "OTPAY" which identifies workers who ordinarily receive tips, commission or overtime pay. The majority of workers who respond yes to this variable are employed in food service occupations although a substantial proportion are also employed in retail occupations.

Table 4: Minimum wage effects on the prevalence of subminimum wage earnings in food service jobs

	(1)	(2)	(3)	(4)
Treatment effect	0.055***	0.052***	0.053***	0.074***
Standard error	(0.003)	(0.004)	(0.004)	(0.007)
P	0.000	0.000	0.000	0.000
95% CI	(0.049 - 0.061)	(0.045 - 0.059)	(0.045 - 0.061)	(0.060 - 0.087)
Observations	1,524	1,524	1,516	1,516
R-squared	0.018	0.158	0.170	0.328
Elasticity	2.763**	3.816***	3.830***	5.346***
Standard error	(1.329)	(0.591)	(0.626)	(1.548)
P	0.039	0.000	0.000	0.001
95% CI	(0.140 - 5.387)	(2.648 - 4.983)	(2.594 - 5.066)	(2.290 - 8.402)
Observations	1,061	1,061	1,060	1,060
R-squared	0.024	0.370	0.384	0.535
Model Controls:				
County & year fixed effects	N	Y	Y	Y
Demographic controls	N	N	Y	Y
County specific time trends	N	N	N	Y

Standard errors clustered by county

*** p<0.01, ** p<0.05, * p<0.1

From table 5, we can see that there was a larger percentage point increase in subminimum wage earnings among food service workers than in the full sample, but that the elasticities are smaller. The larger percentage point change is reflected in a smaller elasticity here because the prevalence of subminimum wage earnings is higher in food service occupations than in the rest of the economy. So while the percentage point change is larger, the resulting percentage change is smaller. Regression estimates suggest that the minimum wage hike increased the proportion of workers earning subminimum wages by between 5.2 and 7.4 percentage points. The results are statistically significant in all specifications and are robust to the inclusion of county specific linear time trends. This is consistent with the hypothesis that employers began using the lower tipped minimum wage to workers that receive tips but does not support the idea that subminimum wage earnings are unique among food service workers. Rather, the elasticity of subminimum wage earnings with respect to the minimum wage is actually slightly higher in the full sample.

Table 5: Minimum wage effects on the prevalence of subminimum wage earnings in non-tipped occupations

	(1)	(2)	(3)	(4)
Treatment effect	0.005***	0.005***	0.005***	0.005***
Standard error	(0.000)	(0.000)	(0.000)	(0.000)
P	0.000	0.000	0.000	0.000
95% CI	(0.005 - 0.005)	(0.005 - 0.005)	(0.004 - 0.005)	(0.004 - 0.006)
Observations	1,543	1,543	1,543	1,543
R-squared	0.095	0.368	0.375	0.508

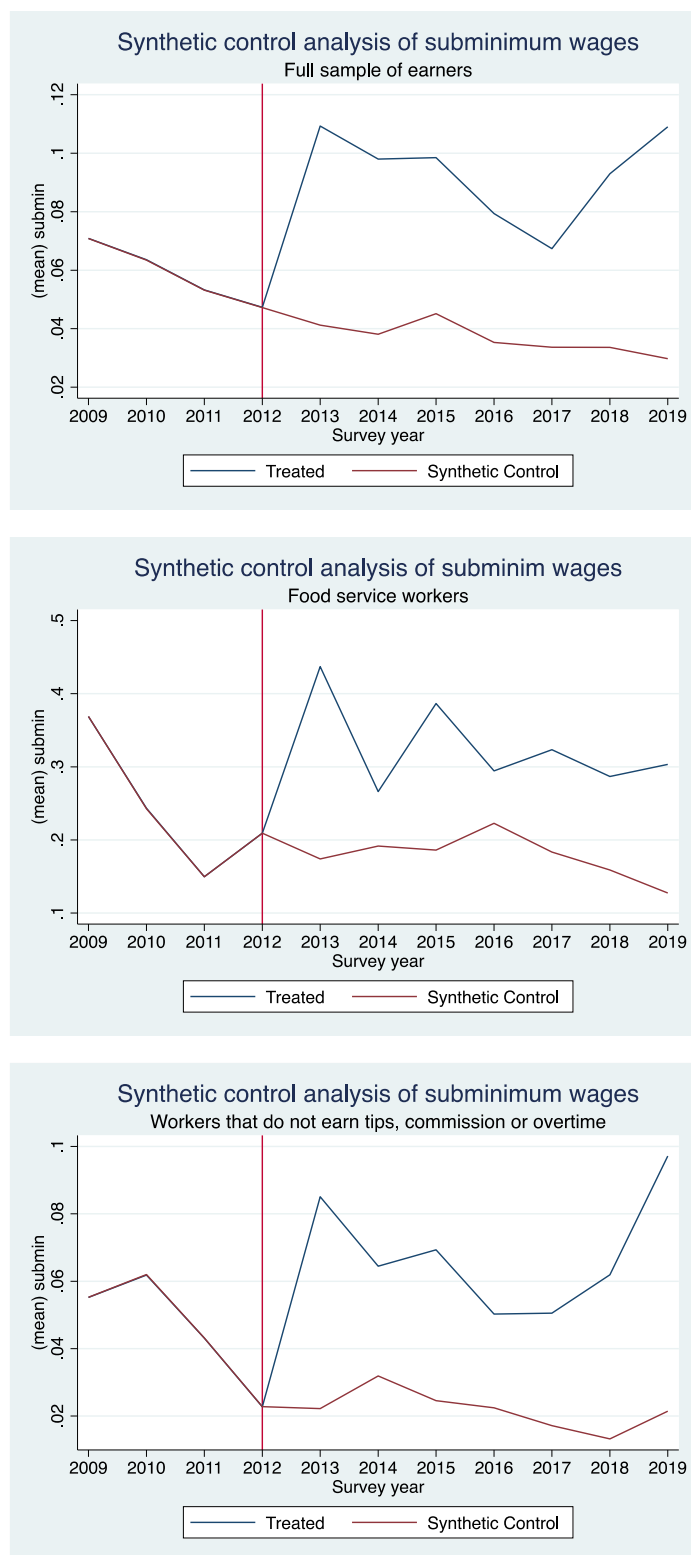
Elasticity	5.662***	6.147***	6.534***	7.138***
Standard error	(0.318)	(0.711)	(0.624)	(1.071)
P	0.000	0.000	0.000	0.000
95% CI	(5.034 - 6.289)	(4.744 - 7.550)	(5.303 - 7.765)	(5.024 - 9.252)
Observations	1,208	1,208	1,208	1,208
R-squared	0.125	0.467	0.475	0.550
Model Controls:				
County & year fixed effects	N	Y	Y	Y
Demographic controls	N	N	Y	Y
County specific time trends	N	N	N	Y
Standard errors clustered by county				
*** p<0.01, ** p<0.05, * p<0.1				

The results in table 6 suggest that non-compliance has been an issue following the minimum wage increase. While the treatment effect estimates are small, indicating a 0.05 percentage point increase in subminimum wage earnings among workers that do not ordinarily receive tips, commission or overtime pay, the elasticities are large and range from 5.6 to 7.1. Taken together, these numbers tell us that before the ordinance, sub-minimum wages were not widespread among non-tipped workers but that increases in the minimum wage were responsible for a large relative increase in sub-minimum rates of pay¹¹. The elasticities tell us that for a 10% increase in the minimum wage, the proportion of workers earning subminimum wages increased between 56 and 71 percent relative to the control group of US Counties.

The synthetic control results support and expand on the conclusions drawn from the regression analysis by providing both an overall treatment effect and treatment effects by year. When looking at the treatment effects by year (figure 3 and table 6)), we can see that the increase in the proportion of the workforce earning subminimum wages was sharp and sustained. For each group, the increase in subminimum wage earnings began in 2013 and persisted until 2019. On average, the prevalence of sub-minimum wage earnings increased by 4.7 percentage points in the full sample, 15.0 percentage points in food-service occupations and by 4.7 percentage points among workers that do not customarily earn tips, commission or overtime in their jobs.

¹¹ Sub-minimum wage earnings are very uncommon among workers that do not earn tips, commission or overtime. Before 2013, 0.36% of earners in this category reported earning wages below the statutory minimum (95% CI 0.26 - 0.48%); after 2013 this value had nearly doubled to 0.68% (95% CI 0.59 - 0.76%).

Figure 3 | Comparisons of the prevalence of subminimum wages in the Bernalillo against the synthetic control group.



Note: These figures plot the proportion of the workforce earnings subminimum wages in the full sample and in sub-groups of food-service workers and those that do not earn tips or commission. Each sub-group has an independently created synthetic control.

Table 6: Synthetic control estimates of the effect on subminimum

	Full Sample	Food Service	Non-tipped workers
2013	0.068*** (0.000)	0.263* (0.051)	0.063** (0.022)
2014	0.060*** (0.000)	0.074 (0.128)	0.033** (0.011)
2015	0.053*** (0.000)	0.200* (0.064)	0.045** (0.011)
2016	0.044*** (0.000)	0.072 (0.167)	0.028** (0.011)
2017	0.034** (0.011)	0.140* (0.077)	0.033*** (0.000)
2018	0.059*** (0.000)	0.128* (0.077)	0.049** (0.011)
2019	0.079** (0.011)	0.175** (0.038)	0.076** (0.022)
Average	0.047**	0.150*	0.047**
Std pval	(0.011)	(0.077)	(0.022)
Pre RMSPE	0.926	0.821	0.935
# of donor counties	94	78	93

Note: Standardized pvalues in parentheses. Effects by year listed in the top panel, average effects presented at the bottom. Pre-RMSPE measures the quality of the match between the treated group and the synthetic control in the pre-treatment period. A Pre-RMSPE of 0.926 indicates that the pretreatment match was better than that of 92.6% of the similarly created matches between placebo regions and their respective synthetic controls.

Taken together, it appears that the Bernalillo/Albuquerque minimum wage increases of 2013 led to an increase in the payment of subminimum wages to employees. In part this increase was driven by a reduction in wages in food-services occupations. Because many food services jobs are tipped (either directly or through tip-sharing systems) this increase may have been in compliance with the law. However, the prevalence of subminimum wages increased in jobs that should not have been exempt from coverage. To estimate the wage loss to employees who began earning subminimum wages following the passage of the ordinance, I first calculated the wage gap, defined as:

$$Wage\ gap_{it} = wage_{it} - minimum\ wage_{it}$$

The wage gap for individual i at time t is equal to that earners wage at time t minus the relevant minimum wage at time t . For food services workers earning less than the minimum wage, the average wage gap in Bernalillo County is \$2.72 per hour. For non-tipped workers earning less than the

minimum wage, the average wage gap is \$0.98 per hour¹². For a food-service employee working full time for 50 weeks per year, this equates to an annual earnings loss of \$5,440. For non-tipped workers, this equates to a loss of \$1,960 per year. For food service workers, part of this loss might be offset if patrons increased the amount that they regularly tipped, but I think that's unlikely. The most probable scenario is that this group of workers experienced a reduction in remuneration as employers relied on their ability to pay reduced minimum wages to tipped workers.

Conclusion

This paper uses data from the Current Population Survey to explore the effects on subminimum wage earnings of the Albuquerque/Bernalillo minimum wage ordinances of 2013. Following the passage of the minimum wage ordinance, the proportion of workers earning less than the statutory minimum wage increased. This was driven, in part, by a clause in the ordinance allowing employers to pay reduced wages to workers who ordinarily earn tips. However, a reliance on the tipped provision of the minimum wage law explains only part of the rise in subminimum wages. An increase in subminimum wages was apparent both in the full sample and among a subset of workers that do not earn tips or commission.

From a policy perspective, attention must be paid to the desirability and equitability of reduced minimum wages for tipped workers. The Bernalillo/Albuquerque ordinances apply a loose threshold in determining who earns tips and this allows employers to pay the lower tipped wage to workers who earn only \$30 per week in tips. For a policy designed to protect earnings of vulnerable workers, this appears to be an oversight. Additionally, results such as these highlight the importance of enforcing minimum wage laws.

¹² This figure is close to the \$1.00 per hour reduction in minimum wages allowed by the policy for employees who earn more than \$2,500 per year in child or healthcare benefits. This area deserves investigation.

Appendix 1: Minimum wage ordinance details on coverage and exemptions

Jurisdiction	Employer Coverage	Employer Exemptions	Worker Coverage	Worker Exemptions
City of Albuquerque	Any employer who is required to have a business license or business registration from the City of Albuquerque. Any agency who hires and has discretion over wages on behalf of an employer.	The United States, the State of New Mexico or any political subdivision of the State.	Full time, part-time, seasonal or temporary workers who work for at least two hours in a given week.	Interns working for academic credit or work-study employees. Volunteers. Salespeople paid by piecework, on a flatrate schedule or who receive commission. Registered apprentices.
Bernalillo County	Any employer who is required to have a business registration from the county and who directly or indirectly employs or controls wages, hours or working conditions of employees.	The United States, the State of New Mexico or any political subdivision of the State.	Full time, part-time, seasonal or temporary workers who work for at least two hours in a given week.	Interns working for academic credit or work-study employees. Volunteers. Salespeople paid by piecework, on a flatrate schedule or who receive commission. Registered apprentices. Any person employed by a parent, spouse or sibling. In-house babysitters. Any employee under the age of 16
New Mexico State	Any individual, partnership, association, corporation, business trust, legal representative or any organized group of persons employing one or more employees at any one time, acting directly or indirectly in the interest of an employer in relation to an employee, but shall not include the United States.	The United States government	All employees unless explicitly excluded.	Domestic servants in a private home. Executives, managers, supervisors. Volunteers. Salespeople paid by piecework, on a flatrate schedule or who receive commission. Any employee aged 18 and younger who has not graduated from secondary school. Seasonal employees who work for employers who have received exemptions. Any employee receiving board. Most agricultural employees.

Sources: *Bernalillo County (2014)*; *City of Albuquerque (2014)*; *New Mexico State (2020)*

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