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Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania

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This paper assesses the impact of the increase in minimum wage from \$4.25 to \$5.05 per hour on 410 fast-food restaurants in New Jersey and Pennsylvania. This increase in the minimum wage took place in the state of New Jersey which sample also constitutes the treatment group in the differences-in-differences method that we used to derive our results. The remaining sample in Pennsylvania constitutes our control group. Surveys were conducted at these restaurants to gather data on employment and wages before and after New Jersey's minimum wage increase (we have two survey's waves). The main conclusion is that the minimum wage increase in New Jersey did not result in a decrease in employment in the fast-food industry, contradicting the predictions of traditional economic theory. Finally, to derive these results in our analysis, the method of least squares was also used.

Introduction

In the 1994 paper "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania," authors Card and Krueger set out to investigate the impact of minimum wage increases on employment levels in the fast-food industry. The study was conducted in response to the widely held belief that minimum wage hikes lead to job losses in the low-wage sector. To examine this relationship, Card and Krueger focused on the fast-food industry in New Jersey and Pennsylvania, comparing employment trends in fast-food restaurants in New Jersey, where the minimum wage was raised, to those in Pennsylvania, where it remained unchanged. The study found that employment in New Jersey's fast-food industry increased following the minimum wage hike, while employment in Pennsylvania's fast-food industry declined. This led the authors to conclude that the widely held assumption that minimum wage increases lead to job losses is not supported by the evidence. The authors chose to focus on the fast-food industry for several reasons. Their choice of the fast food industry was driven by several factors. First, fast-food outlets are the leading employer of low wages. Second, fast food restaurants comply with minimum wage regulations and are expected to raise wages in response to a minimum wage increase. Third, the labor requirements and products of fast food restaurants are relatively homogeneous, which makes it easier to obtain reliable measures of employment, wages, and product prices. The absence of tips greatly simplifies the measurement of wages in the industry. Fourth, it is relatively easy to construct a sample franchise restaurant framework.

Finally, the researchers' previous experience suggested that fast food restaurants have high telephone survey response rates. It is vital to refer that unclear that the increase's effects were masked by overall economic conditions considering that the law was passed during a time when the state economy was strong but went into effect during a recession.

Data

Initially for our research a data set containing 410 observations-fast food stores was used. In the first stage, the variables of interest that will be used in our analysis from the sample are the following: SHEET which indicates the store's unique code id, CHAIN where the variable chain indicates the name of the business where number 1 corresponds to bk, number 2 corresponds to kfc chain, number 3 corresponds to roys chain and finally number 4 corresponds to wendys chain, CO_OWNED which indicates if the store is privately owned, STATE indicates the state where the where the survey took place and takes the price 0 if the state is Pennsylvania and price 1 if state is New Jersey. Next we create some dummy variables in order to determine the exact proportion of states. More specifically we create the variables SOUTHJ if the store is in southern New Jersey, CENTRALJ if the store is in central New Jersey, NORTHJ if the store is in northern New Jersey, PA1 if the store is located in Pennsylvania, in the northeast suburbs of Philadelphia, PA2 if the store is located in Pennsylvania in Easton of Philadelphia, and finally the dummy SHORE if the store is located on New Jerseyshore. we create the following variables for the first interview which took place from 02/15/1992 to 03/04/1992. First we create the variable NCALLS which indicates the number of calls that were made to the store until we received the information that was necessary. the variable EMPFT reports the firm's employees who work full time, EMPPT reports the firm's employees who work part time, NMGRS indicates the number of managers or assistant managers, WAGE_ST indicates the starting wage in dollars per hour, INCTIME indicates the time in months until the usual first raise at the employees salary, FIRSTINC indicates the usual amount of the first raise in dollars per hour, BONUS indicates if there is a cash bounty for new workers. A value of 1 indicates that there is a cash bounty. PCTAFF indicates the percentage of employees affected by a new minimum wage, variable MEALS indicates the availability of free or reduced-price meals. The code 0 indicates that none is available, 1 indicates that the employee has free meals, number 2 indicates reduced price meals, and finally number 3 indicates both free and reduced price meals are available. OPEN indicates the hour of store's opening, HRSOPEN indicates the number of hours the store is open per day PSODA indicates the price of a medium soda, including tax, PFRY indicates the price of small fries, including tax, PENTREE indicates the price of an entree, including tax, NREGS indicates the number of cash registers in the store, and finally NREGS11 indicates the number of registers open at 11:00 am.

The second interview was conducted from 05/11/1992 to 31/12/1992. The new transitions that were created are the following: TYPE2 indicates the type of second interview. A value of 1 indicates a phone interview, and a value of 2 indicates a personal interview. STATUS2 this variable indicates the status of the second interview. The values for this variable range from 0 to 5, where 0 corresponds to refused second interview, 1 corresponds to answered second interview,

2 corresponds to closed for renovations, 3 corresponds to closed permanently, 4 corresponds to closed for highway construction, and 5 corresponds to closed due to mall fire. DATE2 this variable indicates the date of the second interview, NCALLS2 which indicates the number of call-backs for the second interview, EMPFT2 which indicates the number of full-time employees in the store, EMPPT2 where this variable indicates the number of part-time employees in the store, NMGRS2 this variable indicates the number of managers or assistant managers in the store, WAGE_ST2 this variable indicates the starting wage for employees in the store in \$ per hour, INCTIME2 indicates the amount of time, in months, until the usual first raise for employees, FIRSTIN2 indicates the usual amount of the first raise for employees in \$ per hour, SPECIAL2 is a binary variable indicating if there is a special program for new workers. A value of 1 indicates that there is a special program, while a value of 0 indicates that there is no special program. MEALS2 indicates if the store offers free or reduced price meals to employees. The values for this variable range from 0 to 3, where 0 corresponds to none, 1 corresponds to free meals, 2 corresponds to reduced price meals, and 3 corresponds to both free and reduced price meals, OPEN2R this variable indicates the hour of opening for the store. HRSOPEN2 this variable indicates the number of hours the store is open per day. PSODA2 this variable indicates the price of a medium soda, including tax. PFRY2 which indicates the price of small fries, including tax, PENTREE2 this variable indicates the price of an entree, including tax, NREGS2 this variable indicates the number of cash registers in the store, NREGS112 where this variable indicates the number of registers open at 11:00 am.

The table1 presents the results of two phases surveys of fast food restaurants in New Jersey and Pennsylvania. The first survey was conducted from February 15 to March 4, 1992 and focuses on the number of call-backs received by the restaurants (column "NCALLS"). It shows that 208 out of 410 total restaurants received no call-backs as they respond with the first call, with 46 of these being in Pennsylvania and 162 in New Jersey. 37 restaurants had to be called again, with 5 in Pennsylvania and 32 in New Jersey. 95 restaurants had to be called at whole 3 times from which 52 takes place in New Jersey and 1 in Pennsylvania. In addition, we notice that a total of 4 phone calls had to be received by a total of 53 stores, of which 52 are located in New Jersey and 1 in Pennsylvania. At the end of the call-back, they had to accept a total of 17 stores all in Pennsylvania of which the fifth time 11 answered at the 6th ,7th , and the 8th time each time from 2 stores.

The second survey was conducted from November 5 to December 31, 1992 and focuses on the status of the second interview (column "STATUS2"). It shows that 399 out of 410 total restaurants answered the second interview, with 78 of these being in Pennsylvania and 321 in New Jersey. 1 restaurant refused the second interview, which was located in New Jersey. 6 restaurants were closed permanently and had no second interview, with 1 in Pennsylvania and 5 in New Jersey. At the rest of the categories all of our firms are located in new jersey where we have 2 which are closed for renovations, 1 which is closed for highway construction, and finally 1 which is closed due to mall fire.

Table1: Number of call-backs and response rates

STATE			
Wave 1, February 15-March 4, 1992:			
NCALLS	PA	NJ	Total
0	46	162	208
1	5	32	37
2	27	68	95
3	1	52	53
4	0	11	11
5	0	2	2
6	0	2	2
8	0	2	2
Total	79	331	410
Wave 2, November 5- December 31, 1992:			
STATUS2	PA	NJ	Total
0	0	1	1
1	78	321	399
2	0	2	2
3	1	5	6
4	0	1	1
5	0	1	1
Total	79	331	410

Notes:Temporarily closed includes one store closed because of highway construction and one store closed because of fire

In table 2, means for several key variables are presented. In constructing the means, employment in wave 2 is set to 0 for the permanently closed stores but is treated as missing for the temporarily closed stores. The full-time employment (FTE) was determined by adding the number of full-time employees, including managers, with half the number of part-time employees. The results are shown separately for stores in New Jersey and including t-statistics to test the hypothesis that the means are equal between the two states. In the sample, the average meal pricing, hours of operation, and employment levels of Burger King, Roy Rogers, and Wendy's restaurants are similar. However, KFC restaurants often are of smaller size and tend to operate fewer hours. Additionally, compared to other chains, its main meal menu items are more expensive (chicken instead of hamburgers). In wave 1, Pennsylvania had 23.3 full-time employees on average per store, compared to 20.4 on average in New Jersey. Although the average cost of a "full meal" (a medium soda, small fries, and an entree) was much higher in New Jersey, starting earnings were quite similar between stores in the two states. In terms of average business hours, the percentage of full-time employees, or any other measure, there were no substantial cross-state differences. The average starting wage at fast-food restaurants in New Jersey increased by 10 percent following the rise in the minimum wage.

Table 2: Means of key variables

Variable	NJ	PA	t
1. Distribution of Store Types:			
Burger King	41.1	44.30	0.5
KFC	20.5	15.2	-1.1
Roy Rogers	24.8	21.5	-0.6
Wendy's	13.6	19.0	1.2
Total	100.00	100.00	
Company-owned	34.1	35.4	0.2
2. Means in Wave 1:			
a. FTE employment	20.4 (0.51)	23.3 (1.35)	2.3506
b. Percentage full-time employees	32.8 (1.3)	35.0 (2.7)	0.7252
c. Starting wage	4.61 (0.02)	4.63 (0.04)	0.4053
d. Wage = \$4.25 (percentage)	30.5 (2.5)	32.9 (5.3)	0.4
e. Price of full meal	3.35 (0.04)	3.04 (0.07)	-3.8
f. Hours open (weekday)	14.4 (0.2)	14.5 (0.3)	0.3
g. Recruiting bonus	23.6 (2.3)	29.1 (5.1)	1.0
3. Means in Ware 2:			
a. FTE employment	21.0 (0.52)	21.2 (0.94)	0.1
b. Percentage full-time employees	35.9 (1.4)	30.4 (2.8)	-1.8
c. Starting wage	5.08 (0.0)	4.62 (0.4)	-19.7
d. Wage = \$4.25 (percentage)	0	25.3 (4.9)	10.6
e. Wage = \$5.05 (percentage)	88.9 (1.7)	1.4 (1.4)	-23.2
f. Price of full meal	3.41 (0.036)	3.03 (0.07)	-4.7
g. Hours open (weekday)	14.4 (0.2)	14.6 (0.3)	0.7
h. Recruiting bonus	20.3 (2.3)	23.4 (4.9)	0.6

Notes: See text for definitions. Standard errors are given in parentheses.

Empirical model

Differences in differences (DID or DD) is a statistical technique used in econometrics and quantitative research that attempts to mimic an experimental research design using observational study data, by studying the differential effect of a treatment on a 'treatment group' versus a 'control group' in a natural experiment. It calculates the effect of a treatment (i.e., an explanatory variable or an independent variable) on an outcome (i.e., a response variable or dependent variable) by comparing the average change over time in the outcome variable for the treatment group to the average change over time for the control group. Although it is intended to mitigate the effects of extraneous factors and selection bias, depending on how the treatment group is chosen, this method may still be subject to certain biases (e.g., mean regression, reverse causality and omitted variable bias).

For estimating purposes we used the Ordinary Least Squares (OLS) and the Differences-in-Differences methods. We perform the OLS method to model (1):

$$E_{ist} = \alpha + \gamma NJ_s + \lambda D_t + \delta(NJ_s * D_t)\varepsilon_{ist} \quad (1)$$

where E_{ist} is the employment at restaurant i , state s , at time t , NJ is a dummy variable which is equal to 1 if the observation is from NJ and d is a dummy variable which is equal to 1 if the observation is from November(post). We use the D-i-D method in model (2):

$$\Delta E_i = \alpha + \beta X_i + \gamma NJ_s + \varepsilon_i \quad (2)$$

Where ΔE_i is the change in employment from wave 1 to wave 2 at store i , X_i is a set of characteristics of store i .

Estimation results

Figure 1, shows the distributions of starting wages in the two states before and after the rise of the minimum wage in relation with the stores in each state. In wave 1, the distributions of stores in New Jersey and Pennsylvania were very similar. We observe that by wave 2 virtually all restaurants in New Jersey that had been paying less than \$5.05 per hour reported a starting wage equal to the new rate. One more finding is that the minimum-wage increase had no apparent spillover on higher-wage restaurants in both states. Finally we observe that despite the increase in wages, full-time employment increased in New Jersey relative to Pennsylvania.

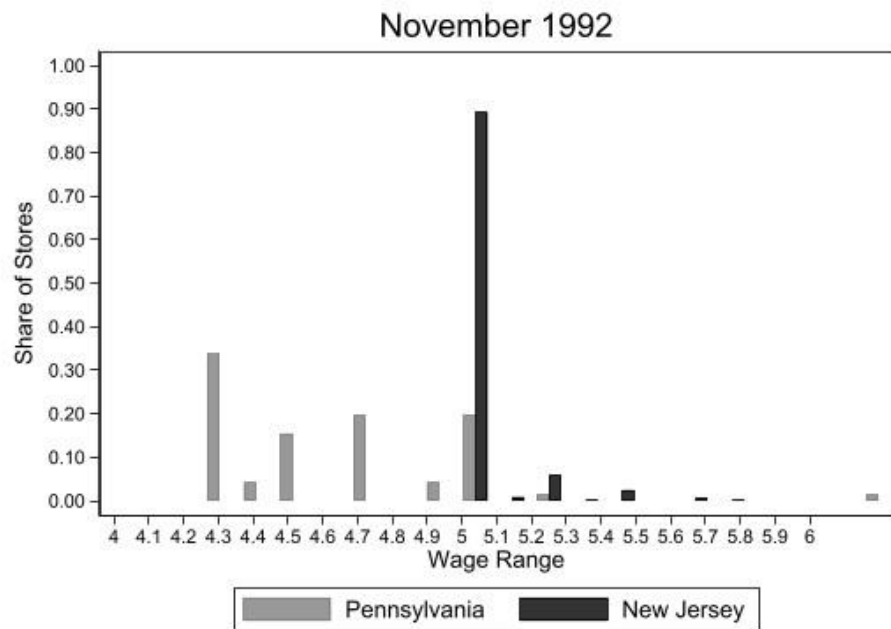
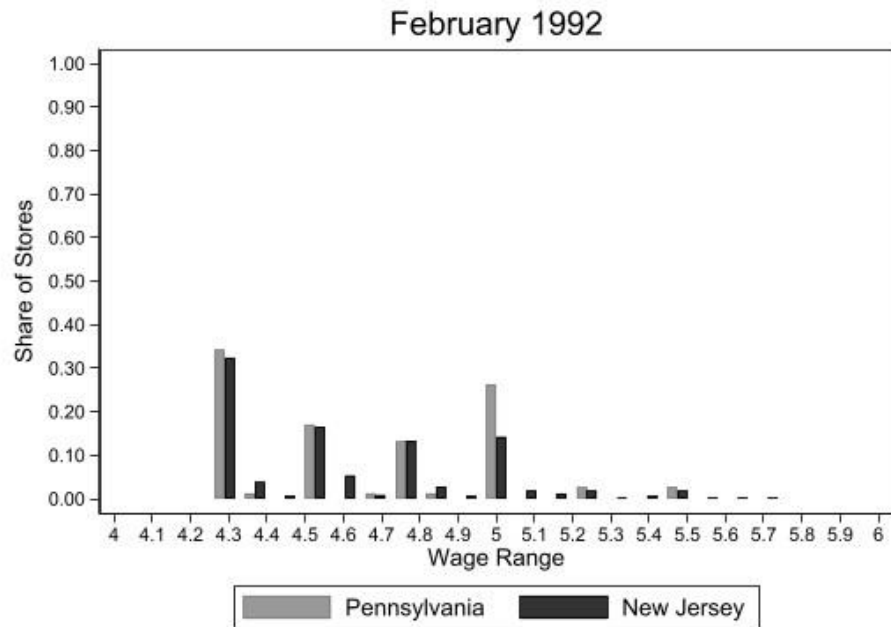


Table 3 shows the results of the technique we applied differences-in-differences. The first column shows the results for the state of Pennsylvania, while the second column shows the results for the state of New Jersey. The third column shows the differences in employment for columns 1 and 2. The first line shows the results of the FTE employment index before the minimum wage increase, while the second line shows the results of the FTE employment after the minimum wage was implemented. Line 3 calculates the change in average employment of

the FTE index of lines 1 and 2. The results in Table 3 suggest that employment after the minimum wage increase increased for the state of New Jersey. This conclusion is drawn as the result of the differences after the application of the differences-in-differences is 1.788 positive for the New Jersey.

Table 3: Average employment per store before and after the rise in New Jersey minimum wage

Variable	PA (i)	NJ (ii)	Difference, NJ-PA (iii)
1. FTE employment before, all available observations	23.59 (1.37)	20.44 (0.53)	-2.85 (1.27)
2. FTE employment after, all available observations	21.76 (0.97)	21.49 (0.51)	-0.263 (1.17)
3. Change in mean FTE employment	-1.91 (1.4)	0.39 (0.48)	1.788 (1.20)

Notes: Standard errors are shown in parentheses. The sample consists of all stores with available data on employment. FTE (full-time-equivalent) employment counts each part-time worker as half a full-time worker.

As for the table 4 we have the following results. In the first model we estimate that in New Jersey the employment dropped by 3.19 on average per store after the implementation of the new law. A significant decrease that refers to a 5% level of statistical significance. In New Jersey the minimum wage increased on average by 2.29 dollars. As for the second model the estimated change in mean FTE employment is statistical significant in 10% level and states that the minimum wage increased on average by 2.29 dollars in New Jersey after the specific law regarding the minimum wage.

Table4: Models For Employment And Change In Employment

Variable	(i) FTE employment after	(ii) Change in mean FTE employment (after – before)
1. New Jersey dummy	-3.19** (1.28)	2.29* (1.20)
2. New Jersey dummy * post minimum wage dummy	2.29 (1.81)	-
2. post minimum wage dummy	Yes	Yes
3. Company owned stores dummy	Yes	Yes

Notes: Standard errors on parenthesis. *** denotes 1% significance, ** 5% significance, and * 10% significance

Conclusions

This paper presents the findings and conclusions based on the comparison of the fast-food industry in New Jersey, where the minimum wage was increased, and Pennsylvania, where it remained the same. A sample of 410 companies was used, of which 331 are located in New Jersey that make up the treatment group in which the minimum wage increase was implemented as we referred and the remaining 79 in Pennsylvania, which is the control group in our research. We conclude that the increase in the minimum wage in New Jersey did not lead to a decrease in employment, contrary to the predictions of conventional economic theory but instead led her in its increase. These results are shown better in table 3, where the results of the differences-in-differences method we used for our analysis are presented. In addition to the differences-in-differences method, the least-squares method was also used for our analysis and the extraction of the results. The research was carried out in two different periods as required by the analysis method we used. The first wave started on 15 February to 4 March 1992 and the second wave took place on 5 November to 31 December 1992. We believe that the findings are not what was expected and challenge the traditional economic belief that higher wages lead to lower employment. Economically, these results suggest that minimum wage policies may be effective in raising the income of low-wage workers without causing significant harm to employment levels.

References

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