CORNELL HOSPITALITY REPORT

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Have Minimum Wage Increases Hurt the Restaurant Industry?

The Evidence Says No!

by Michael Lynn and Christopher Boone

EXECUTIVE SUMMARY

The U.S. restaurant industry has consistently opposed increases in the regular and tipped minimum wages on the grounds that such increases would require restaurants to reduce staffing, raise prices to offset reduced revenue, or both. Either reaction is thought to reduce customer satisfaction and demand, along with restaurant profitability and even survival. To the contrary, however, the results of this study confirm previous findings, namely, that the relatively modest mandated increases in employees' regular and tipped minimum wages in the past twenty years have not had large or reliable effects on the number of restaurant establishments or restaurant industry employment levels, although those increases have raised restaurant industry wages overall. Even when restaurants have raised prices in response to wage increases, those price increases do not appear to have decreased demand or profitability enough to sizably or reliably decrease either the number of restaurant establishments or the number of their employees. Although minimum wage increases almost certainly necessitate changes in restaurant prices or operations, those changes do not appear to dramatically affect overall demand or industry size. Furthermore, there is strong evidence that increases in the minimum wage reduce turnover, and good reason to believe that it may increase employee productivity as well. While prospective large increases in minimum wage mandates may have more noticeable effects, the evidence suggests that the restaurant industry should accept reasonable, modest increases in the minimum wage.

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Federal, state, and local laws in the U.S. specify the minimum wages to be paid in their jurisdictions. Recent years have seen an increased interest among many in raising those minimum wages, and there has been some movement at the local, state, and federal levels to do so. [1] Proposals to increase the minimum wages have been opposed by the restaurant industry on the grounds that such increases would require restaurants to cut hiring, raise prices, or both.[2] Either reaction is thought to reduce customer satisfaction and demand, as well as restaurant profitability and survival. Although this piece of conventional wisdom seems entirely plausible, we wanted to test whether this is the case, especially in view of studies that have found no such negative outcomes (or tiny outcomes, at worst). Consequently, in this report, we address the question of whether increases in the minimum wages have the negative effects widely expected by the restaurant industry.

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[1] See, for example: Allegretto, S. A. (2013). Waiting for change: Is it time to increase the $2.13 subminimum wage? IRLE Working Paper No. 155-13 (irle.berkeeley.edu/working papers/155-13.pdf); Berman, J. (2014). 600 economists now back a $10.10 minimum wage (www.huffingtonpost.com/2014/01/27/economists-minimum-wage_n_4675290.html); Cooper, D. (2015). Raising the minimum wage to $12 by 2020 would lift wages for 35 million American workers. EPI Briefing Paper No. 405; Executive Office of the President (2014). A year of action: Progress report on raising the minimum wage (www.whitehouse.gov/sites/default/files/docs/minimum_wage_report2.pdf); Kasperkevic, J. and Srinivas, S. (2015). These 21 states raised the minimum wage for 2015 (www.businessinsider.com/these-21-states-raised-the-minimum-wage-for-2015-2015-1); and Shah, K. (2015). Tipped minimum wages for restaurant workers may increase in several states (www.eater.com/2015/3/3/8144709/tipped-minimum-wage-increase-pennsylvania-connecticut-restaurants).

[2] Bergman, B. (2015). Los Angeles restaurant owners worried about future $15 minimum wage (www.scpr.org/news/2015/05/19/51791/restaurants-upset-tips-won-t-count-towards-15-mini/); Greenhouse, S. (2014). Proposal to raise tip wages resisted (www.nytimes.com/2014/01/27/business/proposal-to-raise-tip-wages-resisted.html); and Rosenfeld, S. (2014). The other NRA: How the National Restaurant Association ensures poverty wages (www.salon.com/2013/08/28/the_other_nra_how_the_national_restaurant_association_ensures_poverty_wages_partner/).

We start by briefly describing the complex network of federal and state minimum wage laws currently in effect, and then summarize economic theory addressing the potential effects of raising minimum wages. We outline research on this topic and then present our own study and analysis examining the effects of minimum wage increases on the number of both full- and limited-service restaurant establishments and their employment and wages. We conclude with the implications of our findings regarding the industry's position on potential increases in minimum wages.

Minimum Wage Laws

The federal minimum wage law and those of many states allow employers to count a portion of tipped employees' (reported) tips toward the minimum wage (called a "tip allocation"), resulting in different minimum wages for tipped and non-tipped workers. However, state tip allocations are not all the same, and some states do not allow any tip allocation. Thus, the effective minimum wages for tipped and non-tipped workers, as well as the differences between tipped and non-tipped minimum wages, vary considerably from state to state. In 2015, for example, the federal minimum wage was $2.13 for eligible tipped workers and $7.25 for non-tipped workers. However, the New York state minimum wage was $7.50 for tipped workers and $8.75 for non-tipped workers, and the California state minimum wage was $9.00 for tipped and non-tipped workers alike. Furthermore, changes in minimum wage laws at the federal and state levels need not, and historically have not, affected tipped and non-tipped minimum wages equally. While the federal tipped minimum wage has remained unchanged since 1991, for instance, the federal minimum wage for non-tipped employees has been increased five times since then. Similar differences in changes to the tipped and non-tipped minimum wages have occurred at the state level. This diversity in minimum wages has allowed researchers to study the associations between different levels of minimum wage and various employment outcomes. We make use of these differences in our study as well.

Logical and Theoretical Expectations

Economic theory is often portrayed as clearly predicting that minimum wage increases will adversely affect the employment of low income workers, but this portrayal is overly simplistic. Neo-classical economic theory, which assumes labor markets are perfectly competitive, does identify reductions in levels of employment as one potential effect of raising the minimum wage, but it also identifies other adjustments by businesses—like price increases to consumers and reductions in non-wage employee benefits—that can reduce or even eliminate the effects of rising labor costs on employment levels.[3]

In addition, institutional economists, who view markets as inextricably linked to the political and social environment in which they are embedded and, therefore, as less than perfectly competitive, acknowledge even more potential adjustments to minimum wage increases.[4] This view of economic theory allows for the possibility that increasing wages may increase productivity by giving employers incentives to enhance training or update equipment and by giving employees more incentive to work hard. Institutional economic theory also allows for a stimulus effect of paying workers more and for potential increases in demand to at least partially offset an increase in labor costs associated with raising the minimum wage. Thus, while economic theory does suggest that lower levels of employment are one potential outcome of raising the minimum wage in competitive or near competitive markets, it also allows for other adjustments that reduce or even eliminate this negative employment effect.

Still other economists question even the near competitiveness of labor markets. These economists believe that employers often have market power that permits them to pay less than competitive wages. This demand-side power is called "monopsony," just as supply-side power is called monopoly. In a monopsonistic labor market, powerful employers set the prevailing wage and thereby determine the size of the labor pool. However, assuming that wage-discrimination is not possible and that employers must pay all workers doing the same job the same amount, then hiring an additional worker in a monopsonistic market by offering enough pay to grow the size of the labor pool by one worker requires paying all existing workers the new higher amount. In such markets, wages may be below the marginal value of labor (i.e., below competitive wages), because

[3] Schmidt, J. (2015). Explaining the small employment effects of the minimum wage in the United States. *Industrial Relations*, 54, 547-581.

[4] *Ibid.*

even if hiring an additional worker at a slightly higher wage would increase production enough to pay for the wage given to that worker, it may not pay for the slightly higher wage that must then be given to all previously hired workers. By this logic, raising minimum wages that are below the marginal value of labor up to that level would remove this perverse incentive of monopsony employers and actually increase employment. Of course, raising the minimum wages at the marginal value of labor to a point above that level would decrease employment even in monopsonistic markets. Thus, in monopsonistic labor markets, raising the minimum wage could increase or decrease employment, depending on the levels of the original and new wages relative to the marginal value of labor.[5]

Even if labor markets are generally competitive, Wessels has argued that the market for tipped restaurant servers is likely to be monopsonistic, because hiring more servers decreases the tips that each receives (assuming constant restaurant demand and tips that are linked to restaurant bill sizes).[6] To compensate for the reduced per-server customer counts and tips, restaurants must pay higher wages to all their servers when hiring new ones. This means that the marginal cost of hiring servers is greater than the average cost of hiring them, which makes the market behave in a monopsonistic fashion. Thus, Wessels argues that regardless of regular (non-tipped) minimum wage effects, increases in the tipped minimum wage are likely to exhibit a curvilinear "monopsony pattern"—first increasing and then decreasing employment of restaurant servers as the tipped minimum wage increases from below the marginal value of labor to above the marginal value of labor.

In summary, economic theory suggests that raising the minimum wage could decrease employment of low wage workers. However, it also allows for the possibility that minimum wages could be raised with little or no negative effect on employment. It even allows for the possibility that raising the minimum wage (especially the tipped minimum wage) could increase employment. Similar arguments also apply to minimum wage effects on prices. Thus, contrary to common opinion, an answer to the question of what effect raising the minimum wage would have on employment and prices cannot be answered using economic theory alone. Ultimately, this is an empirical question that must be answered with research data.

Existing Evidence

Many studies have examined the effects of raising the minimum wage.[7] Of particular interest in this report are the effects on employment levels and work hours, worker income, consumer prices, and firm profitability and survival. So, we briefly review studies examining those effects in the paragraphs that follow.

Studies on the Employment Effects of Regular Minimum Wage Increases

Most minimum wage studies have examined the effects of the regular (that is, non-tipped) minimum wage on employment levels. These studies have produced mixed results, but the bulk of the studies find a negative effect. Those studies found that raising the non-tipped minimum wage appeared to decrease employment among low-skill workers.[8] However, there is evidence that these negative effects are an artifact of chance coupled with publication bias against positive effects[9] or are confounded by regional differences in economic and political variables that are unlikely to be affected by the minimum wage.[10]

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[5] Aaronson, D., French, E. and MacDonald, J. (2008). The minimum wage, restaurant prices and labor market structure. *Journal of Human Resources*, 43, 688-720; and *Ibid*.

[6] Wessels, W. J. (1997). Minimum wages and tipped servers. *Economic Inquiry*, 35, 334-349.

[7] For recent reviews, see: Schmidt, *op.cit.*; and Belman, Dale and Paul J. Wolfson. What does the minimum wage do? Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2014.

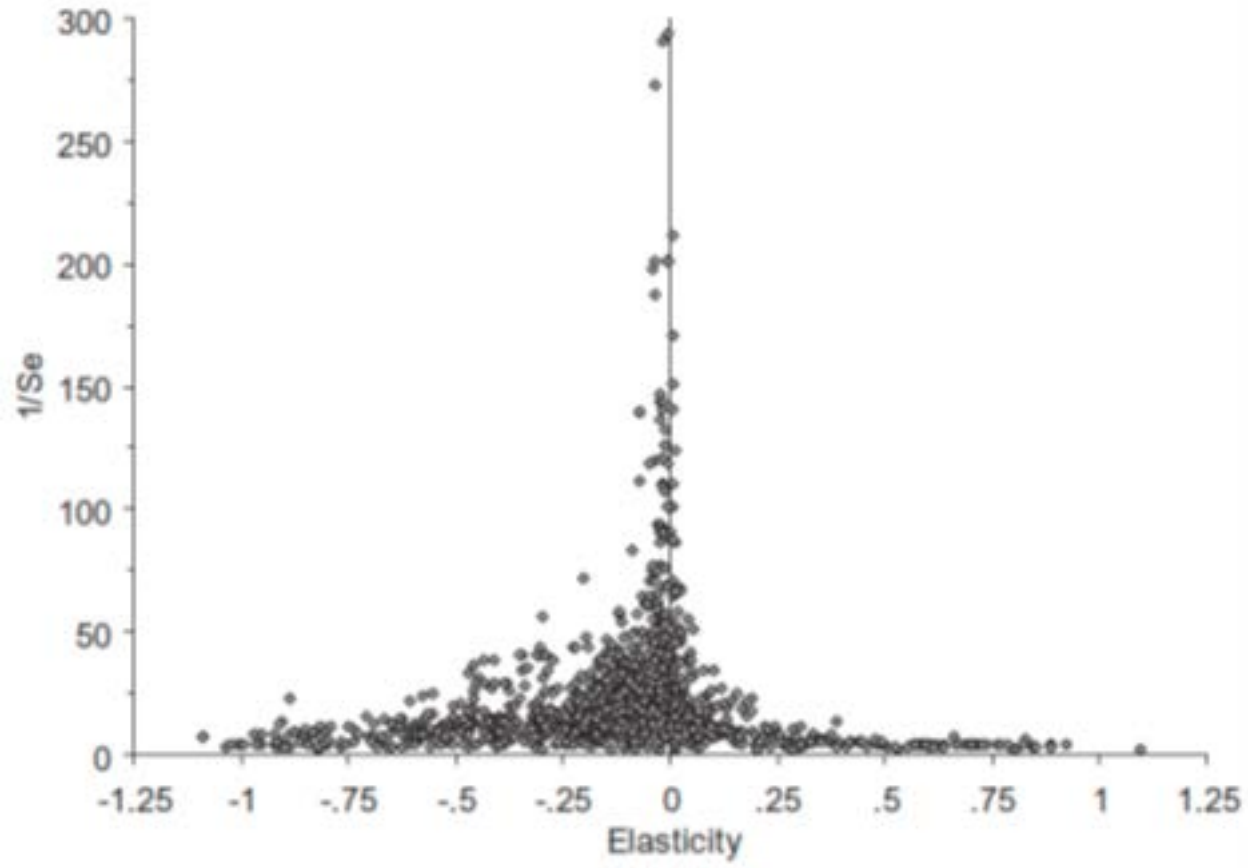
[8] For a qualitative review, see: Neumark, D. and Wascher, W. (2006). Minimum wages and employment: A review of evidence from the new minimum wage research, Working Paper 12663, National Bureau of Economic Research, Cambridge, MA.

[9] Card, D. and Krueger, A.B. (1995). Time-series minimum wage studies: A meta-analysis. *American Economic Review* Papers and Proceedings, 85 (2), 238-243; and Doucouliagos, H. and Stanley, T.D. (2009). Publication selection bias in minimum wage research? A meta-regression analysis. *British Journal of Industrial Relations*, 47 (2), 406-428.

[10] Dube, A., Lester, T.W. and Reich, M. (2010), Minimum wage effects across state borders: Estimates using contiguous counties. *Review of Economics and Statistics*, 92 (4), 945-964; and Allegretto, S.A., Dube, A. and Reich, M. (2011). Do minimum wages really reduce teen employment? Accounting for heterogeneity and selectivity in state panel data. *Industrial Relations*, 50 (2), 205-240.

Exhibit 1

Trimmed funnel graph of estimated minimum-wage effects (*N* = 1,424)



Source: H. Doucouliagos and T.D. Stanley, "Publication selection bias in minimum wage research? A meta-regression analysis," *British Journal of Industrial Relations*, Vol. 47, No. 2 (2009), pp. 406-428. Copyright © John Wiley and Son. Used by permission.

Evidence of a publication bias favoring negative minimum wage effects on employment is found when plotting those estimated effects against their statistical precision and reliability, as Doucouliagos and Stanley did in the graph shown in Exhibit 1. The more precise or reliable effects are close to zero, while only the less precise or reliable effects are substantially different from zero. This pattern of results suggests that minimum wage increases have no more than tiny true effects on employment and that the larger effects in the literature occur by chance, with the greater preponderance of negative effects reflecting economists' bias in favor of believing and publishing those findings.[11]

Evidence that the confounding effects of uncontrolled state and regional differences in economic and political variables are responsible for many of the negative minimum wage findings on employment comes from Dube and his colleagues. They found that high and low minimum wage states and regions differ on many economic and political variables that are related to employment but are unlikely to be caused by the minimum wage. For example, high minimum wage states are more Democratic leaning and are more unionized with smaller declines in unionization than are low minimum wage states.[12] High minimum wage states also experienced sharper growth in upper-half wage inequality and sharper job recessions.[13] These other state differences may affect low-wage employment, thereby creating an artificial negative relationship between minimum wages and employment. In fact, the negative minimum wage

[11] Doucouliagos and Stanley, *op.cit.*

[12] Allegretto, S.A., Dube, A., Reich, M. and Zipperer, B. (2015). Credible research designs for minimum wage studies: A response to Neumark, Salas and Wascher. IRLE Working Paper No. 116-15 (bit.ly/1RdZuHV).

[13] Allegretto, (2013), *loc.cit.*

effects on employment observed in some studies disappear after statistically controlling for these state and regional differences.[14] Since there is still enough variability in minimum wages after implementing these controls to observe the effects of that variability on wages, the absence of minimum wage effects on employment after implementing these controls argues against causal effects of the minimum wage on employment.

Taking these problems of publication bias and confounding into account, research suggests that raising the regular minimum wage has little if any effect on employment among low income workers. However, a recent paper by Meer and West suggests that minimum wage increases may not affect immediate employment levels as much as rates of employment growth, and that existing studies do not adequately test for such long-term effects. In particular, studies controlling for state differences in linear trends over time are unlikely to find negative minimum wage effects on rates of employment growth (and therefore, long-run employment levels) even when those effects really exist. Using alternative statistical tests, Meer and West found that a 10-percent increase in the minimum wage was associated with a 0.7-percent cumulative reduction in employment over the ensuing three years.[15] This paper muddies the waters. The critique of using controls for state differences in linear trends is valid, but only some studies and analyses have employed these troublesome controls. The bulk of the evidence still seems to argue against strong negative employment effects of minimum wage increases, but additional research explicitly testing longer-term effects seems to be needed.

Other Effects of Regular Minimum Wage Increases

Studies of minimum wage effects on workers' incomes, employment flows, consumer prices, and firm profitability and survival are not as numerous as studies of minimum wage effects on employment, and their findings are not always consistent. Nevertheless, these studies provide reasonably strong evidence for minimum wage effects on employment flows, incomes, and prices. First, a recent study found that separations, hires, and turnover rates for restaurant workers and teens all substantially decline following an increase in the minimum wage.[16] Second, a recent review of minimum wage effects on average wages reported that 26 of 29 studies found positive effects.[17] With respect to U.S. restaurant workers, a 10-percent increase in the minimum wage is associated with about a 2-percent increase in *total* wages.[18] That is, in response to an increase in the minimum wage, there is an increase in aggregate earnings of workers in the restaurant sector. Thus, if employment declines at all, this means that there must be an even larger increase in the *average* wage. Finally, a review of research regarding minimum wage effects on prices concluded that most of the thirty studies examined found modest, positive effects.[19] The size and timing of minimum wage effects on restaurant prices appears to vary across nations,[20] but in the United States, a 10-percent increase in the minimum wage was found to lead within a few months to about a 1.5-percent increase in limited-service restaurant prices and a 0.3 percent increase in full-service restaurant prices.[21]

In contrast, a review of minimum wage effects on firms' profitability and survival found less clear results.[22] One U.K. study found that a 10-percent increase in the minimum wage reduced firms' profit margins by 15 percent,[23] but six other studies found weak or inconsistent minimum wage effects on proxies for profitability, such as survival rates or share prices.

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[14] Dube, Lester and Reich, *op.cit.*; Allegretto, Dube and Reich, *op.cit.*; Allegretto, Dube, Reich and Zipperer, *op.cit.* Controls for state trends were continuous-year by state interactions. Controls for regional shocks were census division by year-dummy-variable interactions.

[15] Meer, J. and West, J. (2015). Effects of the minimum wage on employee dynamics. *Journal of Human Resources*, forthcoming.

[16] Dube, Lester, and Reich, *op.cit.*

[17] Belman and Wolfson, *op.cit.*

[18] Allegretto, S. and Nadler, C. (2015). Tipped wage effects on earnings and employment in full-service restaurants. *Industrial Relations*, 54(4), 622-647; and *Ibid.*

[19] Lemos, S. (2008). A survey of the effects of the minimum wage on prices. *Journal of Economic Surveys*, 22 (1), p. 208.

[20] Fougere, D. Gautier, E. and Le Bihan, H. (2010). Restaurant prices and the minimum wage. IZA discussion papers, No. 4070 (nbn-resolving.de/urn:nbd:de:101:1-2009033033); and Aaronson, D., French, E. and MacDonald, J. (2008). The minimum wage, restaurant prices and labor market structure. *Journal of Human Resources*, 43, 688-720.

[21] Aaronson, French and MacDonald, *op.cit.*

[22] Belman and Wolfson, *op. cit.*

[23] Draca, M., Machin, S. and Van Reenen, J. (2011). Minimum wages and firm profitability. *American Economic Journal: Applied Economics*, 3(1): 129-151.

Exhibit 2

Summary of study findings about the effects of raising the tipped minimum wage

	Tipped Minimum Wage Effects on Restaurant Employment	Tipped Minimum Wage Effects on Restaurant Wages
Allegretto & Filion (2011)	—	positive
Allegretto & Nadler (2015)	small, non-significant	positive
Anderson & Bodvarsson (2005)	—	small, non-significant
Even & Macpherson (2014)	negative	positive
Wessels (1993)	negative	—
Wessels (1997)	curvilinear—increasing then decreasing	—

Employment and Wage Effects of Tipped Minimum Wage Increases

Little research has examined the effects of the tipped minimum wage. Unfortunately, even this small literature is full of contradictory findings (see Exhibit 2). The findings of Even and Macpherson and of Allegretto and Nadler appear to us to be based on the strongest data and analyses, but even they are contradictory.[24] Moreover, these authors failed to test for the quadratic "monopsony" effects predicted by Wessels, so more research is needed on the effects of raising the tipped minimum wage.

Effects of Minimum Wage Increases, 1995–2014

Since it is possible that the effects of minimum wage changes vary between full-service and limited-service restaurants, we analyzed these establishments separately. Our goals in conducting and reporting these analyses are to: **(1)** make the findings more accessible and credible to non-academicians than are the analyses and findings in the academic literature, **(2)** explicitly test for long-term (or lagged) minimum wage effects on restaurant employment, **(3)** test for curvilinear tipped minimum wage effects on restaurant employment, and **(4)** test regular and tipped minimum wage effects on the number of restaurant establishments.

Data sources. We obtained yearly data on the effective regular (non-tipped) and tipped minimum wages in each state (including the District of Columbia) from the website of the U.S. Department of Labor—Wage and Hour Division. Minimum wage data extended from 1995 to 2014, while data on tipped minimum wages were available only from 2003 to 2014. Both measures had a sufficiently long stream of data to span a variety of economic conditions. On rare occasions when minimum wage changes are known to have gone into effect mid-year, we analyzed the minimum wage that was in effect for the greatest portion of that year. Several states have different levels of minimum wage for different sizes of firm, industry sectors, and conditions of employment (e.g., with or without health insurance). Those minimum wages recorded and used in our analyses were those specifically for **(1)** restaurant employees, **(2)** larger firms, or **(3)** firms under the least restrictive qualifying conditions (e.g., those that do not provide health insurance). We also used U.S. Department of Labor data for the number of full-service and

[24] William E. Even and David A. Macpherson, "The Effect of the Tipped Minimum Wage on Employees in the U.S. Restaurant Industry," *Southern Economic Journal*, Vol. 80, No. 3 (January 2014), pp. 633-655; and Allegretto and Nadler, *op.cit.*

Exhibit 3

Descriptive statistics for study data

	N	Minimum	Maximum	Mean	Std. Deviation
%Δ Minimum Wage	969	-14.63	40.78	3.2103	5.65436
%Δ Tipped Minimum Wage	561	-41.32	79.81	1.7066	7.42091
%Δ Full-service restaurant employment	969	-7.42	17.78	2.2930	2.50599
%Δ Limited-service restaurant employment	969	-18.05	17.77	1.6689	2.84896
%Δ Total employment	969	-10.14	10.24	.9907	2.28826
%Δ Full-service restaurant wages	969	-51.18	19.33	5.5914	3.79611
%Δ Limited-service restaurant wages	969	-11.69	23.33	4.4837	3.19435
%Δ Total wages	969	-30.78	53.83	4.3704	4.47108
%Δ Full-service restaurant establishments	969	-10.48	9.90	1.9874	2.45185
%Δ Limited-service restaurant establishments	969	-12.69	22.08	1.8029	2.94903
%Δ Total establishments	969	-9.51	11.62	1.4390	2.26511
Valid *N* (listwise)	561				

limited-service restaurant establishments, for the number of people employed, and for the total wages in each sector for each state and year from 1995 to 2014.[25]

Analyses and Findings

We calculated the percentage changes in the regular and tipped minimum wages, employment, wages, and number of establishments for each year from the previous year's values (see Exhibit 3), and we analyzed those changes in regression analyses using error terms clustered within states. To increase confidence that any observed relationships reflect the causal effects of changes in the regular and tipped minimum wages on percentage changes in restaurant employment, payrolls, or establishments, these analyses statistically controlled for percentage change in total employment, wages, or establishments across all industries (selected to match the dependent variable), as well as year, state, and census-division-specific year effects. Importantly, our models did not control for state level trends (in other words, continuous-year by state-dummy interactions), which some authors[26] have argued could inappropriately hide real minimum wage effects.[27]

[25] US DOL Quarterly Census of Employment and Wages.

[26] Meer and West, *op.cit.*

[27] Fortunately, a supplemental analysis testing for the confounding effects of state-level trends indicated that such trends did not confound our main analyses. A model regressing percentage change in full-service restaurant employment on percentage change in minimum wage and tipped minimum wage and their values the year after, as well as the controls used in all our other analyses, produced non-significant effects of next year's minimum wage (B = .010, S.E. = .025, t(50) =0.41, n.s.) and tipped minimum wage (B = .001, S.E. = .014, t(50) = 0.08, n.s.).

Exhibit 4

Long- and short-term linear effects of percentage change in the minimum wage and tipped minimum wage on percentage change in full-service restaurants

	%ΔEmployment		%ΔEstablishments		%ΔWages	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Full-service Restaurants	*N* = 867	*N* = 459	*N* = 867	*N* = 459	*N* = 867	*N* = 459
%Δ Minimum Wage (MW)	-.010 (.015)	-.015 (.022)	-.009 (.022)	-.037 (.027)	**.086*** (.021)**	.034 (.024)
%Δ MWlag1	-.015 (.015)	-.015 (.020)	-.002 (.017)	.013 (.017)	-.014 (.019)	-.017 (.027)
%Δ MWlag2	-.017 (.016)	-.010 (.019)	.004 (.015)	-.008 (.021)	-.020 (.019)	-.021 (.025)
%Δ Tipped Minimum Wage (TMW)		.002 (.015)		.025 (.020)		**.039* (.017)**
%Δ TMWlag1		-.003 (.014)		-.018 (.012)		-.006 (.016)
%Δ TMWlag2		-.011 (.014)		-.021 (.016)		-.008 (.019)
Linear Combinations of Coefficients						
MW+MWlag1+MWlag2	-.041 (.029)	-.04 (.032)	-.007 (.040)	-.032 (.050)	.052 (.036)	-.004 (.038)
TMW+TMWlag1+TMWlag2		-.012 (.027)		-.014 (.029)		.025 (.027)

Note: Control variables were: %ΔTotal Employment (or %ΔTotal Establishments or %ΔTotal Wages), state dummies, year dummies, and census-division-by-year dummies. All error terms were clustered within state. *$p < .05$, ***$p > .001$.

Effects on Full-service Restaurants

As summarized in Exhibits 4 and 7, our analyses of regular and tipped minimum wage effects on full-service restaurants indicate that increasing either type of wage increases payrolls, but leaves employment and the number of establishments unaffected. A 10-percent increase in the regular minimum wage increases full-service restaurant wages by a little less than 1 percent (see Exhibit 4, Model 5), and a 10-percent increase in the tipped minimum wage increases full-service restaurant wages by a little less than 0.5 percent (see Exhibit 4, Model 6). Both effects are felt in the same year that the minimum wage is increased, with no lagged effects. This means that the increases are not offset by declining growth in wages over the subsequent three years.

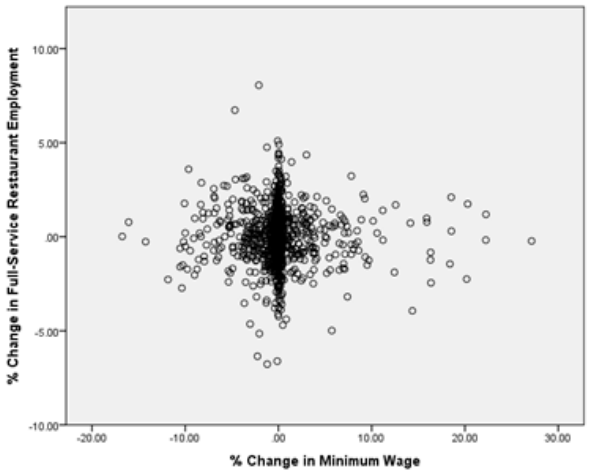
In contrast with their positive effects on workers' incomes, increases in the regular and tipped minimum wages had no reliable linear effect on the number of full-service restaurants or on full-service restaurant employment, even when looking at cumulative effects over three years (see Exhibit 4, Models 1–4). Overall, these findings are consistent with those of Allegretto and Nadler. The fact that we used different measures, controls, units of analysis, and years of data support the robustness of their results.[28]

Because of the strength of the conventional wisdom that there must be a (negative) relationship between these variables, we include Exhibits 5 and 6, on the next page, which show the scatter plots of percentage change in full-service restaurant employment by percentage change in minimum wage and tipped minimum wage after controlling for state, year dummies, census-division-by-year dummies, and percentage change in total employment across all industries. These plots show substantial variability in minimum wages, even after controlling for potential confounds, but no effect of that variability on full-service employment. Since the variables are re-centered around a mean of zero, it appears that the variables declined as much

[28] Allegretto and Nadler used natural log transformations of employment and minimum wages while we used percentage changes in these variables. They controlled for population while we did not. They analyzed data at the county-quarter level while we analyzed it at the state-year level. Finally, they examined data from 1990 to the first quarter of 2013 while we examined data from 1995 to 2014 for minimum wage effects and from 2003 to 2014 for tipped minimum wage effects. See: Allegretto and Nadler, *op.cit.*

Exhibit 5

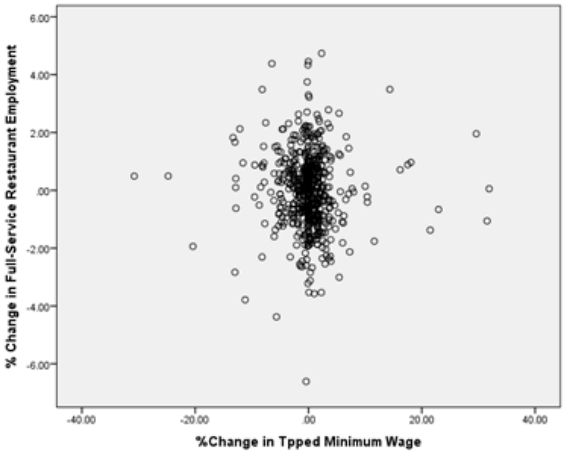
Scatterplot of percentage change in full-service restaurant employment by percentage change in (regular) minimum wage



Note: Scatterplot controls both variables for state, year dummies, census-division-by-year dummies, and percentage change in total employment across all industries. Variables are re-centered the around a mean of zero.

Exhibit 6

Scatterplot of percentage change in full-service restaurant employment by percentage change in tipped minimum wage



Note: Scatterplot controls for state, year, census division by year, percentage change in total employment across all industries, and percentage change in the regular minimum wage. Variables are re-centered around a mean of zero.

as they increased. However, the minimum wage declined only one out of 969 times, the tipped minimum wage declined only five out of 561 times, and full-service restaurant employment actually declined only 15.3 percent of the time.

In consideration of Wessel's theory and evidence that the market for tipped workers is monopsonistic, we tested the curvilinear effects of changes in the tipped minimum wage on full-service restaurant employment. Our study found non-significant results (see Exhibit 7).[29] Thus, we were not able to conceptually replicate Wessel's cross-sectional findings supporting a monopsony theory of tipped minimum wage effects.[30]

Exhibit 7

Quadratic effects of percentage change in the tipped minimum wage on percentage change in employment at full-service restaurants

Model 7	%ΔEmployment *N* = 459
%Δ Tipped Minimum Wage Squared (TMW2)	.0001 (.0003)
%Δ TMW2lag1	-.0003 (.0003)
%Δ TMW2lag2	.0000 (.0004)
Linear Combination of Coefficients	
TMW2+TMW2lag1+TMW2lag2	-.0001 (.0006)

Note: Control variables were: %ΔTotal Employment, state dummies, year dummies, census-division-by-year dummies, and percentage change in the minimum wage and the tipped minimum wage, plus their one- and-two year lags. All error terms were clustered within state.

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[29] The analyses in Exhibit 7 test curvilinear effects of the tipped minimum wage that are tied to the percentage change in its value. However, it is possible that the curvilinear effects of the tipped minimum wage are tied to its absolute value instead. In other words, the change in tipped minimum wage effects from positive to negative may occur at a specific tipped minimum wage rather than at a specific percentage change in tipped minimum wage. To test this possibility, we regressed the natural log of full-service restaurant employment on the minimum wage, tipped minimum wage, tipped minimum wage squared, the natural log of total employment and all the other controls described previously. This analysis produced non-significant effects for minimum wage (B = -.011, S.E. =.011, t (50) = -1.01, n.s.), tipped minimum wage (B = -.027, S.E. = .028, t(50) = -0.95, n.s.), and tipped minimum wage squared (B = .004, S.E. = .004, t(50) = 1.19, n.s.). Thus, our data provide no support for Wessel's monopsony analysis of tipped minimum wage effects.

[30] Wessels, *op.cit.*

Exhibit 8

Long- and short-term linear effects of percentage change in the minimum wage and tipped minimum wage on percentage change in limited-service restaurants

	%ΔEmployment	%ΔEstablishments	%ΔWages
	Model 7	Model 8	Model 9
Limited-service Restaurants	*N* = 867	*N* = 867	*N* = 867
%Δ Minimum Wage (MW)	-.022 (.017)	-.007 (.016)	**.075**** **(.021)**
%Δ MWlag1	-.017 (.019)	.001 (.021)	.017 (.024)
%Δ MWlag2	-.032* (.015)	-.019 (.020)	-.011 (.017)
Linear Combination of Coefficients			
MW+MWlag1+MWlag2	-.071 (.037)	-.026 (.047)	.081 (.048)

Note: Control variables were: %ΔTotal Employment (or %ΔTotal Establishments or %ΔTotal Wages), state dummies, year dummies, and census-division-by-year dummies. All error terms were clustered within state. $*p < .05$, $**p < .01$.

Effects on Limited-service Restaurants

Similar to full-service restaurants, our analyses of regular minimum wage effects on limited-service restaurants indicate that increasing the minimum wage increases worker income, but leaves employment and the number of establishments unaffected. A 10-percent increase in the regular minimum wage increases limited-service restaurant wages by a little less than 1 percent (see Exhibit 8, Model 9). Again, this effect is felt in the same year that the minimum wage increased, with no lagged effects.

Also like full-service restaurants, increases in the minimum wage have no large and reliable effects on the number of limited-service establishments or their levels of employment. Moreover, this remains true even when looking at cumulative effects over three years (also shown in Exhibit 8). There was one statistically significant negative effect of changes in the minimum wage on limited-service restaurant employment three years after the increase, but the effect was small.

General Discussion and Conclusions

Our study essentially replicates the findings of other research, which indicates that increasing the regular and tipped minimum wages does raise restaurant industry wages, but does not have large or reliable effects on full-service and limited-service restaurant employment. The analysis also shows similarly weak effects on the number of full-service and limited-service restaurants. There is no doubt that restaurateurs face higher expenses as a result of minimum wage increases, but if restaurants are raising prices to compensate, those increases do not appear to decrease demand or profitability enough to sizably or reliably decrease either the number of restaurants or the number of employees. Thus, we conclude that the best empirical data available suggest that the industry's objections that minimum wage hikes will cause restaurants to close are largely unfounded. Although minimum wage increases necessitate some changes in restaurant prices or operations, those changes do not appear to dramatically affect overall demand or industry size.

Regarding the effect on employees' income, it is worth emphasizing that other studies found large and robust increases in wages as a result of increases in the minimum wage. Those increases appear relatively small in our analyses, but that is because we examined percentage changes in the aggregate earnings of all workers, not just of minimum wage workers. Therefore, even if there are (small) negative effects on employment, the average restaurant worker can expect to see his or her earnings go up following a minimum wage increase. The argument that minimum wage increases are "bad for workers" does not seem to hold. That argument suggests that these workers are so risk averse that they would forgo a large increase in expected earnings to alleviate a minor risk of job loss—a risk that may not even exist.

We must underscore the limitation that these conclusions apply only to the mostly modest minimum wage increases that were implemented during the study period. Much larger increases, like the $15 minimum wage recently enacted in Los Angeles, San Francisco, and Seattle and contemplated elsewhere

(including New York),[31] may have more substantial negative effects on the industry. Thus, the industry may be justified in opposing immediate, large hikes in the minimum wages, but data do not support opposition to all minimum wage increases.

To the contrary, we believe the restaurant industry should support reasonable increases in the regular and tipped minimum wages because better compensated employees tend to be happier, more productive, and less likely to quit their jobs.[32] Increases in the minimum wage allow restaurant firms to enjoy these benefits of paying workers more without suffering a competitive disadvantage in terms of labor costs. Furthermore, supporting minimum wage hikes demonstrates caring for your workers. Employees are happier, more productive, and less likely to quit their jobs when they perceive their employers as caring for and supporting them.[33]

There is strong evidence that increases in the minimum wage reduce turnover, as mentioned previously.[34] While no study has tested our belief that increasing the minimum wage will increase employee happiness and productivity as well, our reasoning is theoretically sound and consistent with more general research on compensation effects. Moreover, the research reviewed and reported here suggests that the industry has little to lose by acting on this belief. Thus, we contend that the restaurant industry should support rather than oppose reasonable increases in the minimum wage. ■

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[31] Springer, D. (2015). Seattle sees fallout from $15 minimum wage, as other cities follow suit (www.foxnews.com/politics/2015/07/22/seattle-sees-fallout-from-15-minimum-wage-as-other-cities-follow-suit/, viewed 9-25-2015).

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[33] Allen, D.G., Shore, L.M. and Griffeth, R.W. (2003). The role of perceived organizational support and supportive human resource practices in the turnover process. *Journal of Management*, 29, 99-118; Baruch-Feldman, C., Schwartz, J., Brondolo, E. and Ben-Dayan, D. (2002). Source of social support and burnout, job satisfaction, and productivity. *Journal of Occupational Health Psychology*, 7, 84-93; and Eisenberger, R., Huntington, R., Hutchison, S. and Sowa, D. (1986). Perceived organizational support. *Journal of Applied Psychology*, 71, 500-507.

[34] Dube, Lester and Reich, *op.cit.*

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