Impact of Minimum Wage Increases on Unemployment:

A case study of Limited Service restaurants along the border of Missouri and Kansas

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Abstract: This study exploits a natural experiment to analyze whether increases in the minimum wage affect employment levels in limited service restaurants. Missouri and Kansas were selected because they share a border. Missouri has increased its minimum wage multiple times since 2012, while Kansas has not. A differences-in-differences regression revealed no statistically significant difference between Kansas and Missouri in mean employment level change in limited service restaurants.

1. Introduction

In 2009, the Fair Labor Standards Act (FLSA) was amended to set the federal minimum wage to $7.25. Since then, there have been numerous legislative efforts to increase it further, most recently in 2023 (H.R.4889, 2023). However, these efforts have received pushback from those who believe that increasing the minimum wage will have negative effects on employment. States and municipalities, however, are allowed to increase their minimum wages beyond the federal baseline. Our study looks at the border counties in Kansas and Missouri to determine if increases in the minimum negatively impact employment. Kansas' minimum wage is the same as the federal default of $7.25. Missouri, on the other hand, first adopted its own state minimum wage rate in 2006 when voters passed ballot measure "Proposition B," which increased the state minimum wage to $6.50. Proposition B also tied any future increases to the state minimum wage to changes in the Consumer Price Index (CPI) (Missouri Secreary of State, 2006). Several years

later, Proposition B of 2018 set the minimum wage to increase to $12.00 by 2023 through year-over-year increases ranging from 75 and 85 cents (Missouri Secretary of State, 2018).

The states of Kansas and Missouri share a 341-mile border that runs along a section of the Missouri River. On the west of this border lies the state of Kansas, a conservative-leaning state that has not seen an increase in its minimum wage since 2009 (Department of Labor, 2023). On the east of the border lies Missouri. Although Missouri is also a conservative-leaning state, its metropolitan areas are largely Democratic. And Missouri has consistently increased its minimum wage since 2012 (Missouri Department of Labor, 2023). Not only do these states share a border, but they also share the Kansas City Metropolitan Statistical Area, a population center made up of half a million people and nine counties. Kansas and Missouri provide an opportunity for a promising natural experiment to assess the effect of minimum wage increases on employment.

Figure 1: Kansas and Missouri Minimum Wage, 1991–2023

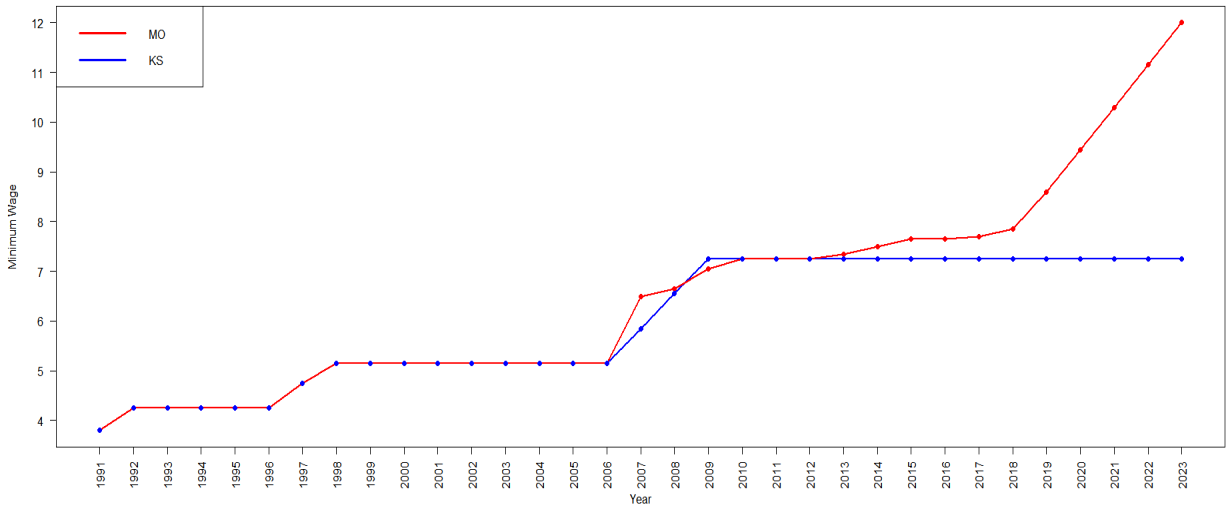


Figure 1 shows the increases in the minimum wage over time in both Kansas and Missouri. The last federal minimum wage increase was in 2009, which Missouri also adopted by default until 2012 when minimum wage began to be tied to the CPI. In 2018, Proposition B increased the minimum wage in 75 to 85 cent increments annually.

2. Literature Review

The history of the minimum wage question can be roughly separated into three stages. First, we have the events surrounding the Fair Labor Standards Act (FLSA) of 1938, the first minimum wage legislation passed in the history of the United States, introduced by Franklin D. Roosevelt's presidency as a result of the Great Depression. This bill set the minimum wage in the United States at $0.25 per hour, a rate that would slowly continue to go up throughout the years (Neumark and Wascher, 2006). The implementation of this piece of legislation sparked debates between the "marginalists," economists who believed that the labor market had significant competitive characteristics such as price taking and lack of market power, and the "institutionalists," a group of economists who believed that the labor market was likely monopsonistic. In short, their debates yielded no consensus, which propelled the federal government to continue hiking the minimum wage in the United States, reaching $3.35 in 1981 through further FLSA amendments. The constant raising of the minimum wage generated tensions within the floors of Congress, propelling the legislative body to create the Minimum Wage Study Commission in 1977 (Neumark and Wascher, 2006). The purpose of this commission was to put the debate to rest and thoroughly determine whether there were truly any negative effects of the minimum wage on employment. The final report of the commission, along with further analyses of contributors of the Commission Charles Brown, Curtis Gilroy, and Andrew Kohen, concluded that raises in the minimum wage had detrimental effects on employment (Minimum Wage Study Commission, 1977). Specifically, Brown, Gilroy, and Kohen posited a notorious estimate of the elasticity of employment and raises in the minimum wage which suggested that a ten percent increase in the minimum wage reduced teen employment by one to three percent (1982). The verdicts of the Commission gave rise to the

second stage in the history of minimum wage research, an utter halt of publications and discussions throughout the rest of the 1980s.

These conclusions relegated the minimum wage question to the margins of academic research, at least until the early 1990s. The lack of federal raises in the minimum wage up to 1990 devalued it in real terms by almost thirty percent, leading to quarrels resurfacing within the US legislature. Individual states began to implement their own minimum wages, which brought into question the effects of minimum wage on employment once more. This sparked the third stage of the debate around the question of the minimum wage spearheaded by studies looking at state-level effects, thus trying to create natural experiments and isolate the effects of minimum wage changes (Neumark and Wascher, 2006). These studies also focused on specific industries and age groups, such as retail and teenagers respectively, as these groups were theorized to be most negatively affected by increases in the prevalent wage. While many added to this movement, arguably the most important of them all was the 1993 paper published by Card and Krueger comparing the effects of the 1991 minimum wage raise in New Jersey on employment with neighboring Pennsylvania, which saw no raises (1993). The paper revolutionized the field, causing much controversy and admiration. In 2021, David Card was awarded the Nobel Prize in Economic Sciences for his contributions to the knowledge of the development of natural experiments through his 1993 paper. Ever since then, the literature has shifted to suggest that the effects of minimum wage on employment might be negligible; however, some meta-analyses posit that this is not true and that most of the recent research suggests negative elasticities of employment and minimum wage (Neumark and Wascher, 2006).

From the institutionalist camp, there exists a multitude of papers that provide valuable insights into the minimum wage question. As mentioned previously, Card and Krueger virtually

revived the research around the minimum wage, with their paper looking at the effects of the minimum wage increase in New Jersey on fast food establishment employment. The economists surveyed 473 fast food establishments in the two states, and compared employment levels before and after the change, accounting for layoffs, and increases in weekly wages and prices, among other factors. Surprisingly, Card and Krueger found positive and significant effects on employment following the minimum wage increase in New Jersey in comparison to Pennsylvania. The authors suggested that the new costs were internalized through the raising of product prices, which rose faster in New Jersey in contrast to Pennsylvania (Card and Krueger, 1993). Dube et al. expand this type of analysis to compare policy differences in minimum wages across all contiguous county pairs in the US from 1990 to 2006 (2008). Their analysis finds no adverse effects on employment of youth and low-wage segments and suggests that any negative effects on employment found in previous studies stem from approaches that do not control for local economic conditions that tend to create spatial heterogeneities in employment not related to the minimum wage (Dube et al., 2008). Cengiz et al. looked at 138 state-level minimum wage changes from 1979 and 2016 and found that, through a difference-in-difference approach, the overall number of jobs remained unchanged following an increase in the minimum wage (2019). Overall, their contributions provided evidence against the idea that minimum wage increases reduce labor stocks. From a more international perspective, Harasztosi and Lindner looked at the effects of years of steady increase in the minimum wage in Hungary since 2000 (2019). The authors specifically found employment elasticities to be slightly negative, with firms mostly passing on these costs to consumers. Overall, job losses were marginal as out of the 290,000 minimum-wage workers in Hungary only 30,000 (0.076 percent of aggregate employment) lost their jobs, while the remaining 260,000 workers saw increases of sixty percent in their wages

(Harasztosi and Lindner, 2019). Furthermore, other papers suggest that increases in the minimum wage reduce labor market frictions, with minimum wage increases incentivizing workers to stay in their respective jobs and reducing overall layoff and quit rates (Dube et al., 2016; Brochu and Green, 2013).

There is also significant literature from the marginalist camp. Even and McPherson focus their analysis on the state of California and analyze its thirty-year minimum wage experiment by looking at county-industry pairs (2017). Their findings suggest that, overall, minimum wage increases cause a decrease in employment growth. However, when looking at specific income groups, the effect is higher for low-wage industries compared to higher-wage ones. They find that, on aggregate, a ten percent increase in the minimum wage leads to a two percent decrease in employment in the state. When looking at industries where at least one-half of its workers earn low wages, this elasticity is even more negative, with a ten percent increase in the minimum wage leading to a roughly 4 percent reduction in employment (Even and Macpherson, 2017). Using panel data of state minimum wage laws from the years 1973-1989, Neumark and Wascher analyze the effects of minimum wage raises on teenage employment (1992). The authors provide evidence as to the adverse employment effects of hiking the prevalent minimum wage, with an estimated elasticity of a one to two percent decrease in employment for teenagers per every 10% increase in the minimum wage. Moreover, they criticized Card in an earlier study for failing to consider school enrollment. Neumark and Wascher believe that school enrollment could potentially be correlated with employment and minimum wage, as high minimum wage might lead individuals to stay in school due to worsened employment conditions or because schooling increases employment opportunities in the covered sector. Significantly, when Neumark and

Wascher excluded school enrollment from their model, they found slightly positive employment effects among teenagers (1992).

Overall, there still seems to be a lack of consensus amongst economists as to what truly occurs to employment. This motivates our current analysis, as we strive to add to the literature and fill in the gaps where previous research has not gone or is insufficient. These papers informed our initial research on the subject, helping us understand how different policy changes impact our outcome variable. Card and Krueger (2000) was our initial inspiration for the type of study we wanted to recreate because of their use of localized analysis units and a difference-in-difference model. Their localized analysis of New Jersey and Philadelphia inspired us to focus on two states that border each other, Kansas and Missouri. Additionally, we also look at a specific sector of the labor force, limited-service restaurants which, like fast food restaurants, are most impacted by minimum wage changes.

3. Data and Experimental Design

Our units of analysis are counties in the states of Missouri and Kansas from the years 2011 to 2023. Initially, twenty counties along the border were included in the analysis, but 3 Kansas counties and 1 Missouri county were later removed from the analysis because they had very few limited-service restaurants, and there was a total lack of employment level reporting for several months. After removing these counties, there were seven remaining counties in Kansas along the state border: Wyandotte, Johnson, Leavenworth, Atchison, Bourbon, Cherokee, and Doniphan counties. On the Missouri side, nine counties remained: Buchanan, Platte, Clay, Jackson, Cass, Bates, Barton, Jasper, and Newton Counties. Data were obtained from the Bureau of Labor Statistics' (BLS) Quarterly Census of Employment and Wages (QCEW) by county and industry.

The covariates are the states of Kansas and Missouri, which constitute the treated and control groups, respectively. The "treatment" here being the implementation of the minimum wage in the state of Missouri in all but two of the years observed. Additionally, the year of observation is also a covariate, acting as the "post-period" variable in our analysis. We looked at year pairs, where the last six months of the first year along with the first six months of the next constituted a full temporal unit of analysis. Since the increases in the minimum wage were always implemented at the beginning of the latter calendar year, the second group of six months within our observed timeframe constitutes the post-period unit. Following general observations of the literature, our outcome variable is the employment level change in limited-service restaurants, a type of restaurant characterized by a lack of servers and limited presence of employees (Bureau of Labor Statistics, 2023). This industry was chosen specifically because of the large proportion of low-wage workers that characterizes it. Because of this, these individuals are most likely to be affected by changes in the minimum wage (Neumark and Wascher, 2006). We decided to focus on Kansas and Missouri because they share the Kansas City metropolitan area, which is split by the state line. By looking at the contiguous county pairs along their borders, we can control for general differences in labor market trends and shocks characterized by significant geographical disparities. Thus, we can avoid any confounders such as major migration movements, exogenous demand or supply shocks, or natural disasters that would affect the results of one group but not those of the other.

Because of the possibility that changes in the economy might confound our findings, for example, if many limited service restaurants begin laying off employees, not because of minimum wage increases, but because of more general economic trends, we included the overall employment level for all industries as a control. This allows us to estimate the impact minimum

wage increases have on limited service restaurants while holding constant for changes in employment level for all industries.

This project exploited a natural experiment between Kansas and Missouri. Using a differences-in-differences regression model, we sought to calculate the mean difference in employment level change between the Kansas counties and those in Missouri. Our regression model is as follows, where State * Year is the treatment effect:

$$Emplvl\ Limited\ Service_{ij} = \beta_0 + \beta_1 State_i + \beta_2 Year_j + \beta_3 State_i * Year_j + \beta_4 Emplvl\ All_{ij}$$

This model relies on a parallel trend assumption. A plot was constructed showing the employment level trends of Missouri and Kansas both before and after the treatments were applied. This plot shows the change in the average proportion of workers employed in limited service restaurants in each county each month. Additionally, for this analysis to be meaningful, it is also necessary to demonstrate that the minimum wage increases were *binding,* or had the intended effect of increasing wages for workers in the limited service restaurant industry. If the minimum wage increase was not binding, then it brings into question whether any changes in employment level can truly be attributed to changes in the minimum wage; an additional bar plot was constructed to check whether this condition was met.

Hypothesis

We hypothesized that increases in the minimum wage would have little to no effect on employment levels in limited service restaurants. Any changes in employment levels could instead be attributed to other confounding factors, such as overall labor market trends (see Figure 2). Our predictions were informed by the assumption that, unlike what marginalists would suggest, the buyers of labor, that is, firms, are not price takers, but price makers. Ultimately, employers are theorized to have the ability to adjust their intake of employment and set favorable

wages, as opposed to what competitive models would suggest. This ability to set prices of labor, is what allows them to generate profit on labor, and thus an increase in minimum wage would not lead to massive layoffs. An increase in the minimum wage would only eat away at the margins of firms, a change that would most likely be internalized by price changes, but not in layoffs, given unsubstantial changes to the binding wage in the market.

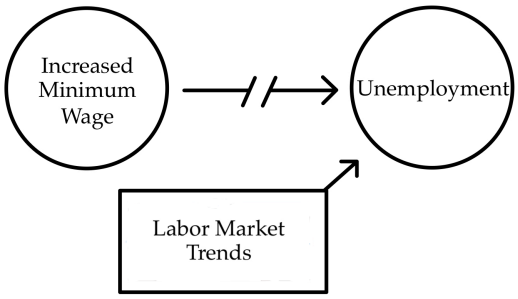


Figure 2: Hypothesized Relationship Between Increases in Minimum Wage and Employment

Note: This diagram conveys the lack of a relationship between unemployment and raises in the minimum wage, instead suggesting that multiple other confounders inherent to the labor market are behind any fluctuations in the labor market and regional economy. Some factors that could affect hiring rates could include demand shocks, recessions, oil shocks, input shortages, etc.

4. Assumptions and Diagnostics

An important consideration for our analysis is whether the minimum wage increase was binding, that is, whether it had the effect of actually increasing wages. We found little evidence to suggest that Missouri minimum wage increases were binding in the limited service restaurant industry in the Missouri border counties. While Missouri's limited-service restaurant workers did receive a larger average weekly wage each year, including treatment years, they were not substantially larger than the increases in the control state, Kansas (Figure 3; Table 1). This is a limitation for this study, as it is important to show that any treatment effect found can actually be

attributed to the minimum wage increase. These limitations and another approach using all counties in Kansas and Missouri are discussed in greater depth in the Limitations section.

Figure 3: Average Weekly Wages for Limited Service Restaurants

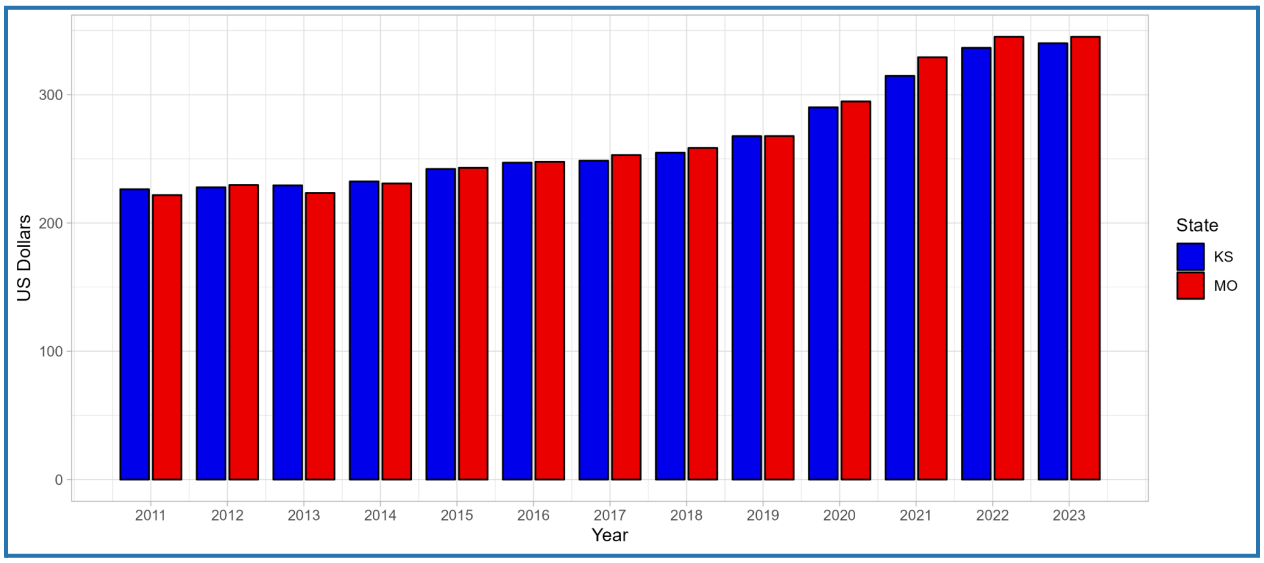


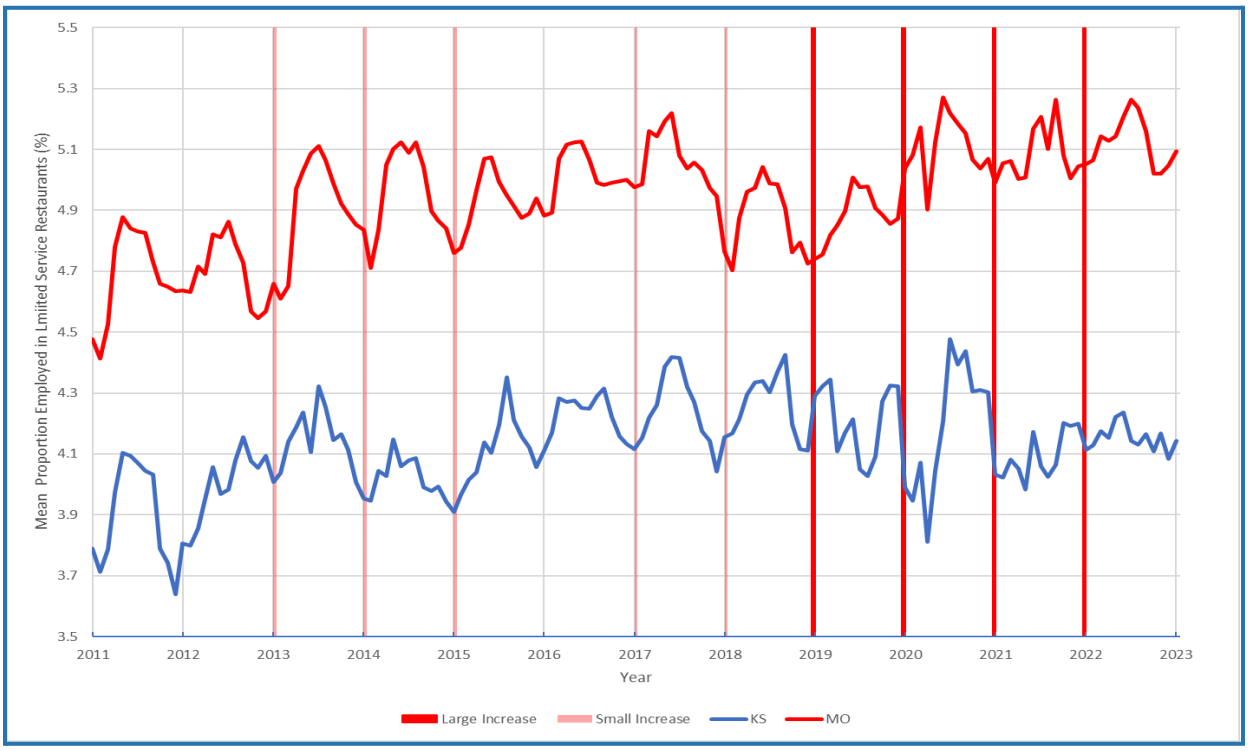
Table 1: Average Weekly Wages for Limited Service Restaurants

State	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Kansas	229.86	228.96	231.11	236.32	241.54	245.32	248.50	249.93	266.00	285.14	310.86	328.75	336.29
Missouri	220.70	229.80	223.20	229.75	242.45	246.18	250.35	257.63	267.80	294.78	326.20	340.65	341.60

Another diagnostic plot assesses whether the parallel trend assumption is reasonable. Figure 3 shows that the limited service industries of both Kansas and Missouri roughly mirror each other, right down to the annual cyclical increases and decreases. This suggests that the parallel trend assumption is reasonable. Lastly, the yearly cycle seen on the chart also reveals an interesting quirk of the limited service industry. Nearly every year saw employment increase during the summer months. Considering the nature of limited service labor, this makes sense; younger workers pick up summer jobs and then leave them when school picks up again in the fall. This yearly cycle thus might represent the presence of younger workers entering and exiting the limited service industry.

5. Findings and Analysis

Figure 4: Mean Proportion Working in Limited Service Restaurants in Kansas and Missouri Border Counties, 2011–2023



The pre-treatment regression, 2011-2012, indicates a difference in mean employment level loss of 110 jobs. However, this was not statistically significant from zero. Regressions for years when there was a minimum wage increase also did not show a statistically significant relationship between increasing the minimum wage and employment. The lack of a relationship remains true, regardless of the size of the increase in the minimum wage. Furthermore, the treatment effect on employment level was relatively small compared to the total size of the economy that we are measuring. The largest difference in mean employment change was only 110 jobs lost across nine counties in Missouri for 2011-2012, a year that did not even see a minimum wage increase. The lowest P-value is only 0.39, also for years 2011–2012. What's more, the data in the regression table does suggest any trends. For example, 2013 saw a $0.10

increase in the Missouri minimum wage and observed an increase of around seven jobs more than Kansas. Meanwhile, 2022 saw an $0.85 increase in the minimum wage and larger *job growth* than 2013. The randomness of the direction of the treatment effects and lack of any correlation between the size of the minimum wage increase and the treatment effect are consistent with our hypothesis.

Table 2.

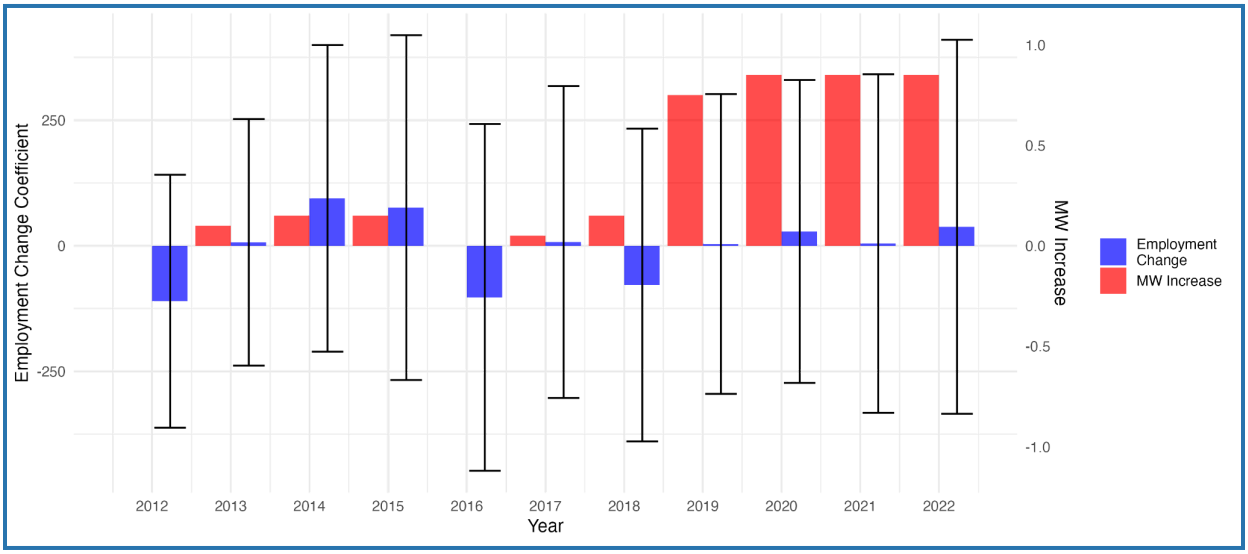
	Dependent Variable										
	Employment Level Change in Limited Service Restaurants										
	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
State x Year	-110.26	6.81	94.41	75.99	-102.88	7.61	-78.05	3.54	28.62	4.47	37.83
	(127.63)	(124.40)	(154.69)	(174.00)	(174.95)	(157.39)	(157.77)	(151.24)	(152.87)	(170.85)	(188.75)
Year	127.23	24.00	-32.32	11.11	133.02	66.43	23.47	44.11	-6.17	-29.57	24.90
	(98.86)	(96.36)	(119.82)	(134.78)	(135.52)	(121.92)	(122.21)	(117.15)	(118.42)	(132.34)	(146.21)
State	629.19***	549***	596.57***	695.81***	824.38***	716.77***	731.11***	671.63***	698.27***	807.3***	850.16***
	(93.66)	(91.30)	(113.54)	(127.72)	(128.40)	(115.51)	(115.79)	(111.00)	(112.19)	(125.40)	(138.53)
Total Employment	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Intercept	-168.57***	-163.56**	-192.22**	-253.57**	-312.91***	-237.27**	-168.57*	-146.2**	-132.30	-148.37	-206.68*
	(75.64)	(73.74)	(91.75)	(103.27)	(103.82)	(93.39)	(93.61)	(89.71)	(90.90)	(101.36)	(111.93)
Minimum Wage Increase	$0.00	$0.10	$0.15	$0.15	$0.00	$0.05	$0.15	$0.75	$0.85	$0.85	$0.85

Standard Errors are in parentheses
*p<0.1; **p<0.05; ***p<0.01

This is also consistent with the stance of institutionalist economists, who have suggested that low-income labor markets were not best characterized through the competition model following the adoption of the FLSA of 1938 (Neumark and Wascher, 2006). Overall, this evidence suggests that monopsony models of labor markets might offer a more accurate description than that of competitive models. Additionally, contrary to what a perfectly competitive model of the labor market would suggest, our regression found that the years that had the most depressive effects on employment were 2012 and 2016, years that saw no increase in the minimum wage. The regression analysis for these years still lacked statistical significance so we cannot suggest that this information disproves the perfectly competitive model, but it is notable nonetheless. As an alternative to the standard model of perfect competition, later in this

paper we discuss the possible presence of a labor-purchasing monopsony, which still incorporates the basic principles of supply and demand but also better fits the realities of the labor market.

Figure 5: Limited Service Restaurant Employment and Minimum Wage Change in Missouri, 2012–2023



6. Theoretical Explanations

As with the results of Card and Krueger (1993; 2000) or Dube et al. (2016), our findings are inconsistent with what the standard economic theory would predict. The standard competitive model would suggest that an increase in the minimum wage would lead to significant losses in employment, as some marginalists fervently argue. In this section, we analyze the two competing interpretations of labor markets and why our results seem consistent with one as opposed to the other.

Competitive Model

Standard competitive models suggest that firms are price takers in the labor market. This means that the model assumes that employers lack market power within the labor market and have to take the prevailing wages as given. Consequently, the model suggests that an exogenous raise to the minimum wage would force the firm to lay off workers to maintain pre-raise margins. The mechanism behind this is that the prevailing wage or price of labor is at market equilibrium, meaning that it is at the point where the supply and demand of labor meet. When the minimum wage is raised above market-clearing level, the labor supply travels up its upward-sloping curve due to the new binding wage, as workers are incentivized to supply more labor due to more favorable prices. On the other hand, the labor demand also travels up its downward-sloping curve, meaning that a lower amount of labor is being sought, resulting in an overall decrease in labor demanded. This model identifies this disparity between higher supply and lower demand of labor as unemployment, as the increase in the minimum wage disrupts market incentives, leaving the firms with no option but to lay off a portion of their workforce due to the increased cost of labor (Manning, 2020). Thus, the optimal allocation of wages is that of the competitive equilibrium, as it maximizes employment, and any distortion from that would serve to reduce that level of employment, harming workers.

The predictions of this model would result in outcomes such as those suggested by the Congressional Budget Office, which argued that a periodic increase in the federal minimum wage to $15 would lead to millions of job losses (CBO, 2019). Our results suggest that this model's predictions are unfounded, as no statistically significant negative relationship between minimum wage hikes and unemployment was found. Therefore, we look to other theoretical explanations as to the observed results in the Kansas and Missouri labor markets.

Monopsony Model

An alternative model to the labor market question is the monopsony model. A monopsony refers to the situation in which the buyer of a good has market power over the seller of the good. This means that they can set the price of the good, as opposed to taking the price as given under the competitive model. The monopsony model in the labor market assumes that employers, the buyers of labor, have wage-setting power over sellers of labor, that is, the workers. Usual explanations of the model assume that firms' market power stems from the fact that workers are not completely free to choose between firms without any cost. This is referred to as the concept of "search friction" whereby the search of labor is a difficult and costly process (Manning, 2020). A standard competitive model would suggest that if firms decrease workers' incomes by an infinitesimal unit, all workers would leave the firm as countless alternatives in the labor market would provide better wages. However, in reality, a worker might hesitate to leave as if they do, they would risk losing the flow of wages for the indefinite period that they have to find another job. Furthermore, this process is also costly as the worker would have to spend time preparing resumes, completing interviews, and even traveling, all of which have the opportunity cost of continuing to receive wages at the current job.

In addition, even if workers take the risk of looking for a new job, they are often not able to freely choose the most favorable option. This is because firms have limited vacancies. Thus, the most favorable jobs might reject the prospective worker, forcing them to resort to a less beneficial alternative offering a lower wage, a price which the worker has to accept; otherwise, they would have to risk finding another job again. In this sense, search friction gives employers monopsony power, a power that they use to set the quantity of labor demanded, along with the corresponding wage, at the point where their marginal revenue and cost curves meet. This point,

the profit-maximizing point, demands a lower amount of labor than the competitive equilibrium point and sets a wage that is also lower than the market-clearing price. Therefore, if labor markets were truly monopsonistic, marginal increases in the minimum wage would not create significant losses in employment. Theoretically, they would even lead to gains in employment as the firm is now forced to use more workers to set marginal revenue at the new point which brings it closest to profit maximization, something that Card and Krueger's results seem to suggest (1993). If the labor market was monopsonistic, the minimum wage increase, being that it is not significant enough, would push the wage closer to the equilibrium level without creating massive layoffs.

Our results seem to suggest this intuition, as increases in the minimum wage were not found to lead to significant labor contraction in Missouri in the years observed. However, our results are not consistent with the model in that no statistically significant increases in employment occurred after the wage increase. It is also worth noting that there is evidence within the literature that most labor markets are monopsonistic. For instance, Azar, Marinescu, and Steinbaum used the Herfindahl-Hirschman Index (HHI), a tool used to measure the degree of market concentration within a given industry or geography, and found that the HHI for vacancies in most labor markers was above the Federal Trading Commission threshold for high market concentration (2017). Furthermore, others point out at falling labor share of GDP in the US in the last three decades, further suggesting a significant presence of firm wage-setting power in the market (Manning, 2020).

Limitations

Despite our efforts to make our methodology as robust as possible, we must admit to several limitations with our design. Our primary assumption is that neighboring counties, even

across state borders, share similar economies. Although we can find indicators of similarity, it would require a far more in depth breakdown of the economic activity of the border counties in question to remove any doubt of the counties' economic ties.

We found issues when analyzing whether the minimum wage increase was binding. This is a critical assumption for the validity of our analysis. We found no evidence that average weekly wages in limited service restaurants increased more post-treatment in the treatment state (Missouri) then in the control state (Kansas). We suspect that this could be because of labor shortages during COVID-19 pandemic, and employers responding by voluntarily increasing their wages to entice workers to apply for vacancies. This trend would have likely affected both Kansas and Missouri, since this was not tied to a minimum wage increase. Additionally, it is possible that the minimum wage increase in Missouri has had spillover effects, causing Kansas employers near the state line to voluntarily raise their wages to keep workers from fleeing to nearby Missouri for work. To be sure, we do not have evidence that these are the causes of such trends. It is beyond the scope of this paper to test these theories, but it remains a possibility that others could investigate. Additionally, the confidence intervals in our regression for the treatment effect coefficients were also quite large. This may have been due to the small sample size of 16 counties.

We ran our analysis again, this time including every county in Kansas and Missouri that reported data for limited service industries. Although running the experiment this way weakens one of the key theoretical assumptions, that border counties are most likely to have similar economies, we wanted to see if any new revelations resulted from such an analysis. We found that the assumptions for parallel trends were met (Figure B), with both states having similar employment trends in the limited service restaurant industry. Moreover, when including all

counties, the minimum wage increase was binding: the limited service restaurant average weekly wages in Missouri increased more in the post-treatment years in Missouri than in Kansas (Figure B). This eliminated a limitation of our initial model. The regression with all counties also resulted in smaller confidence intervals, though still not statistically different from zero (see Appendix; Table A and Figure C). This suggests that the number of observations in our base study was not a crucial issue on this front. It also suggests that even with a larger data set, the mean differences in employment level change between Kansas and Missouri were still not statistically significant.

Although our analysis had limitations related to data constraints and wage and labor dynamics across state borders, the findings offer insights into the nuanced effects of minimum wage increases on employment. Further research could explore varying minimum wage levels, potential differences between the rate and amount of increases, and detailed wage competition dynamics across state borders to deepen our understanding of these complex relationships.

To further verify if the fast food labor markets in the two states are monopsonistic, future research should determine if labor-constrained establishments saw increases in employment after the wage, as the model would predict. The empirical evidence in this paper would also suggest that the strength of the increases observed is not significant enough to put the prevailing wage above competitive equilibrium. This suggests that, under current conditions, increases south of $1 yearly have no significant disservices to employment. However, further research might look to find the cent or dollar amount of an increase where diminishing returns to scale and losses in employment begin to be seen.

7. Conclusions

In contrast to standard economic intuition, we find that increases in the minimum wage across multiple years did not reduce employment within the limited service industry in the state of Missouri in comparison to the state of Kansas. The empirical evidence seems to show that the changes caused by the minimum wage are not statistically different from zero. Thus, we cannot reject the hypothesis that raises in the minimum wage have null effects on employment. While focused on the contiguous county pairs of both states, we also analyze the effects on both states overall to test the validity of our previous examination. This second analysis provides similar results, with no changes in employment being statistically different from zero. We also find that increases in the minimum wage in Missouri seemed to have spillover effects in Kansas, with the wages of the latter closely following those of the former. We theorize that this is due to competition dynamics and labor supply shocks from the Covid-19 pandemic, among other factors. Furthermore, we provide theoretical frameworks to understand the intuition behind the observed results, with the results mostly aligning with the monopsony model of the labor market whereby firms hold wage setting power over workers. Finally, we find that the strength of the raise did not seem to have differing impacts on employment outcomes. This seems to suggest that increases of less than $1, according to current conditions, are not significant enough to negatively impact employment. Further studies could analyze the question of the strength of the minimum wage to determine the inflexion point where further increases in the strength of the raise lead to negative effects on employment.

Appendix

Figure A

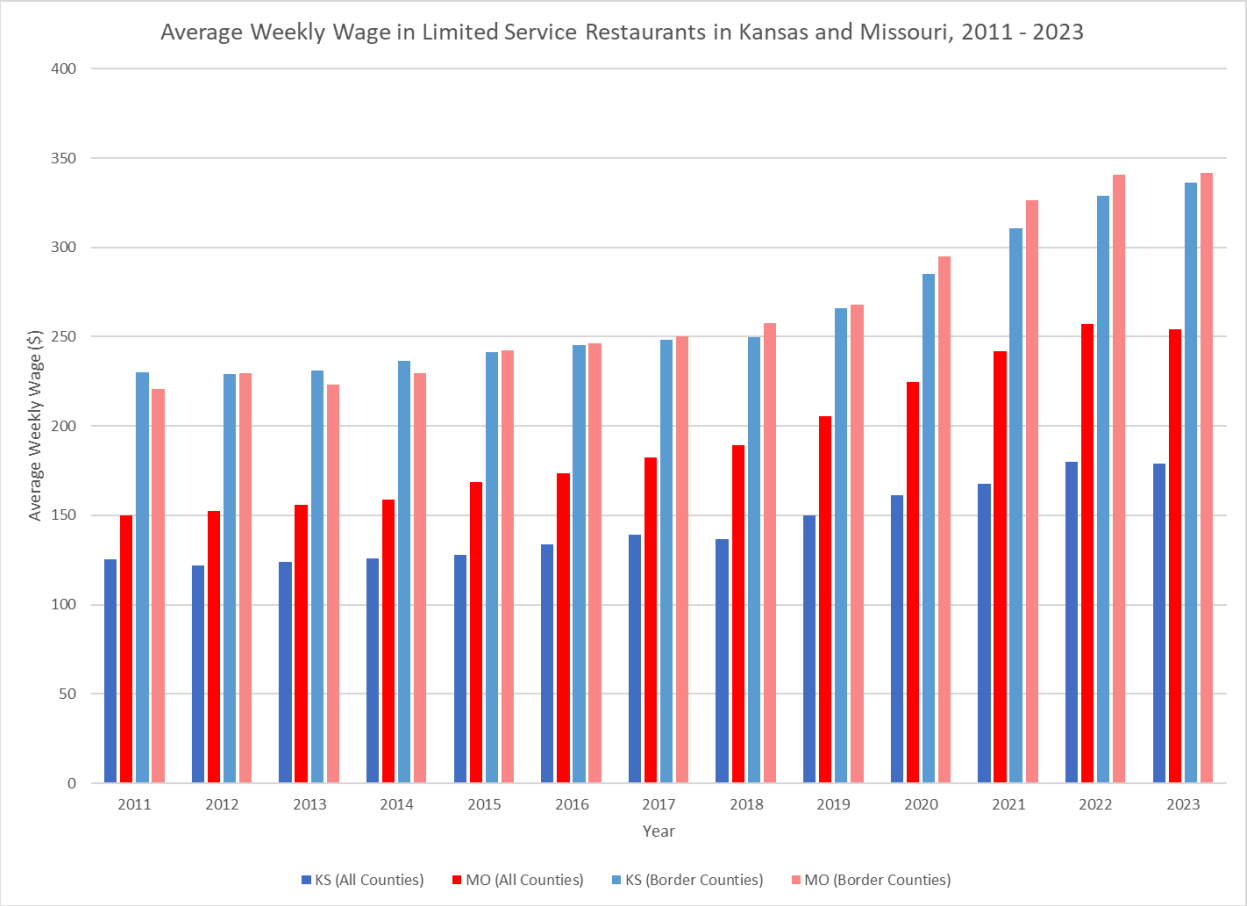


Figure B: Mean Proportion Working in Limited Service Restaurants in Kansas and Missouri, All Counties, 2011–2023

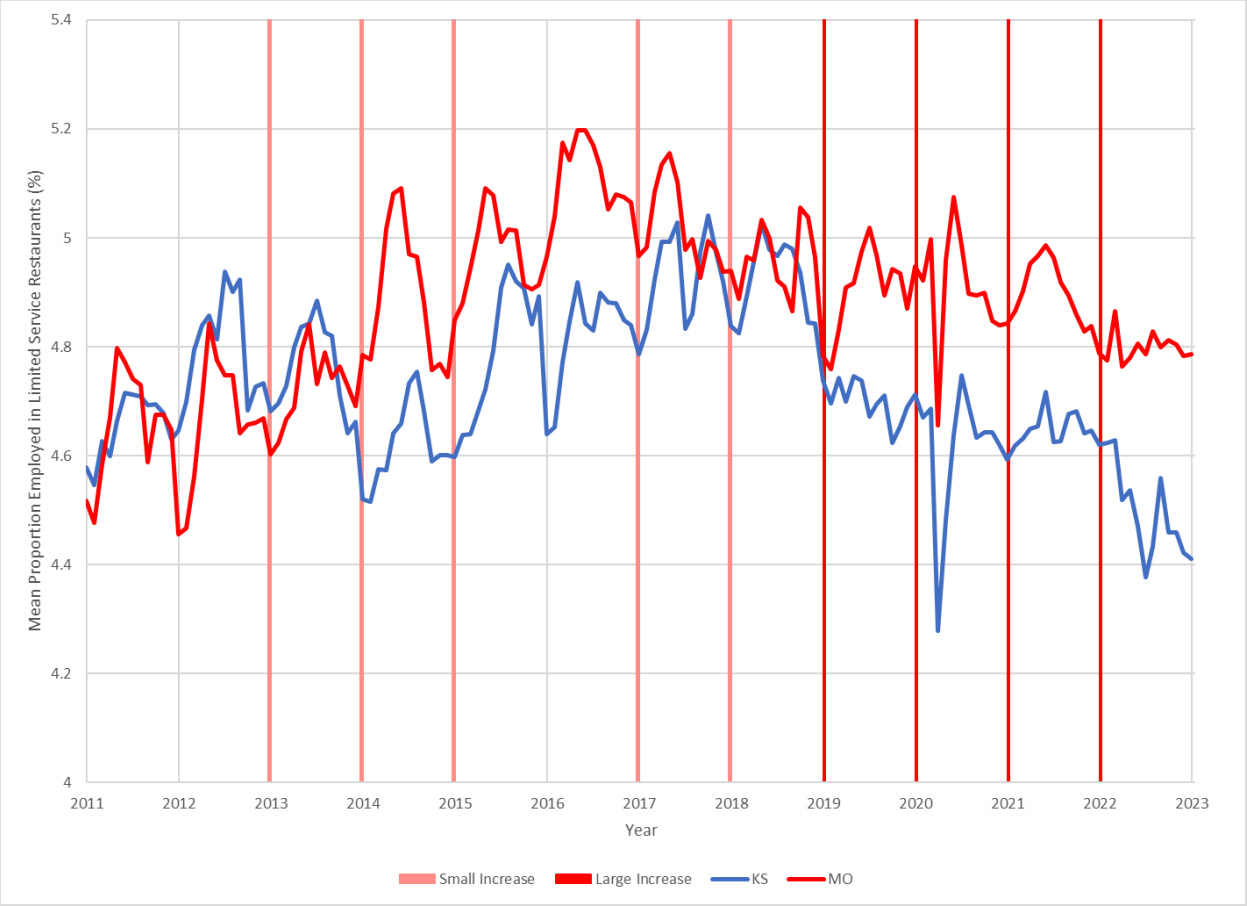


Table A: Regression Data for all Counties

	Dependent Variable										
	Employment Level Change in Limited Service Restaurants										
	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
State x Year	-30.12	29.11	57.58	-35.18	-22.24	-22.64	2.71	-11.61	-20.64	-15.58	-0.26
	(56.03)	(55.17)	(57.46)	(33.79)	(61.46)	(58.68)	(57.61)	(57.11)	(55.78)	(56.03)	(61.65)
Year	46.64	12.14	-2.66	16.55	55.57	39.32	4.30	22.05	11.22	-1.79	-2.96
	(43.27)	(42.09)	(43.86)	(45.57)	(47.18)	(44.87)	(44.25)	(43.94)	(42.69)	(43.31)	(47.79)
State	15.94	-15.55	30.72	69.32	120.64**	101.94**	74.53*	82.70*	32.44	37.22	57.97
	(41.26)	(40.81)	(42.13)	(43.98)	(45.30)	(43.23)	(42.13)	(42.54)	(41.14)	(40.93)	(45.33)
Total Employment	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Intercept	9.02	26.66	-9.10	-35.18**	-73.63**	-51.74	-23.63	-35.34	8.22	10.28	-9.99
	(32.04)	(31.19)	(32.27)	(33.79)	(34.99)	(33.21)	(32.43)	(32.92)	(31.61)	(31.64)	(35.08)

Standard Errors are in parentheses
*p<0.1; **p<0.05; ***p<0.01

Figure C

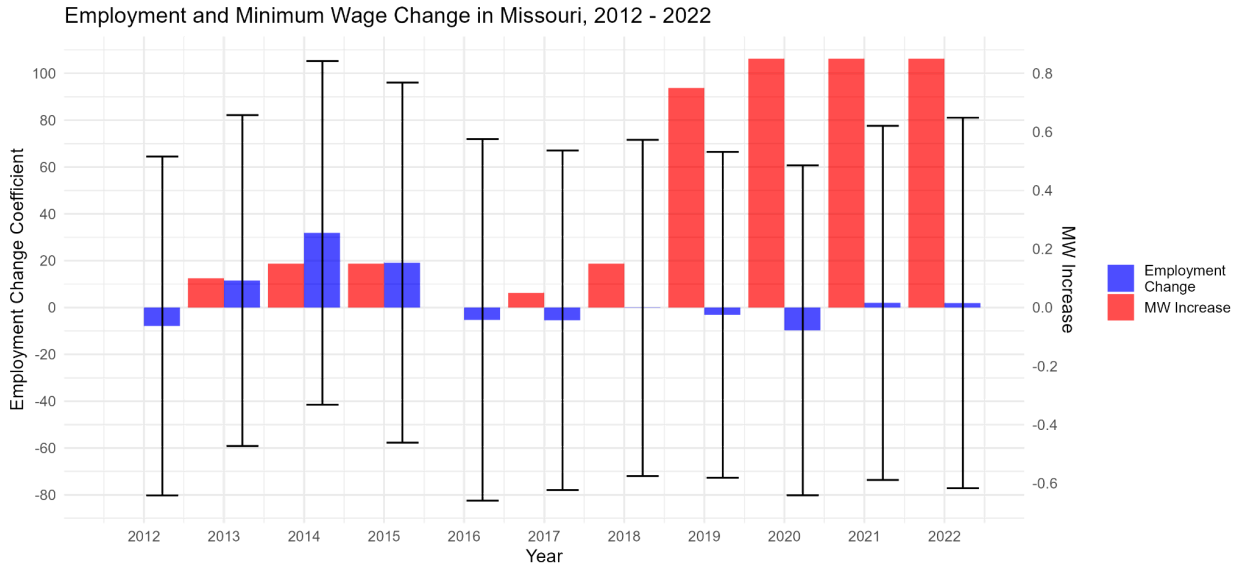


Table B: Minimum Wage Data for Missouri

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
MW increase	0	0.10	0.15	0.15	0	0.05	0.15	0.75	0.85	0.85	0.85	0.85
New MW	$7.25	$7.35	$7.50	$7.65	$7.65	$7.70	$7.85	$8.60	$9.45	$10.30	$11.15	$12.00

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