Working Paper

A $15 Federal Minimum Wage is Outside Historical Experience

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Abstract

How informative is historical experience with the minimum wage about the consequences of raising the federal minimum to $15? This paper compares a hypothetical $15 federal minimum to the most recent federal minimum wage increase, in 2007, from $5.15 to $7.25. I describe a straightforward method for using publicly available data from the Occupational Employment and Wage Statistics (OEWS) program to assess whether a proposed minimum wage increase is within historical experience. I illustrate the method by comparing the occupations and industries most directly affected by the 2007 increase with those that would be affected by a $15 minimum wage. By any measure, a $15 minimum wage is far outside historical experience—in both its size and the breadth of occupations and industries it would affect—and the frontier of historical experience is a minimum wage between $9 and $11 per hour. I recommend that future minimum wage proposals, both federal and local, include a similar analysis to assess whether the proposal is within historical experience. Finally, I argue for future research to take advantage of several scheduled state-level minimum wage hikes to estimate heterogeneous employment effects by occupation and industry.

1 Introduction

Recent proposals have advocated for raising the federal minimum wage from $7.25 to $15. While opponents have objected that this would significantly reduce employment and harm low-wage workers, advocates have argued that such concerns are overblown, pointing to papers finding small or zero employment effects of the minimum wage.[1] But, of necessity, estimates of the employment effects of the minimum wage are based on historical experience with prior increases in the minimum wage. For example, in a letter advocating for a $15 minimum, a number of prominent economists argue that[2]

> The last decade has seen a wealth of rigorous academic research on the effect of minimum wage increases on employment, with the weight of evidence showing that *previous, modest increases in the minimum wage* had little or no negative effects on the employment of low-wage workers [emphasis added].

The Congressional Budget Office also relies on prior experience when asked to evaluate the likely effects of a $15 minimum. In its 2019 report "The Effects on Employment and Family Income of Increasing the Federal Minimum Wage" (Congressional Budget Office, 2019), CBO projects 1.3 million workers would become jobless in response to a $15 minimum. This projection was based on its own review of the literature on the employment effects of the minimum wage.

> In CBO's assessment, *for the average change in the minimum wage studied in the literature*, the employment elasticity for teenage workers is -0.07. That value is CBO's median estimate of the elasticity that would apply in the short run (one year after the implementation of the higher minimum wage) to a minimum-wage change *that was close to the average of past changes* [emphasis added].

Advocates, opponents, and analysts are all operating under the implicit assumption that "previous, modest increases in the minimum wage" are indeed informative about the effects of a $15 minimum. However, economic theory predicts that the employment effects of the minimum wage should vary both across industries and with the level of the minimum wage itself. I find that a $15 minimum would affect a far wider set of occupations and industries than prior increases, calling into question whether the estimates in the literature apply at all.

Much of the debate over a $15 minimum has focused on its size. For instance, a $15 federal minimum wage is large relative to historical levels (see Figure 1). Between 1960 and 1980, the real minimum wage hovered around $10 per hour (in 2019 dollars). Then, beginning in the 1980s, it fell and has generally varied between $7 and $8. Thus, not only would a $15 federal minimum be

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[1]See Neumark and Wascher (2007) for a literature review and Wolfson and Belman (2019) for a meta-analysis of more recent work.

[2]See https://www.epi.org/economists-in-support-of-15-by-2024/

far outside of the last 40 years of historical experience, it would considerably exceed its highest-ever level of $11.76, set in 1968. In percentage terms, the most recent increase in 2007 was also the largest ever—a 41 percent increase in the nominal minimum wage phased in over 3 years. The prior two increases were 27 percent, in the late 1980s, and 21 percent in the mid-1990s. In contrast, $15 would represent a 107 percent increase in the nominal minimum wage. However,
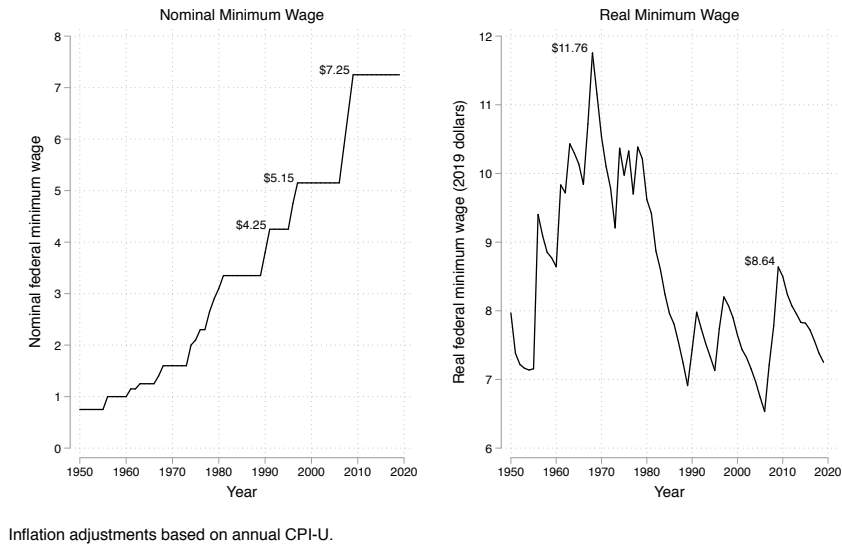

Figure 1: Historical Federal Minimum Wage

focusing solely on the size of the minimum wage may provide perverse guidance to policy makers. Would raising the minimum wage by 41 percent always be *within* historical experience, even if the minimum had been raised by 41 percent just a few years earlier? Would raising the minimum above $11.76 always be *outside* historical experience, even if productivity gains have moved the real wage distribution far to the right of where it was in 1968?

Economic theory predicts that the employment effects of the minimum wage should vary across labor markets. In some labor markets, like those for doctors or lawyers, a $15 minimum would not be binding and would have no effect. In other markets, a $15 minimum would be binding, but the employment effect would vary with several factors including the size of the increase relative to the current wage distribution, the supply and demand elasticities[3] for labor, and the amount of monopsony power, if any, that employers possess. Thus, the estimates in the empirical literature are driven by how these factors happened to align in those labor markets that were affected by prior minimum wage increases. For example, since past increases primarily affected a small number of service industries, particularly fast food, we have little experience with the effect of the minimum wage in, say, manufacturing.

How can we determine whether a proposed minimum wage is "within historical experience?"

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[3]In section 2, I explain why we would expect demand elasticities for labor to vary across industries.

I propose using data from the Occupational Employment and Wage Statistics (OEWS) program at the U.S. Bureau of Labor Statistics. This data provides annual wage percentiles for detailed occupation codes and industries, both nationally and at the state level. Since OEWS only goes as low as the 10th wage percentile, I consider an occupation to be "measurably affected" by a minimum wage increase if the proposed minimum exceeds the 10th percentile of that occupation's wage distribution. And I define an occupation to be "strongly affected" if the proposed minimum exceeds the 25th percentile.[4] The same applies for industries. If a proposed minimum wage increase affects similar occupations and industries as past increases did, then the proposal is within historical experience. If it does not, then it is outside historical experience.

I find that, by any measure, a $15 federal minimum wage is far outside historical experience. The most recent increase in 2007, the largest in history, strongly affected 25 occupations and two industries.[5] By contrast, a $15 minimum in 2019 would strongly affect 245 occupations and 45 industries. Strongly affected occupations in 2006 can account for only 28.1 percent of employment in occupations that would be strongly affected by a $15 minimum in 2019. Similarly, strongly affected industries in 2006 can account for only 17.5 percent of employment in strongly affected industries in 2019. Thus, regardless of one's views on the employment effects of past minimum wage increases, historical experience is unlikely to be informative about raising the federal minimum to $15.

Although a $15 minimum wage would be outside historical experience, smaller increases in the minimum wage would not be. For example, I find that a $9 minimum would be well within historical experience and that the frontier of historical experience falls between $9 and $11. It's important to note that being within historical experience does not tell us anything directly about the employment effects of a proposed minimum wage. Rather, it merely indicates that prior experience is likely to be a good guide. Thus, while my results say nothing directly about the employment effects of a $9 minimum, they do show that raising the federal minimum from $5.15 to $7.25 in 2007 affected a similar set of occupations and industries to those that would be affected by a $9 minimum in 2019. This suggests that the employment effects of the minimum wage hike in 2007, be they small or large, would serve as a useful guide in predicting the employment effects of a $9 federal minimum in 2019.

The methodology in this paper offers policy makers, federal or state, a practical approach to assessing whether any proposed minimum wage increase is within historical experience. It may also be useful to state-level policymakers for deciding which minimum wage increases in other states would be a useful guide for a proposed increase in their own state. For example, if state A is dominated by the financial services industry and state B is dominated by manufacturing, a minimum wage increase in state A may provide a poor prediction for the effects of a similar

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[4]Thus, strongly affected occupations are a subset of measurably affected occupations. I use the 10th and 25th percentiles because these are the two lowest percentiles reported in the OEWS data.

[5]OEWS uses the North American Industrial Classification System (NAICS), and for this paper I use industries at the three-digit level of detail.

increase in B. Researchers can also contribute by taking advantage of several scheduled increases in state-level minimum wages to estimate the heterogeneous effects of the minimum wage by occupation and industry. With estimates of these heterogeneous effects, policy makers can make better informed predictions about the effect of the minimum wage in their home states, based on their state's mix of occupations and industries.

2 Theory predicts employment effects should vary

Within a given industry, we would expect the employment effects of the minimum wage to vary with the minimum itself for at least three reasons. First, for a binding minimum wage, the elasticity of employment with respect to the minimum wage is given by the elasticity of labor demand,[6] which should vary with the wage. To see why, consider a competitive industry with a constant elasticity of substitution (CES) production function and constant elasticity demand. Firms take the wage rate w, the capital rental rate, r, and the final goods price p as given. For simplicity, assume that the supply of capital is perfectly elastic. The labor demand elasticity in the industry, $\lambda = -\frac{\partial \log(L)}{\partial \log(w)}$, is equal to

$$\lambda = \sigma + (\eta - \sigma)s_L \tag{1}$$

where $\sigma \in [0, \infty)$ is the industry's elasticity of substitution between labor and capital, $\eta > 0$ is (the absolute value of) the demand elasticity for the final product, and s_L is the industry's labor share.[7] λ will vary with the wage because

$$\frac{\partial \lambda}{\partial \log(w)} = (\eta - \sigma)(1 - \sigma)s_L(1 - s_L) \tag{2}$$

Thus, equation (2) illustrates that, even restricting ourselves to a single industry with a binding minimum wage, the employment effect should vary as the minimum wage rises.[8] Second, for small minimum wage increases firms may be able to adjust various non-wage aspects of the job without reducing employment, such as scheduling flexibility or fringe benefits (Mulligan and Tsui, 2016; Clemens and Strain, 2020; Clemens, 2021). If the scope for these adjustments were limited, large increases in the minimum wage would force firms to adjust along the employment dimension as well. Finally, if firms have monopsony power, then small increases in the minimum wage would raise employment until the wage exceeds its efficient level, whereupon further increases would lower employment (with an elasticity equal to the elasticity of labor demand).

Economic theory also predicts that the employment effects of the minimum wage should vary across industries. From equation (1), we can see that industries which face more elastic demand

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[6]This is also true in the case of monopsony if the minimum wage exceeds the efficient wage level.

[7]See Chirinko and Mallick (2011) for a derivation.

[8]The only cases where λ would be constant are Cobb-Douglas production ($\sigma = 1$) or when $\eta = \sigma$ so that scale effects and substitution effects perfectly offset.

for their final products will have more elastic labor demand—even more so if the industry labor share is large. The labor demand elasticity will also vary with σ, although the relationship may be difficult to sign since s_L is generally a function of σ, except in the special case of Cobb-Douglas production ($\sigma = 1$) (Chirinko and Mallick, 2011). Thus, as the minimum wage rises and the composition of affected industries changes, we would expect the aggregate employment effects of the minimum wage to change also. We could, in principle, predict these compositional changes if we had industry-level estimates of η, σ, and s_L, although this is not generally the approach the minimum wage literature has taken. In this paper, I show that, for large minimum wages increases like a \$15 minimum wage, the composition of affected occupations and industries would differ significantly from the composition of affected occupations and industries in 2007.

Clemens and Strain (2021) find empirical support for these theoretical predictions. They explore state-level minimum wage increases between 2011–2019 and find larger employment elasticities for states that implemented larger minimum wage increases than for those with smaller increases. However, they do not attempt to decompose their estimates into variation in the employment elasticity within an industry and variation in the composition of affected industries. Moreover, the average minimum wage of their "large increase" states only rose to between \$11 and \$12 in 2019, still considerably short of \$15.[9]

3 Data

To compare the most recent federal minimum wage increase with a hypothetical increase to \$15, I use data from the U.S. Bureau of Labor Statistics' Occupational Employment Statistics (OES) program, renamed in the spring of 2021 as the Occupational Employment and Wage Statistics (OEWS) program (Bureau of Labor Statistics, U.S. Department of Labor). The OEWS program conducts an annual survey of establishments to provide wage and employment estimates for over 800 occupations in the United States, providing estimates nationally, by state, and by industry. For my analysis, I utilize occupation and industry-level datasets from 2006 and 2019.[10]

The OEWS data aggregates occupations at four levels: major, minor, broad, and detailed. I focus on detailed occupations. For each detailed occupation at the national level, OEWS reports total employment, average hourly and annual wages, and percentiles for hourly and annual wages.[11] For a small number of occupations, OEWS only reports annual wages and not hourly wages, so I exclude these occupations.

Each occupation in the dataset is identified by a unique six-digit occupation code. In 2006, the OEWS program directly utilized the U.S. Bureau of Labor Statistics' Standard Occupational

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[9]Several states have recently passed laws to raise their minimum wages to \$15 over the next several years. In section 6, I discuss research opportunities afforded by these scheduled state-level minimum wage increases.

[10]I use 2006 because it is the year prior to the minimum wage increase in 2007. I use 2019 to avoid data anomalies related to the Covid-19 pandemic.

[11]OEWS reports the 10th, 25th, 50th, 75th, and 90th percentiles.

Classification (SOC) codes. SOC codes were most recently updated in 2000, 2010, and 2018. For 2019, OEWS used a "hybrid structure" for their occupation codes based on a mixture of the 2010 and 2018 SOC codes. As a result, the 2006 OEWS data conforms to the 2000 SOC codes while the 2019 data consists of a hybrid of the 2010 and 2018 codes. Though there is no published crosswalk between the 2019 OEWS hybrid codes and the 2000 SOC codes, the OEWS program does provide a crosswalk that gives, for each 2019 code, the corresponding 2010 SOC code. I then used the SOC crosswalk to match 2010 occupation codes and titles to the corresponding 2000 codes and titles.

OEWS also publishes wage statistics by industry. Industries are classified using the North American Industrial Classification System (NAICS). Although OEWS provides wage statistics for more detailed industry classifications (up to five and six digits), I focus on three-digit industries to avoid changes that were made to the more detailed NAICS codes between 2006 and 2019.

4   Strongly Affected Occupations and Industries

In Table 1, I compare the occupations that would be strongly affected by a hypothetical minimum wage in 2019 with those occupations that were strongly affected by the minimum wage increase of 2007. Recall that for an occupation to be strongly affected, the new minimum wage must exceed the 25th percentile of the occupation's wage distribution. In 2006, 25 occupations were strongly affected by the new minimum wage of $7.25. Many of these occupations involved food service, with fast food being the second largest strongly affected occupation. Employment in these 25 occupations came to just over 16 million employees or 12.2 percent of total U.S. employment in 2006. In contrast, 245 occupations would be strongly affected by a $15 minimum wage in 2019, accounting for half of total U.S. employment. In Table 1, strongly affected occupations in 2019 that were also strongly affected in 2006 are grayed out; only 28.1 percent of strongly affected occupations in 2019 (weighted by employment) can be accounted for by strongly affected occupations in 2006. The remaining 71.9 percent are "new" occupations that were not strongly affected by the increase to $7.25 in 2007 but that would be strongly affected by a $15 minimum in 2019. Indeed, the largest strongly affected occupation in 2019, *Retail Salespersons*, was not strongly affected in 2006. Other new occupations include *Office Clerks, General*; *Laborers and Freight, Stock, and Material Movers, Hand*; and *Customer Service Representatives*. The labor markets for these occupations may differ substantially from occupations like *Cashiers*; *Combined food preparation and serving workers, including fast food*; and *Waiters and waitresses*, which made up half of employment in strongly affected occupations in 2006. Thus, while prior minimum wage increases may be informative about the effects of a $15 minimum on a small number of occupations, it cannot tell us what to expect for the many new occupations that have never been strongly affected by the federal minimum.

Table 1 also calculates, for each strongly affected occupation, where the new minimum wage

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<div align="center">Table 1: Strongly Affected Occupations</div>

	2006 (New Minimum of $7.25)				2019 (New Minimum of $15)		
Code	**Occupation Title**	**Employment**	**MW Pctile**	**Code**	**Occupation Title**	**Employment**	**MW Pctile**
41-2011	Cashiers	3,479,390	31.0	41-2031	Retail Salespersons	4,317,950	73.9
35-3021	Combined food preparation and serving…	2,461,890	50.2	*35-3023*	*Fast Food and Counter Workers*	*3,996,820*	*>90*
35-3031	Waiters and waitresses	2,312,930	51.4	*41-2011*	*Cashiers*	*3,596,630*	*89.7*
37-2012	Maids and housekeeping cleaners	900,040	25.2	*31-1120*	*Home Health and Personal Care Aides*	*3,161,500*	*80.5*
35-2021	Food preparation workers	871,470	26.7	43-9061	Office Clerks, General	2,956,060	40.9
53-7064	Packers and packagers, hand	827,470	26.3	53-7062	Laborers and Freight, Stock, and Mate…	2,953,170	55.5
35-2011	Cooks, fast food	612,020	45.1	43-4051	Customer Service Representatives	2,919,230	37.6
39-9021	Personal and home care aides	578,290	27.8	*35-3031*	*Waiters and Waitresses*	*2,579,020*	*76.8*
39-9011	Child care workers	572,950	27.6	37-2011	Janitors and Cleaners, Except Maids a…	2,145,450	62.5
35-3022	Counter attendants, cafeteria, food c…	524,410	36.0	53-7065	Stockers and Order Fillers	2,135,850	64.6
35-9021	Dishwashers	502,770	39.9	43-6014	Secretaries and Administrative Assist…	2,038,340	28.6
35-3011	Bartenders	485,120	36.0	31-1131	Nursing Assistants	1,419,920	56.9
35-9011	Dining room and cafeteria attendants …	401,790	46.3	49-9071	Maintenance and Repair Workers, Gener…	1,418,990	26.8
53-3031	Driver/sales workers	396,680	26.1	35-2014	Cooks, Restaurant	1,401,890	67.7
35-9031	Hosts and hostesses, restaurant, loun…	340,390	36.6	51-2090	Miscellaneous Assemblers and Fabricat…	1,371,920	45.2
39-3091	Amusement and recreation attendants	235,670	35.6	33-9032	Security Guards	1,126,370	54.6
35-2015	Cooks, short order	189,610	26.1	43-4171	Receptionists and Information Clerks	1,057,370	54.3
53-6021	Parking lot attendants	131,870	27.3	47-2061	Construction Laborers	1,020,350	30.2
33-9092	Lifeguards, ski patrol, and other rec…	108,870	28.8	35-1012	First-Line Supervisors of Food Prepar…	1,011,100	41.9
39-3031	Ushers, lobby attendants, and ticket …	101,530	39.5	*37-2012*	*Maids and Housekeeping Cleaners*	*926,960*	*77.2*
Number of Strongly Affected Occupations			**25**	**Number of Strongly Affected Occupations**			**245**
Employment of Strongly Affected Occupations			**16,238,660**	**Employment of Strongly Affected Occupations**			**72,908,480**
Share of Total Employment			**12.2%**	**Share of Total Employment**			**49.6%**
				Employment of New Occupations			**52,444,990**
				Share of Strongly Affected Employment That Is New			**71.9%**
Average MW Pctile (weighted by employment)			**37.4**	**Average MW Pctile (weighted by employment)**			**52.7**

Only the 20 largest (by employment) strongly affected occupations are listed. An occupation is strongly affected if the new minimum wage exceeds the 25th percentile of that occupation's wage distribution. Strongly affected occupations in 2019 that were also strongly affected in 2006 are grayed out. Thus, "new" occupations in 2019 are those which were not strongly affected by a $7.25 minimum wage in 2006. The "MW Pctile" column reports where the new minimum wage would fall in that occupation's wage distribution. The "Average MW Pctile" at the bottom of the table reports the average percentile (weighted by employment) for only strongly affected occupations.
SOURCE: Occupational and Employment Wage Statistics, U.S. Bureau of Labor Statistics.

would fall in that occupation's wage distribution.[12] Since all the occupations in Table 1 are strongly affected, they each have a minimum wage percentile in excess of 25 percent. In 2006, $7.25 was at the 37th percentile of wages in strongly affected occupations. In contrast, $15 in 2019 would be at the 53rd percentile. And for several occupations, the comparison is even more dramatic. In 2006, $7.25 was at the 31st percentile of cashiers, while $15 in 2019 would be just below the 90th percentile. For fast food workers, $7.25 was at the median of the wage distribution in 2006, but $15 in 2019 would exceed the 90th percentile. Thus, not only would a $15 minimum wage affect a wider array of occupations, it would also cut much deeper into the wage distribution.

In Table 2, I compare strongly affected three-digit industries in 2006 and 2019 and find that, compared to a $7.25 minimum in 2006, a $15 minimum in 2019 would strongly affect a much wider array of industries and would cut much deeper into their wage distributions.. In 2006, a $7.25 minimum wage strongly affected only two industries: *Food Services and Drinking Places* and *Gasoline Stations*. Employment in these two industries came to just over 10 million, which amounted to 7.6 percent of total U.S. employment. Moreover, *Food Services and Drinking Places* accounted for over 90 percent of employment in strongly affected industries, which is consistent with the observation in Table 1 that many of the strongly affected occupations in 2006 were related to food service. In contrast, a $15 minimum wage in 2019 would strongly affect 45

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[12]I calculate these percentiles by linearly interpolating between the reported wage percentiles in OEWS.

industries with combined employment of nearly 74 million, just over half of U.S. employment. Most of the strongly affected employment in 2019 (82.5 percent) would be from new industries, and whereas *Food Services and Drinking Places* dominated strongly affected industries in 2006, it would account for just 16 percent of employment among industries strongly affected by a $15 minimum in 2019. It is far from clear that the historical experience of a $7.25 minimum wage in 2006 that strongly affected only a couple of industries would generalize to industries like *Administrative and Support Services*, *Ambulatory Health Care Services*, or *Social Assistance*. Moreover, $15 would cut much deeper into the wage distributions of strongly affected industries. In 2006, $7.25 was at the 37th percentile of strongly affected industries, while in 2019 $15 would be at the 52nd percentile. For *Food Services and Drinking Places* in particular, $7.25 was at the 38th percentile in 2006, but in 2019 $15 would be at the 78th percentile.[13] And for a number of industries in 2019, $15 would exceed the industry's median wage.

Table 2: Strongly Affected Three-Digit Industries

2006 (New Minimum of $7.25)				2019 (New Minimum of $15)			
Code	**Industry Title**	**Employment**	**MW Pctile**	**Code**	**Industry Title**	**Employment**	**MW Pctile**
722000	Food Services and Drinking Places	9,249,600	37.6	*722000*	*Food Services and Drinking Places*	*11,949,080*	77.6
447000	Gasoline Stations	865,500	30.5	561000	Administrative and Support Services	8,927,730	48.0
				621000	Ambulatory Health Care Services	7,608,860	25.8
				624000	Social Assistance	3,970,540	58.1
				623000	Nursing and Residential Care Faciliti...	3,351,090	51.5
				452000	General Merchandise Stores	3,129,540	73.5
				445000	Food and Beverage Stores	3,073,360	68.2
				424000	Merchant Wholesalers, Nondurable Good...	2,151,560	27.1
				721000	Accommodation	2,124,210	59.8
				441000	Motor Vehicle and Parts Dealers	2,018,210	41.4
				713000	Amusement, Gambling, and Recreation I...	1,793,450	59.0
				531000	Real Estate	1,666,530	28.2
				311000	Food Manufacturing	1,619,740	42.9
				812000	Personal and Laundry Services	1,519,470	58.8
				813000	Religious, Grantmaking, Civic, Profes...	1,392,050	32.9
				448000	Clothing and Clothing Accessories Sto...	1,367,030	66.8
				811000	Repair and Maintenance	1,338,210	34.1
				444000	Building Material and Garden Equipmen...	1,311,670	53.6
				493000	Warehousing and Storage	1,214,230	33.4
				446000	Health and Personal Care Stores	1,059,820	49.8
Number of Strongly Affected Industries			**2**	**Number of Strongly Affected Industries**			**45**
Employment of Strongly Affected Industries			**10,115,100**	**Employment of Strongly Affected Industries**			**73,815,260**
Share of Total Employment			**7.6%**	**Share of Total Employment**			**50.3%**
				Employment of New Industries			**60,932,530**
				Share of Strongly Affected Employment That Is New			**82.5%**
Average MW Pctile (weighted by employment)			**37.0**	**Average MW Pctile (weighted by employment)**			**51.8**

Only the 20 largest (by employment) strongly affected industries are listed along with their 3-digit NAICS codes. An industry is strongly affected if the new minimum wage exceeds the 25th percentile of that industry's wage distribution. Strongly affected industries in 2019 that were also strongly affected in 2006 are grayed out. Thus, "new" industries in 2019 are those that would be strongly affected by a $15 minimum wage but were not strongly affected by a $7.25 minimum wage in 2006. The "MW Pctile" column reports where the new minimum wage would fall in that industry's wage distribution. The "Average MW Pctile" at the bottom of the table reports the average percentile (weighted by employment) for only strongly affected industries.
SOURCE: Occupational and Employment Wage Statistics, U.S. Bureau of Labor Statistics.

5   Alternative Minimum Wage Increases

We have just seen that a $15 minimum is far outside of historical experience with the minimum wage, affecting a much wider set of occupations and industries than did prior minimum wage

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[13]Similarly, although $7.25 was at the 31st percentile of wages for *Gasoline Stations* in 2006, $15 in 2019 would be at the 80th percentile.

increases. But perhaps a smaller minimum wage would be within historical experience. In fact, it appears that the frontier of historical experience is a minimum wage between $9 and $11. In Table 3, I report summary measures of the overlap between four different levels of the minimum wage—$9, $11, $13, and $15—and the occupations and industries affected by the $7.25 increase in 2007. Whereas a $15 minimum would strongly affect 245 occupations and measurably affect 415, a $9 minimum would strongly affect only a single occupation and measurably affect only 31. Similarly, while a $15 minimum would strongly affect 45 industries and measurably affect 75,[14] a $9 minimum would not strongly affect any industries and would measurably affect only four. What's more, a $9 minimum would affect few, if any, new occupations or industries. Comparing the first and second columns of Table 3, it is clear that a $9 minimum wage would be well within historical experience. Comparing the first and last columns, it is also clear how, with a large share of affected occupations and industries being new, a $15 minimum is far outside of historical experience. The same is true of a $13 minimum. An $11 minimum is closer to historical experience, although still over one-quarter of strongly affected occupations, and over one-half of strongly affected industries, would be new. While a minimum wage of $9 would be well within historical experience, this does *not* directly tell us what the employment effects of a $9 minimum would be. Rather, this result simply tells us that the employment effects from the minimum wage increase of 2007 are likely to be informative about the employment effects of a $9 minimum wage in 2019.

6   Recent Changes in Local and State Minimum Wages

Starting around 2015, some cities and states started increasing their minimum wages toward $15. For example, Seattle phased in an increase over several years with large employers facing a $16 minimum wage by 2019 and small employers facing a $15 minimum wage by 2021. Los Angeles, Washington D.C., and Chicago have also raised their minimum wages to $15 or more, and several states including California, Connecticut, and Florida are scheduled to impose a $15 minimum over the next several years.

It is possible that these recent large increases in the minimum wage for specific cities or states could be informative about a federal $15 minimum wage. While one might be concerned about generalizing from the experiences of a few metropolitan areas to the nation as a whole, the experiences of multiple states may be more promising. As these states raise their minimum wages over the next several years, researchers will have new opportunities to estimate the employment effects of the minimum wage. Still, the method I have outlined in this paper will be useful in determining to what extent the experiences of these states are informative about a federal $15 minimum by comparing the occupations and industries most affected in these states with

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[14]Strongly affected industries would account for half of U.S. employment, while measurably affected industries would account for nearly all.

Table 3: Comparing multiple minimum wage increases with the increase to $7.25

	2006	2019			
	$7.25	$9.00	$11.00	$13.00	$15.00
Strongly affected occupations					
Number	25	1	47	154	245
Share of total employment	12.2%	0.1%	19.4%	38.2%	49.6%
Share of affected employment in new occupations	---	0.0%	28.3%	63.5%	71.9%
Strongly affected industries					
Number	2	0	10	32	45
Share of total employment	7.6%	0.0%	18.6%	38.1%	50.3%
Share of affected employment in new industries	---	---	52.8%	77.0%	82.5%
Measurably affected occupations					
Number	93	31	163	316	415
Share of total employment	29.6%	12.3%	38.2%	54.5%	63.8%
Share of affected employment in new occupations	---	0.2%	21.3%	44.4%	52.5%
Measurably affected industries					
Number	20	4	32	57	75
Share of total employment	28.6%	11.4%	38.8%	65.2%	95.4%
Share of affected employment in new industries	---	0.0%	21.9%	53.2%	68.0%

The table compares a $7.25 minimum wage in 2006, the year before it was raised, with four hypothetical increases in 2019. Each column reports the number of affected occupations (industries), their employment relative to total U.S. employment, and the share of their employment that comes from new occupations (industries). A new occupation (industry) is one that wasn't affected by the minimum wage increase in 2007 but that would be affected by a given hypothetical minimum wage in 2019.
SOURCE: Occupational and Employment Wage Statistics, U.S. Bureau of Labor Statistics.

the occupations and industries that would be affected nationally. Moreover, policy makers in other states with a different mix of occupations and industries may wonder how applicable the experiences of states like California or Connecticut or Florida will be to their own states. The method I have outlined in this paper can help policy makers identify minimum wage increases in other states that affected similar occupations and industries to those that would be affected back home.

Researchers can play an important role by using these scheduled state-level increases to estimate separate employment elasticities for different occupations and industries. As the results above suggest, earlier state-level minimum wages have been low enough that they simply haven't affected the same breadth of occupations and industries that these scheduled increases will. Thus, to the extent that previous research has focused on specific industries, it has focused almost exclusively on the food service industry in general and fast food in particular. With multiple states scheduled to raise their minimum wages to $15 and beyond, researchers have the opportunity to estimate separate employment elasticities for a much wider range of occupations and industries. Such estimates would enable a state's policy makers to better predict the effects of a proposed minimum wage increase at home, even if their home state differed somewhat from states like California or Connecticut or Florida in its mix of occupations and industries.

7 Conclusion

Economic theory predicts that the employment effects of the minimum wage should vary both with the level of the minimum itself and also with the composition of affected occupations and industries. I use OEWS data to compare the composition of occupations and industries that would be affected by a $15 minimum wage with those occupations and industries that were affected by the most recent federal minimum wage increase in 2007 to $7.25. I find that enacting a $15 minimum wage in 2019 is far outside of historical experience with the federal minimum wage. The most recent increase in 2007, the largest in history, strongly affected 25 occupations and two three-digit industries, and it measurably affected 93 occupations and 20 industries. By contrast, a $15 minimum in 2019 would strongly affect 245 occupations and 45 industries, and it would measurably affect 415 occupations and 75 industries. 71.9 percent of employment in strongly affected occupations, and 82.5 percent in strongly affected industries, would be new relative to the historical experience of 2007. Thus, estimates based on historical experience with the federal minimum wage are unlikely to be informative about the likely effects of a $15 minimum. Although $15 is outside historical experience, smaller minimum wage increases are not. The data indicates that the frontier of historical experience is a minimum wage between $9 and $11.

Policy makers can and should use the methodology in this paper to evaluate whether *any* proposed minimum wage increase is within historical experience. At the federal level, this could involve simply repeating the analysis here for a different proposed minimum wage (as in Table 3). At the state level, policy makers could compare a proposed minimum wage increase to prior increases in the same state. Or they could compare a proposed increase to prior increases in other states that affected similar occupations and industries as the proposed minimum wage would. Minimum wage researchers should take the opportunity afforded by several scheduled state-level minimum wage increases to study how the effects of the minimum wage differ across occupations and industries. These estimates would provide policy makers with a better understanding of the likely effects of future minimum wage increases, based on their state's mix of occupations and industries.

References

Bureau of Labor Statistics, U.S. Department of Labor, . *Occupational Employment and Wage Statistics*. URL `www.bls.gov/oes/`.

Chirinko, Robert S. and Mallick, Debdulal. The elasticity of derived demand, factor substitution, and product demand: Corrections to Hicks' formula and Marshall's Four Rules. *Labour Economics*, 18(5):708–711, 2011.

Clemens, Jeffrey. How do firms respond to minimum wage increases? understanding the relevance of non-employment margins'. *Journal of Economic Perspectives*, 35(1):51–72, 2021.

Clemens, Jeffrey and Strain, Michael R. Implications of Schedule Irregularity as a Minimum Wage Response Margin. *Applied Economics Letters*, 27(20):1691–1694, 2020.

Clemens, Jeffrey and Strain, Michael R. The heterogeneous effects of large and small minimum wage changes: Evidence over the short and medium run using a pre-analysis plan. Working Paper 29264, National Bureau of Economic Research, September 2021. URL `http://www.nber.org/papers/w29264`.

Congressional Budget Office, . The Effects on Employment and Family Income of Increasing the Federal Minimum Wage. Technical report, Congress of the United States, 2019. URL `https://www.cbo.gov/publication/55410`.

Mulligan, Casey B and Tsui, Kevin K. The upside-down economics of regulated and otherwise rigid prices. Working Paper 22305, National Bureau of Economic Research, June 2016. URL `http://www.nber.org/papers/w22305`.

Neumark, David and Wascher, William L. Minimum wages and employment. *Foundations and Trends in Microeconomics*, 3(1):1–182, 2007.

Wolfson, Paul and Belman, Dale. 15 Years of Research on US Employment and the Minimum Wage. *Labour*, 33(4):488–506, 2019.