

# State Impacts of a \$15 Tipped Minimum Wage

HOW TIP CREDIT ELIMINATION COULD AFFECT EMPLOYMENT AND  
EARNINGS OF RESTAURANT EMPLOYEES

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# About the Economists

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**DR. WILLIAM EVEN** is a Professor Emeritus of Economics in the Farmer School of Business at Miami University. He received his Ph.D. in economics from the University of Iowa in 1984. He is a research fellow with the Scripps Gerontology Center, the Employee Benefits Research Institute and the Institute for the Study of Labor. His recent research examines the effects of minimum wage laws, the Affordable Care Act, the effect of Greek affiliation on academic performance, and the relationship between skills and earnings among older workers. His research has been funded by several organizations including the U.S. Administration on Aging, the U.S. Department of Education, and the Employment Policies Institute. Even has published journal articles in a variety of outlets including the Journal of Labor Economics, the Review of Economics and Statistics, the Journal of Human Resources, Economic Inquiry, Industrial and Labor Relations Review, and Industrial Relations.

**DR. DAVID MACPHERSON** is the E.M. Stevens Professor of Economics at Trinity University. Prior to joining Trinity University, he held the Rod and Hope Brim Eminent Scholar Chair in Economics, and was Director of the Pepper Institute on Aging and Public Policy at Florida State University. Earlier, he served as an assistant and associate professor of economics at Miami University. Macpherson's research has been concentrated on examining factors that cause deviations from wage equalization. In particular, he has focused on the role of trade unions, pensions, wage discrimination, industry deregulation, and the minimum wage. Macpherson has written over 60 journal articles and book chapters. He is a co-author of the undergraduate textbooks Economics: Private and Public Choice and Contemporary Labor Economics. He also co-authored the book Pensions and Productivity. With Barry Hirsch, he provides union data to researchers and the public through the web site [www.unionstats.com](http://www.unionstats.com).

# Executive Summary

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Since the Raise the Wage Act of 2021 failed in the U.S. Senate, fights over the minimum wage – especially for tipped restaurant employees – have moved to the states. Anti-tip credit activists have pledged to implement similar provisions at the state level, including eliminating states’ existing tip credit systems in favor of a flat \$15 minimum wage. New analysis from Drs. William Even (Miami University) and David Macpherson (Trinity University) presents the negative impacts tip credit elimination would have at the state and family level.

These efforts are at odds with significant economic research finding tip credit elimination causes significant negative consequences for restaurant employers and their employees. Most recently, economists David Neumark and Maysen Yen (University of California-Irvine) estimated the impacts of tip credit elimination nationwide: every \$1 increase in the federal tipped minimum wage could cause up to a 6.1 percent decrease in restaurant employment and a 5.6 percent decrease in tipped restaurant employee earnings.<sup>1</sup>

This study by Even and Macpherson builds on Neumark and Yen’s findings and a large body of economic research by estimating the specific impacts of tip credit elimination and a \$15 tipped minimum wage by state. Key findings include:

- **The United States could lose as many as 801,224 jobs in the restaurant industry under a \$15 minimum wage with no tip credit, with 466,040 of those jobs belonging to tipped restaurant employees.** The states with the largest number of jobs lost include Texas (127,477 lost), Ohio (63,205 lost), Pennsylvania (57,291 lost), North Carolina (46,738 lost), and Michigan (43,568 lost).
- **Full-service restaurant employees across the U.S. could lose nearly \$2.2 billion in total annual earnings due to a \$15 tipped minimum wage.** States with largest earnings losses include Texas (\$452 million lost), Georgia (\$151 million lost), North Carolina (\$143 million lost), Virginia (\$129 million lost), and Tennessee (\$113 million lost).
- **Eliminating the tip credit and raising state tipped minimum wages to \$15 would cost the average family with a tipped worker thousands of dollars**

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1 Neumark, David, and Yen, Maysen, “The Employment and Redistributive Effects of Reducing or Eliminating Minimum Wage Tip Credits,” NBER Working Paper 29213, September 2021

**per year in annual income.** The largest losses for families of tipped workers will fall in the following states: Texas (\$4,942 lost annually per family), Virginia (\$4,899 lost per family), New Hampshire (\$3,755 lost per family), Mississippi (\$3,651 lost per family), and Nebraska (\$3,597 lost per family).

## State Level Impact of Eliminating State Tip Credits

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The federally-binding Fair Labor Standards Act establishes a required \$2.13 tipped minimum wage for employees who consistently earn tips, provided that employers ensure their employees are earning at least the \$7.25 standard hourly minimum wage when their tips are factored in. The difference between this standard minimum wage and the lower tipped minimum wage for tipped employees is considered a “tip credit.” Many states have wage laws that set their own minimum and tipped minimum wage standards, but most maintain some level of tip credit for employers to count consistent tip income toward the regular minimum wage requirement. The following analysis presents resulting impacts of changing tip credits and tipped minimum wages.

### EMPLOYMENT LOSS

Even and Macpherson first estimated restaurant industry employment trends based on U.S. Census Bureau Current Population Survey (CPS) data. Across the country, they project a \$15 minimum wage hike would cost 520,583 jobs, and tip credit elimination would cost an additional 280,641 jobs, creating a total nationwide employment loss of up to 801,224 jobs. This figure represents 10.9 percent of all restaurant jobs forecasted for 2027.

Even and Macpherson find the effects of tip credit elimination and a \$15 tipped wage are proportionately larger when the sample is restricted to only tipped workers. Assuming a \$15 minimum wage is already in effect, adding a \$15 tipped minimum wage would reduce U.S. employment of tipped workers by 11.7% (280,641 jobs lost). Table 1 presents job loss estimates for each state.

Of this total for the restaurant industry, 466,040 lost jobs due to a \$15 minimum wage and an eliminated tip credit would be held by those in tipped positions,

representing over 19 percent of the projected 2027 tipped workforce and 58 percent of the total job loss in the restaurant industry.

**Table 1. Employment Loss Due to a \$15 Tipped Minimum Wage for the Restaurant Industry.<sup>2</sup>**

State	2027 Emp. Under Current Law	\$15 Min.		\$15 Tipped Min.		\$15 Min. & \$15 Tipped Min.	
		Number	Percent of 2027 Emp.	Number	Percent of 2027 Emp.	Number	Percent of 2027 Emp.
US (restaurant industry)	7,375,066	-520,583	-7.1%	-280,641	-3.8%	-801,224	-10.9%
US (tipped workers only)	2,408,021	-185,399	-7.7%	-280,641	-11.7%	-466,040	-19.4%
TX	624,136	-87,693	-14.1%	-39,784	-6.4%	-127,477	-20.4%
OH	345,042	-42,770	-12.4%	-20,435	-5.9%	-63,205	-18.3%
PA	297,880	-40,269	-13.5%	-17,022	-5.7%	-57,291	-19.2%
NC	236,135	-31,874	-13.5%	-14,864	-6.3%	-46,738	-19.8%
MI	259,323	-30,119	-11.6%	-13,449	-5.2%	-43,568	-16.8%
GA	224,601	-25,334	-11.3%	-10,522	-4.7%	-35,856	-16.0%
TN	172,555	-23,782	-13.8%	-8,103	-4.7%	-31,885	-18.5%
WI	138,815	-22,554	-16.2%	-9,282	-6.7%	-31,836	-22.9%
IN	164,644	-24,303	-14.8%	-6,681	-4.1%	-30,984	-18.8%
VA	186,665	-12,127	-6.5%	-16,315	-8.7%	-28,442	-15.2%
LA	106,899	-15,453	-14.5%	-7,810	-7.3%	-23,263	-21.8%
SC	114,729	-14,359	-12.5%	-6,219	-5.4%	-20,578	-17.9%
KY	108,225	-15,265	-14.1%	-5,300	-4.9%	-20,565	-19.0%
AL	105,965	-13,125	-12.4%	-4,684	-4.4%	-17,809	-16.8%
OK	87,219	-12,313	-14.1%	-4,074	-4.7%	-16,387	-18.8%
KS	68,861	-10,096	-14.7%	-3,696	-5.4%	-13,792	-20.0%
MS	62,636	-10,748	-17.2%	-2,922	-4.7%	-13,670	-21.8%
MN	137,858	-10,385	-7.5%	-1,477	-1.1%	-11,862	-8.6%
IA	74,438	-8,389	-11.3%	-3,118	-4.2%	-11,507	-15.5%
MO	142,987	-6,810	-4.8%	-4,659	-3.3%	-11,469	-8.0%
UT	60,660	-9,038	-14.9%	-1,666	-2.7%	-10,704	-17.6%

<sup>2</sup> Projected based on U.S. Census Bureau data from the Current Population Survey (CPS) Outgoing Rotation Groups (ORGs) and Annual Social and Economic Supplement (ASEC) spanning January 2010 to December 2021. See methodology for full description.

AR	62,347	-6,695	-10.7%	-3,322	-5.3%	-10,017	-16.1%
NE	50,590	-7,305	-14.4%	-2,348	-4.6%	-9,653	-19.1%
NJ	147,995	0	0.0%	-8,664	-5.9%	-8,664	-5.9%
MA	133,491	0	0.0%	-8,155	-6.1%	-8,155	-6.1%
NM	53,703	-3,992	-7.4%	-4,096	-7.6%	-8,088	-15.1%
NY	356,439	-884	-0.2%	-7,129	-2.0%	-8,013	-2.2%
ID	43,012	-5,744	-13.4%	-2,034	-4.7%	-7,778	-18.1%
IL	306,411	0	0.0%	-7,730	-2.5%	-7,730	-2.5%
WV	35,930	-5,238	-14.6%	-2,042	-5.7%	-7,280	-20.3%
MD	115,949	0	0.0%	-7,179	-6.2%	-7,179	-6.2%
NH	35,161	-3,726	-10.6%	-3,159	-9.0%	-6,885	-19.6%
FL	500,671	0	0.0%	-5,237	-1.0%	-5,237	-1.0%
NV	73,174	-3,818	-5.2%	-882	-1.2%	-4,700	-6.4%
CO	130,363	-2,249	-1.7%	-2,198	-1.7%	-4,447	-3.4%
AZ	151,687	-1,782	-1.2%	-2,460	-1.6%	-4,242	-2.8%
MT	29,791	-2,871	-9.6%	-511	-1.7%	-3,382	-11.4%
HI	43,096	-2,727	-6.3%	-622	-1.4%	-3,349	-7.8%
SD	19,046	-1,767	-9.3%	-1,047	-5.5%	-2,814	-14.8%
WY	14,321	-1,914	-13.4%	-847	-5.9%	-2,761	-19.3%
CT	73,185	0	0.0%	-2,198	-3.0%	-2,198	-3.0%
ME	28,981	-445	-1.5%	-1,563	-5.4%	-2,008	-6.9%
ND	16,516	-1,411	-8.5%	-529	-3.2%	-1,940	-11.7%
RI	27,115	0	0.0%	-1,899	-7.0%	-1,899	-7.0%
DE	23,121	0	0.0%	-1,510	-6.5%	-1,510	-6.5%
AK	13,304	-961	-7.2%	-125	-0.9%	-1,086	-8.2%
VT	11,326	-248	-2.2%	-500	-4.4%	-748	-6.6%
DC	13,833	0	0.0%	-573	-4.1%	-573	-4.1%
CA	888,541	0	0.0%	0	0.0%	0	0.0%
OR	93,818	0	0.0%	0	0.0%	0	0.0%
WA	161,876	0	0.0%	0	0.0%	0	0.0%

## EARNINGS LOSS

Even and Macpherson use two data sources to present the distinct impacts of tip credit elimination on top of a \$15 minimum wage increase on employees' earnings..

First, calculations based on Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) data project the magnitude of annual earnings lost for restaurant employees statewide. Even and Macpherson estimated that increasing the minimum wage to \$15 with no change in the tipped minimum wage would increase total earnings in the full-service restaurant industry by about \$5.36 billion. Adding a tipped minimum wage increase to \$15 would cut these increases by \$2.16 billion in earnings for tipped restaurant employees. State level losses are presented in Table 2 Column 2.

Second, Even and Macpherson used Census Bureau Current Population Survey (CPS) data to analyze the effects of a \$15 tipped minimum wage policy on individual family incomes by state. Under current law, the average family income for tipped workers is \$91,447. If the minimum wage was increased to \$15, the authors project a small increase in family income to \$92,731. Adding a \$15 tipped minimum wage would reduce the average family income to \$91,466, representing an income loss for each tipped worker's family by an average of \$1,266 per year. Table 2 Column 3 summarizes these effects of a \$15 tipped wage on family income at the mean income distribution. Families are estimated to experience significantly larger impacts in states including: Texas (-\$4,942 lost annually), Virginia (-\$4,899 lost annually), New Hampshire (-\$3,755 lost annually), Mississippi (-\$3,651 lost annually), and Nebraska (-\$3,597 lost annually).

Even and Macpherson observe the negative effect of a \$15 tipped minimum on family income is generally larger for families at the bottom of the income distribution before the hike.<sup>3</sup> That is, the families who would experience the greatest loss in income tend to be those with the greatest need prior to the hike. The effects on the poorest 10 percent of families are presented in Table 2 Column 4.

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3 There are only 8 states where the loss in income is greater at the 25th than the 10th percentile of family income.

**Table 2. Earnings Losses Due to a \$15 Tipped Minimum Wage,  
Compared to a \$15 Regular Minimum with Intact Tip Credit.**

State	Total State Earnings Losses (in Thousands) <sup>4</sup>	Earnings Loss of Average-Income Tipped Employees' Families <sup>5</sup>	Earnings Loss of Poorest 10% of Tipped Employees' Families <sup>6</sup>
US	-\$2,159,144	-\$1,266	-\$4,445
TX	-\$452,846	-\$4,942	-\$9,767
GA	-\$151,483	-\$2,872	-\$6,699
NC	-\$143,591	-\$2,778	-\$5,845
VA	-\$129,542	-\$4,899	-\$9,349
TN	-\$113,487	-\$1,047	-\$3,183
PA	-\$109,301	-\$2,390	-\$7,578
IN	-\$84,908	-\$247	-\$5,276
SC	-\$80,879	-\$1,464	-\$3,606
LA	-\$63,161	-\$2,927	-\$6,936
WI	-\$58,556	-\$1,531	-\$3,095
AL	-\$55,242	-\$3,336	-\$10,297
KY	-\$52,250	-\$1,936	-\$5,750
OK	-\$49,173	-\$2,265	-\$4,835
MI	-\$48,206	-\$1,109	-\$6,874
OH	-\$48,187	-\$1,321	-\$5,206
NY	-\$44,924	\$677	-\$2,198
MD	-\$44,000	-\$2,530	-\$8,093
NJ	-\$38,564	-\$1,485	-\$2,300
KS	-\$34,503	-\$469	-\$1,228
UT	-\$33,029	-\$1,416	-\$506
MA	-\$29,651	-\$1,199	-\$2,548
MS	-\$26,711	-\$3,651	-\$5,928
AR	-\$24,308	-\$1,576	-\$5,927
NE	-\$21,591	-\$3,597	-\$6,871

4 Projected based on U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) data spanning from 2018Q3 to 2021Q2 for the full-service restaurant industry. See methodology for full description.

5 Projected based on U.S. Census Bureau data from the Current Population Survey (CPS) Outgoing Rotation Groups (ORGs) and Annual Social and Economic Supplement (ASEC) spanning January 2010 to December 2021. See methodology for full description.

6 Projected based on U.S. Census Bureau data from the Current Population Survey (CPS) Outgoing Rotation Groups (ORGs) and Annual Social and Economic Supplement (ASEC) spanning January 2010 to December 2021. See methodology for full description.



IL	-\$20,756	\$507	-\$1,815
MO	-\$18,421	\$157	-\$2,255
DE	-\$17,546	-\$3,011	-\$2,086
NH	-\$17,131	-\$3,755	-\$16,170
NM	-\$16,944	-\$2,757	-\$6,546
FL	-\$16,392	\$599	\$0
WV	-\$13,548	-\$2,512	-\$11,144
IA	-\$13,225	-\$1,964	-\$3,033
ID	-\$12,099	-\$3,011	-\$5,628
RI	-\$10,211	-\$2,370	-\$6,031
WY	-\$9,233	-\$2,278	-\$4,914
DC	-\$8,631	-\$1,539	-\$8,671
CT	-\$7,986	-\$241	\$89
CO	-\$7,187	\$681	-\$1,562
AZ	-\$5,733	\$1,065	\$776
ME	-\$4,482	-\$533	-\$1,485
HI	-\$3,991	\$724	\$454
MN	-\$3,738	\$628	\$0
ND	-\$3,610	\$257	-\$1,411
SD	-\$2,872	-\$1,290	-\$2,693
VT	-\$2,860	-\$267	-\$4,672
NV	-\$2,782	\$606	\$951
MT	-\$1,218	\$748	\$26
AK	-\$452	\$1,506	-\$917
CA	\$0	\$0	\$0
OR	\$0	\$0	\$0
WA	\$0	\$0	\$0

# Methodology

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The Raise the Wage Act of 2021 proposes to raise the minimum wage to \$15 per hour in 2025 and eventually increase the tipped minimum wage to match the minimum wage. The result of the proposal would be to create a minimum wage of \$15 (indexed to growth in the median wage beyond 2025) and eliminate any tip credit by 2027.

This study estimates the effects of such a policy on the employment, earnings, and family income distribution of workers in the restaurant industry. The analysis relies on two data sets: the Quarterly Census of Employment and Wages (QCEW) between 2018Q3 and 2021Q2, and Current Population Survey (CPS) data between January 2010 and December 2021. We use the QCEW data to obtain quarterly data on employment, total earnings, and average weekly earnings for workers in the full-service restaurant industry. These data are then used to predict industry outcomes in 2027 under current law and the potential change in these outcomes if a \$15 minimum and tipped minimum wage is implemented in 2027.

The CPS data are used to obtain employment and earnings estimates for restaurant industry workers (full and limited service combined) and separate the workers into tipped and non-tipped occupations. Combining the data from the monthly CPS Outgoing Rotation Groups (ORG) with the Annual Social and Economic Supplement (ASEC) that is collected only in March of each year, we derive estimates of family income and poverty rates for workers in the restaurant industry. The CPS data are used to forecast employment, wages, family income, and poverty rates under current laws. These are contrasted to forecasts for the same outcomes with a \$15 minimum and tipped minimum wage.

Details on the methods used to forecast the outcomes with the two different data sources are provided below.

# QCEW Analysis

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Even and Macpherson use QCEW data spanning from 2018Q3 to 2021Q2. This time period was chosen to include both pre- and post-pandemic outcomes so as to reflect an averaging of the two economies. They also consider an alternative sample (2020Q3 to 2021Q2) to check for sensitivity of results. The analysis is restricted to workers in the full-service restaurant industry. They use this sample to forecast employment, average weekly wage, and total earnings for the full-service restaurant industry in 2027.

## THE BASE-LEVEL FORECAST FOR 2027

In their base-level forecast, the authors forecast average weekly wages, employment, and total earnings in 2027. The base-level forecast for the industry in 2027 is accomplished in several steps.

1. The average weekly wage is inflated to 2027 values using actual growth in the CPI between the year of the survey and 2021 and the forecast of inflation between 2021 and 2027 provided by the July 2021 Congressional Budget Office (CBO) projections.<sup>7</sup>
2. The base level of employment is forecast by calculating the percentage increase in the CBO employment estimate across all industries in the sample period and the CBO projection for total employment in 2027 (161.0 million). The 2027 forecast of the full-service industry employment level is estimated by growing the sample period full-service industry employment at the overall employment growth rate.
3. The total earnings in 2027 are estimated by multiplying the projected 2027 average weekly wage times projected 2027 employment times 52.

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7 Congressional Budget Office, "An Update to the Budget and Economic Outlook: 2021 to 2031 Economic Projections", July 2021, <https://www.cbo.gov/system/files/2021-07/51135-2021-07-economicprojections.xlsx>

## ADJUSTING THE 2027 FORECAST FOR A \$15 MINIMUM WAGE BUT NO CHANGE IN TIPPED MINIMUM

The base-level employment, average weekly earnings, and total earnings are adjusted in two steps to estimate the effect of a \$15 minimum wage with no change in the tipped minimum from current law, and then the effect of increasing the tipped minimum wage to \$15 after a \$15 minimum wage is already in place. In the first case (\$15 minimum + current law), the base forecasts are adjusted as follows:

1. The average weekly wage change is calculated by multiplying the projected 2027 average weekly wage times the percentage minimum wage increase times the elasticity of weekly wage with respect to a minimum wage hike (0.094) estimated by Neumark and Yen for the full-service restaurant industry over the 1990-2019 period.<sup>8</sup> The average weekly wage change is added to the projected 2027 average weekly wage.
2. The employment change with respect to the minimum wage increase is assumed to be zero since Neumark and Yen don't find a statistically significant employment elasticity with respect to a minimum wage hike. Thus, the employment level will equal the forecasted 2027 level after the minimum wage increase.
3. The total earnings adjusted earnings change is estimated by multiplying the projected 2027 total earnings times the percentage minimum wage increase times the elasticity of weekly wage with respect to a minimum wage hike (0.094) estimated by Neumark and Yen for the full-service restaurant industry over the 1990-2019 period. The total earnings change is added to the projected 2027 total earnings.

## ADJUSTING THE 2027 FORECAST FOR A \$15 MINIMUM AND \$15 TIPPED MINIMUM WAGE

In the second case (\$15 tipped minimum + \$15 minimum wage), the \$15 minimum wage forecasts are adjusted as follows:

1. The average weekly wage change is calculated by multiplying the projected 2027 average weekly wage with a \$15 minimum wage times the percentage tipped minimum wage increase times the elasticity of weekly wage with

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8 Neumark, David, and Yen, Maysen, "The Employment and Redistributive Effects of Reducing or Eliminating Minimum Wage Tip Credits," NBER Working Paper 29213, September 2021

respect to a tipped minimum wage hike (0.062) estimated by Neumark and Yen for the full-service restaurant industry over the 1990-2019 period.<sup>9</sup> The average weekly wage change is added to the projected 2027 average weekly wage with a \$15 minimum.

2. The employment change is calculated by multiplying the projected 2027 employment with a \$15 minimum wage times the percentage tipped minimum wage increase times the elasticity of employment with respect to a tipped minimum wage hike (-0.064) estimated by Neumark and Yen for the full-service restaurant industry over the 1990-2019 period.<sup>10</sup> The employment change is added to projected 2027 employment with a \$15 minimum.
3. The total earnings adjusted earnings change is estimated by multiplying the projected 2027 total earnings with a \$15 minimum wage times the percentage tipped minimum wage increase times the sum of the elasticities of weekly wage and employment with respect to a minimum wage hike (-0.002) estimated by Neumark and Yen for the full-service restaurant industry over the 1990-2019 period. The total earnings change is added to the projected 2027 total earnings with a \$15 minimum.

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9 Neumark, David, and Yen, Maysen, "The Employment and Redistributive Effects of Reducing or Eliminating Minimum Wage Tip Credits," NBER Working Paper 29213, September 2021

10 Neumark, David, and Yen, Maysen, "The Employment and Redistributive Effects of Reducing or Eliminating Minimum Wage Tip Credits," NBER Working Paper 29213, September 2021

# CPS Analysis

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Even and Macpherson then use CPS data spanning from January 2010 through December 2021. The analysis is restricted to workers in the restaurant industry (including bars) who are included in the Outgoing Rotation Groups (ORGS). The data is restricted to those in the ORGs in order to obtain information on wages.<sup>11</sup> In addition, the CPS administers the ASEC in March of each year to collect information about earnings in the prior year. Depending on which rotation group a person is in during March, the ASEC data can be merged to a person's ORG data which will be found in March, April, May, or June of the year in which the ASEC is administered.<sup>12</sup> The ASEC and ORG data combination allows us to examine the effect of a change in the minimum wage law on a person's earnings and employment and compute the impact on their family income and poverty status.

The authors combine 12 years of ORG data (2010 through 2021) matched to the ASEC data for the corresponding year to perform the analysis. Given the need to match to the ASEC data, the ORG data is for March through April of each year. They restrict the sample to workers employed in the restaurant industry and other family members. They use this sample of workers to forecast employment, earnings, and income for the same people in 2027.

The authors distinguish between a tipped worker's wage and cash wage for our analysis. Tipped workers are defined as anyone employed in the restaurant industry that reports an occupation of waiter or waitress; dining room or cafeteria attendant or bartender helper; and miscellaneous food preparation or serving related workers.<sup>13</sup> The cash wage is the amount paid to a restaurant worker before

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11 When people are selected for inclusion in the CPS, they are included for a total of 8 monthly surveys where they are interviewed for the first 4 consecutive months, not interviewed for the next 8 months, and re-interviewed for another 4 consecutive months. People surveyed for the fourth and eighth time are part of the "outgoing rotation groups" and are asked more questions than in other months. For example, the ORGs include information about wages and weekly earnings.

12 All people in the March ORG data are included in the ASEC data. Moreover, workers who were in months 1-3 or 4-7 of the CPS in March will be part of an ORG in one of the 3 months following March (April, May, or June). For example, if a person is in rotation group 1 in March, they will be included in the ORG data in June. There is some attrition in the data, however. That is, some people who are interviewed in March may not appear in later surveys due to the fact that people may leave a household between months.

13 The list of occupations that are defined as "tipped occupations" is based on Congressional Budget Office, "The Effects on Employment and Family Income of Increasing the Federal Minimum Wage," July 2019.

tips. Under current federal law, restaurants must pay at least \$2.13 per hour in cash wages. Hence, the federal “tipped minimum wage” is \$2.13. The “wage” is the amount that a worker earns per hour – including tips. To estimate the wage for tipped workers, they divide their reported usual weekly earnings by their usual weekly hours. If this wage estimate is below the state’s minimum wage, they raise their estimated wage to the state minimum since state law requires that a worker’s cash wage plus tips must meet the minimum, and it’s likely that some people underreport their tips in the CPS.

## THE BASE-LEVEL FORECAST FOR 2027

In the base-level forecast, Even and Macpherson attempt to forecast wages, earnings, employment, and family income in 2027 based on existing minimum wage laws. The base level forecast for each worker in 2027 is accomplished in several steps.

1. All wages, cash wages, and tips (estimated as a worker’s wage minus cash wage) are inflated to 2027 values using actual growth in the CPI between the year of the survey and 2021, and the forecast of inflation between 2021 and 2027 provided by the Congressional Budget Office (CBO). After inflating values to reflect 2027 prices, any worker whose wage (or cash wage) is below the state’s projected minimum wage (or tipped minimum) for 2027 is increased to match the relevant minimum wage law. If the forecast of a worker’s cash wage plus tips in 2027 is below the minimum wage, the authors raise the cash wage to ensure that the minimum wage law is satisfied. For example, if a worker’s projected cash wage in 2027 is \$3.00 and projected tips are \$6.00 per hour in a state where the minimum wage is \$10, they would increase the worker’s cash wage to \$4.00 per hour.
2. The base level of employment for 2027 is forecast by aggregating the earnings weights for all workers in the CPS over the 2010-2021 sample period and then re-scaling those weights so that the aggregate level of employment matches the CBO projection for total employment in 2027 (161.0 million). The 2027 forecast employment level for workers in the restaurant industry is estimated by summing these re-scaled weights across the relevant group of workers. The implicit assumption is that employment in the restaurant industry will grow at a rate matching that for overall employment.
3. The base level of family income is estimated by inflating reports of family income to 2027 values using actual and projected growth in the CPI. No adjustments are made for the effect of changes in state minimum or tipped minimum wages on family income for the base level estimates.

## ADJUSTING THE 2027 FORECAST FOR A \$15 MINIMUM WAGE BUT NO CHANGE IN TIPPED MINIMUM

The base-level distribution of employment, earnings, and family income are adjusted in two steps. First, Even and Macpherson estimate the effect of raising the minimum wage to \$15 without any change in the tipped minimum from the current law. In a second step, they estimate the impact of increasing the tipped minimum wage to \$15 after a \$15 minimum wage is already in place. In the first case (\$15 minimum + current law), the base-level forecasts for relevant variables in 2027 s are adjusted as follows:

1. Anyone whose wage is below the \$15 minimum has their wage increased to \$15.
2. Anyone whose wage is increased by the \$15 minimum wage is given a probability of employment loss estimated by multiplying their percentage wage increase by the elasticity of employment with respect to a minimum wage hike utilized in earlier work by the CBO.<sup>14</sup> This is 0.266 for adults (20 years and over) and 0.822 for teens (ages 16-19). These elasticities imply that a 10 percent increase in the wage of workers affected by a minimum wage (or tipped minimum wage) increase will cause employment to drop by 2.66 percent for adults and 8.22 percent for teens if they are currently paid the minimum. More generally, the change in the probability of employment for a worker affected by the minimum wage increase is where  $e$  is the percent increase in the person's wage caused by the minimum wage increase, and  $e$  is the relevant elasticity depending on whether the person is a teen or an adult. For tipped workers, a minimum wage increase could increase their cash wage because we assume that if tips are insufficient to cover the difference between the new minimum and their new cash wage, their cash wage is increased to make up the difference. The same elasticities are used to estimate the effect on the probability of employment when the cash wage is increased due to raising the minimum wage.
3. For each family with at least one worker in the restaurant industry, replicates are created to reflect the possibility that one or more family members will lose a job due to the minimum wage increase. The weights for each person in a replicate family are adjusted to reflect the probability of each possible combination of employment outcomes for family members. For example, suppose a family has two workers affected by the minimum wage increase

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14 The list of occupations that are defined as “tipped occupations” is based on Congressional Budget Office, “The Effects on Employment and Family Income of Increasing the Federal Minimum Wage,” July 2019.



(at least one of which must be a restaurant worker), and they each experience a 20 percent chance of losing their jobs. In this case, four replicates of the family are created to reflect four possible outcomes in terms of their employment. The earnings weights for each replicate are adjusted to reflect the probability of the particular combination of employment outcomes.<sup>15</sup>

4. To estimate the effect of increasing the minimum wage to \$15 on employment, the adjusted earnings weights are summed across the relevant workers (e.g., restaurant workers) and compared to the base case.
5. To estimate the effect of the minimum wage increase on family income (and, by extension, poverty rates), family income is adjusted to reflect the impact of the minimum wage on each family member's earnings. For replicates where a family member loses a job, the reduction in earnings is estimated as their wage in 2027 \* usual hours worked \* usual weeks worked per year. Weeks worked is obtained from the ASEC data and reflects weeks worked in the prior year. Usual weekly hours are reported in the ORG and reflect the usual hours per week in the current year. For replicates where a person does not lose a job, the increase in income is estimated as the wage increase from the minimum wage hike \* usual hours worked \* weeks worked per year.

## ADJUSTING THE 2027 FORECAST FOR A \$15 MINIMUM AND \$15 TIPPED MINIMUM WAGE

To separately estimate the effect of a \$15 tipped minimum, Even and Macpherson start with the outcomes forecasted for restaurant workers with a \$15 minimum and current law and estimate the changes resulting from raising the tipped minimum to \$15. To estimate these changes, we take the following steps:

1. They increase the cash wage of any tipped restaurant worker with a forecasted cash wage below \$15 to \$15. Recall that prior to this adjustment,

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15 With two workers affected by the minimum wage hike, there are four possible outcomes: both employed; neither employed; first one employed and second one not employed; first one not employed and second one employed). Assuming that the probability of employment is reduced by 20 percent for both workers and that the effects on employment are independent across family members, the probabilities of the four respective employment outcomes are .64, .04, .16, and .16. Hence, in this case, 4 replicates of the family are created and the earnings weight for each family member in the first replicate is multiplied by .64 and both workers are assumed to be employed. In the second replicate, all earnings weights are multiplied by .04 and both workers are assumed to be not employed. The same logic extends to the other replicates. If there are n restaurant workers in a family, 2n replicates are created to account for the different permutations of employment outcomes that the family may realize because of the minimum wage hike.

the forecasted cash wage for 2027 was adjusted for inflation, increases in the cash wage due to current law, and any increase necessary increase in the cash wage that might be due to a minimum wage hike if tips were insufficient to make up the gap between the cash wage and the new \$15 minimum.

2. They estimate the probability of job loss using the same elasticities described above for the effect of a \$15 minimum wage, but apply it to the percentage increase in the cash wage required by a \$15 tipped minimum wage for all tipped restaurant workers.
3. Starting with the data set generated to simulate the effect of a \$15 minimum wage (i.e., with the replicates that account for different possible combinations of employment among families with at least one person working in the restaurant industry), they create a new set of replicates to account for the different combinations of employment outcomes that might result from the increase in the tipped minimum wage. Earnings weights are adjusted for each replicate to reflect the probability of that particular combination of employment outcomes for the family.
4. To estimate the effect of increasing the tipped minimum wage to \$15 on employment, the adjusted earnings weights are summed across the relevant group of workers (e.g., restaurant workers) and compared to the case with a \$15 minimum, but no change to the current law regarding the tipped minimum.
5. To estimate the effect of the \$15 tipped minimum wage on family income (and, by extension, poverty rates), family income is adjusted to reflect the impact of the \$15 tipped minimum wage on each family member's earnings (after having already adjusted for the \$15 minimum wage). For replicates where a family member loses a job due to the \$15 tipped minimum (only tipped workers), the reduction in earnings is estimated as their wage in 2027 \* usual hours worked \* usual weeks worked per year. Weeks worked is obtained from the ASEC data and reflects weeks worked in the prior year. Usual weekly hours are reported in the ORG and reflect the usual hours per week in the current year. For replicates where a tipped worker does not lose a job, the increase in income is estimated as the wage increase from the tipped minimum wage hike \* usual hours worked \* weeks worked per year.

