January 2017

Employment Effects Of The 2015 Minimum Wage Increase In Johnson County, Iowa

Joseph Charles Pastorino

EMPLOYMENT EFFECTS OF THE 2015 MINIMUM WAGE INCREASE IN JOHNSON COUNTY, IOWA

by

Joseph Pastorino

Bachelor of Arts, University of Iowa, 1994

Master of Business Administration, University of Northern Iowa, 1997

A Thesis

Submitted to the Graduate Faculty

of the

University of North Dakota

In partial fulfillment of the requirements

for the degree of

Masters of Science in Applied Economics

Grand Forks, North Dakota

May 2017

This thesis, submitted by Joseph Pastorino in partial fulfillment of the requirements for the Degree of Master of Science in Applied Economics from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

Daniel Biederman

David Flynn

Wei Yang

This thesis is being submitted by the appointed advisory committee as having met all of the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.

Grand McGimpsey
Dean of the School of Graduate Studies

May 1, 2017
Date

PERMISSION

Title: Employment Effects of the 2015 Minimum Wage Increase in

Johnson County, Iowa

Department: Applied Economics

Degree: Master of Science in Applied Economics

In presenting this thesis in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my thesis work or, in her absence, by the chairperson of the department or the dean of the School of Graduate Studies. It is understood that any copying or publication or other use of this dissertation or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my thesis.

Joseph Pastorino

5/17/17

Date

TABLE OF CONTENTS

LIST OF TABLES

Table Page

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to Dr. David Flynn, Dr. Daniel Biederman, and Dr. Xiao Wang for serving as members of my advisory committee. Each provided me a tremendous learning experience during my time in the master's program at the University of North Dakota that I greatly appreciate. In particular, I would like to thank Dr. Xiao Wang for serving as my faculty advisor and for providing valued advice and encouragement on this project. Finally, I would like to thank my family for all their support throughout this journey.

ABSTRACT

This paper studies the employment effects of the November 2015 minimum wage increase in Johnson County, Iowa from $7.25 per hour to $8.25 per hour. It was the first of three incremental minimum wage increases implemented by the county to raise its minimum wage to $10.10 per hour. The paper uses a difference-in-difference approach to compare the experience of the Johnson County labor market with that of contiguous border counties to estimate the impact of the policy change. The study's results yielded employment comparison estimates which were not statistically significant. Therefore, the null hypothesis that the policy effect of the minimum wage hike on employment is zero cannot be rejected.

CHAPTER I

INTRODUCTION

In September 2015, Johnson County (Iowa) voted to increase its minimum wage ahead of the current federal and state minimum wage of $7.25 per hour. The stated intention of the policy is to respond to the difficulties faced by low-wage workers given local economic conditions. (Board of Supervisors). However, the policy may also cause many low-wage workers to lose their jobs due to the increased cost to business of hiring and employing minimum wage workers.

Johnson County is the only county in Iowa which has moved to increase its minimum wage. This discrepancy creates a research opportunity to analyze the employment effects of the minimum wage increase against contiguous Iowa counties who remain at the state-level minimum wage.

The minimum wage hike in Johnson County was implemented in three steps. The first step happened on November 1, 2015 and it raised the minimum wage to $8.25 per hour. On May 1, 2016, a second step raised the minimum wage to $9.15 per hours. The final step happened on January 1, 2017 and it raised the minimum wage to $10.10 per hour. On July 1, 2018 and on each July 1 thereafter, the ordinance will raise the minimum wage incrementally to reflect the Consumer Price Index for the Midwest region as published by the Bureau of Labor Statistics.

There were some local exceptions to the Johnson County minimum wage ordinance to note. The towns of Solon, Swisher, Shueyville, and Oxford opted out of the minimum wage hike. However, the combined population of these towns is only 4,606 people, which amounts to 3.3% of the county's population. Also, the town of Tiffin raised its minimum wage to a lower amount than the rest of the county. It went to a minimum wage of $9 per hour as of March 2016.

However, the population of Tiffin is also very small accounting for only 1.7% of the county's population. The combined effect of these exceptions is assumed to be very small for the purposes of this study.

The question of whether to raise the minimum wage in Iowa is significant because other Iowa counties have either passed or are also considering minimum wage increases. Polk county (which includes the Des Moines metro area) (Meinch 2016), Linn county (which includes the Cedar Rapids metro area) (Schmidt 2016), and Wapello county (N 2016) have already passed proposals to increase the local minimum wage. Linn County implemented its increase January 1, 2016. Polk is scheduled to implement its increase on April 1, 2017. Wapello County plans to raise its minimum wage on January 1, 2018. Lee County is moving toward an implementation of a minimum wage hike (N 2017) and Black Hawk County is reviewing the matter (Jamison 2017).

Linn and Polk counties contain the two biggest population centers in the state. A minimum wage change in both of those counties would impact a significant portion of Iowa's citizens.

Furthermore, there is some political momentum within Iowa toward the adoption of a state-wide minimum wage increase. Recent poll results show that around seven in 10 Iowans favor an increase in the state's current minimum wage (Hardy 2016). The Iowa Senate passed a bill to raise the state's minimum wage in 2015, but it was later voted down by the Iowa House of Representatives (Hanson 2015).

The minimum wage issue could have a significant policy impact on the state economy. Proponents of a minimum wage increase cite the improvement in the well-being of low wage

households along with benefits for the local business community. Estimates suggest that raising Iowa's minimum wage to $10.10 per hour state-wide would boost the incomes of around 306,000 Iowans (around 10% of the population), with the biggest impact coming to low-income households (Cooper 2013). The potential GDP impact of workers' increased earnings is estimated to be as high as $272 million for the state of Iowa (Cooper 2013). However, critics point to the possibility of negative employment effects which could come with an increase in the cost of low-wage labor.

This study contributes to the existing literature in three ways. First, it adds to the existing literature of minimum wage studies using the rigorous methodology of control group comparison. This is a relatively new and emerging development in this field of minimum wage research. Second, it represents a more recent study of the impact of the minimum wage specific to the state of Iowa. The last published study on the employment effects of the minimum wage in Iowa was published in 2002 (Orazem & Mattila 2002). Finally, it would use the experience of the Johnson county minimum wage increase to inform policymakers and citizens of the employment impact of such an increase elsewhere in the state.

This paper is organized as follows. Section 2 will review the literature of minimum wage studies done to address the research question. Section 3 will discuss minimum wage theory and how it relates to this study. Section 4 will cover the design of the study used in this paper. Section 5 will discuss the dataset used for this study. Section 6 will deliver the empirical results from the models. Section 7 will provide a conclusion to the paper.

CHAPTER 2

LITERATURE REVIEW

The minimum wage in the United States is set at the national, state, and local levels. Currently, the federal government sets a minimum standard for hourly wages at $7.25 per hour. However, many state and local jurisdictions set a higher minimum wage than the national standard. The differences in minimum wage standards established by different layers of government provide researchers ample opportunities to examine the employment effects of the policy.

The method of fixed effects modelling was extended to study local level data to study the impact of minimum wage changes on specific affected groups such as teenagers and least-skilled workers. Neumark and Wascher (1996), Neumark (2001), Burhauser et al (2000a&b) and many others soon utilized the fixed-effects modeling framework to individual-level data to understand the impact of the minimum wage on specific vulnerable groups. The results of these studies generally reflected negative employment effects to the specified groups because of a higher minimum wage.

Neumark and Wascher (2007) performed an exhaustive review of 102 minimum-wage studies. In this review, they highlighted a group of 33 studies that they perceived as providing the most credible evidence on the employment effects of the minimum wage. Of the group of 33 studies, they point out that 28 of them (85 percent) estimate negative employment effects. Most of the studies within this subset fall into the category of state and individual-level fixed-effects models.

A key divide in the minimum wage literature is along methodological lines. The differences in study design methods may be responsible for much of the variance in results. One type of methodology compares cases involving an increase in the minimum wage against a similar control group. Studies using this methodology generally find that minimum-wage increases have little or no effect on employment. Another type of methodology tends to run a fixed effects model on employment levels to estimate how employment changes after states enact a higher minimum wage. It does not compare against a similar control group, but uses controls and fixed effects in a regression model. Studies using this methodology tend to find that minimum-wage increases produce a negative impact on employment.

Fixed effect models on the employment effects of the minimum wage typically use panel data on employment levels at the state and local levels to examine the effect of a minimum wage increase. They control for stable differences between observations which do not vary over time. Such models rely on differences in the minimum wage among localities to determine the effect of the policy.

David Neumark and William Wascher have emerged as leaders in the application of fixed effect models to study the employment effects of increases to the minimum wage. Their 1992 paper estimated that a 10 percent increase in the minimum wage reduced teenage employment by 1 to 2 percent and young adult employment by 1.5 to 2 percent. They followed that up over more than two decades with numerous studies and literature reviews on the issue of the minimum wage. Their work tends to focus on short-term negative employment effects of a minimum wage increase. They also argue that the impact is particularly severe on the youngest unskilled workers who suffer lasting damage because they are denied entry into formal paid

labor. They also assert that minimum wages are poorly targeted policy and not a particularly useful tool to lower poverty (Neumark and Wascher 2008).

A landmark case study was done by Card and Krueger (1994) on an increase in New Jersey's state minimum wage from $4.25 to $5.05. The study used comparable restaurants in Pennsylvania (which did not increase the minimum wage) immediately across the border from New Jersey as a control group. The Card and Krueger study concluded that the minimum wage increase in New Jersey did not reduce employment in that state relative to the control group of Pennsylvania restaurants.

Card and Krueger's approach of using control group comparisons was subsequently used by many researchers with more sophistication and improved data sources. A significant example of this was done by Dube, Lester, and Reich (2010). Rather than focusing on a particular locality, these researchers compared every pair of neighboring counties with a minimum wage difference along every state border in the country over the course of a 16-year span. This study found no adverse employment effects from an increase in the minimum wage. Furthermore, the findings are robust allowing for long-term effects of minimum wage changes due to the extended time span covered by the study. Given the wide sampling of data drawn for the study and the control group methodology, this study offers estimates which are representative of a typical minimum wage increase rather than one specific to a particular labor market.

Many other studies using control group comparisons yielded similar results. Dube, Lester, and Reich (2013) used the same cross-border methodology to analyze the effect on teens and found no significant impact on their employment. Dube and Zipperer (2014) confirm these findings using a "synthetic control group approach". Addison, Blackburn, and Cotti (2009,

2012) found no evidence of job loss in the retail or restaurant sectors once they accounted for trends in sectoral employment.

While most minimum wage studies using control group comparisons find no negative employment effects, there are a small minority which do. For example, Sabia, Burkhauser, and Hansen (2012) compared New York state with several comparison states, and found negative employment effects. Singell and Terborg (2007) found negative effects associated with much larger increases in the minimum wage in Oregon and Washington compared to California, Idaho, and Nevada. Finally, Neumark, Salas, and Wascher (2013) use a "synthetic control method" which uses methods that let the data identify the appropriate control groups and find negative minimum-wage employment effects.

However, each of these studies carry significant flaws. Hoffman (2014) found that the negative effect found in the Sabia, Burkhauser, and Hansen study was found only in a subset of their data source and not when applied to the full Current Population Survey. More to the point, each of these aforementioned studies use state-wide data rather than data from localized control groups to make their comparisons. By doing so, they fail to account for the heterogeneity which exists between local labor markets. While these studies did use control group comparisons to estimate their conclusions, their control groups were weak in comparison to studies like Dube, Lester, and Reich (2010) which use adjacent counties rather than states.

CHAPTER 3

MINIMUM WAGE THEORY & PREDICTION

The effect of a minimum wage on employment has been studied extensively by many researchers. However, despite the large volume of research made in this area, there remains no clear consensus on the employment effects of a change in the minimum wage. Much of this is likely due to differences in empirical study design. This section of the paper will review the literature of minimum wage studies as they relate to employment effects and discuss how differences in empirical study designs can influence results.

There are many possible explanations for the lack of substantial negative employment effects from an increase in the minimum wage in many labor markets. One possibility is that some employers possess monopsony power in their local market. Monopsony is similar in many ways to monopoly as a market structure, except that the influence of market power exists on the buyer side of the market rather than on the seller side. If labor markets are monopsonistic, employers can use their bargaining power to pay a wage lower than workers' marginal product. In such a case, the implementation of a minimum wage can increase employment and efficiency if it is set at a point between the monopsony wage and the marginal product of labor (Leonard 2000).

Another possibility is that employers may respond to increases in minimum wage rates in ways other than job cuts. Employers may compensate for higher wage rates in alternate ways such as price increases or productivity improvements rather than letting minimum wage workers go.

Finally, an increase in the minimum wage may operate as an efficiency wage in a local labor market. Minimum wage labor markets tend to be characterized by high rates of turnover which creates extra costs related to hiring and training workers. Efficiency wages are wages paid at a rate higher than the market clearing price to increase productivity or reduce labor cost related to worker turnover. If the minimum wage serves as an efficiency wage in a job market, a higher wage rate can be offset by reduced labor costs of hiring and replacing workers due to lower turnover rates. For example, Georgiadis (2008) estimated that higher wage costs due to an increase in the UK minimum wage were more than offset by lower monitoring costs, and concluded that the wage increase may have acted as an efficiency wage.

It is important to bear in mind that the lack of negative employment effects found in many of the national minimum wage studies may be subject to some variation locally. For example, the landmark minimum wage study done by Dube, Lester, and Reich (2010) analyzes 377 U.S. border counties over a 16-year span. It shows that the distribution of employment elasticities from individual case studies is largely centered on zero. However, the paper also concludes that the probability of obtaining individual results which are large is not trivial. This result establishes the importance of pooling across individual case studies to obtain a more reliable estimate. While a typical labor market may not encounter significant job losses from an increase in the minimum wage, a specific local labor market may experience such effects. The authors also note that the possible effect of such large individual estimates can be positive as well as negative. For the local labor markets where this condition may hold, an increase in the minimum wage would deliver positive employment effects to the community.

It is important to note that conclusions which can be drawn from minimum wage research about the employment effects of a hypothetical minimum-wage increase are limited by the scope

of previous studied increases. For example, Dube, Lester, and Reich (2010) caution in their national minimum wage study that their "results cannot be extrapolated to predict the impact of a minimum-wage increase that is much larger than what we have experienced over the period under study." University of Kentucky's Center for Poverty Research publishes a state-level panel data series covering population, employment, unemployment, welfare, poverty, and politics for the period spanning from 1980 to 2014. One of the variables it tracks is the minimum wage. Almost all the effective one-year minimum wage increases described in this dataset were 15 percent or lower. Furthermore, periodic increases in the federal minimum wage have tended to range between around 20 percent and 45 percent in multiple steps (Cooper 2013). Given the scope of previous minimum wage increases, caution should be exercised when considering minimum wage increases which exceed historical norms established in minimum wage research.

Based on the current stage of research, Arindrajit Dube (2014) suggests that setting the state and local minimum wages close to half the median full-time wage is a good gauge for policy. He also proposes states and localities should consider the local cost of living when setting minimum wage policy and should index wage levels for inflation. Adoption of such a policy would offer a target in line with U.S. experiences in the 1960s and 1970s as well as that of other advanced industrialized nations. The adoption of such a policy could raise the wage floor for many minimum wage workers in the United States while still respecting local economic conditions and minimizing the probability of negative employment effects.

The adoption of a minimum wage increase could deliver substantial economic benefits to minimum wage workers as well as to the macroeconomy potentially. For example, Dale Cooper published a paper quantifying the economic impact of a minimum wage increase bill sponsored

by Patty Murray (D-Wash.) and Rep. Robert "Bobby" Scott (D-Va.) named the Raise the Wage Act of 2015. The bill that would have raised the federal minimum wage in five steps to $12 per hour by 2020. This analysis estimates that such a change would have either directly or indirectly raised the wages of 35.1 million workers, who would have received about $80 billion in additional wages over the phase-in period. This would deliver a raise of about $2,300 per year to the average minimum wage worker (assuming no change in hours worked). While such an approach may have delivered negative employment effects to some specific labor markets where the cost of living is low, the analysis does illustrate the substantial gains such a policy could potentially deliver to low-wage workers overall.

Dale Belman of Michigan State University and Paul Wolfson of the Tuck School of Business at Dartmouth compiled a very comprehensive evaluation of minimum wage research in their 2014 book "What Does the Minimum Wage Do?". The book won the William G Bowen award for Outstanding Book on Labor and Public Policy in 2014. Their work synthesizes more than 200 scholarly publications published since 1991 (most after 2000) that study the various impacts of raising the minimum wage. Based on their analysis, the authors conclude the following: "Evidence leads us to conclude that moderate increases in the minimum wage are a useful means of raising wages in the lower part of the wage distribution that has little or no effect on employment and hours. This is what one seeks in a policy tool, solid benefits with small costs. That said, current research does not speak to whether the same results would hold for large increases in the minimum wage."

Based on current minimum wage theory and the empirical results of recent studies, the research hypothesis for this study holds that the employment effects from the minimum wage increase will not be strong. There are several reasons why an increase in the minimum wage

might not lead to significant employment losses among low-wage workers. One rationale for this is that the labor market may push toward an efficiency wage equilibrium. Furthermore, employers may respond by passing along some of the cost to consumers in the form of price increases or by raising the productivity of their business processes. Finally, businesses may have difficulty cutting back on employment if there is an increase in the demand for the goods and services they deliver to the local community. The increase in local consumer demand may be brought about due to spending increases related to the higher minimum wage.

CHAPTER 4

STUDY DESIGN

An issue with many fixed-effects models which study the minimum wage is that they implicitly compare every state which raises the minimum wage coequally with every state which does not. This potentially introduces the issue of selection bias into the model. States that "select" into a higher minimum wage are often significantly different from those which do not.

Fixed effects models could potentially control for this problem if they have data which accounts for these differences and if these factors do not change over time. However, if these factors are not effectively accounted for, then a given fixed effects model will deliver biased estimates of the effect of the minimum wage. Giotis and Chletsos (2015) conducted a review of 64 U.S. studies and found that once selection bias is accounted for and corrected, little or no evidence of a negative association between minimum wages and employment remains.

States in the U.S. with larger minimum wages tend to have systematically different labor market characteristics which are mostly unrelated to minimum wage policy. They tend to be regionally clustered and possess different political economy characteristics. States in the Northeast, in parts of the Midwest, and in the Pacific regions are much more likely to have high state minimum wages, while states in the Southeast and the Mountain regions are much less likely to possess them (Allegretto, Dube, Reich, & Zipperer 2013).

High minimum wage states tend to withstand more severe economic downturns, experience sharper reductions in routine task intensive jobs, and sustain faster growth in upper-half wage inequality. Furthermore, intrastate heterogeneity exists between local labor markets of

different geographical areas. These differences affect low-wage labor demand and the resulting heterogeneity must be accounted for in the model (Allegretto, Dube, Reich, & Zipperer 2013).

This suggests that heterogeneity between geographic areas can be properly accounted for in minimum wage models by using comparisons within local areas. Using local area controls avoids the problem of structural differences between labor markets. This assumption presumes that neighboring control groups are very similar in terms of key covariates.

Minimum wage studies which use control group comparisons tend to deliver more reliable estimates than fixed effects models using panel data. Aside from addressing the issue of selection bias which is present in fixed effect models, the construction of credible control groups in comparison models also reduces the possibility of bias from omitted variables or reverse causality.

Matching cases of minimum-wage increases to a proper control group is important because it is the closest a study can get to the ideal of a random assignment experiment (Kuehn 2014). Blundell and Costa Dias (2000) listed five major categories of empirical evaluation methods: social experiments, natural experiments, matching methods, instrumental variables, discontinuity design, and control functions. They do not discuss state-level fixed effect models as a valid empirical evaluation method. Imbens and Wooldridge (2009) mentioned fixed-effects models as a more archaic tool for empirical evaluation, and clarified that these were used before new insights were developed requiring fewer functional form and homogeneity assumptions. Minimum wage studies using well-matched control group comparisons offer a stronger study design than fixed effect models using panel data.

The design of this proposed study would follow the border discontinuity approach suggested by Allegretto, Dube, Reich, & Zipperer (2013). This method exploits a policy discontinuity between contiguous bordering geographic areas to estimate treatment effects. It assumes that the inherent similarities of neighboring areas used for the treatment and control groups offer good controls for heterogeneity in the model. This approach offers a way of constructing credible control groups which reduces the possibility of bias from omitted variable or reverse causality. Matching cases of minimum-wage increases to a proper control group is important because it is the closest a study can get to the ideal of a random assignment experiment (Kuehn 2014). The similarity of covariates between the control groups minimizes the possibility of identification problems due to omitted variables or reverse causality. The nature of the potential data source (employer-reported government data) also makes the prospect of measurement error unlikely. The Johnson County minimum wage increase provides a natural experiment from which a study with a high degree of internal validity is possible.

The study will use the technique of difference in differences to estimate the treatment effect of the minimum wage increase against the outcomes of a control group. This method assumes that the treatment group and control group have similar characteristics and are trending in the same way over time. The difference between the groups is that the treatment group is affected by the policy change while the control group is not. By comparing the outcomes of the two groups, the effect of the policy treatment on the treated group can be estimated.

The difference in differences method helps control for differences between the treatment and control groups which may exist even after controlling for observed outcomes. Rather than measuring the outcomes of the independent variables, this estimator compares the change in

outcomes pre- and post-treatment. By doing so, it adjusts for any unobserved remaining differences which may possibly exist between the groups (Stock & Watson 2015).

The use of local area controls in this study assumes that neighboring control groups are very similar in terms of key covariates. Since the outcomes of the Johnson County labor market are compared with the outcomes of other local labor markets in surrounding counties, the study design seeks to mitigate the possibility of selection bias in its estimates.

For this paper, I estimate the following model:

$$yict=\beta_0 DinDct+\beta_1 Treatmentct+\beta_2 Afterct+ [\sigma_t] + [\tau_c] + [u_i]+ v_{ict}$$

where subscript i stands for industry, subscript c stands for county, and subscript t stands for time. The term y_{ict} is the dependent variable including wage and employment. The coefficient β_0 is of particular interest as it estimates the employment effect of the policy change on the treatment group versus that on the control group. The term $[\sigma_t]$ represents a time fixed effect, $[\tau_c]$ was used for county fixed effect, and $[u_i]$ represents an industry fixed effect. The term v_{ict} is an error term.

The treatment group for the initial difference in difference regression is restaurants and bars in Johnson County. Specifically, this includes all establishments which are identified by the 7224 NAICS code ("Drinking places, alcoholic beverages") and the 7225 NAICS code ("Restaurants and other eating places"). These industry groups were chosen for the treatment group because they are labor-intensive enterprises whose workers are minimum wage intensive.

To further test this research question, an expanded treatment group was also formed. The purpose of this was to expand the reach of the treatment group to capture the experiences of

other minimum wage workers in Johnson County. While restaurants and bars tend to be very minimum wage intensive, there are many minimum wage workers employed in other industries.

The expanded treatment group includes eight industry codes with the lowest weekly wage levels in the county as measured before the policy intervention. It was defined to include all industries below the threshold level of $15,080 for annualized weekly wages. That figure is the annual income a hypothetical worker would receive for 40 hours of work per week at the $7.25 minimum wage.

The expanded treatment group includes the following industry codes:

- NAICS 7224 Drinking places, alcoholic beverages
- NAICS 7225 Restaurants and other eating places
- NAICS 8141 Private households
- NAICS 7139 Other amusement and recreation industries
- NAICS 6116 Other schools and instruction
- NAICS 6244 Child day care services
- NAICS 4531 Florists
- NAICS 4481 Clothing stores

For the sake of further comparison, an "expanded" control group was also defined. The expanded control group includes eight industry codes with the highest weekly wage levels in the county as measured before the policy intervention.

The reasoning behind the formation of this group is to prevent the inclusion of workers employed to minimum wage positions even if they work in an industry which is not minimum wage intensive. Through the application of a more selective standard to the expanded control

group, the chance of unintentionally including a minimum wage worker is reduced. The intent is to identify the industries least likely to be affect by the minimum wage policy change to compare them against those which are most likely to be affected by the minimum wage change.

The expanded control group includes the following industry codes:

- NAICS 4251 Electronic markets and agents and brokers
- NAICS 5231 Securities and commodity contracts brokerage
- NAICS 5415 Computer systems design and related services
- NAICS 5611 Office administrative services
- NAICS 5413 Architectural and engineering services
- NAICS 5511 Management of companies and enterprises
- NAICS 5112 Software publishers
- NAICS 6211 Offices of physicians

To check the robustness of the difference-in-difference method, a falsification test was employed. This test re-estimates the difference-in-difference model over a time period in the dataset prior to the policy intervention. The model makes the implicit assumption that the treatment effect happened well before the actual policy change. By doing so, the falsification test seeks to identify a "placebo" treatment effect where none should exist. Since the implicit placebo treatment precedes the actual policy intervention, the difference-in-difference estimator should be statistically insignificant and small.

CHAPTER 5

DATA

The data source for this study is the Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW). It provides county-level payroll data by detailed industry on a quarterly basis. The data set is based on business filings to calculate payroll taxes related to unemployment insurance. According to the Bureau of Labor Statistics, it covers 97.2% of American workers constituting virtual census of employees on nonfarm payrolls (U.S. Bureau of Labor Statistics). Because the QCEW is based on official government documentation built from information submitted from the businesses themselves, the data can be considered highly reliable and accurate.

The dataset built from the QCEW includes variables on the number of establishments, employment, average weekly wage, and total quarterly wages. The data for each variable is broken down by industry to the 4-digit NAICS code level for each county. While the employment figures reported in the QCEW are monthly totals, the information on the number of establishments, average weekly wage, and total quarterly wages are quarterly numbers. To maintain consistency in the database, the quarterly figures were converted to monthly numbers by averaging them out over each of the months in the quarter.

The dataset includes information from Johnson County along with the surrounding counties of Linn, Cedar, Muscatine, Louisa, Iowa, and Washington. Since the minimum wage was raised only in Johnson County, the data from the surrounding counties provides an opportunity to contrast groups who did not experience a minimum wage rate hike against those who did.

Due to the limited amount of data released by the QCEW at the time of writing, this paper will focus on the effect of the first wage increase which occurred in November 2015. Given the date of the policy intervention, the "before" period is defined at the months between January 2014 and October 2015. The "after" period is defined as the months between November 2015 and May 2016. Taken together, these groups represent 30 distinct time periods for estimation. The number of time periods involved in the study should sufficiently capture the before and after effects of the policy intervention as well as trends between the treatment and control groups.

CHAPTER 6

EMPIRICAL RESULTS

Subsection: Benchmark Regressions:

Table 1 shows the means and standard deviations for the treatment and control groups within and outside of Johnson County.

Table 1: Means and Standard Deviations of Treatment & Control Groups

	Johnson County		Non-Johnson County	
Variable	Treatment	Control	Treatment	Control
Number of establishments: Mean	170.1	27.71	91.69	25.85
Number of establishments: Std. Dev.	128.6	30.32	120.67	38.65
Employment: Mean	3583	313	1691	325
Employment: Std. Dev	2975.3	417	2595	691
Average weekly wage: Mean	$239.80	$756.62	$222.11	$756.17
Average weekly wage: Std. Dev	30.42	373.47	38.82	442.77
Avg. total wage (monthly): Mean	$4,069,373	$960,725	$1,885,621	$1,064,501
Avg. total wage (monthly): Std. Dev	3530654	1407363	3010801	2397030
Observations	60	3426	303	12876

In an average month, Johnson County maintained 170.1 restaurants and bars and employed 3,583 workers in those establishments. The average weekly wage for a worker in the treatment group was $239.80 per week. The businesses in the control group averaged 27.71 employers per industry and hired 313 workers per industry. The wage of the average worker in the control group was $756.62 per week.

Table 1 also shows the means and standard deviations for the treatment and control groups for the surrounding counties around Johnson County. The surrounding counties maintained 91.69 restaurants and bars and employed 1,691 workers in an average month. The average weekly wage for a worker in that group was $222.11 per week. There was also an

average of 25.85 non-restaurants/bars in the surrounding counties which employed an average of 325 workers in each industry. The average wage of a worker in this group was $756.17 per week.

Table 2 shows the regression results of the difference in difference comparison of Johnson County restaurants and bars versus all other industry groups.

Table 2: Regression Results for Restaurant Treatment Group

	(1)	(2)	(3)	(4)
Difference in Difference	-176.56	-176.56	-153.98	-152.82
	(324.07)	(324.42)	(305.64)	(268.78)
Policy Change	6.42	25.50	27.16	34.64
	(10.81)	(43.56)	(39.85)	(31.37)
Treatment Group	1450.02***	1449.97***	1515.93***	2317.13***
	(178.13)	(178.32)	(169.14)	(209.68)
Constant	290.61***	274.84***	326.22***	475.52***
	(5.49)	(30.02)	(28.68)	(31.11)
Monthly Fixed Effect	No	Yes	Yes	Yes
County Fixed Effect	No	No	Yes	Yes
Industry Fixed Effect	No	No	No	Yes
Observations	12876	12876	12876	12876
Adjusted R-sq.	0.094	0.092	0.237	0.532

The dependent variable in equation (1), (2), (3), & (4) is employment
Standard errors in parentheses
*, **, *** Statistically different from zero at the 10%, 5%, and 1% level.

Explanatory variables were added to the regression equation to control for the unobserved heterogeneity specific to each factor. A monthly time fixed effect was used to mediate the influence of seasonality in the equation. Fixed effects for differences in county and industry were also added to the model to control for differences in these areas.

Adding the time fixed effects to the model yielded an estimated outcome of 176.56 jobs lost due to the policy. When county fixed effects were included to the equation, the regression estimates a job loss of 153.97 jobs. When time, county, and industry fixed effects are each

considered in the regression, it estimates that 152.81 jobs were lost due to the policy intervention.

The adjusted r-squared increased from 0.094 when no fixed effects were considered to 0.532 when all fixed effects were included in the regression. However, none of the regression models with the restaurant treatment group yielded estimates which are significant at the 10% level.

Table 3 shows summary statistics for the treatment group's weekly average wage before and after the policy change.

Table 3: Average Weekly Wages for Treatment Group Before and After Policy Change

	Treatment Group		Control Group	
Variable	Before	After	Before	After
Average Weekly Wage: Mean	$221.17	$224.40	$1,005.42	$1,047.71
Average Weekly Wage: Std. Dev.	37.73	41.50	780.42	824.05
Minimum Figure	138	142	63	49
Maximum Figure	309	301	3784	3938
Observations	215	88	1227	444

The treatment group experienced only a small increase in average weekly wage from $221.17 before the policy intervention to $224.40 after it happened. While the minimum outcome for average weekly wage rose from $138 to $142 after the ordinance was implemented, the maximum number dropped from $309 to $301.

Table 4 shows regression results for treatment effects on average weekly wages from the policy intervention.

Table 4: Average Weekly Wage Regression Results for Restaurant/Bar Treatment Group

	(1)	(2)	(3)	(4)
Difference in Difference	-45.6000	-43.8617	-1.5514	-49.7855
	(88.4844)	(88.8844)	(95.7799)	(42.8745)
Treatment Group	-785.3002***	-787.0385***	-787.8574***	-1849.8382***
	(37.2777)	(37.5578)	(41.4142)	(60.7902)
Policy Change	41.1023	58.7411	68.7943	63.6888*
	(87.9278)	(93.2283)	(90.4380)	(38.0174)
Constant	1008.3888***	1062.8447***	995.6084***	2033.8706***
	(37.0328)	(67.7550)	(76.7105)	(64.1849)
Time Fixed Effect	No	Yes	Yes	Yes
County Fixed Effect	No	No	Yes	Yes
Industry Fixed Effect	No	No	No	Yes
N	658	658	658	658
adj. R-sq	0.130	0.128	0.164	0.852

The dependent variable in equations (1), (2), (3), and (4) is average weekly wages
Standard errors in parentheses
*, **, *** Statistically different from zero at the 10%, 5%, and 1% level.

The models in Table 4 estimate that the treatment group experienced lower wages relative to the control group even once the minimum wage hike was implemented. Model (1) estimates that average weekly wages for the treatment group were $45.60 lower than those experienced by the control group. Model (2) includes a time fixed effect and estimates an average weekly wage loss of $43.86 for the treatment group. Model (3) adds both time and county fixed effects to the model and it estimates average weekly wages were lower by $1.55 for the treatment group. Model (4) includes time, county, and industry effects and estimates an average weekly wage loss of $49.79 relative to the control group.

The adjusted r-squared increased from 0.130 when no fixed effects were considered to 0.852 when all fixed effects were included in the regression. However, none of the regression models with the restaurant treatment group yielded estimates which are significant at the 10% level.

The possible reasons for a decline in average weekly wages for despite the implementation of a minimum wage hike are unclear from the information available in this dataset. It could be speculated that employers may have reacted to the higher wage by reducing the number of hours worked. Also, many of the workers at restaurants and bars rely on tips from customers as part of their wage. It is possible that consumers may have responded to the policy change by leaving lower tips for tipped employees. Ultimately, the outcome remains that the estimated treatment effect of the policy intervention on average weekly wages was too small to be statistically significant.

Subsection: With Expanded Treatment/Comparison:

Table 5 shows the means and standard deviations for the treatment and control groups for the expanded treatment group in Johnson County along with those for businesses outside the treatment group in the county.

Table 5: Means and Standard Deviations of Original and Expanded Treatment Groups

Variable	Treatment	Expanded Treatment
Number of establishments: Mean	170.1	87.7
Number of establishments: Std. Dev.	128.6	92.25
Employment: Mean	3583	1229
Employment: Std. Dev	2975.3	2047
Average weekly wage: Mean	$239.80	$262.15
Average weekly wage: Std. Dev	30.42	53.97
Avg. total wage (monthly): Mean	$4,069,373	$1,404,462
Avg. total wage (monthly): Std. Dev	3530654	2386488
Observations	60	3426

In a typical month, the average industry in the expanded treatment group included 87.73 establishments employing 1,229 workers. The average weekly wage for a worker in the expanded treatment group was $262.15. By comparison, the original treatment group included

170.1 restaurants and bars and employed 3,583 workers in those establishments. The average weekly wage for a worker in the treatment group was $239.80 per week.

Table 6 shows the regression results of the difference in difference comparison of the expanded treatment group versus all other industry groups.

Table 6: Regression Results for Expanded Treatment Group

Variable	(1)	(2)	(3)	(4)
Difference in Difference	-18.16	-18.27	-7.40	-35.07
	(53.85)	(53.91)	(50.85)	(43.00)
Policy Change	7.47	26.77	27.89	34.18
	(11.72)	(45.56)	(42.07)	(31.07)
Treatment Group	145.34***	145.44***	182.1494***	-743.3613***
	(28.67)	(28.71)	(27.75)	(95.80)
Constant	303.14***	287.00***	338.67***	424.64***
	(5.97)	(31.46)	(30.74)	(28.92)
Monthly Fixed Effect	No	Yes	Yes	Yes
County Fixed Effect	No	No	Yes	Yes
Industry Fixed Effect	No	No	No	Yes
Observations	12876	12876	12876	12876
adj. R-sq	0.010	0.008	0.150	0.547

The dependent variable in equation (1), (2), (3), & (4) is employment
Standard errors in parentheses
*, **, *** Statistically different from zero at the 10%, 5%, and 1% level.

The regression equation estimates that the expanded treatment group lost 18.16 jobs relative to the control group due to the implementation of the minimum wage hike. Adding the time fixed effects to the model yielded an estimated outcome of 18.26 jobs lost due to the policy. When county fixed effects were included to the equation, the regression estimates a job loss of 7.40 jobs. When time, county, and industry fixed effects are each considered in the regression, it estimates that 35.07 jobs were lost due to the policy intervention.

The adjusted r-squared increased from 0.010 when no fixed effects were considered to 0.547 when all fixed effects were included in the regression. However, as was the case with the

restaurant treatment group, none of the regression models with the expanded treatment group yielded estimates which are significant at the 10% level.

Table 7 compares the summary statistics of the expanded control group with those of the expanded treatment group.

Table 7: Summary Statistics for Expanded Treatment/Control Group Before & After Policy Change

	Expanded Treatment		Expanded Control	
Variable	Before	After	Before	After
Employment: Mean	1228	1232	322	340
Employment: Std. Dev.	2033	2103	453	482
Minimum Figure: Employment	23	15	4	5
Maximum Figure: Employment	6850	6765	2051	2098
Average Weekly Wage: Mean	$254.34	$284.19	$1,606.66	$1,684.05
Average Weekly Wage: Std. Dev.	53.86	48.24	511.60	556.48
Minimum Figure: Avg. Weekly Wage	166	208	837	977
Maximum Figure: Avg. Weekly Wage	409	415	3784	3938
Number of Observations	175	62	687	246

The expanded treatment group showed an increase in mean employment from 1228 before the policy change to 1232 after it was implemented. The minimum outcome for employment declined from 23 to 15 after the minimum wage hike, and the maximum number also decreased from 6850 to 6765.

The expanded treatment group experienced a substantial increase in average weekly wage from $254.34 before the policy intervention to $284.19 post-implementation. The minimum outcome for average weekly wage rose from $166 to $208 after the ordinance was implemented, and the maximum number also increased from $409 to $415.

The expanded control group showed an increase in mean employment from 322 before the policy change to 340 after it was implemented. The minimum outcome for employment

increase from 4 to 5 after the minimum wage hike, and the maximum number also increased from 2051 to 2098.

The expanded treatment group experienced a substantial increase in average weekly wage from $1606.66 before the policy intervention to $1684.05 after the change. The minimum outcome for average weekly wage rose from $837 to $977 after the ordinance was implemented, and the maximum number also increased from $3784 to $3938.

Table 8 shows the regression results for the expanded treatment group against and the expanded control group.

Table 8: Regression Results for Expanded Treatment Group vs. Expanded Control Group

	(1)	(2)	(3)	(4)
Difference in Difference	-23.51	-23.71	2.68	-31.50
	(55.58)	(56.00)	(51.23)	(43.61)
Policy Change	18.09	50.70	57.38	35.26
	(49.95)	(200.97)	(186.64)	(138.50)
Treatment Group	85.45***	85.60***	180.69***	-807.70***
	(29.42)	(29.68)	(30.72)	(98.12)
Constant	415.07***	387.48***	636.22***	340.81***
	(24.89)	(137.96)	(142.26)	(96.28)
Monthly Fixed Effect	No	Yes	Yes	Yes
County Fixed Effect	No	No	Yes	Yes
Industry Fixed Effect	No	No	No	Yes
Observations	1974	1974	1974	1974
adj. R-sq	0.002	-0.012	0.122	0.514

The dependent variable in equations (1), (2), (3) & (4) is employment
Standard errors in parentheses
*, **, *** Statistically different from zero at the 10%, 5%, and 1% level.

Regression equation (1) in Table 8 estimates that the expanded treatment group lost 23.51 jobs relative to the expanded control group due to the implementation of the minimum wage hike. Regression equation (2) in Table 8 adds time fixed effects to the regression equation. By this estimation, the expanded treatment group lost 23.71 jobs relative to the expanded control

group due to the policy change. Regression equation (3) includes time and fixed effects in the equation and estimates 2.68 jobs gained from the intervention. Regression equation (4) includes all three fixed effects and estimates 31.50 jobs lost from the minimum wage hike.

The adjusted r-squared increased from 0.002 when no fixed effects were considered to 0.514 when all fixed effects were included in the regression. However, as was the case with the other permutations, none of the models regressing the expanded treatment group against the expanded control group yielded estimates which are significant at the 10% level.

Table 9 shows regression results for treatment effects on average weekly wages from the policy intervention on the expanded treatment group.

Table 9: Weekly Wage Regression Results for Expanded Treatment Group

	(1)	(2)	(3)	(4)
Difference in Difference	-36.27	-36.04	-35.85	-39.17
	(42.70)	(42.84)	(39.57)	(32.10)
Treatment Group	-696.65***	-696.88***	-759.17***	-304.13***
	(16.80)	(16.78)	(18.21)	(46.26)
Policy Change	75.72	88.10	87.76	92.64
	(80.57)	(82.65)	(74.53)	(59.34)
Constant	1537.46***	1584.34***	1257.32***	1900.26***
	(31.67)	(44.28)	(43.06)	(74.70)
Time Fixed Effect	No	Yes	Yes	Yes
County Fixed Effect	No	No	Yes	Yes
Industry Fixed Effect	No	No	No	Yes
N	658	658	658	658
adj. R-sq	0.707	0.707	0.787	0.860

The dependent variable in equations (1), (2), (3), and (4) is average weekly wages
Standard errors in parentheses
*, **, *** Statistically different from zero at the 10%, 5%, and 1% level.

The models in Table 9 estimate that the expanded treatment group experienced lower wages relative to the expanded control group after the policy intervention happened. Model (1)

estimates that average weekly wages for the treatment group were $36.27 lower than those experienced by the control group. Model (2) includes a time fixed effect and estimates an average weekly wage loss of $36.04 for the treatment group. Model (3) adds both time and county fixed effects to the model and it estimates average weekly wages were lower by $35.85 for the treatment group. Model (4) includes time, county, and industry effects and estimates an average weekly wage loss of $39.17 relative to the control group.

The adjusted r-squared increased from 0.707 when no fixed effects were considered to 0.860 when all fixed effects were included in the regression. However, none of the regression models with the expanded treatment group yielded estimates which are significant at the 10% level.

Subsection: Falsification Test Results

Table 10 shows the regression results for the falsification test made for employment on the restaurant/bar treatment group and the expanded treatment group.

Table 10: Falsification Test for Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Diff in Diff	-82.83	-83.16	-65.90	-50.56	16.56	16.48	2.88	-42.60
	(585.66)	(587.33)	(530.94)	(454.24)	(58.98)	(59.45)	(54.84)	(45.91)
Treatment Group	1482.09***	1482.64***	1577.70***	2432.20***	76.29*	76.48*	179.03***	-794.31***
	(418.29)	(419.45)	(385.46)	(425.17)	(43.05)	(43.40)	(43.34)	(112.71)
Policy Change	1.93	1.74	6.17	-2.09	-15.30	17.65	47.32	33.47
	(36.85)	(37.01)	(37.00)	(34.45)	(50.16)	(204.32)	(190.57)	(141.01)
Constant	273.96***	265.33***	560.79***	694.43***	423.69***	396.32***	640.59***	320.74***
	(25.80)	(87.21)	(120.37)	(121.83)	(37.56)	(137.11)	(146.00)	(95.69)
Time Fixed Effect	No	Yes	Yes	Yes	No	Yes	Yes	Yes
County Fixed Effect	No	No	Yes	Yes	No	No	Yes	Yes
Industry Fixed Effect	No	No	No	Yes	No	No	No	Yes
Observations	524	524	524	524	1442	1442	1442	1442
adj. R-sq	0.185	0.180	0.316	0.486	0.002	-0.011	0.118	0.520

The dependent variable in equations (1), (2), (3), (4), (5), (6), (7) & (8) is employment

Standard errors in parentheses

*, **, *** Statistically different from zero at the 10%, 5%, and 1% level.

The falsification test results shown in Table 10 estimate a difference-in-difference outcome which is small relative to the employment variable. Models (1), (2), (3), and (4) estimate difference-in-difference models for the restaurant/bar treatment group. The estimates declined in size even when explanatory fixed effects variables were added. The model with no

fixed effect estimated a job loss of 82.83 jobs, while the model which controlled for all fixed effects estimated a job loss of 50.56 jobs.

In table 10, models (5), (6), (7) and (8) estimate the difference-in-difference outcomes for the expanded treatment group. The model with no fixed effect estimated a job gain of 16.56 for the treatment group relative to the control group, while model (8) which controlled for all fixed effects estimated a job loss of 42.60.

Each of the models estimated in the table were statistically insignificant. This reinforces the notion that the model did not register a placebo treatment effect in the pre-implementation period where one did not exist.

Table 11 shows the regression results for the falsification test made for average weekly wages on the expanded treatment group.

Table 11: Falsification Test for Weekly Wages

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Diff in Diff	-35.85	-36.61	-9.78	-15.42	-24.34	-24.97	-19.55	-22.04
	(74.59)	(74.94)	(77.31)	(36.22)	(20.61)	(20.65)	(19.72)	(16.39)
Treatment Group	-767.28***	-768.83***	-788.00***	-1774.27***	-681.74***	-681.65***	-745.83***	-283.53***
	(53.16)	(53.56)	(55.98)	(64.89)	(15.44)	(15.45)	(15.80)	(33.68)
Policy Change	44.29	45.38	52.51	21.72	57.21	71.92	62.32	62.35
				(62.9970)				
Constant	986.00***	1040.31***	979.77***	1963.40***	1500.22***	1519.67***	1201.46***	1793.41***
	(52.83)	(78.59)	(87.67)	(69.68)	(29.16)	(53.60)	(46.15)	(54.43)
Time Fixed Effect	No	Yes	Yes	Yes	No	Yes	Yes	Yes
County Fixed Effect	No	No	Yes	Yes	No	No	Yes	Yes
Industry Fixed Effect	No	No	No	Yes	No	No	No	Yes
Observations	524	524	524	524	1442	1442	1442	1442
adj. R-sq	0.129	0.126	0.157	0.854	0.709	0.707	0.787	0.861

The dependent variable in equations (1), (2), (3), and (4) is average weekly wages
Standard errors in parentheses
*, **, *** Statistically different from zero at the 10%, 5%, and 1% level.

The falsification test results shown in Table 11 estimate a difference-in-difference outcome which is small. Models (1), (2), (3), and (4) estimate difference-in-difference models for the restaurant/bar treatment group. The model with no fixed effect estimated an average weekly wage loss of $35.85, while model (4) which controlled for all fixed effects estimated a job loss $15.42.

In Table 10, models (5), (6), (7) and (8) estimate the difference-in-difference outcomes for the expanded treatment group with regard to average weekly wages. The model with no fixed effect estimated an average weekly wage loss of $24.35, while model (8) which controlled for all fixed effects estimated a wage loss $22.04.

Each of the models estimated in both Table 10 and Table 11 were statistically insignificant. This outcome supports the assumption of the robustness of the models since it did not register a placebo treatment effect for either employment or average weekly wages in the pre-treatment period.

CHAPTER SEVEN

CONCLUSION

None of the difference-in-difference regressions employed in this paper yielded estimates which are statistically significant. Therefore, based on these results, the null hypothesis that the policy effect of the minimum wage hike on employment in Johnson County is zero cannot be rejected. There may have been some effect of the policy intervention on employment, but these estimates show that the impact, if it is non-zero, is too small to be statistically significant.

This outcome is consistent with the empirical results of many recent studies which tend to find that minimum-wage increases have little or no effect on employment. Such studies typically match labor markets experiencing an increase in the minimum wage with an appropriate comparison labor market to control for heterogeneity in the model.

It should be noted that Johnson County is home to the University of Iowa in Iowa City. The university has an enrollment of just over 30,000 students per year. Many of the students are likely potential additions to the local minimum wage labor pool and thus may have some effect on local labor market conditions. However, many empirical studies in non-college towns also report similar results to those estimated in this study. Research suggests that the appropriate minimum wage depends strongly on local labor market conditions and the cost of living.

One caveat to the findings of this study is that it applies only to the first step of Johnson County's minimum wage ordinance. Two other minimum wage hikes were also implemented in the county: a raise to $9.15 in May 2016 and an increase to $10.10 in January 2017. It is possible that the effect of those minimum wage hikes on employment in Johnson County were different than those estimated in this paper.

Another caveat is that a minimum wage hike is more likely to significantly affect employment at higher wage levels. The minimum wage increase estimated in this paper could be described as a moderate increase relative to local economic conditions. One should not assume that a higher minimum wage has little effect on employment conditions at all wage levels. At higher relative wage levels, an increase in the minimum wage is more likely to affect employment levels among lower-wage workers.

Nevertheless, the conclusion that moderate increases in the minimum wage produce little effect on employment is noteworthy. It suggests that increases in the minimum wage can be used as means to effectively raise wages for low wage workers with little cost to society in the form of employment losses. Much of the wage increases paid to this group are likely to be re-spent in the local economy. To the extent that this outcome is beneficial to society, a modest minimum wage increase can produce significant marginal benefits at little marginal cost.

Linn and Polk counties in Iowa have passed minimum wage increases in their local labor markets. Both of those counties are fairly similar to Johnson County demographically. Each has a metro area somewhat larger than the Iowa City metro area located in Johnson county. The Cedar Rapids (Linn) and Des Moines (Polk) metro areas are measurably larger than Iowa City. Based on the results of this paper and the similarity of those labor markets, it is likely that Linn and Polk counties will also be able to absorb moderate minimum wage increases at little cost to employment.

Wapello county has also passed a minimum wage increase at the time of this writing but has not implemented it yet. Wapello county is a smaller and more rural county with a lower wage base and a much smaller metro area. Furthermore, the main population center for the county (Ottumwa) has opted out of the local ordinance (Sussmann 2016). Because of these

differences, it should not assume similar outcomes to those experienced in Johnson county. Given the dissimilarity of its labor market relative to Johnson county, caution should be employed regarding the question of a policy to increase its minimum wage.

The minimum wage remains a contentious issue in Iowa. On March 30, 2017, Governor Terry Branstad signed legislation into law which removes local control over wage issues (Gruber-Miller 2017). This law effectively renders local minimum wage ordinances like those in Johnson County void and unenforceable. Nevertheless, a local campaign has begun to encourage employers to keep the minimum wage stable at the current $10.10 per hour rate. Many local employers have publicly expressed a willingness to maintain current wage levels for existing employees, suggesting that local minimum wages may be sticky for some time despite the passage of the state law abolishing local wage controls (Gruber-Miller 2017).

While local control of wage issues has been abolished in Iowa for the time being, the minimum wage issue still promises to be a provocative issue in Iowa. The experience of Johnson County, along with that of Linn County, has raised the expectations of many workers about the definition of a reasonable wage. Johnson County's experience of raising the minimum wage from November 2015 through March 2017 will be instructive and enlightening in future policy discussions of the issue.

REFERENCES

1. Addison, J., Blackburn, M, Cotti, C. (2009). Do Minimum Wages Raise Employment? Evidence from the U.S. Retail-Trade Sector. *Labor Economics* 16 (4): 397– 408.

2. Addison, J., Blackburn, M, Cotti, C. (2012). "The Effects of Minimum Wages on Labor Market Outcomes: County-Level Estimates from the U.S. Restaurant and Bar Sector." *British Journal of Industrial Relations* 50 (3): 412–35.

3. Allegretto, S., Dube, A., Reich, M., & Zipperer, B. (2013). Credible Research Designs for Minimum Wage Studies. IRLW Working Paper No. 148-13. http://irle.berkeley.edu/workingpapers/148-13.pdf.

4. Belman, D. and Wolfson, P. (2014). What Does the Minimum Wage Do? W.E. Upjohn Institute for Employment Research: Kalamazoo, MI.

5. Blundell, R., and M. Costa Dias. (2000). "Evaluation Methods for Non-Experimental Data." *Fiscal Studies*, 21(4), 427–468.

6. Card, D., & Krueger, A. B. (1994). Minimum wages and employment: A case study of the fast-food industry in New Jersey and Pennsylvania. *American Economic Review*, 84(4), 772-793.

7. Chletos, Michael and Georgios P Giotis. (2015). "The Employment Effect Of Minimum Wage Using 77 International Studies Since 1992: A Meta-Analysis." Munich Personal RePEc Archive, No. 61321.

8. Cooper, D. (2013). "Raising the Federal Minimum Wage to $10.10 Would Lift Wages for Millions and Provide a Modest Economic Boost." Briefing Paper no. 371, Economic Policy Institute, Washington, DC.

9. Cooper, D. (2015). "Raising the Minimum Wage to $12 by 2020 Would Lift Wages for 35 Million American Workers." Briefing Paper #405, Economic Policy Institute, Washington, DC.

10. Dillon, L., & McGreevy, P. (2016, March 31). Legislature approves minimum wage increase, sending historic measure to Gov. Jerry Brown. Retrieved November 28, 2016, from http://www.latimes.com/politics/la-pol-sac-minimum-wage-vote-20160331-story.html

11. Dube, Arindrajit (2014). "Proposal 13: Designing Thoughtful Minimum Wage Policy at the State and Local Levels." The Hamilton Project.

12. Dube, A., Lester, T. W., & Reich, M. (2010). Minimum wage effects across state borders: Estimates using contiguous counties. *Review of Economics and Statistics, 92*(4), 945-964.

13. Dube, A., Lester, T. W., & Reich, M. (2010). “Minimum Wage Shocks, Employment Flows and Labor Market Frictions.” IRLE Working Paper 149-13, Institute for Research on Labor and Employment, Berkeley, CA.

14. Dube, A., and Zipperer, B. (2014). “Pooled Synthetic Control Estimates for Recurring Treatments: An Application to Minimum Wage Laws.” Unpublished manuscript.

15. Georgiadis, A. (2008). “Efficiency wages and the economic effects of the minimum wage: Evidence from a low-wage labor market.” CEP Discussion Paper No. 857, Centre for Economic Performance London School of Economics.

16. Gruber-Miller, S. (2017, March 30). “What's next for Johnson County after minimum wage rollback?” Retrieved April 01, 2017, from http://www.press-citizen.com/story/news/local/2017/03/30/whats-next-johnson-county-after-minimum-wage-rollback/99778038/

17. Hanson, Alex. "Minimum Wage Increase Dies in Iowa Legislature." *Iowa State Daily*. N.p., 2 Apr. 2015. Web. 03 July 2016.

18. Hardy, Kevin. "Iowa Poll: Most Want Increase in State's Minimum Wage." *Des Moines Register*. N.p., 29 Feb. 2016. Web. 03 July 2016.

19. Hoffman, S. D. (2014). “Are the Effects of Minimum Wage Increases Always Small? A Re-Analysis of Sabia, Burkhauser, and Hansen.” Submitted to Industrial and Labor Relations Review.

20. Imbens, G., and J. Wooldridge. (2009). “Recent Developments in the Econometrics of Program Evaluation.” *Journal of Economic Literature*. 47(1), 5–86.

21. Jamison, T. (2017, February 01). Black Hawk County to review setting local minimum wage. Retrieved March 22, 2017, from http://wcfcourier.com/news/local/govt-and-politics/black-hawk-county-to-review-setting-local-minimum-wage/article_e4f676d4-127c-5634-8f08-f3e139094e9a.html

22. Johnson County Board of Supervisors Page. (n.d.). Retrieved July 03, 2016, from http://www.johnson-county.com/dept_supervisors.aspx?id=18549

23. Kuehn, D. (2014). “The Importance of Study Design in the Minimum-Wage Debate” Briefing Paper no. 384, Economic Policy Institute, Washington, DC.

24. Leonard, T. (2000). “The Very Idea of Applying Economics: The Modern Minimum-Wage Controversy and Its Antecedents.” *History of Political Economy*. Vol. 32, Supplement, pp. 117-144.

25. Meinch, T. (2016, April 19). Polk County explores minimum wage increase. Retrieved July 03, 2016, from http://www.desmoinesregister.com/story/news/2016/04/18/polk-county-explores-minimum-wage-increase/83192516/

26. N. (2016, September 14). Wapello County board votes to raise minimum wage. Retrieved March 14, 2017, from http://www.desmoinesregister.com/story/news/2016/09/14/wapello-county-board-votes-raise-minimum-wage/90351098/

27. N. (2017, March 16). Lee County board moves toward hiking minimum wage. Retrieved March 22, 2017, from http://qctimes.com/news/state-and-regional/iowa/lee-county-board-moves-toward-hiking-minimum-wage/article_840af253-424a-5016-854d-12e726fb0ab5.html

28. Neumark, D. (2001). "Evidence on Employment Effects of Recent Minimum Wage Increases from a Pre-Specified Research Design." *Industrial Relations*. p. 121–144.

29. Neumark, D., & Wascher, W. (1992). "Employment effects of minimum and subminimum wages: Panel data on state minimum wage laws." *Industrial and Labor Relations Review*, 46(1), 55-81.

30. Neumark, D., and W. Wascher. (1996). "The Effects of Minimum Wages on Teenage Employment and Enrollment: Estimates from Matched CPS Data." *Research in Labor Economics,* 25–64.

31. Neumark, D., and W. Wascher. (2007). "Minimum Wages and Employment." *Foundations and Trends in Microeconomics*, 1–182.

32. Neumark, D., & Wascher, W. L. (2008). Minimum Wages Cambridge and London: MIT Press.

33. Neumark, D., Salas, J. M. I., & Wascher, W. (2013). Revisiting the minimum wage-employment debate: Throwing out the baby with the bathwater? *Industrial and Labor Relations Review,* 67, 608-648.

34. Orazem, P. F., & Mattila, J. P. (2002). Minimum wage effects on hours, employment, and number of firms: The iowa case. *Journal of Labor Research*, 23(1), 3-23.

35. Sabia, J. J., R.V. Burkhauser, and B. Hansen. (2012). "Are the Effects of Minimum Wage Increases Always Small? New Evidence from a Case Study of New York State." *Industrial and Labor Relations Review*. 65(2).

36. Schmidt, Mitchell. "Linn County Explores Minimum Wage Increase." *The Cedar Rapids Gazette*. N.p., 13 Jan. 2016. Web. 03 July 2016.

37. Singell, L.D., and J.R. Terborg. (2007). "Employment Effects of Two Northwest Minimum Wage Initiatives." *Economic Inquiry*. 45(1), 40–55.

38. Stock, J. H., & Watson, M. W. (2015). *Introduction to econometrics*. Boston, MA: Pearson.

39. Sussmann, R. (2017, December 9) "Ottumwa Opts Out of Wapello County Minimum Wage Hike." Retrieved March 22, 2017, from http://www.kbur.com/2016/12/09/ottumwa-opts-out-of-wapello-county-minimum-wage-hike/

40. University of Kentucky Center for Poverty Research. (2015). "UKCPR National Welfare Data, 1980-2014." Gatton College of Business & Economics, University of Kentucky, Lexington, KY. http://www.ukcpr.org/data (accessed 11/30/16).

41. U.S. Bureau of Labor Statistics, http://www.bls.gov/cew/cewbultn14.htm

42. United States Census Bureau. (n.d.). *Quarterly Workforce Indicators 101* (QWI20151218, pp. 1-20).