Minimum Cash Wages, Tipped Restaurant Workers, and Poverty[*]

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Abstract

This is the first study to examine the effect of increases in the tipped minimum cash wage—the wage employers must pay to tipped employees—on poverty. Using March Current Population Survey data (1988-2014), we find that tipped minimum cash wage increases are associated with declines in the risk of a tipped restaurant worker living in a poor *family* (elasticities around -0.2). However, we find little evidence of poverty-alleviating effects when using the *household* rather than the *family* as the sharing unit. This result is consistent with evidence that a substantial share of tipped workers who live in a poor family live in a non-poor household with persons unrelated by blood, marriage or adoption who contribute to the household's income. Furthermore, we find that tipped minimum cash wage hikes are associated with *increases* in the risk of a younger, less-educated individual living in a poor family or household. Adverse labor demand effects that redistribute income among low-skilled individuals drive these outcomes. We conclude that raising the tipped minimum cash wage is a poorly targeted policy to deliver income to poor restaurant workers.

Keywords: minimum cash wages; tipped workers; poverty

Workers who are forced to rely mainly on tips see their paychecks fluctuate widely, frequently leaving them unable to pay their bills or provide for their families. This problem is now worse than ever because economically squeezed customers are leaving smaller tips. As a result, waitresses and waiters—the largest group of tipped workers—have three times the poverty rate of the workforce as a whole.

- National Employment Law Project, 2009

1.0 INTRODUCTION

Employers of tipped workers such as waiters, bartenders, or bussers must pay their employees a minimum hourly cash wage, which, when added to an employees' average hourly tipped income ("tip credit"), sums to at least the non-tipped minimum wage. As of June 2017, the Federal minimum cash wage for tipped employees was $2.13 per hour and the minimum wage paid to non-tipped employees was $7.25 per hour.

The Raise the Wage Act of 2017, sponsored by Senator Patty Murray (D-Washington), Senator Bernie Sanders (I-Vermont), Representative Bobby Scott (D-Virginia), and Representative Keith Ellison (D-Minnesota), would (i) raise the Federal minimum wage paid to non-tipped workers to $15 per hour by 2024, and (ii) raise the minimum cash wage paid to tipped workers to $4.15 per hour in 2018 and $1.15 per hour per year thereafter until it reaches parity with the non-tipped wage at $15 per hour. Advocates of these increases argue that they are necessary to raise the labor earnings of tipped workers and to alleviate poverty:

> "No one in our country who works full-time should live in poverty... Since 1991, the subminimum wage for tipped workers has been fixed at $2.13 per hour. While tips are expected to supplement the subminimum wage, these tend to be unstable and seasonal, often making employees susceptible to wage theft, and further widening the gender-wage gap as more women tend to be tipped workers. Tipped workers are two times more likely to live below the federal poverty line." (Raise the Wage Act, 2017)

A relatively large literature has found that increases in the minimum wage paid to non-tipped workers have been ineffective in reducing poverty due to poor targeting (Card and Krueger 1995; Burkhauser, Couch, and Glenn 1996; Sabia and Burkhauser 2010; Sabia and Nielsen 2015; Sabia, Burkhauser, and Nguyen 2015) and adverse employment effects (Neumark et al. 2014a, b; Neumark and Wascher 2002; Sabia et al. 2016; 2012). However, very little is known about the poverty effects of minimum cash wage increases.

The poverty impacts of the tipped minimum cash wage may differ from the non-tipped minimum wage for a number of reasons. Tipped workers represent a narrower slice of the United States workforce than non-tipped minimum wage workers (2.7 percent versus 5.2 percent; see U.S. Bureau of Labor Statistics 2017; Allegretto and Cooper 2014). Thus, tipped minimum cash wage increases may have a smaller impact on the economic well-being of low-skilled workers overall. On the other hand, because the tipped minimum cash wage affects workers in a somewhat narrower set of jobs, mostly in the restaurant industry (Even and Macpherson 2014), it is possible that the tipped minimum cash wage could better target families or households near the poverty line than the non-tipped minimum wage.

As we show below, nearly 20 percent of tipped restaurant workers live in poor families, while an additional 20 percent live in families with incomes between 100 and 200 percent of the Federal Poverty Threshold (FPT). Moreover, in sharp contrast to non-tipped minimum wage workers, approximately one-half of all tipped workers are the highest earner in their family sharing units.[1] Furthermore, current proposals to increase the minimum cash wage from $2.13

[1] As we will discuss in detail below we use standard Census Bureau definitions of family and household here that are consistent with the definition of sharing units in the poverty literature. While the Census survey unit is the household, there is considerable controversy in the poverty literature over which is the more appropriate assumption of how individuals within a household share their collective income.

per hour to $7.60 by 2021 (and to nearly $15 per hour in 2027) could, if not accompanied by a reduction in hourly income from tips or in hours worked, raise the average weekly labor earnings of full-time employed tipped workers by over $200 per week. Such additional labor earnings could generate potentially important poverty-alleviating effects for affected workers' families.

While minimum cash wage-induced adverse employment or hours effects could undermine total cash wage gains by workers living in poor families, as is the case with non-tipped minimum wage increases, minimum cash wage increases may also affect consumer tipping and employer tip pooling. These additional general equilibrium effects may negatively impact total labor earnings that workers receive, thus undermining family income gains and muting poverty-alleviating effects.

Finally, the magnitude and distribution of tipped minimum cash wage increases on total labor earnings could differ from those of non-tipped wages (Allegretto and Nadler 2015; Even and Macpherson 2014). Adverse labor demand effects could differ among workers living in families just above or below poverty thresholds. Such effects could change the distribution of their earnings such that family poverty could decline among tipped workers who retain their jobs (and do not have their hours substantially cut), but increase for the families of other low-skilled workers who lose their jobs. Whether changes in the income distribution that result from this change in earnings is desirable depends on the relative weights society places on these "winners" and "losers" in its social welfare function, and whether there are alternative policy instruments that could more efficiently deliver work related income to tipped workers whose families live in poverty.

This is the first study to examine the impact of increases in tipped minimum cash wages on poverty. Using repeated cross-sections of the Current Population Survey, we find that tipped minimum cash wage increases are associated with a reduction in the risk of poverty among tipped restaurant workers, with an estimated elasticity of -0.2. However, this result is strongest when using the *family* (all persons in a household who are related by blood, marriage or adoption) as the resource sharing unit. When we use the *household* (all person in the house, condominium or apartment dwelling) instead, we estimate poverty elasticities that are 50 to 75 percent smaller in magnitude and statistically indistinguishable from zero at conventional levels.

This difference in findings is consistent with evidence that a substantial share of tipped workers who live in a poor family simultaneously live in a non-poor household together with persons unrelated by blood, marriage or adoption who contribute to the household's income. Our results suggest that the poverty-alleviating effects of tipped minimum cash wages are overstated by failing to account for income contributed to households by such workers.

We also find that minimum cash wage hikes *increase* the risk of a younger, less-educated individual living in a poor family or household, with estimated poverty elasticities from 0.05 to 0.1, a finding driven by adverse labor demand effects that suggest tipped minimum cash wage increases redistribute income among low-skilled individuals. On net, we find tipped minimum cash wage increases do little to reduce net poverty among working-age individuals.[2] We conclude that tipped minimum cash wages are a target inefficient means of delivering income to the working poor.

[2] Our estimates are sufficiently precise such that we can rule out, with 95 percent confidence, poverty elasticities of less than -0.04 and greater than 0.16.

2.0 BACKGROUND

2.1 Theoretical Framework

The effect of increases in tipped minimum cash wages on poverty depends on the distribution of employment and earnings effects on workers, and where their family (or household) sits in the income distribution. Hence, minimum cash wage-induced changes in employment, tipping, and tip-pooling behavior represent potentially important mechanisms through which poverty may be affected.

Tipped employees in the United States are largely employed in the restaurant industry, creating unique circumstances through which tipped minimum cash wages may affect earnings:

> "The theoretical effects of a higher tipped minimum wage on earnings and employment depend critically on whether (a) the employer can use tip pooling or dual jobs [requiring tipped workers to perform duties that are classified as non-tipped workers], or (b) restaurants act like monopsonists." (Even and Macpherson 2014, p. 636)

Thus, one way restaurant employers may ameliorate the higher labor costs of increases in the tipped minimum cash wage is via requiring tip pooling. This approach would redistribute tips from some employees to others so as to reduce out-of-profit wages paid. However, there are a number of legal limitations to this approach that impose constraints on employers.[3]

[3] For instance:

> "[F]ederal law requires that only "regularly tipped' workers be included in a mandatory tip pool. 'Back of the house' staff who do not regularly engage with customers such as cooks, dishwashers, and janitors do not qualify. Over the years, there have been numerous lawsuits over tip-pooling requirements (Ahmed 2009). These include rulings that salad preparers and workers with managerial responsibilities cannot be included in the tip pool, but bartenders can." (Even and Macpherson 2014, p. 635)

If the restaurant industry is competitive and cannot engage in tip-pooling, then increases in the minimum cash wage will increase the cost of employing tipped workers and potentially induce adverse employment and/or hours effects. The resultant effects on poverty, ceteris paribus, will depend on the elasticity of demand for tipped workers around the poverty threshold. If, however, restaurants can act as monopsonists, minimum cash wage increases could increase employment (Wessels 1997; Even and Macpherson 2014), which could unambiguously increase earnings and reduce poverty among affected workers.

If minimum cash wage increases result in higher prices to consumers (Aaronson and McDonald 2008; Aaronson 2001) and consumers respond with less spending or reduced tips, then employers would face higher out-of-pocket costs to meet higher wages, which could induce employment reductions and undermine poverty alleviation.

2.2 Existing Empirical Evidence on Minimum Cash Wages

Only a handful of studies have examined minimum tipped cash wages and all have focused on affected workers' earnings and employment rather than consequences to the worker's family or household income, including risk of poverty. Using cross-state variation in non-tipped and tipped minimum wages in 1987, Wessels (1993) estimates an employment elasticity with respect to the tipped minimum wage of -0.15. While consistent with a competitive labor market for tipped workers, the use of cross-state variation in minimum tipped wages for identification could lead to biased estimates if differences in minimum wage levels across states reflect other state policy preferences or economic environments.

A second study by Wessels (1997) exploits within-state variation in tipped minimum wages between 1977 and 1987 and finds that increases in the tipped minimum wage (i) increase full-service restaurant employment at low levels of initial tipped minimum wages, but (ii) decrease employment at higher levels of initial tipped minimum wages, consistent with monopsony power.

The strongest evidence for competitive labor markets for tipped workers comes from Even and Macpherson (2014). Using repeated cross-sections from the 1990 to 2011 Quarterly Census of Employment and Wages (QCEW) and the Current Population Survey (CPS), the authors find that increases in state tipped minimum wages were associated with increases in tipped workers' earnings, but also with reductions in employment. They estimate employment elasticities with respect to tipped minimum wages of approximately -0.1 to -0.2. Falsification tests on limited-service restaurant employment and non-tipped restaurant employment, groups that should be largely unaffected by changes in minimum cash wages except through labor-labor substitution, are consistent with a causal interpretation of their findings.

Finally, Allegretto and Nadler (2015) find that employment elasticities with respect to the minimum cash wage are quite sensitive to controls for spatial heterogeneity. Specifically, after controlling for state-specific linear time trends and census division specific year effects, Allegretto and Nadler (2015) find that minimum cash wage-induced earnings gains persist for tipped workers, but employment effects become small and statistically indistinguishable from zero. However, there is a fierce debate in the minimum wage literature about whether the inclusion of these additional controls isolates variation in the minimum wage that is conflated

with the state business cycle, understating adverse labor demand effects (see Neumark et al. 2014a, 2014b and Allegretto et al. 2017).

Together, results from the existing tipped minimum wage literature suggest that while minimum cash wage hikes increase earnings among tipped employees, there may be adverse labor demand effects that likely result in a redistribution of income among tipped workers. The net impacts on family or household income and risk of poverty remain unexplored.

2.3 Target Efficiency of Minimum Wages

While Allegretto and Cooper (2014) provide descriptive evidence on the demographic characteristics of tipped workers, no study of which we are aware has examined how well targeted minimum cash wages are to workers who live in poor families (or households). In contrast, there is a large literature that has examined the target efficiency of non-tipped minimum wages. Over 70 years ago, Stigler (1946) pointed out that the relationship between earning a low hourly wage and living in poverty is "fuzzy" because poverty depends not only on a worker's wage rate, but also on the size of the resource sharing unit, the earnings of other members of the sharing unit, and the hours the low-wage earner works per year. Burkhauser, Couch, and Glenn (1996) show that the target efficiency of minimum wages has sharply declined over time. While workers affected by minimum wages were disproportionately drawn from households living in poverty during the 1930s—in 1939, 85 percent of low-wage workers lived in poor households—the relationship between a low hourly wage rate and living in poverty became more remote as the decades passed. By 2014, less than 15 percent of those who would be affected by a $15 Federal minimum wage lived in poor households (Sabia and Nguyen 2017). However, there is some

evidence that the targeting of minimum wages to the working poor may have improved during the Great Recession Era (Lundstrom 2014).

The choice of resource sharing unit could also be important in evaluating the poverty impacts of tipped minimum cash wages. There is some controversy in the income literature with respect to the most appropriate sharing unit to use in measures of the resources of Americans. While the official U.S. poverty measure uses the family (those related by blood, marriage or adoption) as its sharing unit, the new Supplemental Poverty Measure uses the household as its sharing unit (all those living in the dwelling).[4] In the case of tipped workers, when tipped workers reside in a dwelling with workers who are unrelated to them by blood, marriage or adoption, it is possible for the measured poverty status of all members of that dwelling to differ depending on whether one assumes that they share their income only among family members or share it with all household members. The target efficiency of increases in the minimum cash wage will look quite different depending on this assumption and hence on choice of sharing unit.

Our study contributes to the above literature by (i) providing the first estimates of the impact of tipped minimum cash wage increases on poverty, including redistributive income effects among young, low-skilled individuals, (ii) exploring the sensitivity of poverty impacts to the choice of the resource sharing unit, and (iii) examining the target efficiency of newly proposed Federal tipped wage increases.

[4] See Short (2012) and Fox, Garfinkel, Kaushal, Waldfogel and Wimer (2015) for discussions of the Supplemental Poverty Measure.

3.0 DATA AND METHODS

3.1 Data

Our primary analysis uses data from the March 1988 to March 2014 Current Population Surveys (CPS). These data contain information on family (or household) income and family (or household) size, which, when combined with information on family-size adjusted Federal poverty guidelines, allow us to construct indicators for whether an individual lives in a resource sharing unit with income that falls below the family/household-size adjusted Federal Poverty Threshold (FTP). Note that using the household as the resource sharing unit will increase the potential income to be shared as well as the number of persons who will share it. In 2013, for a family of four, the Federal poverty level was $23,550 in the 48 contiguous states.[5] Because information on family or household income is collected with respect to the previous calendar year, the years included for our poverty analysis are from 1987 to 2013.

Our analysis focuses on four low-skilled demographic groups. We begin by examining *Tipped Restaurant Workers*, the population most likely to be affected by changes in tipped minimum cash wages. We follow Even and Macpherson (2014) and define tipped workers as those classified as waiters, bartenders, bussers and waiter assistants who are employed for positive hours and weeks over the previous year. We also examine *Full-Year Tipped Workers*, those likely to receive the largest gains from increases in minimum cash wages, defined as those working at least 50 weeks per year. In addition, we follow Even and Macpherson (2014) in

[5] In Hawaii, the threshold was $27,090 for a family of four in 2013; the comparable threshold was $29,440 in Alaska.

creating a "counterfactual" sample of *Non-Tipped Restaurant Workers* who should only be affected by minimum cash wage increases via labor-labor substitution, but otherwise face similar economic trends to tipped restaurant workers.[6]

Finally, we examine *Younger & Less Educated* individuals, those ages 16-to-29 with a high school diploma or less. This sample includes young adults, some of whom may be working while attending school.[7] Almost 40 percent of all tipped restaurant workers are less educated 16-to-29 year-olds by this definition. If minimum cash wages reduce their employment and the labor earnings they were contributing to their families (or households), this could result in an unintended increase in poverty among this low-skilled demographic group.

3.2 Methods

We begin by estimating a two-way fixed effects model via ordinary least squares (OLS):

$$Poverty_{ist} = \gamma_0 + \gamma_1 CashWage_{st} + \gamma_2 MinWage_{st} + \gamma_3 \mathbf{X}_{st} + \gamma_4 \mathbf{Z}_{it} + \theta_s + \tau_t + \nu_{ist} \quad (1)$$

where $Poverty_{ist}$ is an indicator for whether respondent i residing in state s in year t lives in a family (or household) with sharing unit-size adjusted income below the Federal poverty threshold, $CashWage_{st}$ is the natural log of the minimum cash wage that must be paid to tipped employees, and $MinWage_{st}$ is the natural log of the minimum wage that must be paid to non-

[6] Following Even and Macpherson (2014), these workers include cooks, dishwashers, food service managers, and counter attendants. However, we note that it is possible for these restaurant workers to be affected by tipped pooling.

[7] We note, however, that the survey design of the Current Population Survey does not well measure college students living in dorms away from home.

tipped workers.[8] In addition, $\mathbf{Z}_{it}$ is a vector of individual demographic controls, including age, age squared, gender, marital status, educational attainment, race, the number of people in the individual's family (or household), and the number of children in the family (or household). In order to disentangle the impact of the minimum cash wage from the state business cycle and changes in the "bindingness" of the state minimum wage (Sabia and Burkhauser 2010; Neumark et al. 2014a, b), we also include controls in the vector $\mathbf{X}_{st}$ for state per capita GDP and the prime-age (ages 30-to-55) wage rate paid to non-tipped non-restaurant workers. However, we recognize that while these controls may reduce bias in the estimate of γ_1, they may also control for pathways through which minimum cash wages could impact poverty. Thus, we also present estimates that exclude these controls. Also included in the vector $\mathbf{X}_{st}$ is the state Earned Income Tax Credit (EITC) refundable percentage rate.[9] Finally, in equation (1), we include controls for time-invariant state effects (θ) and state-invariant year effects (τ_t).

Identification of γ_1 comes from state-specific changes in minimum cash wages. Between 1987 and 1990 the Federal minimum cash wage was $2.03 per hour. In 1991, it was raised to $2.13 per hour, where it remains as of May 2017. There were a total of 227 state-year instances of minimum cash wage increases from 25 states during the 1987 to 2013 period. In 2013, the state with the highest minimum cash wage was Washington State, which had a minimum cash wage of $9.19 (with zero tip credit).

An important concern with the difference-in-difference approach outlined in equations (1) and (2) is that the parallel trends assumption may be violated. We take a number of tacks to

[8] Given the potential for collinearity between $CashWage_{st}$ and $MinWage_{st}$, we also experimented with excluding $MinWage_{st}$ from equation (1). The estimate of γ_1 is largely unchanged.
[9] Weighted means of the independent variables are shown in Appendix Table 1.

address potential concerns with state-specific time-varying unobservables. First, we follow the approach of Even and Macpherson (2014) and Allegretto and Nadler (2015) and control for state-specific linear time trends, as well as experiment with census division-specific year effects:

$$Poverty_{ist} = \gamma_0 + \gamma_1 CashWage_{st} + \gamma_2 MinWage_{st} + \gamma_3 \mathbf{X}_{st} + \gamma_4 \mathbf{Z}_{it} + \theta_s + \theta_s * t + d_d * \tau_t + \nu_{ist} \quad (2)$$

where $\theta_s * t$ is a state-specific linear time trend and $d_d * \tau_t$ is a census division (d)-specific year effect. However, this specification has been the subject of some controversy in the literature, with some arguing that it may eliminate potentially valid sources of identifying variation and conflate minimum wage effects with those of the business cycle (Neumark et al. 2014a, b).

As an extension to this approach, we follow Allegretto et al. (2015; 2017) and apply a double-selection post-LASSO estimation strategy. This approach, developed by Belloni, Chernozhukov and Hansen (2014), uses a least absolute shrinkage and selection operator (LASSO) regression to select only those factors that are important predictors of either the outcome (poverty) or treatment of interest (minimum cash wage) from a pool of potential control variables. In our case, these controls will include the full set of right-hand side variables, including state-specific linear time trends and census division-specific year effects. A traditional two-way fixed effects regression specification is then complemented with the subset of variables that are selected as the most important predictors. This approach offers the advantage of reducing model dimensionality and preserving identifying variation. However, this approach eschews theoretical considerations for the inclusion of appropriate controls. Moreover, like most quasi-experimental research designs, the credibility of the identification strategy still relies on the

assumption that variation in the minimum wage used to identify the model is exogenous to poverty. And there is at least some evidence that the LASSO approach may not always generate credible estimates of the economic impacts of minimum wages (see, for example, Neumark and Wascher 2017).

Finally, we conduct falsification-type tests on populations that should not be (directly) affected by the minimum cash wage. Following Even and Macpherson (2014), we estimate the effect of minimum wage increases on non-tipped restaurant workers. We also estimate difference-in-difference-in-difference models of the following form:

$$\begin{aligned} Y_{ist} = {} & \pi + \delta_1 CashWage_{st} + \delta_2 TIPPED + \delta_3 CashWage_{st} * TIPPED_i \\ & + \boldsymbol{X_{it}\beta_1} + \boldsymbol{X_{it}} * TIPPED_i \boldsymbol{\beta_2} + \boldsymbol{Z_{st}\varphi_1} + \boldsymbol{Z_{st}} * TIPPED_i \boldsymbol{\varphi_2} \\ & + \theta_s + \theta_s * TIPPED_i + \tau_t + \tau_t * TIPPED_i + \varepsilon_{ist} \end{aligned} \quad (3)$$

where TIPPED is an indicator set equal to 1 if the respondent is a tipped restaurant worker. The coefficient of interest, δ_3, is the effect of increases in cash minimum wages on tipped restaurant workers relative to non-tipped restaurant workers. Of course, labor-labor substitution in response to minimum cash wage increases could contaminate triple-difference estimates.

Panel I of Table 1 shows the weighted means of the poverty measures across various poverty thresholds using the family as the resource sharing unit. We find that over the 1987-2013 period, 16.6 percent of tipped restaurant workers lived in families with incomes below the Federal poverty line (FPL), 6.0 percent lived in deep poverty (family income less than 50 percent of the FPL) and 29.1 percent lived in near-poverty (family income less than 150 percent of the FPL). The poverty rate was generally 4 to 5 percentage-points lower for full-year employed tipped restaurant workers. Non-tipped restaurant workers face similar poverty rates to tipped

restaurant workers. The highest poverty rate among our four main groups is for younger, less educated individuals for whom we estimate a poverty rate of 21.4 percent and a deep poverty rate of 10.8 percent.

Turning to the household as the resource sharing unit (Panel II), we find that mean poverty rates for these same individuals are in all cases lower than when using the family sharing unit. This may be indicative of the fact that a substantial share of individuals in all four of these subgroups live with a person unrelated by blood, marriage or adoption who contributes to household income sufficiently for all household members to escape poverty. Panel III shows the magnitude of the difference in poverty rates using the family as compared to household measure, with estimated differentials ranging from 0.7 to 8.9 percentage-points. We explore the issue of using the family versus the household as the resource sharing unit in more depth below.

4.0 RESULTS

Our main findings appear in Tables 2 through 9. These tables focus on estimated effects of the tipped minimum cash wage on poverty. Estimated coefficients on the control variables for our main samples of interest are shown in Appendix Table 2. Standard errors corrected for clustering on the state are shown in parentheses (Bertrand et al. 2004).

4.1 Family Poverty

Table 2 shows estimates from equation (1) using 100 percent of the family-level poverty threshold to measure our poverty outcome. Column (1) presents estimates of equation (1) using

only demographic controls, column (2) adds controls for per capita GDP, column (3) adds a control for the prime-age wage rate, and column (4) adds controls for state EITC policy. The results in Panels I and II suggest that minimum cash wage increases are associated with reductions in the risk of a tipped restaurant worker living in a poor *family*, with the largest elasticities (in absolute magnitude) for full-year tipped workers, those who stand the most to gain. Overall, for tipped workers, we estimate poverty elasticities with respect to the minimum wage of -0.14 to -0.26.

An examination of non-tipped restaurant workers (Panel III) provides no evidence that minimum cash wages affect poverty, which suggests a causal interpretation of our findings for tipped workers. Difference-in-difference-in-difference estimates (see columns 1 and 2 of Appendix Table 3) confirm that tipped minimum cash wage increases reduce poverty among tipped restaurant workers relative to non-tipped restaurant workers.

In Panel IV, we examine younger, less educated individuals. The results show that minimum wage increases result in a small increase in their risk of living in a poor *family*, with estimated elasticities around 0.07. This finding is consistent with adverse labor demand effects of tipped minimum cash wage hikes resulting in income declines for some of these low-skilled individuals.[10]

[10] As Appendix Table 2 shows, there is some evidence that non-tipped minimum wage increases are associated with modest declines in poverty rates of less-educated individuals, but not for tipped workers. While the consensus in the literature suggests that non-tipped minimum wage increases fail to reduce net poverty among all working-age individuals (see, for example, Neumark and Wascher 2002; Burkhauser and Sabia 2007; Sabia and Burkhauser 2010; Sabia 2014), the findings in Appendix Table 2 are consistent with evidence that some younger, less-educated workers may see a reduction in poverty (Addison and Blackburn 1999). We find no net effect of the EITC refundable credit on poverty; this is not surprising given that while low-skilled single mothers' may see income gains from EITC expansions, others, including low-skilled single men, may see employment losses and hence income reductions (see Leigh 2010; Neumark et al. 2011).

Table 3 examines the sensitivity of estimates obtained from our preferred difference-in-differences specification (column 4 of Table 2) to additional controls for geographic-specific time-varying unmeasured heterogeneity. When we augment our preferred specification with state-specific linear time trends (column 1), census division-specific year effects (column 2), and both sets of controls (column 3) for spatial heterogeneity, the pattern of results remains quite similar, though the magnitudes of the estimated elasticities are consistently larger. Moreover, when we use a double-selection post-LASSO approach to select controls (column 4), we continue to find evidence that minimum cash wage increases reduce the risk of a tipped restaurant worker living in a poor *family*, but increase it for younger, less educated individuals. This result from the LASSO specification is not surprising given that the model selects most of the same controls that are used in column (3), including geographic-specific time trends.[11]

In Table 4, we explore the impact of minimum cash wage increases across the distribution of family income by examining alternate poverty thresholds, ranging from deep poverty (50 to 75 percent of the FPT) to near poverty (100 to 200 percent of the FTP) using our preferred specification from column (4) of Table 2.[12] The results show stronger evidence that minimum cash wage increases alleviate poverty among tipped workers at or just above the official poverty threshold. On the other hand, younger less educated individuals who are

[11] The controls selected in the LASSO model include age, education, race, gender, marital status, number of people in family/household, number of children in family/household, state regular minimum wage, state per capita GDP, state prime age wage rate, state refundable EITC credit, the average age of the state population, and state-specific linear time trends and Census division-specific year effects for most states and census divisions. As an alternate approach, some minimum wage scholars have used synthetic control design (Powell 2016; Sabia et al. 2012; 2016; Neumark et al. 2016), though these approaches, along with the LASSO approach, have been subject to critiques (Allegretto et al. 2017; Neumark and Wascher 2017).

[12] Results using specifications including controls for state-specific linear time trends and census division-specific year effects produce a qualitatively similar pattern of results.

adversely affected are more likely to be pushed into deep poverty (50 to 75 percent of the FTP), where we find the largest positive poverty effects.

What are the primary mechanisms at work to explain the reduced risk of living in a poor family for tipped workers and the increased risk for younger less educated individuals? Table 5 empirically explores these channels. First, in Panel I, we document that increases in tipped minimum cash wages increase the labor earnings of tipped restaurant workers, particularly full-year tipped restaurant workers. Difference-in-difference-in-difference estimates show that a 10 percent increase in the minimum cash wage is associated with an approximately 1 percent increase in labor earnings of full-year tipped employees relative to non-tipped restaurant employees (column 6). These labor earnings gains are even larger in models that include controls for unmeasured spatial heterogeneity (see Panel I in Appendix Table 5). These, minimum cash wage-induced labor earnings gains are associated with the poverty declines we find in Panels I and II of Table 2.

In Panel II, we uncover a source of poverty increases among younger, less educated individuals. We find that tipped minimum cash wage increases are associated with a decline in employment in tipped jobs and full-year tipped employment, with estimated elasticities of -0.2 to -0.3. Falsification tests on non-tipped employment suggest that this finding is causal in nature and not explained by differential state-specific time trends associated with minimum cash wage

increases and overall restaurant employment.[13] Thus, these adverse labor demand effects appear to be a cause of the poverty effects we discover.[14]

4.2 Household Poverty

The findings in Tables 2 through 4 suggest that tipped minimum cash wage increases reduce the risk of a tipped worker living in a poor family, but may increase it among low-skilled individuals whose reduced labor earnings reduce the income of their families. In Table 6, we explore whether these findings are robust to the choice of resource sharing unit. The household sharing unit is commonly used to study income inequality in the United States (DeNavas-Walt, Proctor, and Smith 2012) and in OECD countries (d'Ercole and Förster 2012) and captures resources from all individuals residing in the dwelling, including all biologically unrelated and unmarried individuals living in the same household. Such individuals could include cohabiting couples (including, prior to recent court decisions, lesbian/gay/bisexual individuals denied legal protections of marriage see Sabia 2014 for a discussion) as well as roommates.

The findings in Table 6 also show that minimum cash wage increases are associated with an increase in the risk of younger, less educated individuals living below household poverty thresholds particularly at 50 to 125 percent of the FTP, with estimated elasticities of 0.05 to 0.3 (Panel IV). However, for tipped (Panel I) and full-year tipped (Panel II) restaurant workers,

[13] In Appendix Table 4, we explore poverty and employment results separately for teens and those ages 20-to-29. Overall, less educated 16-to-29 year-olds contribute approximately 27 to 36 percent of their sharing unit's total earned income. The proportions are much higher for 20-to-29 year-olds relative to teenagers (42 to 55 percent vs. 8 to 11 percent), though we note that minimum cash wages could impact the risk of poverty not only through teens, but also potentially through income of other household members. Appendix Table 4 shows evidence of employment declines and poverty increases for both teens and 20-to-29 year-olds.

[14] In Appendix Table 5, we show that the main findings in Table 5 hold after controlling for state-specific linear time trends and census division-specific year effects.

while the coefficients continue to mostly be negative, they are never significant at the 10 percent level. Across the various poverty thresholds, we estimate poverty elasticities that are 50 to 75 percent smaller than when using the family, and all estimates are statistically indistinguishable from zero.[15] Using 100 percent of the poverty threshold, our estimates are sufficiently precise to rule out, with 95 percent confidence, poverty elasticities with respect to the minimum wage less than -0.31 and greater than 0.11.[16]

4.3 Who Are Affected Families and Households?

What could explain such a divergence in findings across the choice of resource sharing unit? In Table 1 we showed that mean household poverty rates of the same individuals in our subpopulations are systematically lower than is their family poverty rates. In Table 7A, we begin to answer this question by exploring these differences in measured family and household poverty for the same people that conceptually resembles an overlapping Venn diagram. The majority of individuals who are classified as poor using either a family or household resource sharing unit are classified as poor using *both* family and household measures. However, a non-trivial share of tipped restaurant workers who are classified as poor using the family as the resource sharing unit are not classified as poor using the household as the sharing unit.

[15] The inclusion of controls for state-specific linear time trends and census division-specific year effects produce larger estimated poverty elasticities for both tipped workers and younger, less educated individuals (see Appendix Table 6). This particular empirical specification (as well as the post-LASSO approach) still shows significant negative poverty effects for tipped workers when the household is used as the resource sharing unit. However, the effects of minimum cash wages on poverty for full-year tipped restaurant workers is not statistically significantly different from zero in these specifications.

[16] When we estimate regressions at the family-level and household-level, defining affected families and households by whether there is a tipped worker (or younger less educated individual) residing in the sharing unit, we find a qualitatively similar pattern of results. These are available upon request of the author.

The results in Table 7A show that 6.2 percent of tipped restaurant workers (37 percent of all those living in poor families) are classified as poor using the family as the resource sharing unit, but are not classified as poor using the household as the resource sharing unit. In contrast, 0.8 percent of tipped workers classified as poor using the household as the resource sharing unit (only 7 percent of all those living in poor households) are not classified as such when family income is used. A similar, though less pronounced pattern of evidence exists for younger less educated individuals (26 percent of all those living in poor families vs. 7 percent of all those living in poor households). This result suggests that some tipped workers who appear to be lifted out of poverty by minimum cash wage increases were already above the FPT when income from persons unrelated to them by blood, marriage or adoption is included as part of countable household resources. In the final four columns of Table 7A, we show that poverty rates are generally lower for tipped workers in state-years with tipped minimum cash wages above the Federal minimum of $2.13 per hour, though the gap in poverty is modestly smaller when using the household rather than the family as the resource sharing unit.

An examination of the families and households in which tipped workers reside generally support this interpretation. In the first two columns of Table 7B, we examine the characteristics of tipped workers as well as other members of his sharing unit. Column (1) shows average characteristics of tipped workers' family members and column (2) shows average characteristics of tipped workers' household members. Thus, the *difference* in the mean characteristics shown in column (1) and column (2) provides information about persons in a household who are not related by blood, marriage or adoption to the tipped worker.

In the first two columns of Table 7B, we show that tipped workers have, on average, 0.98 additional workers in their families, but 1.3 additional workers in their households. There are nearly twice as many other restaurant workers in tipped workers' households than in their families (0.23 versus 0.13). Moreover, while nearly half of tipped restaurant workers are the highest earners in their families (49.7 percent), just one-third (33.8 percent) are the highest earners in their households. These findings show that not only do tipped workers reside with persons unrelated to them by blood, marriage or adoption, but that these unrelated persons in most cases contribute to household earnings and in some cases do so more than the tipped worker.[17] In fact, the average share of household income contributed by others residing in the sharing unit is larger in households (60 percent) than in families (45 percent), suggesting that unrelated adults are contributing to tipped workers' household resources.

In addition, the findings in Table 7B allow a closer examination of the "winners" and "losers" from minimum cash wage increases. While we do not use longitudinal data that would permit an examination of workers who retain their jobs and those who lose their jobs, we can examine the aggregate populations that win and lose, which underlie our "intent-to-treat" estimates in the prior tables. Workers who experience income gains, tipped workers who retain their jobs, are disproportionately white (73 percent) and female (68 percent). Approximately 8 percent are single mothers, 34 percent have attained at most a high school diploma, and 45 percent have attained at least some college education. Nearly 60 percent of tipped restaurant

[17] The pattern of results persists when we examine poor and non-poor tipped restaurant workers (see Appendix Table 7).

workers are themselves attending school and reside with biologically unrelated individuals who are also attending school.

In comparison, our population of younger less educated individuals who experience employment losses and poverty increases are less likely to be heads of or high earners in their sharing units. They are less educated than the average tipped worker, and are more non-white and male. They are somewhat more likely than all tipped workers to have (other) minor children living in the household, but are less likely to be single mothers or heads of household.

Whether income redistribution of this type is desirable depends on the relative weights society places on various demographic groups (e.g. non-white, less educated males versus white, more highly educated women) in its social welfare function, the efficiency loss society is willing to bear from minimum cash wage hikes (relative to other redistributive policy tools), and the target efficiency of the minimum wage as a policy instrument for helping the working poor.

4.4 Net Poverty Effects and Target Efficiency

Above, we have focused on the impact of tipped minimum cash wage increases on low-skilled populations for whom we most expect tipped minimum cash wages to bind. In Table 8, we present estimates on the net poverty effects of tipped minimum cash wage increases on all working age individuals. We replicate the specifications in Table 2 (columns 1 through 4), including our preferred specification in column (4) and find little evidence that tipped minimum cash wage increases reduce net poverty in this broader population, whether using the family (Panel I) or the household (Panel II) as the resource sharing unit. Our estimates are sufficiently precise that we can rule out, with 95 percent confidence, poverty elasticities greater than 0.16

and less than -0.04. Somewhat more surprisingly, using the LASSO method, which includes state-specific linear time trends and census division-specific year effects as controls (column 5), we find a positive association between tipped minimum cash wage increases and poverty, which suggests adverse employment effects are an important consequence of tipped minimum cash wages for working age individuals.

Together, the lack of poverty-alleviating effects of tipped minimum cash wages can be explained by both adverse labor demand effects among some near-poor workers as well as potential poor target efficiency of tipped minimum cash wages to the working age poor. The majority of working-age poor individuals do not work, and only about one-quarter work across full-year (Center for Poverty Research 2016). Hence, many poor individuals will not directly gain by minimum cash wage increases (Sabia and Nguyen 2017). Moreover, less than five percent of the working poor are tipped workers. But even among tipped workers who are affected, many of whom may see poverty declines (see Tables 2 through 4), there is another reason to be cautious in using tipped minimum cash wages as a policy instrument to reduce poverty: poor target efficiency.

To examine the target efficiency of newly proposed tipped minimum cash wage increases, in Table 9 we present cross-tabulations of the wage distribution of tipped restaurant workers by the income-to-needs ratios of their families and households using the Outgoing Rotation Group subsample of the March 2011 to March 2014 Current Population Surveys.[18] As above, the income-to-needs ratio is defined as the ratio of total family (or household) income to

[18] We pooled data from 2011 to 2014 for this exercise to ensure an adequate number of observations are included in each unique combination of household income to needs ratio and hourly wage category. Each year included in the sample contains approximately 2,000 tipped workers.

the official U.S. Census determined poverty line, adjusted for family (or household) size. In 2013, the poverty line for a family of four was $23,550. Thus, a worker living in a family comprised of four individuals whose total family income was $35,325 (e.g. a married couple with two children) would be assigned an income-to-needs ratio of 1.5. Information on family and household income comes from the previous calendar year, so mapping individual wages to the poverty status of the family or household requires the assumption that the income-to-needs ratio of the resource sharing unit was the same in 2014 as it was in March 2013 (see Burkhauser, Couch and Glenn 1996).[19]

The upper panel of Table 9 provides results calculated using the family as the resource sharing unit. Here, we see that 47.9 percent of tipped workers living in poor families and 42.3 percent of tipped workers living in near-poor families (income-to-needs ratio < 1.5) would be affected by a tipped minimum cash wage increase from $2.13 to $7.60 per hour (column 2). If the tipped minimum cash wage were raised to $15 per hour, these numbers would rise to over 90 percent (column 7). However, just 19.9 percent of workers who would be affected by increases in the tipped minimum cash wage to $7.60 live in poor families (column 10), while 54.1 percent of affected workers live in families with incomes over two times the poverty line. If the tipped minimum cash wage were raised to $15 per hour, it would be even less target efficient, with just 16.4 percent of those affected living in poor families. This suggests that increases in the tipped minimum cash wage are not a particularly efficient way to deliver income to poor tipped restaurant workers even in this best of all possible worlds' case where all current tipped

[19] Also, in Table 9, we assume no adverse employment effects from minimum wage increases, nor differential employment effects by the income-to-needs ratio of a worker's family or household. Hence, this descriptive presentation provides a "best case" estimation of the beneficial consequences of a minimum wage increase (see Burkhauser, Couch, and Glenn, 1996 and Burkhauser and Sabia, 2007 for a fuller discussion).

minimum cash wage earners are assumed to experience no negative employment or hour reduction effects or reductions in their tipped income.

This is even more the case when we move from the family to the household as the resource sharing unit in the second panel of Table 9. Doing so, we find that the tipped minimum cash wage is noticeably less target efficient for tipped restaurant workers, consistent with the evidence shown in Table 7B. For instance, in the example given above (a married couple with two children), the household and family are the same sharing unit. However, if a household is comprised of two unmarried adults and the children are only related to one unmarried adult, then there would be one household, but two families. Now we find that 42.6 percent of poor tipped workers earn wages between $2.13 and $7.59, as compared to 47.9 percent when using the family unit. Moreover, we find that just 10.0 percent of tipped restaurant workers affected by a $7.60 minimum cash wage live in poor households, compared to 19.9 percent who lived in poor families.

Taken together, the findings in Table 9 suggest that (i) tipped minimum cash wage increases are a target inefficient means of increasing the family income of tipped restaurant workers who live in poor families, (ii) higher tipped minimum cash wage proposals are less target efficient than more modest increases, and (iii) using the family rather than the household to measure tipped workers' resources overstates the target efficiency of tipped minimum cash wage increases.

5.0 CONCLUSIONS

This is the first study to examine the impact of increases in tipped minimum cash wages on poverty. We estimate the impact of these increases on poverty (including redistributive income effects among low-skilled individuals), explore the sensitivity of our poverty impact findings to our choice of resource sharing unit, and examine the target efficiency of newly proposed Federal tipped wage increases.

First, like more general increases in the minimum wage, increases in tipped minimum cash wages are largely ineffective at reducing poverty among all working age individuals or even among the subpopulation who work, due to poor target efficiency—most of the beneficiaries of these wage increases do not live in poor or near poor families or households. Second, tipped minimum cash wage increases are effective at alleviating poverty among tipped restaurant workers, particularly full-year employed restaurant workers, with estimated elasticities around -0.2. However, this finding is quite sensitive to the resource sharing unit. Poverty reduction is far less when using the household as compared to the family as the sharing unit. These findings are consistent with evidence we provide that not only do tipped workers reside with persons unrelated to them by blood, marriage or adoption, but that these unrelated workers in most cases contribute to household earnings and in some cases do so more than the tipped worker. Failing to account for this overstates the poverty-alleviating effects of minimum cash wages among tipped workers in most specifications.

Finally, we find evidence that tipped minimum cash wage increases result in an increase in poverty among some low-skilled groups. We find that tipped minimum cash wage increases *reduce* tipped employment among younger, less educated individuals and increase the risk of poverty for their families relatively uniformly across poverty thresholds from 50 to 200 percent

of the poverty line. This is less the case when we focus on households where the largest effect is at lower poverty thresholds. This result suggests that tipped minimum cash wages may redistribute income among low-skilled individuals. Whether this type of income redistribution is desirable depends, in part, on the relative weights that society places in the social welfare function on demographic groups that are helped and harmed.

Our findings provide new evidence that raising the tipped minimum cash wage, like the non-tipped minimum wage, is a poor way to improve the economic well-being of poor Americans. Increasing the tipped minimum cash wage to $7.60 per hour or even $15 per hour will fail to help large segments of the working poor, including poor restaurant workers. Alternative policy strategies for providing work based transfers to lower income families or households, such as expanding state supplements to the Federal Earned Income Tax Credit (EITC) or expanding eligibility to include childless adults may be more effective at targeting the working poor and encouraging employment (Burkhauser 2014).

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Table 1: Weighted Means of Dependent Variables

	Share of Subpopulations Falling Below Percentage of Federal Poverty Threshold						
Dependent Variables	≤50%	≤75%	≤100%	≤125%	≤150%	≤200%	***N***
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel I: Family Poverty Measure							
Tipped Restaurant Workers	.060	.108	.166	.229	.291	.411	*46,774*
Full-Year Tipped Restaurant Workers	.023	.061	.118	.184	.252	.390	*26,137*
Non-Tipped Restaurant Workers	.056	.104	.160	.224	.291	.418	*84,730*
Younger Less Educated Individuals	.108	.159	.214	.271	.329	.439	*513,721*
Panel II: Household Poverty Measure							
Tipped Restaurant Workers	.035	.068	.112	.162	.215	.328	*46,774*
Full-Year Tipped Restaurant Workers	.016	.043	.083	.130	.183	.301	*26,137*
Non-Tipped Restaurant Workers	.035	.076	.126	.185	.248	.375	*84,730*
Younger Less Educated Individuals	.067	.116	.171	.229	.288	.403	*513,721*
Panel III: Difference (Family – Household) in Poverty							
Tipped Restaurant Workers	.025	.039	.054	.067	.076	.083	*46,774*
Full-Year Tipped Restaurant Workers	.007	.018	.035	.054	.069	.089	*26,137*
Non-Tipped Restaurant Workers	.021	.028	.034	.039	.043	.043	*84,730*
Younger Less Educated Individuals	.041	.043	.043	.042	.041	.036	*513,721*

Source: March Current Population Survey, 1988-2014.
Notes: Weighted means are shown. While the unit of analysis is the person, the sharing unit is either the family or the household here and in all other Tables.

Table 2: Estimates of Relationship Between Minimum Tipped Cash Wage and Poverty Using Family as Resource Sharing Unit

	(1)	(2)	(3)	(4)
	Panel I: Tipped Restaurant Workers (N = 46,773)			
Minimum Cash Wage	-.023	-.026	-.028*	-.029*
	(.019)	(.017)	(.017)	(.016)
	[-.137]	[-.153]	[-.169]	[-.175]
	Panel II: Full-Year Tipped Restaurant Workers (N = 26,136)			
Minimum Cash Wage	-.024	-.028*	-.031*	-.031**
	(.018)	(.017)	(.016)	(.015)
	[-.197]	[-.229]	[-.254]	[-.257]
	Panel III: Non-Tipped Restaurant Workers (N = 84,728)			
Minimum Cash Wage	.002	.001	.000	.000
	(.016)	(.015)	(.015)	(.015)
	[.014]	[.004]	[.001]	[-.001]
	Panel IV: Younger Less Educated Individuals (N =513,716)			
Minimum Cash Wage	.017**	.015***	.015**	.014**
	(.008)	(.005)	(.006)	(.006)
	[.082]	[.072]	[.070]	[.067]
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes
Per-capita GDP	No	Yes	Yes	Yes
Prime-age wage	No	No	Yes	Yes
State EITC policy	No	No	No	Yes

***Significant at 1% level **Significant at 5% level *Significant at 10% level
Source: March Current Population Survey, 1988-2014.
Notes: Estimates are based on weighted ordinary least squares regressions. Standard errors corrected for clustering on the state are in parentheses and elasticities of poverty with respect to the minimum wage are in brackets.

Table 3: Sensitivity of Estimates to Controls for Spatial Heterogeneity and Double Selection Post-LASSO Approach

	(1)	(2)	(3)	(4)
	Panel I: Tipped Restaurant Workers (N = 46,773)			
Minimum Cash Wage	-.049**	-.055***	-.072***	-.069***
	(.022)	(.015)	(.018)	(.022)
	[-.293]	[-.329]	[-.431]	[-.415]
	Panel II: Full-Year Tipped Restaurant Workers (N = 26,136)			
Minimum Cash Wage	-.031	-.043**	-.038	-.040
	(.022)	(.018)	(.024)	(.028)
	[-.250]	[-.354]	[-.309]	[-.325]
	Panel III: Non-Tipped Restaurant Workers (N = 84,728)			
Minimum Cash Wage	.001	-.019	-.020	-.018
	(.017)	(.013)	(.019)	(.020)
	[.009]	[-.124]	[-.129]	[-.113]
	Panel IV: Younger Less Educated Individuals (N =513,716)			
Minimum Cash Wage	.017**	.013**	.023***	.023**
	(.007)	(.006)	(.008)	(.009)
	[.080]	[.062]	[.110]	[.110]
State linear time trend	Yes	No	Yes	Yes
Census division year effect	No	Yes	Yes	Yes
LASSO	No	No	No	Yes

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Source: March Current Population Survey, 1988-2014.

Notes: Estimates are based on weighted ordinary least squares regressions. Standard errors corrected for clustering on the state are in parentheses and elasticities of poverty with respect to the minimum wage are in brackets. All models control for age, age squared, education, race, gender, marital status, number of people in household, number of children in household, state per capita GDP, state prime age wage rate, state refundable EITC credit, and the average age of the state population. All models include state and year fixed effects.

Table 4: Sensitivity of Estimates to Use of Alternate Poverty Thresholds Using Family as Resource Sharing Unit

	50%	75%	125%	150%	200%
	(1)	(2)	(3)	(4)	(5)
	Panel I: Tipped Restaurant Workers (N = 46,773)				
Minimum Cash Wage	-.006	-.017	-.037**	-.020	-.017
	(.001)	(.013)	(.018)	(.018)	(.023)
	[-.103]	[-.155]	[-.161]	[-.067]	[-.041]
	Panel II: Full-Year Tipped Restaurant Workers (N = 26,136)				
Minimum Cash Wage	.001	-.003	-.042*	-.023	-.029
	(.007)	(.012)	(.021)	(.021)	(.026)
	[.040]	[-.040]	[-.222]	[-.088]	[-.072]
	Panel III: Non-Tipped Restaurant Workers (N = 84,728)				
Minimum Cash Wage	.005	.011	.011	.009	.001
	(.006)	(.011)	(.016)	(.019)	(.018)
	[.095]	[.104]	[.049]	[.032]	[.001]
	Panel IV: Younger Less Educated Individuals (N = 513,716)				
Minimum Cash Wage	.020***	.014**	.021***	.021***	.020**
	(.006)	(.006)	(.006)	(.008)	(.009)
	[.192]	[.092]	[.077]	[.064]	[.046]

***Significant at 1% level **Significant at 5% level *Significant at 10% level
Source: March Current Population Survey, 1988-2014.
Notes: All models use full set of controls in column (4) of Table 2.

Table 5. Estimates of the Effect of Tipped Minimum Cash Wages on Earnings and Employment

Panel I: Estimated Effect of Tipped Minimum Cash Wage Increases on Log (Labor Earnings) of Restaurant Workers

	Tipped Workers		Non-Tipped Workers		Difference-in-Difference-in-Difference	
	All	Full-Year	All	Full-Year	All	Full-Year
	(1)	(2)	(3)	(4)	(5)	(6)
Minimum Cash Wage	.029	.063*	-.039	-.026	.068	.089***
	(.040)	(.035)	(.045)	(.031)	(.052)	(.031)
	[.029]	[.063]	[-.039]	[-.026]	[.068]	[.089]
N	*46,689*	*26,084*	*84,520*	*47,895*	*131,209*	*73,979*

Panel II: Estimated Effect of Tipped Minimum Cash Wage on Labor Earnings and Employment of Younger Less Educated Individuals

	Labor Earnings	All Employment	Restaurant Employment	Tipped Restaurant Employment	Non-Tipped Restaurant Employment	Full-Year Tipped Restaurant Employment
	(1)	(2)	(3)	(4)	(5)	(6)
Minimum Cash Wage	-.015	.005	-.006	-.007**	.001	-.004**
	(.094)	(.011)	(.006)	(.003)	(.004)	(.002)
	[-.015]	[.008]	[-.068]	[-.237]	[.010]	[-.286]
N	*513,382*	*513,716*	*513,716*	*513,716*	*513,716*	*513,716*

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Source: March Current Population Survey, 1988-2014.

Notes: All models use full set of controls in column (4) of Table 2.

Table 6: Sensitivity of Estimates to Use of Alternate Poverty Thresholds Using Household as Resource Sharing Unit

	50%	75%	100%	125%	150%	200%
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel I: Tipped Restaurant Workers (N = 46,773)					
Minimum Cash Wage	-.003	-.004	-.011	-.011	-.007	-.012
	(.007)	(.010)	(.012)	(.015)	(.018)	(.022)
	[-.078]	[-.063]	[-.094]	[-.066]	[-.030]	[-.035]
	Panel II: Full-Year Tipped Restaurant Workers (N = 26,136)					
Minimum Cash Wage	.006	.007	-.002	-.004	.001	-.004
	(.006)	(.010)	(.017)	(.022)	(.022)	(.024)
	[.376]	[.148]	[-.026]	[-.032]	[.007]	[-.012]
	Panel III: Non-Tipped Restaurant Workers (N = 84,728)					
Minimum Cash Wage	.000	.008	.004	.012	.004	-.027*
	(.004)	(.007)	(.009)	(.012)	(.018)	(.016)
	[.001]	[.101]	[.033]	[.067]	[.014]	[-.073]
	Panel IV: Younger Less Educated Individuals (N = 513,716)					
Minimum Cash Wage	.018***	.011*	.008	.014**	.011	.007
	(.006)	(.006)	(.005)	(.006)	(.008)	(.009)
	[.284]	[.095]	[.049]	[.061]	[.037]	[.017]

***Significant at 1% level **Significant at 5% level *Significant at 10% level
Source: March Current Population Survey, 1988-2014.
Notes: All models use the full set of controls used in column (4) of Table 2.

Table 7A. Percentage of Tipped Restaurant Workers and Younger Less Educated Individuals in Poverty, by Resource Sharing Unit

	All		Tipped Minimum Wage = $2.13		Tipped MW > $2.13	
	Tipped Restaurant Workers	*Younger Less Educated Individuals*	*Tipped Restaurant Workers*	*Younger Less Educated Individuals*	*Tipped Restaurant Workers*	*Younger Less Educated Individuals*
	(1)	(2)	(3)	(4)	(5)	(6)
Poverty Definition						
Family (Total)	16.6	21.4	18.5	22.1	14.6	21.1
Household (Total)	11.2	17.1	12.8	17.9	9.4	16.5
Family Only	6.2	5.5	6.5	5.5	6.0	5.9
Household Only	0.8	1.2	0.9	1.3	0.9	1.3
Family and Household	10.4	15.9	12.0	16.6	8.5	15.2

Source: March Current Population Survey, 1988-2014.
Notes: Weighted means are shown.

Table 7B. Characteristics of Tipped Restaurant Workers and Younger Less Educated Individuals

	Tipped Restaurant Workers		Younger Less Educated Individuals	
	Families	*Households*	*Families*	*Households*
	(1)	(2)	(3)	(4)
Characteristics of Tipped Restaurant Worker/Younger Less Educated Individual				
Head of Sharing Unit (%)	34.7	33.9	22.1	21.5
Single Mothers (%)	8.0	7.9	5.1	4.8
Non-Single Mothers (%)	26.7	26.0	17.0	16.7
Age	28.9	28.9	21.4	21.4
Married (%)	26.1	26.1	21.0	21.0
White (%)	73.3	73.3	59.0	59.0
Female (%)	67.7	67.7	46.9	46.9
HS Diploma Only (%)	34.0	34.0	51.3	51.3
At Least Some College (%)	45.4	45.4	0.0	0.0
Attending School (%)	59.9	59.9	52.4	52.4
High Earner in Sharing Unit (%)	49.7	33.8	31.2	23.7
Characteristics of Other Persons Residing in the Resource-Sharing Unit				
Number of Children < Age 18	.87	.96	.99	1.09
Number of Others 18 and Older	1.04	1.49	1.22	1.70
Number of Other Workers	.98	1.34	1.10	1.45
Number of Other Restaurant Workers	.13	.23	.18	.28
Number of Other Tipped Workers	.07	.13	.07	.13
Number of Others Attending School	.37	.53	.34	.39
Share of Earned Income Contributed by Others (%)	45.4	59.9	66.9	74.3

Source: March Current Population Survey, 1988-2014.
Notes: Weighted means are shown.

Table 8: Estimates Relationship Between Minimum Cash Wage and Poverty, All Working Age Individuals

	(1)	(2)	(3)	(4)	(5)
			Panel I: Family		
Minimum Cash Wage	.007	.006	.006	.005	.011**
	(.005)	(.004)	(.004)	(.004)	(.005)
	[.061]	[.053]	[.051]	[.046]	[.092]
			Panel II: Household		
Minimum Cash Wage	.006	.005	.005	.004	.012**
	(.005)	(.004)	(.004)	(.004)	(.005)
	[.060]	[.052]	[.050]	[.043]	[.120]
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes	Yes
Per-capita GDP	No	Yes	Yes	Yes	Yes
Prime-age wage	No	No	Yes	Yes	Yes
State EITC policy	No	No	No	Yes	Yes
State linear time trend	No	No	No	No	Yes
Census division year effect	No	No	No	No	Yes
LASSO	No	No	No	No	Yes

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Source: March Current Population Survey, 1988-2014.

Notes: Estimates are based on weighted ordinary least squares regressions. Standard errors corrected for clustering on the state are in parentheses and elasticities of poverty with respect to the minimum wage are in brackets. All models control for age, age squared, education, race, gender, marital status, number of people in family/household, number of children in family/household, state per capita GDP, state prime age wage rate, state refundable EITC credit, and the average age of the state population. All models include state and year fixed effects.

Table 9. Wage Distribution of Tipped Restaurant Workers by Income-to-Needs Ratio

Income to Needs Ratio	Hourly Wage Categories								Pct. of All Workers	Between $2.13 and $7.59	Between $2.13 and $14.99
	$0.01 - $2.12	$2.13 - $7.59	$7.60 - $8.99	$9.00 - $10.09	$10.10 - $11.00	$11.01 - $14.99	$15.00 and over	Total			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel I: Family Sharing Unit											
Less than 1.00	3.2	47.9	20.4	9.4	5.6	7.2	6.3	100.0	19.2	19.9	16.4
1.00 to 1.24	0.0	49.7	21.0	12.1	3.0	9.9	4.4	100.0	7.4	10.5	8.7
1.25 to 1.49	0.0	42.3	21.3	18.9	3.0	8.8	5.6	100.0	6.0	7.1	6.9
1.50 to 1.99	0.3	31.3	16.8	21.6	7.9	16.4	5.7	100.0	10.6	8.4	10.9
2.00 to 2.99	1.7	43.4	18.9	10.7	4.0	9.8	11.5	100.0	20.3	22.9	19.9
3.00 or above	1.3	32.3	23.1	16.0	5.8	11.4	10.0	100.0	36.5	31.2	37.2
Whole Category Share	1.4	39.1	20.8	14.3	5.2	10.6	8.5	100.0	100.0	100.0	100.0
Panel II: Housing Sharing Unit											
Less than 1.00	1.0	42.6	25.3	12.2	5.7	5.5	7.7	100.0	11.3	10.0	9.3
1.00 to 1.24	0.0	39.5	20.5	17.9	4.4	11.2	6.4	100.0	5.3	5.7	5.9
1.25 to 1.49	0.0	56.8	23.3	5.8	0.0	11.1	3.0	100.0	5.6	7.8	5.8
1.50 to 1.99	1.9	34.4	22.2	20.2	6.3	11.0	3.9	100.0	11.2	9.6	11.4
2.00 to 2.99	2.1	48.3	21.7	9.0	4.5	10.6	3.8	100.0	18.9	23.0	19.4
3.00 or above	1.4	34.2	19.2	15.8	5.8	11.4	12.2	100.0	47.7	43.9	48.1
Whole Category Share	1.4	39.1	20.8	14.3	5.2	10.6	8.5	100.0	100.0	100.0	100.0

Source: Current Population Survey, March 2011 to 2014, and Outgoing Rotation Groups.

Notes:

[a]For hourly workers, wage rates are based on a direct question concerning earnings per hour on their current primary job; for non-hourly workers, wages are calculated as the ratio of reported weekly earnings to weekly hours worked. All family income data used to calculate income-to-needs ratios come from retrospective information from the previous year because that is the period for which it is reported.

[b]Share of all workers with wage earnings in each category

Appendix Table 1: Weighted Means of Independent Variables

Independent Variables	
Minimum Cash Wage for Tipped Workers	3.12 (1.66)
Minimum Wage for Non-Tipped Workers	5.47 (1.40)
Prime-Age Male Non-Tipped Wage Rate	19.17 (4.69)
Per-Capita Gross Domestic Product	36,517.85 (12,851.12)
EITC Refundable Credit	.04 (.10)
Age	38.40 (13.45)
Age-squared	1,655.37 (1,066.72)
White	.70 (.46)
Black	.12 (.33)
Hispanic	.13 (.33)
Married	.54 (.50)
Family Size	2.90 (1.48)
Household Size	3.33 (1.67)
Number of Children	.83 (1.13)
High School Graduate	.83 (.37)
N	*2,960,874*

Source: March Current Population Survey 1988-2014.
Notes: Weighted means are shown and standard deviations are in parentheses.

Appendix Table 2: Estimated Coefficients on Control Variables

	Family		*Household*	
	Tipped Restaurant Workers	Younger Less Educated Individuals	Tipped Restaurant Workers	Younger Less Educated Individuals
	(1)	(2)	(3)	(4)
Age	0.006***	0.234***	0.012***	0.177***
	(0.002)	(0.005)	(0.002)	(0.006)
Age Squared	-0.000***	-0.005***	-0.000***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)
Race/Ethnicity: Black	0.077***	0.153***	0.098***	0.172***
	(0.008)	(0.007)	(0.008)	(0.008)
Race/Ethnicity: Hispanic	0.076***	0.117***	0.077***	0.119***
	(0.007)	(0.008)	(0.009)	(0.011)
Race/Ethnicity: Other	0.049***	0.089***	0.041***	0.085***
	(0.011)	(0.007)	(0.012)	(0.006)
Married	-0.110***	-0.111***	-0.090***	-0.068***
	(0.009)	(0.006)	(0.008)	(0.006)
Education: High School	0.017***	-.089***	-0.001	-.086***
	(0.006)	(.004)	(0.006)	(.003)
Education: Some College	-0.028***	-	-0.032***	-
	(0.006)		(0.007)	
Education: College Degree	-0.065***	-	-0.061***	-
	(0.007)		(0.007)	
Education: Graduate Degree	-0.047***	-	-0.022	-
	(0.017)		(0.020)	
Female	0.057***	0.079***	0.033***	0.045***
	(0.006)	(0.002)	(0.004)	(0.001)
Number of Persons in Family	-0.099***	-0.108***	-0.040***	-0.037***
	(0.005)	(0.002)	(0.004)	(0.003)
Number of Children in Family	0.141***	0.163***	0.084***	0.097***
	(0.007)	(0.003)	(0.005)	(0.003)
Non-Tipped Minimum Wage	0.063	-0.064**	0.024	-0.053**
	(0.040)	(0.029)	(0.045)	(0.023)
EITC Credit	0.042	0.017	0.028	0.013
	(0.049)	(0.021)	(0.029)	(0.018)
Average Age of Population	0.001	-0.001	-0.000	-0.001
	(0.002)	(0.001)	(0.002)	(0.001)
Log(Prime-Age Wage Rate)	-0.071*	-0.013	-0.050	-0.008
	(0.038)	(0.012)	(0.038)	(0.012)
Log(Per Capita GDP)	-0.153***	-0.174***	-0.093**	-0.150***
	(0.049)	(0.023)	(0.042)	(0.023)
N	*46,773*	*513,716*	*46,773*	*513,716*

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Source: March Current Population Survey, 1988-2014.

Notes: Estimated coefficients for the controls in columns (1) and (2) are from the regressions described in Table 2, column (4), Panels I and IV, respectively. Estimated coefficients for the controls in columns (3) and (4) are from the regressions described in Table 6, column (3), Panels I and IV, respectively. Estimates are based on weighted ordinary least squares regressions. Standard errors corrected for clustering on the state are in parentheses. All models include state and year fixed effects.

Appendix Table 3: Difference-in-Difference-in-Difference Estimates of the Effect of Tipped Minimum Cash Wage Increases on Poverty of Tipped Restaurant Workers

	Family as Resource Sharing Unit	***Household as Resource Sharing Unit***
	(1)	(2)
	Panel I: All Restaurant Workers (N=131,501)	
Cash Wage*TIPPED	-.029*	-.015
	(.016)	(.013)
	[-.180]	[-.124]
	Panel II: Full-Year Restaurant Workers (N =74,174)	
Cash Wage*TIPPED	-.048**	-.008
	(.018)	(.022)
	[-.422]	[-.083]

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Source: March Current Population Survey, 1988-2014.

Notes: Estimates are based on weighted ordinary least squares regressions. Standard errors corrected for clustering on the state are in parentheses and elasticities of poverty with respect to the minimum wage are in brackets. All models control for age, age squared, education, race, gender, marital status, number of people in family, number of children in family, state per capita GDP, state prime age wage rate, state refundable EITC credit, and average age of state population. All models include state and year fixed effects. TIPPED is an indicator set equal to 1 for tipped restaurant workers, and 0 for non-tipped restaurant workers.

Appendix Table 4: Estimates of Relationship Between Tipped Minimum Cash Wage and Poverty Among Younger Less Educated Individuals, by Age Groups

	Ages 16-29		Ages 16-19		Ages 20-29	
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel I: Family Poverty			
Minimum Cash Wage	.014**	.023***	.015*	.025**	.014**	.030**
	(.006)	(.008)	(.008)	(.010)	(.007)	(.013)
	[.067]	[.11]	[.086]	[.140]	[.060]	[.124]
	N = 513,716		*N = 241,151*		*N = 272,565*	
			Panel II: Unconditional Labor Earnings			
Minimum Cash Wage	-.015	-.095	-.176	-.184	.148	-.084
	(.094)	(.127)	(.130)	(.115)	(.104)	(.181)
	[-.015]	[-.095]	[-.176]	[-.184]	[.148]	[-.084]
N	*N = 513,382*		*N = 241,115*		*N = 272,267*	
			Panel III: Employment in Tipped Jobs			
Minimum Cash Wage	-.007**	-.009	-.006*	-.005	-.007*	-.013*
	(.003)	(.006)	(.004)	(.007)	(.004)	(.007)
	[-.237]	[-.303]	[-.191]	[-.166]	[-.271]	[-.482]
N	*N = 513,716*		*N = 241,151*		*N = 272,565*	
			Panel IV: Full-Year Employment in Tipped Jobs			
Minimum Cash Wage	-.004**	-.005**	-.006***	-.005**	-.002	-.004**
	(.002)	(.002)	(.001)	(.002)	(.002)	(.002)
	[-.286]	[-.367]	[-.607]	[-.588]	[-.132]	[-.286]
N	*N = 513,716*		*N = 241,151*		*N = 272,565*	
State & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State linear time trend	No	Yes	No	Yes	No	Yes
Census division year effect	No	Yes	No	Yes	No	Yes

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Source: March Current Population Survey, 1988-2014.

Notes: Estimates are based on weighted ordinary least squares regressions. Standard errors corrected for clustering on the state are in parentheses and elasticities of poverty with respect to the minimum wage are in brackets. All models control for age, age squared, education, race, gender, marital status, number of people in family/household, number of children in family/household, state per capita GDP, state prime age wage rate, state refundable EITC credit, and the average age of the state population. All models include state and year fixed effects.

Appendix Table 5: Sensitivity of Estimates of the Effect of Minimum Cash Wages on Earnings and Employment to Controls for State-Specific Linear Time Trends and Census Division-Specific Year Effects

Panel I: Estimated Effect of Tipped Minimum Cash Wage Increases on Log (Labor Earnings) of Restaurant Workers

	Tipped Workers		Non-Tipped Workers		Difference-in-Difference-in-Difference	
	All	Full-Year	All	Full-Year	All	Full-Year
	(1)	(2)	(3)	(4)	(5)	(6)
Minimum Cash Wage	.186*	.152*	-.092*	-.011	.278**	.162*
	(.097)	(.077)	(.053)	(.044)	(.116)	(.095)
	[.186]	[.152]	[-.092]	[-.011]	[.278]	[.162]
N	*46,689*	*26,084*	*84,520*	*47,895*	*131,209*	*73,979*

Panel II: Estimated Effect of Tipped Minimum Cash Wage on Earnings and Employment of 16-to-29 Year-Olds with ≤ High School Diploma

	Personal Earnings	Employment	Restaurant Employment	Tipped Restaurant Employment	Non-Tipped Restaurant Employment	Full-Year Tipped Restaurant Employment
	(1)	(2)	(3)	(4)	(5)	(6)
Minimum Cash Wage	-.095	-.007	-.002	-.009	.007	-.005**
	(.127)	(.013)	(.010)	(.006)	(.008)	(.002)
	[-.095]	[-.011]	[-.017]	[-.303]	[.115]	[-.367]
N	*513,382*	*513,382*	*513,382*	*513,716*	*513,716*	*513,716*

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Source: March Current Population Survey, 1988-2014.

Notes: Estimated coefficients for the controls included in regression from Table 1, Panel I, Column 3. Estimates are based on weighted ordinary least squares regressions. Standard errors corrected for clustering on the state are in parentheses and elasticities of poverty with respect to the minimum wage are in brackets. All models control for age, age squared, education, race, gender, marital status, number of people in family, number of children in family, state per capita GDP, state prime age wage rate, state refundable EITC credit, and average age of state population. All models include state and year fixed effects.

Appendix Table 6: Sensitivity of Estimates to Controls for Spatial Heterogeneity and Double Selection Post-LASSO Approach Using Household as Resource Sharing Unit

	(1)	(2)	(3)	(4)
	Panel I: Tipped Restaurant Workers (N = 46,773)			
Minimum Cash Wage	-.043**	-.023*	-.070***	-.065***
	(.021)	(.012)	(.022)	(.024)
	[-.374]	[-.197]	[-.616]	[-.568]
	Panel II: Full-Year Tipped Restaurant Workers (N = 26,136)			
Minimum Cash Wage	-.032	-.018	-.045	-.044
	(.028)	(.019)	(.035)	(.034)
	[-.373]	[-.203]	[-.522]	[-.505]
	Panel III: Non-Tipped Restaurant Workers (N = 84,728)			
Minimum Cash Wage	.012	-.006	-.005	-.002
	(.012)	(.011)	(.015)	(.016)
	[.094]	[-.049]	[-.041]	[-.013]
	Panel IV: Younger Less Educated Individuals (N =513,716)			
Minimum Cash Wage	.014*	.006	.022***	.026***
	(.007)	(.005)	(.008)	(.008)
	[.083]	[.036]	[.131]	[.152]
State linear time trend?	Yes	No	Yes	Yes
Census division year effect?	No	Yes	Yes	Yes
LASSO?	No	No	No	Yes

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Source: March Current Population Survey, 1988-2014.

Notes: Estimates are based on weighted ordinary least squares regressions. Standard errors corrected for clustering on the state are in parentheses and elasticities of poverty with respect to the minimum wage are in brackets.

Appendix Table 7. Characteristics of Tipped Restaurant Workers and Younger Less-Educated Individuals, 1988-2014

	Tipped Restaurant Workers		Younger Less Educated Individuals	
	Families	*Households*	*Families*	*Households*
	(1)	(2)	(3)	(4)
			Panel I: Poor	
Characteristics of Respondent				
Head of Sharing Unit (%)	53.4	64.2	31.7	34.4
Single Mothers (%)	26.0	31.7	15.9	16.6
Non-Single Mothers (%)	27.4	32.5	15.8	17.8
Age	28.3	29.7	21.7	21.7
Married (%)	15.5	21.2	18.1	20.4
White (%)	66.7	60.6	41.1	36.2
Female (%)	77.3	76.8	60.3	56.8
HS Diploma Only (%)	40.3	41.4	45.4	42.4
At Least Some College (%)	35.0	31.0	0.0	0.0
Attending School (%)	39.8	38.8	40.1	43.0
High Earner in Sharing Unit (%)	88.9	77.1	36.7	29.3
Characteristics of Other Persons Residing in the Same Resource-Sharing Unit				
Number of Children < Age 18 in Sharing Unit	1.02	1.42	1.36	1.73
Number of Non-Children Persons in Sharing Unit	.33	.78	.64	1.25
Number of Workers in Sharing Unit	.22	.47	.32	.63
Number of Restaurant Workers in Sharing Unit	.06	.14	.08	.17
Number Attending School in Sharing Unit	.13	.48	.27	.40
Share of Other Earned Income (%)	10.36	21.98	62.93	70.36
			Panel II: Non-Poor	
Characteristics of Respondent				
Head of Sharing Unit (%)	31.0	30.1	19.5	18.9
Single Mothers (%)	4.4	4.9	2.2	2.4
Non-Single Mothers (%)	26.5	25.2	17.3	16.5
Age	29.1	28.8	21.3	21.3
Married (%)	28.2	26.7	21.7	21.1

	Tipped Restaurant Workers		Younger Less Educated Individuals	
	Families	*Households*	*Families*	*Households*
	(1)	(2)	(3)	(4)
White (%)	74.6	74.9	63.9	63.7
Female (%)	65.7	66.5	43.3	44.9
HS Diploma Only (%)	32.7	33.1	53	53.2
At Least Some College (%)	47.5	47.2	0.0	0.0
Attending School (%)	63.8	62.1	55.8	54.3
High Earner in Sharing Unit (%)	41.9	28.3	29.7	22.6
Characteristics of Other Persons Residing in the Same Resource-Sharing Unit				
Number of Children < Age 18 in Sharing Unit	.86	.93	.91	.98
Number of Non-Children Persons in Sharing Unit	1.19	1.58	1.40	1.80
Number of Workers in Sharing Unit	1.13	1.46	1.23	1.56
Number of Restaurant Workers in Sharing Unit	.15	.24	.20	.30
Number Attending School in Sharing Unit	.40	.53	.36	.39
Share of Earned Income Contributed by Others (%)	52.4	64.7	68.0	75.1

Source: March Current Population Survey, 1988-2014.
Notes: Weighted means are shown.