

The Minimum Wage:
An Analysis of the Impact on the Restaurant Industry

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1. Executive Summary

The slow recovery of the labor market in the United States following the Great Recession, and resultant rise in income inequality, led many states to raise their minimum wage sharply above the current national level, in light of federal inaction. In California, the minimum wage is on a path to increase annually to \$15 per hour in 2022 – 50% higher in real terms than it was in 2012. This will, of course, benefit minimum-wage workers. But a higher minimum wage could also create distortions in the labor market, potentially causing employers to cut employee hours, and for fewer job opportunities to arise for low-skilled and teenage workers. Policy makers must consider these issues and ways to mitigate their effects, otherwise they risk causing more harm than good to the economy.

As ever, there is heated debate within the economics community over proposed minimum wage hikes and whether market distortions stemming from such policies offset the potential benefit to minimum-wage earners. If, as some believe, there are modest negative impacts on employment from minimum wage increases, these tools need to be used with care.

The analytical focus of this report is the restaurant industry in California. Restaurants, by their nature, hire a large number of relatively low paid workers. The jobs aren't necessarily 'bad', rather they provide employment opportunities to people with low-skills and limited experience. These jobs can lead to other careers by providing basic work experience. They are also ideal for a second income, or, for instance, as a source of income while attending college. And for those who wish to find a home in the restaurant business, there are many industry career paths to choose from.

The restaurant business is fast-growing, dynamic and hyper-competitive. With labor turnover among the highest in the economy, hikes in the minimum wage could have a sizeable impact on employment in the industry. The questions are clear: how much of an impact will the 50% rise in the minimum wage have on employment in the industry? How will it change hiring practices? Will the increase in earnings be sufficient to offset costs? What steps can, and should, policymakers take to mitigate unforeseen consequences?

This report examines how recent hikes in the minimum wage are changing the California restaurant industry. It does so by assessing the impact of changes in minimum wages in a sample of 57 metropolitan regions (MSAs) across the United States. We take account of the changes in minimum wages made by many states to analyze how such changes have impacted employment trends in the industry, as well as earnings and the number of establishments in a given area. This data is collected from the Quarterly Census of Employment and Wages (QCEW). Our model looks at changes in the minimum wage from 2000 to 2017. We also utilize the American

Community Survey from 2005 to 2017 to look more closely at the type of employees being hired.

Data analysis suggests that while the restaurant industry in California has grown significantly as the minimum wage has increased, employment in the industry has grown more slowly than it would have without minimum wage hikes. The slower employment is nevertheless real for those workers who may have found a career in the industry. And when the next recession arrives, the higher real minimum wage could increase overall job losses within the economy and lead to a higher unemployment rate than would have been the case without the minimum wage increases.

Interestingly, there are critical differences in the magnitude of the effect on different parts of the industry depending on the conditions in the local economy and the structure of the minimum wage policy in place. Specifically:

1. The State of California has a vibrant, growing restaurant sector. Over the period 2010-2017, total employment in the state's economy grew by 21%, compared to 27% and 35% in the full-service and limited-service restaurant sectors respectively.
2. At the same time, there is evidence that hikes in the real minimum wage may have slowed the rate of growth in these sectors. There is a statistically significant negative impact on employment growth in both the full-service and limited-service restaurant industries. The type of impact differs. For limited-service restaurants, a higher minimum wage leads to a modest one-time decline in employment growth. For full-service restaurants the impact is much more substantial – a higher real minimum wage creates both a one-time negative impact on employment growth as well as a long-run impact on employment growth in the industry.
3. The impact of the minimum wage hike is greater in lower income communities than higher income communities, presumably because restaurants in high-income areas can pass on the additional costs to customers more easily. The impact of a higher real minimum wage on employment growth is roughly twice as high in low income compared to higher income communities in full-service restaurants. We find the impact of a higher minimum wage on employment is significant in lower income economies, but we find no statistically significant impact for limited-service restaurants in higher income communities.
4. We used these findings to estimate the impact of the hikes to the minimum wage from 2013 to 2017. We also forecast how future hikes will impact employment growth in the industry from 2017 to 2022 when the minimum wage will eventually hit \$15 per hour. We do so for six higher income metropolitan areas including San Diego, Los Angeles, Ventura, San Jose, Sacramento, and San Francisco. We also look at three lower income economies, Fresno, Bakersfield and the Inland Empire.
5. The full-service industry in high-income communities added 55,421 jobs over the period 2013-2017. The model suggests that the full-service restaurant industry would have created 9,453 more jobs over this period had the minimum wage increased at the rate of inflation rather than the quicker rate that occurred.
6. According to the model, 63,000 full-service jobs would be added over the period 2017-2022 if the minimum wage increased at the rate of inflation, rather than the projected increases. The model suggests that there would be 30,000 fewer jobs in the industry from

2017 to 2022 as a result of the higher minimum wage. Over the period 2013-2022, therefore, the number of new jobs in the full-service industry will grow by 120,000, but would have grown by 160,000.

7. Lower income economies are more dramatically affected. The full-service industry in low-income communities added 7,018 jobs over the period 2013-2017, but would have added 9,327 if the minimum wage increased at the rate inflation, rather than the projected increases, a difference of 2,309 jobs.
8. While these losses are mitigated by the strength of the overall economy, it should be noted that losses will be exacerbated in a downturn. If the U.S. economy were to slip into a recession this year, we would expect the industry to lose about 8,000 more jobs than it otherwise would have because of the higher minimum wage.
9. The minimum wage doesn't just reduce employment growth, it also reduces growth in the number of restaurants in a local economy. For full-service restaurants the impact on the number of establishments is smaller than on employment. For limited-service restaurants the impact on establishments is larger than on employment. This implies fewer restaurants than would have been the case and a consolidation in the industry for larger establishments – those that represent major national chains at the expense of small restaurants.
10. Significantly, we find that states with a lower minimum wage for tipped employees see a smaller impact on full-service restaurants. Job losses caused by an increase in the minimum wage will have slightly over half the impact if the tipped minimum wage is not raised as well.
11. We do find that a higher minimum wage raises average incomes in the industry. For limited-service restaurants, a 20% increase in the real minimum wage leads to a 4.2% increase in annual earnings, while the same increase leads to a 2.7% bump in the full-service industry's average pay. One explanation for a relatively small increase in wages is that lower paid workers end up working fewer hours as a result of the higher minimum wage, thus offsetting the increase in their hourly rate.
12. The higher minimum wage has consequences for the types of workers employed in the industry. Specifically, we see a decline in the employment share of low-skilled workers, disabled workers and part-time workers in the sector.

The policy implications of these findings are clear. First, while the state may want to raise minimum wages in pursuit of a broader social goal, they should consider some potential costs of the policy. There are tradeoffs to any policy and policies can be constrained or altered to mitigate the harm that may be caused.

The restaurant industry should also recognize the implications for the industry itself and make some basic modifications to mitigate harm to both the industry and the labor market overall.

This report reveals that the worst effects of minimum wage increases can be hidden in the context of a strong economy, but will be felt more intensely in the event of an economic downturn. It also contains some clear policy advice for lawmakers on how to reduce these impacts. Namely, minimum wages should be set relative to local incomes, and there should be a specific exemption for tipped employees. In both cases it can reduce the impact of the higher minimum wage on the local industry and still achieve higher incomes in the broader economy.

This report will lay out the background of this analysis and briefly look at recent analytical research on the subject. It will then describe the statistical models used and the results found, and do some simulation analysis to explain how the impact of the minimum wage differs through the business cycle.

2. The Return of the Minimum Wage

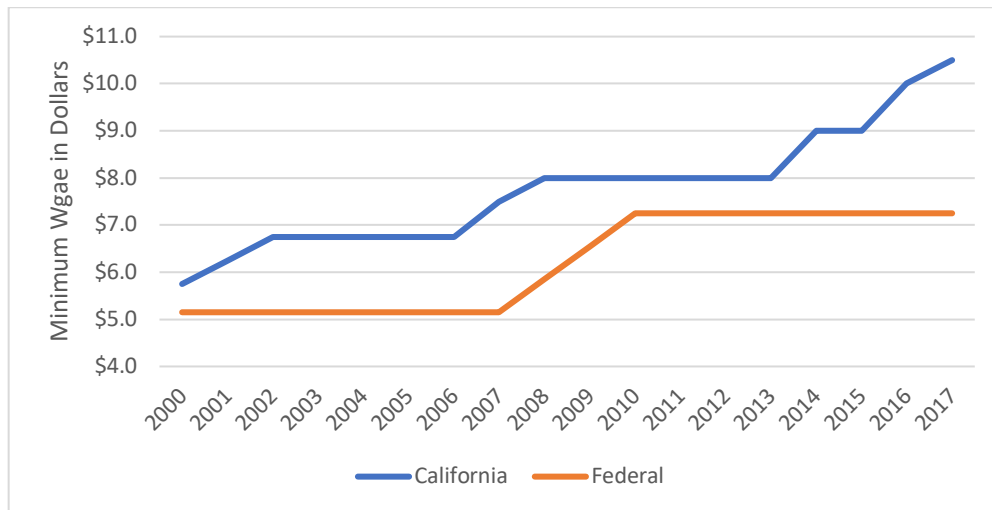
Originally set at 25cents per hour, the national minimum wage came into being in the 1930s. The intention then, as now, was to help the working poor by raising their income. State and local governments have always been allowed to set minimum wage levels higher than the federal level, but as recently as 1980 all states except two used the federal level. At that time the federal minimum wage was \$3.10 per hour, and only Alaska (\$3.60) and Connecticut (\$3.12) set higher levels. By 2017, minimum wages across the U.S. had become a lot more varied. Today, only 20 states use the federal minimum of \$7.25, with the majority of states legislating locally for higher levels.

Increased activity in state and local minimum wage legislation has two primary causes. First, in recent years the federal minimum wage has increased less frequently than in the past, and has not kept up with cost of living increases. Since 1998, the federal minimum wage has been increased on only three occasions, and has not increased at all since 2009. From 1980 to 2018, the real spending power of the federal minimum wage decreased by 27%, and has decreased by 14% since 2010. For the federal minimum wage to have the same spending power today as it had in 2009, it would need to be \$1.04 cents higher, at \$8.29.

Second, minimum wage laws have emerged with greater frequency in response to concerns over elevated levels of income inequality. These issues are most clearly evident in high-cost states and large cities, where substantial increases in house prices have been keenly felt by low-income workers. As disparity in the cost of living from state to state has grown, a ‘one size fits all’ minimum wage is less effective. Such a minimum wage would be too low in high-cost states like California and too high in low-cost states like Mississippi.

California has been front and center of the debate. Since 2013, California’s minimum wage for large employers has increased by more than 33% – from \$8 to \$12 per hour (the current level is \$11 for small employers). In 2022, the state’s minimum wage will increase to \$15 per hour for large employers, and to \$14 for small employers. Some of the State’s cities and counties have raised the minimum wage locally at an even faster pace. These include the cities of Berkeley, San Francisco, Long Beach, Pasadena, Los Angeles, San Diego, San Jose, and Santa Clara.

Chart 1: Hourly Minimum Wage in California, 2000-2017



In 2017 no less than eighteen other states increased their minimum wage. Five states (Arizona, Arkansas, Colorado, Maine, and Washington) increased their rates through ballot initiatives, and seven states (California, Connecticut, Hawaii, Massachusetts, Michigan, New York, and Vermont) did so as a result of legislation passed in prior sessions.

The debate over the minimum wage and its net impact has raged since it was first introduced eighty years ago. Those opposed to the policy point out that raising the price of anything above its market clearing level will reduce the quantity demanded (i.e. fewer workers will be employed). There are a variety of mechanisms behind this decline in demand. Employers may move to expedite automating parts of their operations to reduce their reliance on labor. They may also shift from lower skilled workers to more skilled workers, who should be more productive. To cut costs, employers may switch from full-time to part-time workers, reducing the benefits they pay. And ultimately some of the increased cost of minimum wages gets passed on to consumers in the form of higher prices, shifting spending from other parts of the economy. The net result is that while some workers are better off, others may suffer from fewer job opportunities. Particularly vulnerable in this respect may be low-skilled, young and part-time workers.

Proponents of minimum wage increases suggest that this model misses an important general equilibrium effect. The transfer of wealth from higher to lower income workers (or from capital to labor) is seen to have a positive effect. Since lower income workers spend a higher share of their income on immediate purchases of goods and services, such a transfer increases aggregate demand in a local economy. By their calculations, this is sufficient to offset the labor market distortion of a wage floor. They would note that many of the regions that have seen the largest hikes in the minimum wage, including California, have also seen levels of unemployment fall close to or below historically low levels.

One reason the debate over the impact of the minimum wage is still unsettled is that the majority of industries in the U.S. are not directly affected by minimum wage laws. In 2017, the average

weekly wage in the U.S. was roughly \$1,065, while someone earning the minimum wage and working a 40-hour week would have earned \$290 per week, 70% lower than the average. Yet some industries use a high share of occupations that pay wages close to the minimum wage level. The restaurant industry is incredibly competitive and is sensitive to changes in the cost of labor, which makes up a large share of its costs. The following table reveals the 10 lowest paying occupations in California. Four of the 10 lowest paying occupations are found in the restaurant sector which, since it hires many relatively low-skilled, low-paid workers, is also likely to be most negatively impacted by hikes in the minimum wage.

This analysis focuses on the restaurant industry. In the United States, half a million restaurants directly employ over ten million people, 8% of all employment. This is the highest share ever, driven by a shift in consumer spending towards services, including recreation, tourism and eating away from home. In California it represents a similar record high proportion, employing 1.2 million people.

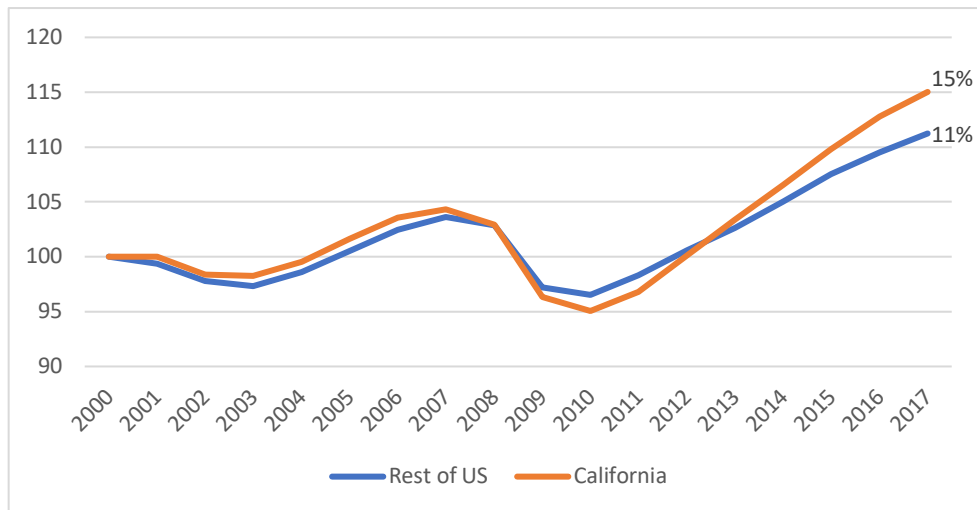
Table 1: Average Hourly Pay for Lowest Paying Occupations in California

Forest and Conservation Workers	10.16
Cooks, Fast Food	11.18
Graders and Sorters, Agricultural Products	11.19
Dishwashers	11.20
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	11.23
Combined Food Preparation and Serving Workers, Including Fast Food	11.31
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	11.40
Manicurists and Pedicurists	11.41
Amusement and Recreation Attendants	11.42
Shampooers	11.52

Source: Bureau of Labor Statistics, Occupational Employment Statistics

Since the depths of the Great Recession, the California restaurant Industry, like much of the state’s economy, has responded strongly. Since 2010, total employment in the state has grown by 21%, while total employment in California’s restaurants has grown by 31%. This compares favorably with the national picture, where total employment grew by 15% and restaurant employment grew by 24% over the same period. Wages in the state have also seen robust growth. The average worker in California has seen their wages grow by 19% since 2010, while wages in the restaurant sector have grown by around 27%. This compares to the national level, where wages in the whole economy grew by 19% and by 22% in the restaurant sector.

Chart 2: Relative Change in Total Employment in California and the Rest of the Nation, 2000-2017



These restaurants typically provide two types of service: limited-service and full-service. In limited-service restaurants, diners typically pay prior to eating and are not served by wait staff. Full-service restaurants typically employ wait staff and patrons usually pay for their meal after they have eaten. For the most part, limited-service workers do not receive tips, while tips comprise a larger share of full-service workers’ pay. Full-services restaurants account for a larger share of restaurant workers than limited-services restaurants. In 2017, full-service restaurants accounted for 55% of California’s restaurant workers. Full-services restaurants accounted for the same share of restaurant workers nationally.

Full-service employment has grown much more quickly than in the rest of the economy. Since the year 2000, full-service sector employment has grown by 48% in California, compared to 42% in the rest of the nation, and 15% for all employment in the state’s economy. Since 2012, growth in California’s full-service sector has accelerated at a faster pace than in the rest of the country. Over the period 2012-2017 (which covers the period when California’s minimum began its steady increase), California’s full-service sector has grown by 17% compared to 13% in the rest of the nation.

The limited-service sector has grown at the same pace in California as it has nationwide since the year 2000 (both have grown by 43%). Again, there has been quicker employment growth in California’s limited-service sector than in the rest of the nation since 2012. Over the period 2012-2017, limited-service employment in California grew by 27% compared to 18% in the rest of the economy. Again, limited-service employment in California has grown much more quickly than in the rest of the state’s economy.

Restaurant sector workers are paid more in California than equivalent workers in the rest of the nation. In 2017, the average annual income for a full-service worker in California was \$24,603 compared to \$21,020 in the rest of the country. In the limited-service sector, the average worker

in California earned \$18,551 per year compared to \$15,733 in the rest of the nation. However, relative to the rest of the economy, workers in California are paid the same as workers in the rest of the nation. For example, the average full-service employee in California earns 38 cents for every dollar earned by the average worker in the rest of the state's economy. Nationally, this figure is the same. This is also true for the limited-service sector. The average limited-service worker in California earns 29 cents for every dollar earned in the rest of the economy (this figure is the same nationally). In other words, a restaurant worker is as relatively well off in California as in the rest of the nation.

By itself, these data suggest the hikes in the minimum wage in California have had little impact on the industry for good or ill. The sector has seen a pace of employment growth beyond the national average, suggesting the minimum wage has not had an undue influence on the industry. But such top line metrics are driven by broader forces in the local and national economy. One has to control for these other factors to tease out the subtle effects of the minimum wage. The restaurant industry in California is doing well largely because the broader economy is doing very well, pushing up demand for dining establishments. The appropriate question is how much better might the sector be doing if it weren't for the hikes in the minimum wage? The wide range of minimum wage hikes that have occurred across the nation gives us the natural experiment to do just such a calculation.

3. Statistical Analysis: Background and Structure

There is a well-established academic literature addressing the minimum wage (too much to be covered in detail here).¹ The question at the heart of the matter is whether raising the minimum wage reduces employment. Historically, many economists believed that a minimum wage had a negative, albeit modest, influence on employment levels. This conventional wisdom was challenged by a series of influential papers in the early 1990s, starting with the work of Card and Krueger (1993) that suggested the minimum wage had almost no effect on, and in some cases a higher minimum wage could actually increase employment. The question as to whether wage floors have a negative impact was no longer considered a settled issue.

Over the last decade a number of papers using panel regression techniques pushed back on the idea that the minimum wage was a cost-free policy. The strongest evidence for the negative employment effect came from large scale panel studies of employment trends across states. The research was summarized in Neumark and Wascher's 2008 book *Minimum Wage*.

A series of recent studies using new statistical methods have further claimed that wage floors have no effect, or at worst a very small negative effect, on employment levels. Examples of this new line of research include Even and Macpherson (2014) who find that in certain instances a 10% increase in the regular and tipped minimum wage can decrease employment in the respective sectors of the industry by less than 1%. Likewise, Dube et al. (2010) find that a 10% increase in the minimum wage can, at worst, lead employment to decrease by 1%, although they find that the minimum wage increase has no effect on employment in certain instances.

¹ For an excellent summary see 'Revisiting the Minimum Wage-Employment Debate: Throwing Out the Baby with the Bathwater?' David Neumark J.M. Ian Salas William Wascher, Working Paper 18681 <http://www.nber.org/papers/w18681>

Allegretto and Nadler (2014) find little evidence that minimum wage increases suppress employment in the industry. These studies have been used to support ongoing political efforts to further increase the minimum wage.

One of the most pressing issues in the debate is the effect of an increase in minimum wage on hours worked. The data on hours are limited, but in a recent study (Jardim et al. 2017) researchers at the University of Washington had access to detailed data on hours and earnings for workers that were affected by the increase in the minimum wage. The study found that minimum wage increases in Seattle from \$11 to \$13 an hour reduced hours worked in low-wage jobs by around 9%, while hourly wages in such jobs increased by around 3%. A handful of skeptics called into question the results of the study, suggesting that Seattle's booming economy obfuscated the effects.

As a follow up, the same team of researchers conducted an additional study to analyze the effects of minimum wage increases on individual workers. Jardim et al. (2018) found that a higher minimum wage increased incentives for employers to retain workers who had become productive at their jobs rather than hiring and training new workers. In other words, raising the minimum wage affects different groups of workers based on observed work experience. The researchers followed more than 14,000 workers and highlighted the asymmetric effects of minimum wage increases on different skill levels. Low skill workers require more training, and at higher wage levels, businesses are less incentivized to provide on-the-job training. Jardim et al. (2018) concluded that minimum wage increases from \$9.47 to as much as \$13 per hour raised earnings by an average of \$8-\$12 per week. However, the "entirety of these gains accrued to workers with above-median experience at baseline; less-experienced workers saw no significant change to weekly pay."

While we acknowledge that the pattern of minimum wage hikes is not random in a statistical sense, even a casual look shows that higher income states with stronger economies (for example California and Washington) have been more aggressive in raising their minimum wages than lower income states. Since stronger economies can absorb cost increases more easily, this would seem to create a bias in the opposite direction – diminishing the estimated impact of the minimum wage on employment rather than intensifying it as claimed. What is clear is that the results of any minimum wage analysis are impacted by the functional form of empirical models used.

The analysis in this paper updates past work on the minimum wage using panel data on employment, establishment and wages from the U.S. Census Bureau's Quarterly Census of Employment and Wages (QCEW). The model is inherently a difference in differences model, where we use states that have not raised their minimum wage above the federal floor as the control group for those that have.

Our models transform variables that are nonstationary by taking first differences of the logarithms to render the variables that contain a unit root stationary. Most economic time series contain unit roots and, therefore, a regression of variables that contain unit roots leads to misleading inferences if the data are not cointegrated. As noted by Granger and Newbold (1974), when variables in a regression are nonstationary, the significance test of coefficients are invalid.

In the univariate case, a spurious regression occurs when several time series, which are not cointegrated, produce a spurious correlation because of trending. Using panel data, the spurious regression problem can be avoided if the data are large.

As noted by Baltagi (2005), panel data spurious regression estimates give a consistent estimate of the true value of the parameter as both the number of observations and years tend to infinity. However, because we don't have a number of years, nor are the variables themselves cointegrated, we use log-differences to remove the unit root in the variables and avoid producing spurious results.

We also estimate our models using a metro specific fixed effects estimator to capture time invariant characteristics for a given MSA. Using fixed effects in our panel allows us to control for factors that are difficult to measure and are unique to a given MSA. In short, we are accounting for individual MSA heterogeneity that could bias the results if not accounted for. We also estimate our models using cross section weights.

Our analysis focuses on the period 2000-2017, a period of rapid changes in minimum wage laws in many regions. As opposed to looking at the effect of minimum wage on employment trends at the state level, we instead examined 57 individual metropolitan regions, eight of which are in California. This allows for better controls at the local level, as well as a consideration of how the impact of the minimum wage varies depending on conditions in the local economy level. The data is made up of annual averages.

We use state level minimum wages in the analysis as these rates apply most broadly to an MSA economy. Cities can raise their minimum wage above state levels – with Seattle and San Francisco being two notable examples. To fold these local variations in would be at best problematic. And it is worth remembering that these individual cities are only a small portion of the local MSA. Seattle, for example, has less than a quarter of the Seattle MSA population.² To prevent substantial contamination of cross-state variation, we deliberately exclude MSAs that cross state lines, such as the New York-Newark MSA.

This framework is used to examine numerous aspects of the restaurant industry over this 17-year period. We use the QCEW payroll data to consider how hikes in the minimum wage impact employment in the industry, but also the number of establishments and wages. Importantly we consider full- and limited-service restaurants independently. We also fold in information from the American Community Survey from 2005 to 2017 to consider trends in hiring teenagers, low-skilled workers, and the share of part-time employees.

As noted, the functional form of the regression at hand is important to the results produced. In all the first set of regressions we use the first log difference of employment, earnings and establishments as the data is non-stationary. Earnings and the minimum wage data are deflated by the CPI. Other controls include first differences in national trends (employment, earnings, establishments) in the restaurant industry, local overall trends in the economy, and then a cross sectoral variable to control for competition between limited- and full-service restaurants. As an

² There is the possibility that excluding these pockets could very modestly bias the coefficient on the minimum wage level. But this would depend largely on a minimum wage having a negative impact in the first place.

example, for local full-service employment growth we use national growth in full-service employment, local growth in non-restaurant industries, local growth in real average payroll earnings, employment growth in limited-service restaurants and the real minimum wage in that economy.³

How the real minimum wage is entered into the regression is of vital importance. From a theoretical perspective, a minimum wage can have both a one-time and an ongoing impact. The short-run impact is how the industry reacts now to a change in the real minimum wage. This is best captured by the change in the real minimum wage. The minimum wage could also alter the growth trajectory of the industry's employment structure. As such, we also include the current level of the real minimum wage in the regression. If statistically significant and negative this suggests that a rise or fall in the real minimum wage has an ongoing impact on employment growth today and into the future.

4. Minimum Wage and Restaurant Employment: Statistical Results

We use a number of statistical models to consider how changes in the minimum wage have influenced employment growth in the restaurant industry. The first examines this relationship for all MSAs in the sample. As noted, we consider the limited- and full-service restaurant independently as we believe there may be structural differences in the industries that would make them react differently to increases in a minimum wage. We then consider some other factors in the debate, including how a minimum wage influences economies at different levels of income, how it impacts the number of establishments, and how various policies such as a lower minimum wage for tipped employees changes the scale of the impact.

We start the analysis by considering the impact of the minimum wage on all employment in the region as a basic control. Our findings for the restaurant industry should look substantially different from the economy overall since low paid workers are employed at a much higher level in this industry. Regression Table 2 shows the regression results for all employment in the full sample of 57 MSAs. The dependent variable is the change in total payroll jobs. We use a standard fixed effect model here to mimic the impacts.

The controls include the lagged local unemployment rate (the concurrent unemployment rate is endogenous to job growth), payroll growth in the national economy, an autoregressive (AR) variable and the controls for the minimum wage. The results of these regressions are shown in Table 2. There is a small negative coefficient on the lagged change in the real minimum wage, while the concurrent real minimum wage is statistically insignificant.

Table 2: Total Employment Regression

Variable	Coefficient	T-Statistics
Intercept	-0.0066	-0.31
Change in National Employment	1.0526	57.6
Lagged Local Unemployment	-0.0003	-1.34
Real Minimum Wage	-0.003	-0.5
Lagged Change in the Real Minimum Wage	-0.0102	-1.68
Auto-regressive	0.5216	19.53
R-squared	0.8891	
S.E. of regression	0.0129	
F-statistic	104.2173	
Durbin-Watson stat	1.9362	

As noted, this seems to confirm the general finding that a higher minimum has a modest one-time negative influence on the overall growth of employment in a region, but no long-run ongoing effect on the economy. This regression is to show that results found for restaurants below are not being driven strictly or even largely by spurious correlation, as such a bias would be similarly expected in the larger set of data.

The next two regressions, shown in Table 3 look at determinants in the change in restaurant employment (limited and full-service) for all 57 MSAs included in the data. Along with the controls for the real minimum wage we also include national growth of jobs in that sector of the restaurant industry, growth in local jobs outside the industry, the lagged local unemployment rate and the change in the other (full or limited) restaurant industry's employment level. An autoregressive term was not needed according to the Durbin-Watson statistic.

Table 3: Limited and Full Service Restaurant Employment Panel Regressions

Variable	Coefficient	T-Statistics	Variable	Coefficient	T-Statistics
Intercept	-0.1	-3.02	Intercept	0.0253	0.69
Change in Full Service National Employment	0.6426	8.95	Change in Limited Service National Employment	0.6566	8.89
Change in Local Non-Restaurant Employment	0.3816	9.97	Change in Local Non-Restaurant Employment	0.3795	9.06
Change in Local Earnings	-0.0867	-3.53	Change in Local Earnings	-0.0832	-2.55
Local Unemployment Lag 1	-0.0005	-1.32	Local Unemployment Lag 1	0.0002	0.53
Real Minimum Wage	-0.0324	-3.41	Real Minimum Wage	0.0045	0.43
Lagged Change in the Real Minimum Wage	-0.0331	-2.11	Lagged Change in the Real Minimum Wage	-0.047	-2.67
R-squared	0.5213		R-squared	0.5286	
S.E. of regression	0.0269		S.E. of regression	0.0324	
F-statistic	14.9138		F-statistic	15.3581	
Durbin-Watson stat	2.011		Durbin-Watson stat	2.0375	

The regression results provide the expected signs for the various controls. Growth in local employment in the full-service restaurant industry is positively related to national trends in full-service employment and local trends in non-restaurant employment. Employment in the other industry (limited-service here) is negative, reflecting substitution effects. The lagged unemployment rate is statistically insignificant in both regressions.

The results here show the increases in the real minimum wage have a statistically significant impact on employment growth in both the limited- and full-service sectors of the industry. However, the regressions suggest that the magnitude and structure of the shock is different for the two industries. For limited-service restaurants only the lagged change in the real minimum wage is significant. This suggests that an increase in the real minimum wage has a one-time negative impact on employment growth but does not have an ongoing impact on future growth trends.

The coefficient suggests an elasticity of approximately -0.05. Therefore, a 20% real increase in the minimum wage will shave approximately one percentage point off of employment growth in the following year. If the growth rate would have been 3%, the hike in the minimum wage will shave that to 2%. Similarly, if, due to a downturn, the sector would have contracted by -2%, the hike in the real minimum wage will intensify that to -3%.

The impact of a higher real minimum wage on full-service restaurants is larger. The initial impact (as measured by the lag in the change of the real minimum wage) is smaller than for limited-service restaurants, roughly -0.03. A 20% increase in the real minimum wage would shrink growth in the sector by two thirds of a percentage point. But the coefficient on the current real minimum wage is statistically significant and of roughly similar magnitude. The relative loss of jobs is cumulative over time. So over four years the industry will grow 3.3 percentage points less than if the minimum wage had stayed constant in real terms. In other words, a 10% growth rate would be reduced to 6.7%. To be clear, employment in the industry would still grow if other factors are supportive of growth in the industry, but at a slower rate.⁴

Why the two industries respond differently to a higher real minimum wage is unclear. What we do know is that, according to the data from the economic census, the wage-share of revenues in limited-service restaurants (25%) is lower than for full-service restaurants (34%). They also produce far more meals and service far more customers per employee than a full-service restaurant does. Either of these factors could explain a lower sensitivity to a higher real minimum wage. Equivalently, there might simply be easier substitutability of capital for labor in full-service restaurants than limited-service restaurants. As such, limited-service restaurants have less flexibility in determining levels of employment and are forced to absorb the higher wage rather than opt for fewer workers and more capital.

As with all policy decisions, there are tradeoffs involved. In the case of a higher minimum wage, gains in income afforded to some workers are offset by fewer job opportunities in the market overall.

⁴ From the standpoint of economic theory, a higher real minimum wage should not have a true permanent impact on growth. Rather we would expect that the industry would eventually find a new equilibrium and growth would settle back to normal. However, the limited time range of the sample and the fact that real minimum wage changes have been within a modest range over the sample period suggests that it would be difficult to find such a subtle effect in the data.

Accounting for Regional Income Differences

These regressions assume that a higher minimum wage has the same impact everywhere. Yet, theoretically, a higher minimum wage should have larger negative impact on lower income communities than on higher income communities. This is driven by a difference in the ability to pass on higher costs to consumers, as well as overall costs (land, rent, logistics), which tend to be higher in high-income communities, meaning the higher minimum wage has less relative effect. The next set of regressions runs these same models, but for the MSA's divided into a high and low payroll income group based on average overall payroll income.

The next set of regression results is shown in Table 4. For limited-service restaurants, the regressions reveal that a higher real minimum wage has no long-run impact on employment growth trends in any region, as seen in the aggregate data. For higher income communities there is no statistically significant short-term impact of the minimum wage on limited-service employment growth. In summary, the minimum wage has no statistically significant impact on employment growth in limited services restaurants in high-income areas. By contrast, in lower income regions, a hike in the real minimum wage has a one-time effect that is slightly less than double that for the full sample. This elasticity suggests that a 20% real hike in the minimum wage shaves about 1.6 percentage points off of employment growth in the industry, but then growth returns to a normal pace.

Table 4: Limited and Full Service Restaurant Regressions by Regional Income

	Full Services				Limited Services			
	High Income		Low Income		High Income		Low Income	
	Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat
Intercept	-0.0786	-1.93	-0.1413	-2.46	0.032	0.72	0.0487	0.76
Change in National Limited/Full Services Employment	0.6797	7.92	0.5756	4.3	0.7388	8.17	0.5573	4.37
Change in Local Employment	0.3693	7.63	0.3933	6.03	0.3533	6.61	0.4109	5.99
Change in Local Limited/Full Services Earnings	-0.083	-2.37	-0.0889	-2.52	-0.1026	-2.25	-0.0685	-1.47
Lagged Local Unemployment	-0.0005	-1.14	-0.0003	-0.47	0.0015	3.17	-0.0014	-2.33
Real Minimum Wage	-0.0262	-2.21	-0.0443	-2.72	0.0093	0.73	0.0075	0.41
Lagged Change in the Real Minimum Wage	-0.0242	-1.25	-0.0487	-1.81	-0.0255	-1.18	-0.0818	-2.79
R-squared	0.5726		0.4564		0.6041		0.4509	
F-statistic	16.905		10.5351		19.2545		10.3016	
Durbin-Watson	1.9701		2.0394		1.8561		2.2509	

For full-service restaurants the results of dividing the sample into higher and lower income regions has a very similar effect on the findings. In higher income areas, the impacts are smaller than they are for the total sample, whereas in lower income economies the impact is larger. For higher income communities a 20% increase in the real minimum wage leads to an immediate slowing of employment by roughly half a percentage point, but there is no statistically significant short-term effect. Over four years, the higher minimum wage will shave two percentage points off of growth. In lower income communities the effect is larger. If employment growth were due to average 2% per year, the hike in the minimum wage would reduce total growth from 8% to 3.5%.

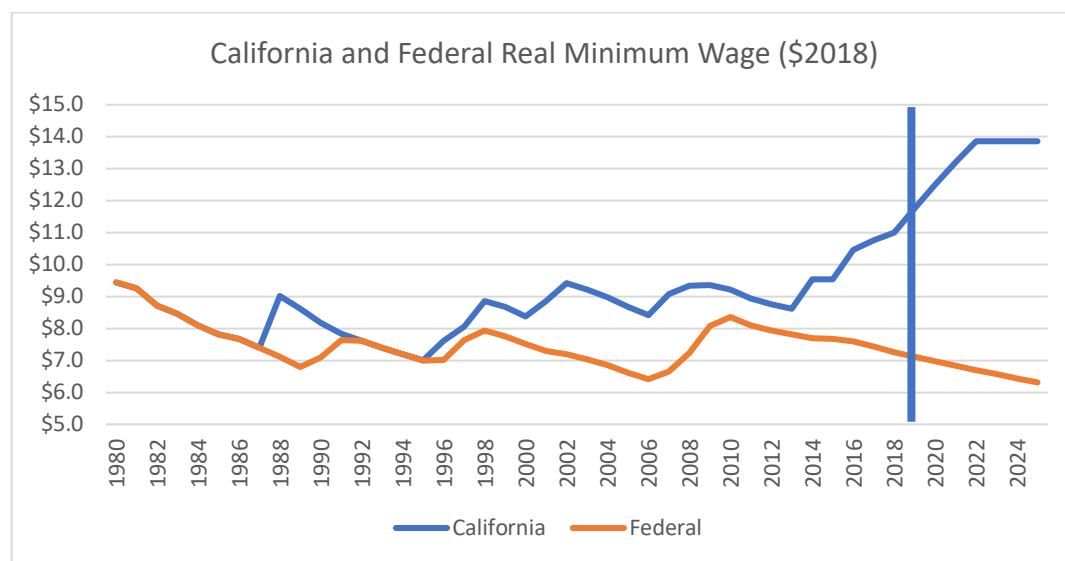
Simulating the impact of minimum wage hikes on the California restaurant industry

At this point we have established that a higher real minimum wage does have a real impact on employment growth in the restaurant industry. But elasticities by themselves do not help us explain the magnitude of such impacts. To translate these elasticities growth projections in California, we first need to consider the recent history of the minimum wage in the state – and more importantly, consider where it is heading.

California established its first minimum wage in 1916, more than two decades before the Federal Government established its own. For much of its history the local level was at, or just above, the federal level. The overall level of the real (inflation adjusted) minimum wage at the state level stayed fairly steady for over thirty years (at or just below \$9 per hour in 2018 dollars), as legislative increases were only sufficient to offset inflation. The gap between the local and national rate increased modestly throughout this period, largely because the federal rate was not increased as often.

In 2013, then-Governor Jerry Brown signed into place an ambitious plan to raise the rate to \$15 by 2022. In real terms it went up by 22% from 2013 to 2017 and is slated to rise another 25% by 2022. Equivalently, the gap between the federal and state level will reach a historic high (assuming there are no changes at the federal level, which seems likely given the current political climate).

Chart 3: Recent History of the Minimum Wage



Data analysis suggests that a steady real minimum wage as seen from 2000 to 2013 will have had little aggregate influence on growth trends in the industry. The real increase from 2013 to 2017, and the subsequent increases through 2022, will reduce growth in the industry. To calculate how many jobs will not be created, we use the elasticity measures to create an alternative path of

employment growth in the industry as if the real minimum wage hadn't increased. For this calculation we will use the income separated regressions. The Inland Empire, Bakersfield and Fresno fall into the lower income group. The other six MSA's in our sample fall into the high-income group. Since the models suggest the minimum wage has no long-term significant impact on employment in the limited-service restaurant industry, there will be no estimates created for this sector.

The results of these simulations are shown in the following two tables. Table 5 shows the results for full-service restaurants in the six higher income regions of California. From 2013 to 2017, full-service restaurants in these areas added a total of 55,421 jobs. Without the real minimum wage increases we estimate these regions would have added 64,874 jobs.

Table 5: Full Service Restaurant Industry Simulations: California High Income Regions

Geography	Scenario	2013-2017	Growth	2017-2022	Growth	2013-2022	Change
LA / OC	With Minimum Wage	28,403	12.10%	32,765	12.40%	61,167	20,550
	Alternative	33,145	14.00%	48,573	17.50%	81,718	25%
Ventura	With Minimum Wage	801	6.50%	645	5.00%	1,446	974
	Alternative	1,043	8.40%	1,377	10.10%	2,420	40%
Sacramento	With Minimum Wage	4,299	13.30%	5,385	14.50%	9,684	2,908
	Alternative	4,956	15.20%	7,636	19.70%	12,592	23%
San Diego	With Minimum Wage	8,441	13.70%	9,508	13.50%	17,949	5,514
	Alternative	9,700	15.60%	13,763	18.60%	23,463	24%
SF / Oak	With Minimum Wage	10,921	11.70%	12,515	11.90%	23,436	8,160
	Alternative	12,813	13.50%	18,782	17.00%	31,595	26%
San Jose	With Minimum Wage	2,557	7.70%	2,271	6.30%	4,828	2,697
	Alternative	3,218	9.60%	4,307	11.50%	7,525	36%
Sum Total	With Minimum Wage	55,421	11.90%	63,089	12.00%	118,510	40,803
	Alternative	64,874	13.70%	94,439	17.10%	159,312	26%

The real job cost to the industry lies in the future. The models suggest the past hikes in the minimum wage will have a cumulative impact on the industry along with those future increases that are built into the law. We forecast that, given these minimum wage increases, the industry in high income areas will add 63,089 jobs from 2017 to 2022.⁵ If the minimum wage had remained at 2013 levels in real terms, the industry would have added 94,439 jobs. In 2022, the industry in these six regions will hire 7% fewer employees in total than it would have had the minimum wage not been significantly raised.

Even if the minimum wage is raised to \$15 per, as projected, our simulation suggests robust growth in the sector with nearly 63,000 new jobs from 2017 to 2022 for the six large high-income regions. While this is 30,000 less than might otherwise be the case, given the strong state of the economy and low unemployment rate it is likely that these workers will be absorbed elsewhere. In other words, it's a small price to pay for providing higher wages.

But this logic relies on a strong economy to hide the impact of the higher minimum wage. There is always a chance of another downturn that would put substantial pressure on both the restaurant industry and the economy overall. As a thought experiment, assume that instead of growth in the industry we predict a sharp slow-down – 20% off of our baseline growth forecasts. If the

⁵ The base employment forecast is simply based on a moving average of the last five years of employment growth with the negative impact of the minimum wage hike added back in.

minimum wage is allowed to go up regardless of the slowing economy, we would predict a loss of 38,000 jobs in the six higher income MSAs – instead of the 30,000 mentioned in the scenario above. In other words, an additional 8,000 jobs would be lost.

For the three lower income regions, Fresno, Bakersfield and the Inland Empire, the impacts are significantly larger, in relative terms. For full-service restaurants our models predict that these two regions would have added 23,509 new jobs but for the increases in the real minimum wage. Because of the hikes, the increases will only be 13,761 from 2013 to 2022. This implies the minimum wage would slow growth by half.

Unlike higher income regions, the higher minimum wage will have an impact on the limited-service industry as well. The three regions are likely to add 42,306 jobs in this sector, whereas if the minimum wage levels had stayed the same as in 2013, in real terms there would have been 46,352 new jobs. In total the restaurant industry will see 4,046 fewer jobs.

The logic here is inescapable. Rather than using a one-size-fits-all approach, the level of the minimum wage should, at the very least, be tied to the level of income in the communities. Other states, significantly New York, have recognized this and acted accordingly.

Table 6: Full and Limited Service Restaurant Simulations: CA Low Income Regions

Limited Service	Scenario	2013-2017	Growth	2017-2022	Growth	2013-2022	Change
Fresno	With Minimum Wage	2,291	20.40%	3,465	24.70%	5,756	578
	Alternative	2,499	22.10%	3,834	26.60%	6,334	9%
IE	With Minimum Wage	13,309	24.00%	20,585	28.50%	33,894	3,022
	Alternative	14,357	25.70%	22,558	30.40%	36,915	8%
Bakersfield	With Minimum Wage	1,109	11.00%	1,547	13.60%	2,656	447
	Alternative	1,289	12.70%	1,814	15.50%	3,103	14%
Limited Service	Scenario	2013-2017	Growth	17-22	Growth	2013-2022	Change
Fresno	With Minimum Wage	582	5.60%	302	2.80%	884	1,421
	Alternative	941	9.00%	1,363	11.70%	2,304	62%
IE	With Minimum Wage	5,718	12.20%	5,452	10.40%	11,170	7,182
	Alternative	7,403	15.60%	10,950	19.30%	18,352	39%
Bakersfield	With Minimum Wage	718	9.60%	989	11.90%	1,707	1,147
	Alternative	983	13.00%	1,870	20.80%	2,853	40%

Impact on the number of restaurant establishments

We also ran the same regressions for the growth in the number of establishments in the local economy. Given the difficulty faced by the Bureau of Labor Statistics in collecting data for small establishments, this data is less reliable than data on employment. Still, it shows a different face of the minimum wage impact – how it impacts the number of restaurants rather than total hiring. The difference between these findings will give us some idea of how hiring per restaurant is impacted. If the higher minimum wage had no statistical impact on the number of establishments then we can assume it simply impacts employment choices at each restaurant, not the growth of the industry overall.

The first test was to use as a control the model for the total number of all establishments in a local economy, as we had with employment (results not shown here). We found the real

minimum wage had no statistical impact on growth in the number of establishments at the local level. We then ran the models for the two restaurant sectors with similar controls as in the original employment growth models, except using establishments (local total or national trends in the industry) as our controls. The only major difference is that in our establishment models we find that the change in the real minimum wage has no significant impact on the growth in the number of establishments as proxied by the lagged change in the minimum wage. As such, we have dropped this variable from the equations.

Table 7 shows the results of these regressions.⁶ As with the employment regressions, the coefficients on the various controls show up with signs that are as would be expected. Interestingly, the data suggests that a higher real level of the minimum wage is negatively associated at a statistically significant level with growth in both the number of full- and limited service restaurants across our 57 sample regions. These are ongoing effects, rather than one-time effects. The implication here is that a higher minimum wage is associated with less long-run growth in the number of restaurants in the industry. A 20% increase in the real minimum wage reduces growth in limited-service restaurants by .5 percentage point per year, while it reduces growth in the full-service industry by .4 percentage points per year.

Table 7: Change in Establishments Regressions

Variable	Coefficient	T-Statistics	Variable	Coefficient	T-Statistics
Intercept	-0.0915	-2.54	Intercept	-0.0622	-1.72
Change in National Limited Service Establishments	0.6634	4.87	Change in National Full Service Establishme	0.6834	5.63
Change in Local non-Restaurant Establishments	0.4598	11.44	Change in Local non-Restaurant Establishmer	0.39	10.33
Lagged Local Unemployment	0.0014	3.15	Lagged Local Unemployment	-0.0003	-0.76
Real Minimum Wage	-0.0252	-2.41	Real Minimum Wage	-0.0197	-1.84
Change in Local Full Service Establishments	0.0728	2.52	Change in Local Limited Service Establishme:	0.051	1.89
R-squared	0.3178		R-squared	0.3349	
F-statistic	6.9276		F-statistic	7.4885	
Durbin-Watson stat	1.834		Durbin-Watson stat	1.7882	

Relative to the regressions for employment, this result has distinctly different implications for the two industries. For full-service, the impact is smaller than that on employment. This suggests fewer new full service restaurants each hiring fewer workers over time. For limited-service restaurants there is no slowing for future employment growth, but there is a slowing in growth in the number of establishments.

This gives us another clue as to the differences between the industries. With a higher minimum wage, we see a consolidation in the limited-service industry whereby economies of scale are used to offset the higher costs. As such, the smaller shops – those more likely to be independent – ‘mom and pop’ types – are pushed out. While this explains the smaller impact in the industry overall, it also suggests that it is smaller limited-service establishments – typically mom and pop-

⁶ We also ran these regressions for higher and lower income economies but found no statistical difference from the overall models. We used both the current real level and the lagged real change in the minimum wage but found the change component never had a statistical impact so the variable was dropped from the final form of the model. This makes intuitive sense given that the short-run impact of a hike in costs should be larger on inputs (employment) than the overall number of competitors in an industry given the relatively higher cost of exit and entry.

style local establishments – that suffer, while the larger national chain brands probably gain market share

Accounting for Incomes from Other Sources

One of the ongoing debates over minimum wage concerns the extent other forms of income should be included in the calculation of the minimum base pay rate. For example, one could argue that a lower minimum wage level for direct pay is warranted if the employer provides health benefits, as is the case in Nevada. Similarly, in most bars and full-service restaurants, front-of-house employees receive pay in the form of tips. Many states and the Federal Government allow a lower minimum wage for such employees. Some states, such as New Jersey and Arizona, have a hybrid model by which they allow a lower minimum wage, but only if the combined wage and tipped compensation reach a minimum level. In California there is no allowance for tipped income in the minimum wage.

To see if the tipped system helps reduce the impact of the minimum wage, we re-ran the regression for the full-service restaurant industry, but this time we used a control which is the ratio between the regular and tipped minimum wage for a given MSA. For regions like California, where the regular minimum wage is equal to the tipped minimum wage, this ratio is 1. For states that use the federal minimums, the ratio is .32. The bigger the difference between the regular and tipped minimum wage, the lower the ratio. We placed this control directly into the equation, along with another variable which is the interaction between the ratio variable and the lagged change in the real minimum wage.⁷ The result of these regressions is shown in Table 8.

⁷ A number of functional forms were attempted in these regressions, including, specifically, an interaction between the level of the real minimum wage and tipped wage ratio. We settled on a reduced functional form with variables that were statistically insignificant dropped from the equation.

Table 8: Full-Service Employment Regression with control for Tipped Minimums

Variable	Coefficient	T-Statistics
Intercept	-0.0915	-2.54
Change in National Limited Service Establishments	0.6634	4.87
Change in Local non-Restaurant Establishments	0.4598	11.44
Lagged Local Unemployment	0.0014	3.15
Real Minimum Wage	-0.0252	-2.41
Change in Local Full Service Establishments	0.0728	2.52
R-squared	0.3178	
Adjusted R-squared	0.272	
S.E. of regression	0.0306	
F-statistic	6.9276	
Durbin-Watson stat	1.834	

As with the earlier regressions, the signs on the control variables are as expected. The ratio of the tipped minimum wage to regular minimum wage has a negative sign and is statistically significant, as is the interaction between the ratio and the lagged real change in the minimum wage. For the former result, the implication is that holding all else constant, including the real minimum wage, areas that have a higher tipped minimum wage will see slower growth in full service restaurant employment. It also suggests that a one-time change in the real minimum wage has a larger overall impact on regions that have a higher tipped minimum wage.

Table 9: Full-Service Employment Regression with control for Tipped Minimums

Percentage Change	Fixed Real Minimum Wage		20% Increase Real Minimum Wage			
	Growth	One Time	Ongoing	Year Cumulative	4 Yr Alternative	
40pp	0.00pp	-0.06pp	-0.62pp	-2.55pp	N/A	
60pp	-0.31pp	-0.71pp	-0.62pp	-3.20pp	-1.31pp	
80pp	-0.62pp	-1.35pp	-0.62pp	-3.85pp	-1.95pp	
100pp	-0.94pp	-2.00pp	-0.62pp	-4.49pp	-2.60pp	

Table 9 reflects the overall impact of various levels of the tipped minimum wage relative to the overall minimum wage. For regions that have a tipped minimum wage at the same level as the regular minimum wage, overall growth is typically one percentage point slower compared to regions that have a tipped minimum wage at 40% of the regular level.

It also strongly suggests that a higher tipped to regular real minimum wage significantly increases the negative impact of a hike in the real minimum wage. For example, if a region hikes its real minimum wage (both tipped and regular) by 20%, a region with the tipped minimum wage at 100% of the regular minimum wage will see growth over four years reduced by 4.5

percentage points. If the tipped minimum wage is 40% of the normal rate then the decline in growth would only be 2.5 percentage points.⁸

Lastly, we include a column which is the simulated decline in growth rates if the 20% increase in the base minimum wage was not accompanied by a similar increase in the tipped minimum wage. Overall, the models suggest that the reduction in the pace of job growth would be almost halved as a result.

The minimum wage is set at a level intended to help the lowest paid workers take a step up. For many front-of-house workers in the full-service restaurant industry, the direct pay they receive from their employers ends up being only a small portion of their total income. This is particularly true in high-end eating establishments where many servers earn more than managers. Clearly, these workers are not the intended target of such policies.

All policy has costs and benefits, and good policy works to maximize the difference between these two metrics. Having a lower minimum wage than normal for tipped workers is clearly one way of improving overall outcomes. It reduces the impact of higher labor costs on the restaurant industry. While it may be noted that some tipped employees do not receive the same income that others do, many states keep a separate minimum wage for them anyway (although employers still have to guarantee a minimum overall income). In other words, if tipped income plus base wages don't reach a certain level, then the restaurant is required to backfill the missing income.

5. Weighing the Costs and Benefits

The point of a higher minimum wage is, of course, to increase the income of low-pay workers. As already shown, such policies may have consequences for the restaurant industry in terms of both slowed employment growth and equivalently slower business formation growth within the sector. But to gauge the relative effectiveness of these policies, we would have to consider more closely the extent to which incomes are altered as a result of the minimum wage, while addressing which groups of potential workers are more liable to lose out on job opportunities.

We start by considering the benefits more closely. To estimate the impact of a higher minimum wage, we use the same panel methodology introduced earlier to consider how changes impact average payroll wages in the full- and limited-service restaurant industry. We continue to use data from the QCEW for this analysis. The following regressions show how a change in the real minimum wage impacts average annual earnings in the two segments of the industry in a panel regression.

⁸ These same regressions were run for high- and low-income regions. The results suggest that the tipped minimum wage level has a larger ongoing impact in lower income regions than high-income regions. However, the one-time effect is greater in high-income regions than low-income regions.

Table 10: Earnings Regressions by Industry

Variable	Coefficient	T-Statistics	Variable	Coefficient	t-statistics
Intercept	0.1139	3.63	Intercept	0.0447	1.93
Change in National Limited Earnings	0.8088	19.12	Change in National Full Earnings	0.8278	22.58
Change Local Earnings - all sector	0.2072	5.51	Change Local Earnings - all sector	0.2249	7.66
Lagged Local Unemployment Rate	-0.0013	-3.66	Lagged Local Unemployment Rate	0	-0.06
Change in the Real Minimum Wage	0.0867	6.88	Change in the Real Minimum Wage	0.0839	8.38
Real Minimum Wage	0.0312	3.58	Real Minimum Wage	0.0133	2.03
R-squared	0.5615		R-squared	0.5984	
F-statistic	19.0365		F-statistic	22.152	
Durbin-Watson stat	2		Durbin-Watson stat	1.92	

As with the previous regressions, the control variables are statistically significant and of the expected signs. The regressions show, not surprisingly, a statistically significant link between average payroll wages and the minimum wage for both sectors. The results look very similar for the two sectors.

The elasticities are relatively small, however. They suggest that a 20% increase in the real minimum wage leads to only a 2% one-time bump in real average wages in both sectors in the first year. It does seem to have some ongoing effects as well, with that same 20% increase leading to an additional .6 percentage point increase in real wage growth annually in the limited-service sector and an annual .3 percentage point increase in real wage growth in the full-service sector. Overall, such a 20% increase in the real minimum wage is linked to only a 4.2% increase in incomes in the limited-service sector over 4 years and a 2.7% increase in real average wages in the full-service industry over four years. In other words, if limited services wages had grown by 5% over a 4-year period without the minimum wage, they would grow by 9.2% with it. Likewise, if full services wages had grown by 5% over a 4-year period without the minimum wage, they would grow by 4.7% with it.

Many workers in the restaurant industry earn sufficiently more than the new minimum wage. The hike is unlikely to increase their pay, either directly or through wage compression. As such, the average wage increase for everyone in the industry will be lower than the minimum wage hike. It is difficult to model, but to scale this issue consider a situation where those workers earning close to minimum wage represent 40% of the overall labor costs for the restaurant. If the minimum wage hike was 20%, we could see the average pay in this group rise by 15% to 25% depending on the overall degree of wage compression. If no one else in the company experiences a pay increase, then we would expect average earnings to rise by 6% to 10%.

There is little doubt that a high proportion of workers in the restaurant industry earn wages on the low end of the spectrum. According to the OES the average hourly pay for the entire industry is slightly over \$12 per hour. It also suggests that over 80% of all pay in the industry goes to workers for whom over 75% earn less than \$14 per hour. As such, the estimates from our statistical analysis seem low relative to expectations. One explanation may be that the number of hours being worked by employees is reduced as a result of the minimum wage – particularly for those earning close to the minimum wage. Unfortunately, there is no good data source of hours

worked by hourly pay in the restaurant industry at the national or local level. And as such we are left only with inference.

It is incumbent for policy makers to understand whether the minimum wage affects some subsets of workers more than others. To examine this question, we have integrated another source of data into our analysis. We gathered data on restaurant employment by different demographic categories from the American Community Survey. Specifically, we are interested in the share of restaurant employment made up of individuals who are disabled, have low levels of education (less than high school), or who work part-time part-time. Overall, these categories are highly represented in the restaurant industry.

According to the data from the ACS, within our sample period about 45% of all workers in the space are part-time (work less than 32 hours per week), and 25% are low-skilled (do not have a high school degree). About 5.5% of these workers are listed as disabled. While such people do not necessarily fall into an at-risk category, those who live close to the poverty line very often have these demographic characteristics. In today's skill-driven labor market, the restaurant industry provides them not only with a regular wage, but also the experience they need to take advantage of future employment opportunities. As such, observing how employment at this level is impacted by the minimum wage hike can be instructive.

The data used here differs materially from that used in earlier studies. First, the shares data is stationary, and as such we are dispensing with the change model used above. Our control for the minimum wage is limited to the lagged real level. A change in the minimum wage here, if found to have significant effects, can be thought of as a permanent shift in the share as represented by the dependent variable. The ACS data is limited to 2005 through 2017. As for the controls, the data is also limited to the restaurant industry as a whole rather than divided into full- and limited-service. Given that, we use a control of local full-service to local limited-service employment to control for differences in the two industries. As with the employment models, we use both a national control for broad trends in the industry as well as local controls for the variable at hand. For example, in the model to estimate the impact of the minimum wage on low-skilled employment we use the share of low-skilled workers employed in the entire local economy as a control, as well as the national share of low-skilled workers employed in the restaurant industry. The results of these regressions are shown in Tables 11-13 below.

Table 11: Minimum Wage and Share of Disabled Workers

Variable	Coefficient	T-Statistics
Intercept	-5.610076	-3.657785
Restaurant Employment	0.112799	0.740577
Lagged Unemployment Rate	-0.075973	-3.473121
National Share of Disabled Workers in Restaurant Sector	-0.190963	-1.958839
Local Share of Disabled Workers in Labor Force	0.94598	16.20137
Log of Real Minimum Wage	-1.934971	-4.322126
Lagged Share of Disabled Workers in Restaurant	0.074058	2.213875
R-squared	0.517961	
F-statistic	121.2416	

Table 12: Minimum Wage and Share of Part-time Workers

Variable	Coefficient	T-Statistics
Intercept	-0.709072	-0.082549
Restaurant Employment	-3.03206	-6.238609
Lagged Unemployment Rate	-0.126061	-1.67007
National Share of Part-time Workers in Restaurant Sector	-0.060758	-0.480058
Local Share of Part-time Workers in Labor Force	1.355863	14.91769
Log of Real Minimum Wage	-2.473815	-1.679955
Lagged Share of Part-time Workers in Restaurant	0.422135	14.68136
		14.68136
		14.68136
R-squared	0.720016	
F-statistic	290.1653	

Table 13: Minimum Wage and Share of Low-skilled Workers

Variable	Coefficient	T-Statistics
Intercept	4.224084	0.948756
Restaurant Employment	-0.857693	-2.045711
Lagged Unemployment Rate	-0.448636	-7.923661
National Share of Low-skilled Workers in Restaurant Sector	0.723091	6.320587
Local Share of Low-skilled Workers in Labor Force	0.670657	24.59246
Log of Real Minimum Wage	-2.525827	-2.037282
Lagged Share of Low-skilled Workers in Restaurant	0.257393	9.766228
R-squared	0.789032	
F-statistic	422.0025	

The tables provide evidence that minimum wage increases may reduce the share of workers in each category. A 20% increase in the minimum wage is associated with a 0.76 percentage point decrease in the share of disabled workers, while the same increase would lead to a 1% in the share of part-time and low-skilled workers.

6. Conclusion

This report examines how recent hikes in the minimum wage are changing the California restaurant industry. It does so by assessing the impact of changes in minimum wages in a sample of 57 metropolitan regions (MSAs) across the United States. The data analysis suggests that while the restaurant industry in California has grown significantly as the minimum wage has increased, employment in the industry has grown more slowly than it would have without minimum wage hikes. When the next recession arrives, the higher real minimum wage could increase overall job losses within the economy and lead to a higher unemployment rate than would have been the case without the minimum wage increases.

Interestingly, there are critical differences in the magnitude of the minimum wage effect on different parts of the industry and on different regions. Full services restaurants are affected by minimum wage increases more than limited services restaurants, low-income regions are affected more than high-income regions and there is some evidence that low-skilled, disabled and part-time workers are affected the most by the policy.

The policy implications of these findings are clear. First, while the state may want to raise minimum wages in pursuit of a broader social goal, they should consider some potential costs of the policy. There are tradeoffs to any policy and policies can be constrained or altered to mitigate the harm that may be caused. This report reveals that the worst effects of minimum wage increases can be hidden in the context of a strong economy, but will be felt more intensely in the event of an economic downturn. Minimum wages should be set relative to local incomes, and there should be a specific exemption for tipped employees. In both cases it can reduce the impact of the higher minimum wage on the local industry and still achieve higher incomes in the broader economy.

References

- Baltagi BH, Bratberg E, Holmaa TH. (2005), “A panel data study of physicians’ labour supply: the case of Norway. *Health Economics*” 14(10): 1035–1045.
- Card, D., and A. Krueger, (1993), “Trends in Relative Black-White Earnings Revisited,” *American Economic Review*, vol. 83, no. 2, 85-91.
- Even, W. and David A Macpherson (2014), “The Effect of the Tipped Minimum Wage on Employees in the US Restaurant Industry.” *Southern Economic Journal*, 80(3):633–655, 2014.
- Dube, A. T William Lester, and Michael Reich (2010). “Minimum wage effects across state borders: Estimates using contiguous counties.” *The Review of Economics and Statistics*, 92 (4):945–964, 2010.
- Granger, C. and Newbold, P. (1974). “Spurious Regressions in Econometrics”. *Journal of Econometrics*.
- Jardim, E., Long, M., Plotnick, R., van Inwegen, E., Vigdor, J., and Wething, H.. (2017). “Minimum Wage Increases, Wages, and Low-wage Employment: Evidence from Seattle,” NBER Working Paper No. 23532, Cambridge, MA.
- Sylvia A., and Carl Nadler. (2014). “Tipped Wage Effects on Earnings and Employment in Full-Service Restaurants.” *Industrial Relations: A Journal of Economy and Society*

Descriptive Statistics

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
Establishments (Private)									
Total	57	66128.33	85579.74	12009	593107	12009	593107	4.394	26.539
Full-Service	57	1650.053	1703.321	401	10423	401	10423	2.971	14.017
Limited-Service	57	1660.737	1636.937	374	10401	374	10401	3.14	15.815
Employment (Private)									
Total	57	878000	874000	197009	5271872	197009	5271872	2.791	12.934
Full-Service	57	40420.89	40988.38	7817	248768	7817	248768	2.831	13.31
Limited Service	57	32283.35	32215.85	7356	192229	7356	192229	2.861	12.967
Average Annual Wage (Private)									
Total	57	53423.07	14690.56	30035	130062	30035	130062	2.984	15.131
Full-Service	57	20837.12	3024.552	15940	29186	15940	29186	.721	3.065
Limited Service	57	15943.49	2013.126	13150	22312	13150	22312	.997	3.749
Minimum Wage	57	8.475	1.403	5.15	11	5.15	11	.245	1.909

Descriptive Statistics

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
Unemployment Rate	57	4.379	1.197	2.2	9.2	2.2	9.2	1.956	8.567
Restaurant Share (%)									
Teenagers	57	23.766	4.785	13.263	33.949	13.263	33.949	-.311	2.571
Low Skill	57	21.392	4.356	13.545	31.506	13.545	31.506	.364	2.33
Disability	57	5.576	2.191	1.681	10.255	1.681	10.255	.503	2.597
Part Time	57	45.208	6.172	32.217	57.666	32.217	57.666	.168	2.391
Local Labor Force Share (%)									
Teenagers	57	4.936	.915	2.974	6.766	2.974	6.766	-.111	2.387
Low Skill	57	9.051	3.636	4.296	23.277	4.296	23.277	1.889	7.209
Disability	57	5.69	1.181	3.376	8.292	3.376	8.292	.438	2.531
Part Time	57	19.06	2.582	7.871	23.404	7.871	23.404	-1.209	7.332

