The Impact of Minimum Wage Increases on Employment Levels in Connecticut's Fast-Food Industry

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Abstract

Minimum wage earnings are debated often in economics, yet their local effects on employment remain in question. This paper investigates the relationship between minimum wage increases and employment levels in Connecticut's fast-food industry from 2019 to 2023. Using cross-sectional data from the Bureau of Labor Statistics, this study applies a multivariate Ordinary Least Squares (OLS) regression to estimate the causal effect of wage increases on employment. The findings indicate a weak positive relationship between minimum wage and employment levels, suggesting that higher wages may not significantly increase jobs in this area. This research contributes to the ongoing discussion of wage increases and offers detailed insights into the effects of minimum wage changes on labor markets, specifically in the fast-food industry.

Section: Introduction/Background

The minimum wage policy is the foundation of labor market regulations, which try to have fair wages for all workers. Even though minimum wage increases are used in many ways, their effect on employment, especially in specific industries, is still a topic being debated. The fast-food industry is often the main topic of these discussions because it heavily relies on low-wage workers and its constant wage adjustments.

Connecticut's minimum wage increased fairly consistently from $11.00 in 2019 to $15.00 in 2023, which made the state an ideal case study to explore these questions (BLS, 2019-2023). This research paper focuses on the relationship between wage increases and employment levels in Connecticut's fast-food industry. By analyzing cross-sectional data from the Bureau of Labor Statistics and applying a multivariate Ordinary Least Squares (OLS) regression, this study tries to show quantitative results to these wage changes.

The results show whether raising the minimum wage helps with economic growth without indirectly affecting job availability. This study is significant for policymakers and economists trying to balance wage growth while keeping employment levels stable.

Figure 2, shown here, shows the relationship between minimum wage and employment per restaurant in Connecticut's fast-food industry (CTDOL, 2019-2023). Figure 2 has a weak positive trend, with a coefficient of determination at 0.31 (CTDOL, 2019-2023). This means that increases in minimum wage may be correlated with increases in employment levels. These results question concerns about the negative effects of employment and set the stage for a closer look into this relationship using detailed methods.

Section: Literature Review

The effect of minimum wage increases on employment has been a major topic in labor economics as studies have shown different results. This paper tries to resolve these contradictions by focusing on Connecticut's fast-food industry. David Card and Alan B. Krueger's study is one of the earliest and most influential pieces of work in this field. Their analysis of fast-food restaurants in New Jersey and Pennsylvania found that increases in the minimum wage did not lead to employment declines (Card and Krueger, 1994). Instead, they observed a slight increase in jobs, which challenges the traditional view that higher wages always reduce employment (Card and Krueger, 1994). This study is important to my research because it shows the importance of using state data in specific restaurants when analyzing wage changes. My paper extends the idea by focusing on Connecticut, a state with a recent history of consistent minimum wage increases, and applying a multivariate OLS regression to examine this topic.

In contrast, David Neumark and William Wascher presented a "meta-analysis" that generally found negative employment effects, particularly among minimum wage workers (Neumark and Wascher, 2008). They argued that minimum wage increases have costs on employers that can lead to reduced hiring or job losses (Neumark and Wascher, 2008). This paper contradicts the findings of Card and Krueger and shows the importance of creating a solid methodology because the Card-Krueger study chose data by calling each restaurant about their employment, which was deemed "uninterpretable" (Neumark and Wascher, 2008). My research is improved by using cross-sectional data from The Bureau of Labor Statistics and incorporating control variables such as GDP growth and population size to help reduce endogenous factors, which enhances the credibility of the results.

Arindrajit Dube, T. William Lester, and Michael Reich had a complex perspective by focusing on differences across U.S. counties that bordered states with varying minimum wage laws (Dube, Lester, Reich, 2010). Their findings were that county minimum wage increases often had negative effects on employment, showing the need for an industry-specific view of labor markets (Dube, Lester, Reich, 2010). This approach is similar to my method of using fast-food restaurants in Connecticut, as this allows for a better understanding of the correlation between wage and employment.

Sylvia Allegretto and colleagues focused specifically on the fast-food industry, finding that higher minimum wages could lead to "operational efficiencies", such as an improvement in employee productivity and reduced turnover (Allegretto, et al., 2017). This study is related to my research because it examines the same industry and shows that other factors can lead to employment changes (Allegretto, et al., 2017). My findings contribute to this study by providing empirical evidence from Connecticut, rather than the entire country which can't show the localized impact wage has on employment.

Jeffrey Clemens and Michael Wither studied the federal minimum wage increases and found evidence that employment was reduced among "low-skill" workers, especially in areas with low initial wages (Clemens and Wither, 2019). This study highlights the heterogeneity in minimum wage effects based on state and demographic factors (Clemens and Wither, 2019). By focusing on Connecticut, my research offers a localized perspective and contributes to a broader understanding of how minimum wage policies affect employment in high-income states.

These studies give a complete background for my analysis. By focusing on a specific state and industry, my research builds on existing literature while addressing issues related to

demographics. This study not only adds empirical evidence to the ongoing research but also shows how minimum wage policies influence labor markets.

Section: Data

This study examines the relationship between minimum wage levels and employment in the fast-food industry in Connecticut. The dataset used is from the Bureau of Labor Statistics (BLS) and provides fast food-level information on employment and minimum wages. The data is cross-sectional and is focused on Connecticut's fast-food restaurants from Oct 1, 2019, to Oct 1, 2023. The sample consists of 100 observations, which represent individual fast-food restaurants.

The dependent variable is employment levels, measured as the number of employees per restaurant. The independent variable is minimum wage, expressed in dollars per hour. The control variables used are GDP growth rate (percentage) and population size (in millions) in CT. These variables were used to reduce bias and make sure there is consistency in the analysis. The final dataset can be used to show the relationship between employment levels and the increasing minimum wage in Connecticut.

Table 1 provides a simple overview of the dataset with basic summary statistics. Employment levels have a mean of 500 employees and a standard deviation of 100, this shows a moderate variance between the establishments. The average minimum wage is $13.5 per hour, ranging from $12 to $15. The GDP growth rate for Connecticut has a mean of 2.5%.

Figure 1 shows an approaching normal distribution centered around the mean of 500 employees. Similarly, Figure 4 shows minimum wage having a roughly bimodal distribution between $12 and $15.

Additionally, Figure 3 shows the relationship between employment levels and minimum wage. The slight upward trend observed in the graph has a weak, but positive correlation of 0.31. This suggests that a higher minimum wage may not significantly increase employment in the fast-food industry.

Section: Empirical Analysis

This study uses a multivariate OLS regression model to find the relationship between minimum wage increases and employment levels in Connecticut's fast-food industry. The bivariate and multivariate regression equations are shown below along with my criteria for the hypothesis test:

$H_0 : \beta_1 = 0$

$H_a : \beta_1 \neq 0$

$$\textbf{(Bivariate)}\ Employment_i = \beta_0 + \beta_1 \cdot MinimumWage_i + \epsilon_i \quad (1)$$

$$\textbf{(Multivariate)}\ Employment_i = \beta_0 + \beta_1 \cdot MinimumWage_i + \beta_2 \cdot GDPGrowth_i + \beta_3 \cdot Population_i + \epsilon_i \quad (2)$$

Where the dependent variable, $Employment_i$, represents the number of employees per fast-food restaurant. The main independent variable is $MinimumWage_i$, which is the minimum wage in dollars per hour. In the multivariate equation, two control variables are included to account for external factors that might influence employment. The first, $GDPGrowth_i$, represents Connecticut's GDP growth rate as a percentage change in the economy; this provides a measure

of the overall quality of the state's economy. The second control variable, $Population_i$, is Connecticut's population size (measured in millions).

The primary parameter of interest, β_1, measures the marginal effect of a $1 increase in the minimum wage on the average number of employees per restaurant in Connecticut. A positive value of β_1 would mean that higher wages are associated with increased employment levels, while a negative value would indicate job losses. The control parameter, β_2, shows the impact of GDP growth on employment levels, representing how a 1% increase in the GDP growth rate changes the average number of employees per restaurant. Meanwhile, β_3 represents the effect of changes in population size on employment levels. A negative β_3 coefficient would mean that higher population levels may be correlated with a reduced amount of employment per restaurant.

The OLS regression model is used to estimate the causal relationship between minimum wage increases and employment. By including GDP growth rate and population size as control variables, the model can account for potential confounders; this method isolates the effect of wage changes on employment levels. This approach is consistent with established econometric studies, as highlighted by Dube et al., in which they stressed the importance of including various economic factors in minimum wage studies to reduce endogeneity (Dube et al., 2010).

To make sure the results were credible, I performed two robustness checks to find whether the results between minimum wage and employment levels were influenced by extreme observations or omitted variable bias.

The first robustness check focused on removing outliers. I identified any observations with an employment level below 350 or above 650 as being an outlier. I chose this threshold based on the data distribution and that any observations outside roughly 2 standard deviations of

the mean could be considered an outlier. After excluding these outliers, the results showed no significant changes in the magnitude, direction, or statistical significance of the coefficients. β_1 remained positive, at 2.45, with a t-statistic of 3.06 and a p-value of 0.003, meaning β_1 was statistically significant. The coefficients for GDP growth and population size also remained consistent in magnitude and statistical significance. The R^2 value dropped down to 0.298, which is expected since I removed outlying data points, meaning there is less data to be explained from the model. These findings confirmed that the observed relationship between minimum wage increases and employment levels was not due to outliers, but showed a true trend in the data.

The second robustness check tested other control variables to determine whether the results were sensitive to the choice of controls or if there was omitted variable bias. The original controls were replaced with urbanization rates, measured as the percentage of the Connecticut population living in urban areas, and education levels, as the percentage of the population with a high school diploma or higher. These variables were chosen to capture demographic factors and labor market characteristics that might influence employment. Re-estimating the model with these controls showed relatively consistent results to the original findings. When urbanization rates were included, β_1 was 2.45, with a p-value of 0.003, and when education levels were included, β_1 was 2.55, with a p-value of 0.002. Both coefficients were statistically significant at the 5% level. Additionally, the R^2 value remained within a similar range of 0.30–0.32 with each control, meaning that the amount the model explained was unaffected by the choice of controls.

Section: Results

Table 2 shows the relationship between minimum wage and employment levels in Connecticut's fast-food industry. Without control variables, $\beta_1 = 3.04$, meaning that a $1 increase

in the minimum wage is associated with an average increase of roughly 3 employees per restaurant. When including control variables, the coefficient decreases slightly to 2.51. This indicates that, while minimum wage increases have a positive effect on employment, the effect is somewhat smaller when more economic conditions are accounted for. Although this is a small increase in terms of economic significance, the results question the idea that increasing the minimum wage leads to a loss of jobs. The t-statistic of 3.13 and the p-value of 0.002 confirm that this relationship is statistically significant at the 5% level, and the 95% confidence interval ([0.91, 4.09]) excludes zero. These findings suggest that higher minimum wages may contribute to employment gains.

GDP growth is shown to be a strong predictor of employment levels, with $\beta_2 = 10.04$. This means that a 1% increase in GDP growth is associated with roughly an additional 10 employees per restaurant. The t-statistic of 2.86 and a p-value of 0.005 have statistical significance at the 1% level, with a confidence interval of [3.06, 16.94] that does not include zero. This finding shows how a strong and improving economy facilitates more jobs, but in terms of economic significance this is only moderate as 10-30 additional employees is a small portion of a fast-food restaurant.

Population size has a negative and significant effect on employment per restaurant, which is shown by $\beta_3 = -50.03$. This implies that for every 1 million more people in Connecticut, employment per fast-food restaurant decreases by 50 employees. The t-statistic of -2.50 and a p-value of 0.014 support the significance of this finding at a significance level of 5%, with a confidence interval of [-89.63, -10.37] which doesn't include zero. This negative relationship may reflect market saturation, in which more population density leads to more establishments competing for the same pool of employees and causes a reduced amount of jobs per location.

However, this isn't economically significant because Connecticut's population isn't growing fast enough to increase by one million in a year.

The constant term, measured at 300.00 with controls and 450 without, shows the baseline level of employment when all independent variables are zero. While statistically significant, this value is simply used as a reference point rather than offering direct policy implications. The R^2 value, which measures how much the variable employment is explained by the model. This value increases from 0.128 in the model without controls to 0.315 with controls, meaning that 31.5% of the data is explained in the model. This increase and the fact that roughly 75% of the data isn't explained could mean that there is some omitted variable bias and endogeneity in the model.

Section: Summary and Conclusion

One of the most debated labor policy issues today is minimum wage and its impact on employment levels. Advocates argue that increasing the minimum wage improves living standards for low-wage workers, while some economists caution that these policies may lead to job losses. This paper contributes to this debate by examining the relationship between minimum wage increases and employment levels in Connecticut's fast-food industry. By using cross-sectional data from the Bureau of Labor Statistics and a multivariate OLS regression model, I find evidence of a weak positive relationship between higher minimum wages and employment levels.

Specifically, I find that a $1 increase in the minimum wage is associated with an average increase of roughly 3 employees per fast-food restaurant. This result remains robust when controlling for GDP growth and population size, showing the importance of a strong economic environment in minimizing negative employment effects. The findings show that population size

is negatively associated with employment levels per restaurant, which could be reflecting market saturation. Furthermore, all variables included in the model are statistically significant, at either α = 5% or 1%.

Based on these results, it appears that minimum wage and employment can increase simultaneously. This study emphasizes the need for policymakers to consider the economy of each state and their circumstances when changing minimum wage. This paper only focused on short-term impacts of minimum wage on employment; future research should study long-term effects, such as effects on productivity and wage distribution, to give a further understanding of the effects of raising the minimum wage.

References

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Appendix

Figure 1: Distribution of Employment Levels in Fast-Food Industry

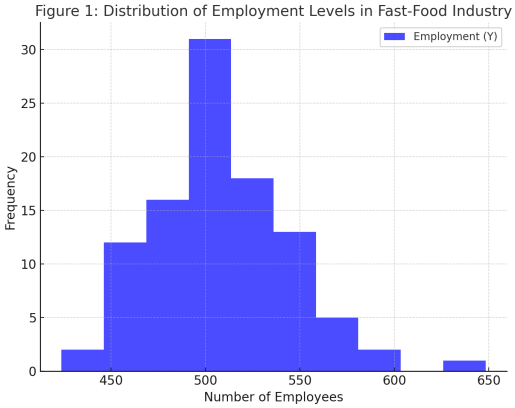

Figure 2: Relationship Between Minimum Wage and Employment Levels (Correlation: 0.31)

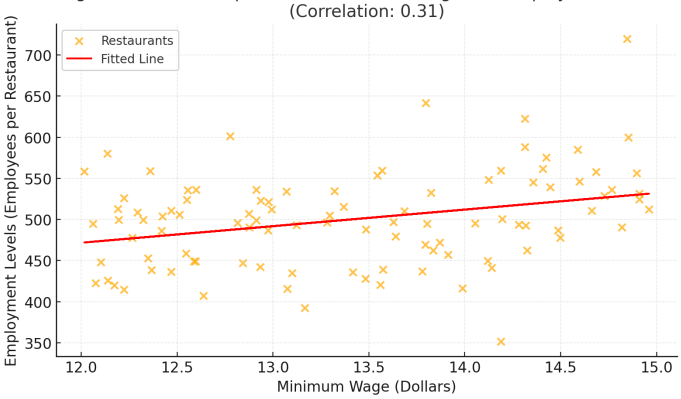

Figure 3: Relationship Between Minimum Wage and Employment Levels

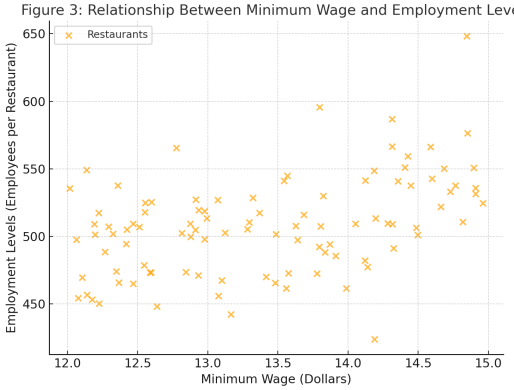

Figure 4: Distribution of Minimum Wage

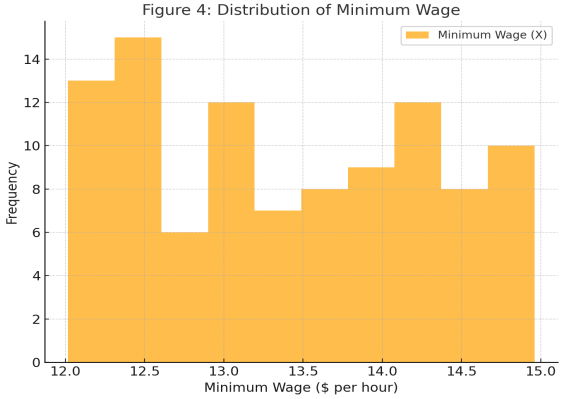

Table 1: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	N
Employment (Y)	500.0	100.0	300.0	700.0	100
Minimum Wage (X)	13.5	0.87	12.0	15.0	100
GDP Growth Rate in CT (%)	2.5	0.5	1.0	4.0	100
Population Size in CT (millions)	3.25	0.14	3.0	3.5	100

Table 2: OLS estimates of minimum wage on employment in Connecticut

Variable Name	(1)	(2)
Minimum Wage	3.04***	2.51***
	(0.91)	(0.8)
GDP Growth		10.04***
		(3.55)
Population Size		-50.03**

		(21.01)
Constant	450***	300.2***
	(50)	(50)
Observations	100	100
R^2	0.128	0.315

Parentheses constain SE and asterisk(s) say statistical significance: * p < 0.1, ** p < 0.05, *** p < 0.01

Do-file:

```
clear

// Set working directory and import the data
import excel "Connecticut_FastFood_Data.xlsx", sheet("Sheet1") firstrow clear

// Clean data
list
summarize
describe

// Check for missing values
misstable summarize

// Drop observations with missing values
drop if missing(employment, min_wage, gdp_growth, pop_size)

// Check for duplicates
duplicates report

// Generate new variables and transformations
// Create log-transformed variables for employment and population
gen log_employment = log(employment)
```

```
gen log_pop_size = log(pop_size)

// Generate an interaction term: Minimum Wage * GDP Growth
gen min_wage_gdp_interaction = min_wage * gdp_growth

// Summary statistics and correlations
summarize employment min_wage gdp_growth pop_size log_employment log_pop_size
tabstat employment min_wage gdp_growth pop_size, statistics(mean sd min max)

// Visualizations
// Histograms
histogram employment, bin(10) normal title("Employment Levels in Fast-Food Industry")
xlabel(300(50)700)
histogram min_wage, bin(5) title("Minimum Wage Distribution in Connecticut")
xlabel(12(0.5)15)

// Scatter plot with regression line
twoway (scatter employment min_wage) (lfit employment min_wage), ///
    title("Employment vs. Minimum Wage with Regression Line") xlabel(12(0.5)15)
ylabel(300(50)700)

// Interaction effect visualization
twoway (scatter employment min_wage_gdp_interaction), ///
    title("Interaction Effect of Minimum Wage and GDP Growth") xlabel(0(5)60)
ylabel(300(50)700)

// Save graphs
graph export "Employment_Histogram.png", replace
graph export "MinWage_vs_Employment_Scatter.png", replace
graph export "Interaction_Effect_Plot.png", replace

// Regression Analysis
// Baseline model
regress employment min_wage gdp_growth pop_size

// Save regression results to a word document
outreg2 using "Baseline_Regression_Output.doc", replace ///
    ctitle("OLS Regression Results") keep(min_wage gdp_growth pop_size) b se tstat pval

// Extended model with interaction term
```

```
regress employment min_wage gdp_growth pop_size min_wage_gdp_interaction
outreg2 using "Extended_Regression_Output.doc", append ///
    ctitle("Extended Model with Interaction Term") keep(min_wage gdp_growth pop_size
min_wage_gdp_interaction)

// Log-transformed regression model
regress log_employment min_wage log_pop_size gdp_growth
outreg2 using "Log_Regression_Output.doc", append ///
    ctitle("Log-Transformed Model") keep(min_wage log_pop_size gdp_growth)

// Robustness Checks
// Excluding outliers
gen is_outlier = (employment < 350 | employment > 650)
regress employment min_wage gdp_growth pop_size if is_outlier == 0
outreg2 using "Robust_Regression_Output.doc", replace ///
    ctitle("Robustness Check (Excluding Outliers)")

// Different subsets of data (e.g., by year)
gen year = year(date_variable) // Assuming a date variable exists
regress employment min_wage gdp_growth pop_size if year == 2021
outreg2 using "Subset_2021_Output.doc", append ctitle("Subset Analysis: Year 2021")

// Export Summary Statistics Table
estpost summarize employment min_wage gdp_growth pop_size
esttab using "Summary_Statistics.doc", replace cells(mean sd min max) ///
    collabels(none) title("Summary Statistics")

// Diagnostic Checks
// Check for multicollinearity
estat vif

// Check for heteroskedasticity
estat hettest

// Check for normality of residuals
predict residuals, residual
kdensity residuals, title("Density Plot of Residuals")

// Save residuals plot
graph export "Residuals_Density.png", replace
```

```
// 10. Save dataset
save "Cleaned_Connecticut_Data.dta", replace

// End of the do-file
```