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ABSTRACT

We provide a comprehensive analysis of the effects of minimum wages on blacks, and on the relative impacts on blacks vs. whites. We study not only teenagers – the focus of much of the minimum wage-employment literature – but also other low-skill groups. We focus primarily on employment, which has been the prime concern with the minimum wage research literature. We find evidence that job loss effects from higher minimum wages are much more evident for blacks, and in contrast not very detectable for whites, and are often large enough to generate adverse effects on earnings.

We supplement this work with additional analysis that distinguishes between effects of an individual's race and the race composition of where they live. The extensive residential segregation by race in the United States raises the question of whether the more adverse effects of minimum wages on blacks are attributable to more adverse effects on black individuals, or more adverse effects on neighborhoods with large black populations. We find relatively little evidence of heterogeneity in effects across areas defined by the share black among residents. But the large disemployment effects for blacks coupled with strong residential segregation imply that that adverse effects of minimum wages are concentrated in areas with high concentrations of blacks.

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Introduction

The large literature on the employment effects of minimum wages pays scant attention to the differential effects of minimum wages on employment of minority workers.[1] There are scattered exceptions. Neumark and Wascher (2011) report separate estimates of the effects of minimum wages, the EITC, and their interaction on less-educated Black or Hispanic men. The core question here is not minimum wage effects per se, but rather whether the positive labor supply effect for women of a combined higher minimum wage and EITC adversely affects the low-skilled men with whom women affected by the EITC compete; the evidence suggests this is the case, and more so for minority men. Deere et al. (1995) study the effects of federal minimum wage increases in 1990 and 1991, identifying employment effects by comparing changes in employment for low- vs. high-wage groups. They report a higher fraction of low-wage workers among blacks than whites or Asians, for both women and men, and larger employment declines for black women and men.[2]

On the other hand, this literature amply documents the largest disemployment effects for the lowest-skilled groups – usually defined in terms of either age or education (see, e.g., Neumark and Shirley, 2022). Presumably the reason is that the minimum wage is more binding for these groups, and hence a larger share of workers among them ends up with marginal revenue product below the minimum wage, even after reallocation of inputs and other changes in firm operations that impact the productivity of labor or otherwise offset the higher cost of the minimum wage.[3]

But, of course, minority groups also earn lower wages (as emphasized by Deere et al., 1995). Whether the wage differences reflect actual lower skills, or "discounting" of minority workers' productivity à la Becker (1957), minimum wages should be more binding for minorities. Thus, the competitive model of

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[1] For an earlier and more recent review of the U.S. literature, see Neumark and Wascher (2007) and Neumark and Shirley (2022).

[2] In regressions for teenagers and high school dropouts adjusting for cyclical changes, they report estimates for blacks, but not other races.

[3] Manning (2021) and Schmitt (2015) discuss many of the other margins of adjustment to a higher minimum wage (although motivating their discussions of other margins based on inaccurate summaries of the research on employment effects as failing to detect job loss).

the labor market should predict more adverse minimum wage effects on minorities.[4] With regard to minimum wage effects on blacks, Milton Friedman put this most succinctly and provocatively in a 1966 op-ed in *Newsweek*: "I am convinced that the minimum-wage law is the most anti-Negro law on our statute books."[5] Yet another hypothesis is that even if skills and wages are similar for blacks and whites, employers choose to reduce employment among blacks more than among whites – behavior that could also be interpreted as discrimination if skill differences do not motivate this response.

In contrast, advocates for higher minimum wages claim that they are a critical tool for closing gaps between blacks and whites (Derenoncourt et al., 2020). The focus of this argument is on wages, which ignores the potential job loss that, as argued above, could be worse for blacks. The research underlying this argument, based on 1960s expansions of the minimum wage (Derenoncourt and Montialoux, 2021), reports that wages for blacks were increased relative to wages for whites, without an accompanying decline in employment for blacks. On the other hand, Bailey et al. (2021) find similar earnings effects, but report offsetting disemployment effects that were larger (compared to the overall modest effects) for Black men.[6] The employment effects debated in these two papers are from decades back, regardless.

Given the strong possibility of more adverse employment effects for blacks, and the dearth of evidence, in this paper, we provide a comprehensive analysis of the effects of minimum wages on blacks, and on the relative impacts on blacks vs. whites. We study not only teenagers – the focus of much of the

[4] Some recent research puts forward evidence of monopsony-like power in labor markets (e.g., Azar et al., 2022; Rinz, 2022), and a couple of papers argue that this framework applies to low-wage labor markets and hence minimum wage effects (Azar et al., forthcoming; Corella, 2020). This paper is not the place to adjudicate this evidence. However, we would suggest caution in adopting this view. First, the literature on the how labor market power might mediate minimum wage effects on employment is in its infancy, and there is debate over whether concentration measures capture employer labor market power (Yeh et al., 2022). Second, most evidence is in fact consistent with the competitive model (Neumark and Shirley, 2022), so even if labor market power reduces or eliminates the adverse employment effects of minimum wages in some markets, this does not happen broadly, and minimum wages would still be more binding for minority workers.

[5] He also referenced the adverse effects of minimum wages on teenagers, referring to the lower skills of both teenagers and blacks. However, as we have pointed out, the same prediction would apply if blacks do not have lower skills, but their productivity is discounted as in the employer discrimination model. Myrdal (1944) also warned of the potential for more adverse employment effects of minimum wages on blacks.

[6] Bailey et al. consider the conflicting evidence on employment and point out that the lack of employment impact in Derenoncourt and Montialoux is quite fragile and depends on a number of factors including excluding from the model state-by-birth cohort effects and a GSP control, and using a likely noisier reference week rather than annual employment measure (Table 2 and Appendix).

minimum wage-employment literature – but also other low-skill groups. We focus primarily on employment, which has been the prime concern with the minimum wage research literature. Moreover, employment effects are of first-order importance, as constraints on employment from a high minimum wage can potentially have both short-term adverse effects on earnings and longer-term adverse effects on human capital accumulation.[7] We find evidence that job loss effects from higher minimum wages are much more evident for blacks, and in contrast not very detectable for whites. We also estimate impacts of the minimum wage on estimated wages, as well as on earnings. The evidence from these analyses further reinforces the adverse effects on blacks, and more so on black men.

We also supplement this work with analysis that distinguishes between effects of an individual's race and the race composition of where they live. It is well-known, of course, that there is extensive residential segregation by race in the United States (e.g., Iceland and Weinberg, 2002; Logan, 2013). This, in turn, raises the question of whether the more adverse effects of minimum wages on blacks are attributable to more adverse effects on black individuals, or more adverse effects on neighborhoods with large black populations. Effects can vary across neighborhoods even if workers are similar across neighborhoods, owing, for example, to the businesses industries present in different neighborhoods (which may vary in sensitivity to minimum wages or present more or fewer product substitutes),[8] variation in labor market competition across neighborhoods,[9] or differences in job density (including jobs available for minorities).[10] Effects can also differ if there is differential selection of black and white workers into neighborhoods depending on their racial mix, with unmeasured skill differences that could influence minimum wage impacts. In this case, differential effects on, say, black workers in more black vs. more white areas might reflect worker differences rather than neighborhood differences per se; nonetheless, the evidence would still

[7] Neumark and Nizalova (2007) find adverse effects of exposure to a higher minimum wage when young on later wages, employment, hours, and earnings. These effects appear to be stronger for blacks.
[8] See, e.g., Moore and Diez Roux (2006) for evidence on differences in the distributions of different types of food stores across white and black neighborhoods.
[9] See Jha et al. (forthcoming) for differences in concentration in the restaurant sector between more rural and urban areas.
[10] See, e.g., evidence on differences in "spatial mismatch" and "racial mismatch" across neighborhoods (Hellerstein et al., 2008).

tell us whether, e.g., effects on blacks are more adverse in black neighborhoods.[11]

There are numerous motivations for this analysis of differences across areas. First, previous studies have repeatedly shown that poverty, and especially poverty among minorities, is spatially concentrated at a neighborhood or city level.[12] Second, Thompson (2009) shows that effects of minimum wages are particularly concentrated in sub-state areas (counties, in that case) with high concentrations of workers that are relatively low-skilled. The concentration of poor and minority workers in the same areas, coupled with Thompson's findings, suggest minimum wage effects could be more adverse for blacks in black areas,[13] which would be relevant given that other types of policy efforts are devoted to *improving* outcomes for blacks in lower-income areas (e.g., Austin, 2011; Neumark, 2018a). Third, and most important in our view, the effects of minimum wages on locations can be in addition to or otherwise differ from the effects on individuals in that location based on the same characteristics. Given geographic segregation by race, adverse minimum wage effects on minorities or the poor might be expected to spill over onto other minorities – specifically those in the same neighborhood. This can happen if reduced employment lowers incomes that support other businesses in the same location. Or it may happen because labor market networks have a strong local and racial component (Hellerstein et al., 2011 and 2014), so that fewer jobs for some lower job finding for others. Despite these concerns and conjectures, we find relatively little evidence of heterogeneity in effects across areas defined by the share black among residents.

Data

We use American Community Survey (ACS) data from 2005-2019. To keep the race comparisons straightforward, we focus only on blacks and non-Hispanic whites and study those aged 16-65.[14]

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[11] We cannot necessarily distinguish between individual and neighborhood effects by, e.g., comparing effects for black vs. white workers in black vs. white areas, because the selection can be similar across races.

[12] For a sample of research documenting the concentration of disadvantaged minorities into neighborhoods and the effects on the residents living there, see Federal Reserve System and Brookings Institution (2008); Small and Newman (2001); Morenoff and Sampson (1997); Cutler and Glaeser (1997); and Collins and Margo (2001).

[13] We could also in principle estimate minimum wage effects in poor vs. non-poor areas. We refrain from doing so because poverty can be affected by the minimum wage (although the evidence on this is not strong; see Burkhauser et al., 2023).

[14] For our wage analysis, we additionally drop unpaid family workers (0.28%) and the self-employed (8.4%). The ACS oversamples units in areas with smaller populations (https://usa.ipums.org/usa/chapter2/chapter2.shtml#ACS). All estimates (in all tables and figures) are weighted by ACS person weights.

The smallest unit of disaggregation available in the publicly available ACS micro data is the Public Use Microdata Area (PUMA). Per the Census Bureau's definition, PUMA boundaries are defined using three main criteria: 1) each PUMA must have a population of 100,000 or more at the time of delineation, and this population threshold must be maintained throughout the decade; 2) PUMAs are formed only by aggregating whole census tracts or counties and must not cross state boundaries; and 3) the building blocks for PUMAs must be contiguous or share a common border.[15] The Census Bureau updates PUMA boundaries every 10 years based on new population data from the Decennial Census. The 2012 ACS data files were the first to include PUMAs defined using the 2010 Census data. ACS data files from 2005-2011, which we also include in our analysis, use PUMAs defined after the 2000 Census.

We use city and county level minimum wages for the years in our sample. We map these local minimum wages to PUMAs for our individual and neighborhood analysis at the PUMA-level. To do so, we map cities within the boundaries of each PUMA and assigned the highest binding annual average minimum wage within a PUMA's boundaries as the PUMA's minimum wage. The average was generated based on the number of months a sub-PUMA jurisdiction spent at each minimum wage level.

Although wages are not central to our analysis, we are interested in estimating wages, to assess the extent to which the bindingness of the minimum wage may vary between blacks and whites. The ACS does not report hourly wages, so they have to be estimated from information on annual wage and salary income and total hours worked. We drop those reporting zero hours. However, these are either unemployed or not in the labor force the entire year. Weeks worked last year is a categorical variable with ranges 1-13, 14-26, 27-39, 40-47, 48-49 and 50-52 weeks. We use the midpoints of these ranges. Hours are reported as usual hours worked per week, reported as 1-99, and top-coded at 99. We thus estimate hourly wages as (wage and salary income/{weeks x usual weekly hours}). This simple approach generates a handful of extreme outliers, with some maximum values in the tens of thousands of dollars, as well as some very low values.[16]

[15] Certain exceptions to these rules and further guidelines for creating PUMAs can be found here: https://www.census.gov/content/dam/Census/library/publications/2020/acs/acs_pums_handbook_2020_ch02.pdf.

[16] There were 0.14% of observations with estimated wages < $1, 0.02% with wages > $1,000, and 0.0005% with wages > $10,000.)

We first inflate all income and wage data to 2019-dollar values using the Consumer Price Index from the U.S. Bureau of Labor Statistics.[17] Next, we identify two types of wage outliers. At the low end are those reporting zero annual income (308 out of more than 16 million). Even if they are over-reporting hours, such as by adding an extra zero, their estimated wage would still be zero, so we do not try to correct these (they will be eventually dropped based on truncation rules discussed shortly). There are also some very high values; for example, the 99th percentile is $158. In many cases, these are associated with high annual incomes. For example, of those with hourly wages above the 99th percentile, 67.7% have annual wage and salary income above $331,294 – the 99th percentile of population wage and salary income distribution. When estimated hourly wages are high and reported wage and salary income is high, there is no obvious problem. These people generally work 40-60 hours per week (Figure 1, Panel A). In other cases, though, those with wages above the 99th percentile and income below the 99th percentile have low reported/estimated hours per week; they have much more hours mass below 20 hours per week and even below 5 hours per week (Figure 1, Panel B). And this is even more apparent if we restrict income to a lower value, like income below the 90th percentile while wages are still above the 99th percentile (Figure 1, Panel C). Thus, it seems likely that in many of these cases hours are reported or coded with a missing zero after the first digit. We thus added a zero to hours when hours were reported as a single digit and wages were above the 99th percentile. After doing this, we restrict wages to between ½ of the prevailing federal tipped minimum wages,[18] and $130 in 2019 dollars. With these changes and restrictions imposed, the distribution of estimated hourly wages looks well-behaved (Figure 2).

Descriptive Evidence

Our constructed/estimated hourly wage data indicate lower wages for blacks. As an example, Figure 3A shows these hourly wages by year for blacks and whites (males) with at most a high school degree, who are younger than 30 years of age. If we condition on working full-time (40 hours a week) and full-year (50-

[17] The source for this is https://fred.stlouisfed.org/series/CPIAUCSL#0.
[18] The source for this is https://www.dol.gov/agencies/whd/state/minimum-wage/tipped/History.

52 weeks a year), the gap is somewhat larger (Figure 3B). In contrast, however, hourly wages for black teens are higher than for white teens (Figure 3C).[19]

There are also race differences in skills that would make minimum wages more binding for blacks. As shown in Figures 4A and 4B, blacks are younger and less educated.

In our analysis, we estimate employment regressions for subsets of the population distinguished by education, age, etc. (as well as race). These wage differences could reflect unobserved skill differences (stemming, for example, from lower school quality for blacks) or discrimination, but either way they might predict stronger disemployment effects for blacks when minimum wages are more binding.

We next examine evidence on whether minimum wages are more binding for blacks. Figure 5A shows that, for all workers, the spike in the wage distribution at the minimum wages is more pronounced for blacks. This is sometimes the case, although less pronounced, for subgroups defined by education, age, and gender, suggesting that the evidence in Figure 5A is not fully attributable to measurable differences between blacks and whites along these dimensions. As examples, Figure 5B shows a slightly larger spike near the minimum (and more mass near the minimum) for blacks compared to whites among males with a high school education or less, as does Figure 5C when we also look at those under age 30. Consistent with Figure 3C, however, the distributions are not notably different for teens (Figure 5D). This descriptive evidence suggests that race differences in employment effects of minimum wages could be more pronounced when we condition on low education and relatively young people, but not necessarily teenagers – even though teens have been the focus of most research on the employment effects of minimum wages. Even more clear from these figures, though, is the motivation for looking at less-educated and younger workers when studying the employment effects of minimum wages, because the minimum wage is binding for larger shares of these groups.

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[19] Teenagers may be a quite heterogeneous group, ranging from high school dropouts to those who will eventually have very high education (for example, 59% of teenagers do not yet have a high school degree), and part-time as well as full-time workers. Moreover, these characteristics may differ by race. Thus, it is perhaps not surprising that the black wage shortfall we generally see does not appear for teenagers. We cannot observe future education in these data. However, if we condition on full-year, full-time workers there is somewhat more of an indication that wages are higher for white teenagers (Appendix Figure A1).

As discussed in the Introduction, however, race differences in employment effects of minimum wages could also arise because of differences in employment effects by location, given the residential segregation of blacks from whites. Figure 6 shows information on this segregation at the PUMA level. We plot the share of the population (based on individual data) that is black in PUMAs in each decile of the share black at the PUMA level.[20] A horizontal line would indicate that the share black is the same everywhere. The relationship is not only steep, but convex, indicating sharp segregation of blacks by PUMA, with the share black increasing from 1.2% to 2.36% between the 1st and 2nd deciles, and from 44.98% to 93.76 % from the 9th to the 10th deciles.

This segregation could matter for the employment effects on blacks vs. whites. First, in areas where blacks are concentrated, families are poorer and workers are lower skilled and younger, as shown in Figure 7. The lower skills can imply sharper disemployment effects of minimum wages, and the differential poverty rate may be associated with fewer job opportunities in the first place, different kinds of businesses in the area, etc. However, the relationship of these differences to whether disemployment effects will be larger in areas with larger concentrations of blacks is subtle. Our regressions condition on skill, so even though blacks live in areas where workers are on average less skilled, the regression effects need not differ by area. On the other hand, to the extent that minimum wage effects are more adverse for the less-skilled, on average minimum wage effects would be stronger for blacks because of their position in the skill distribution.

A second potential reason why the black share may be associated with the strength of minimum wage effects is that employment rates are far lower in areas with a high share black in the population, which may imply that residents' skills or other features of these neighborhoods already create challenges for businesses. Moreover, the gradient is steeper for particular low-skilled subgroups (e.g., less-educated males), as shown in Figure 8 (Panel B vs. Panel A), suggesting that employment challenges for low-skilled blacks in areas with a high share black are more severe. On the other hand, perhaps surprisingly, the downward gradient in employment rates as the share black rises is evident for whites but not blacks, although the white

[20] The first point in the graph corresponds to the 1st percentile and the last point corresponds to the 99th percentile of share black at the PUMA level.

employment rate is much higher (Figure 9, Panels A and B). Moreover, the fact that these lines are relatively flat implies that the main reason the employment rate is lower in black areas is because black employment rates are lower than whites regardless of the share black, but of course there are relatively more blacks in places with a high share black.

Finally, labor market concentration may differ in black and white areas, as a result of potentially offsetting influences of varying business conditions as well as varying density. Recent research has highlighted possible impacts of higher labor market concentration in mitigating the negative effects of minimum wages on employment (Azar et al., forthcoming; Corella, 2020). We examined data from the National Establishment Time Series (NETS), computing PUMA-level HHIs at both the firm and establishment level for a couple of specific low-wage sectors (retail, and food and accommodations), and for a broader set of low-wage sectors (Arts, Entertainment, and Recreation; Administrative and Support and Waste Management; and Other Services (except Public Administration). As shown in Appendix Table A1, there is not a clear relationship between the share black and concentration.

Individual-level Employment Regressions

Baseline minimum wage-employment regressions

We first estimate some standard minimum wage-employment regressions, focusing on evidence of differential effects of minimum wages for different groups of workers. We focus on various low-skill groups, distinguishing workers by age, schooling, and then combinations of age and schooling. We focus on those with a high school education or less, and under different age thresholds, because minimum wage effects for these groups can, on the one hand, do the most to boost incomes, but on the other hand can also have the most adverse labor demand effects. We also study combinations of low education/young age criteria, and in each case include estimates by gender as well.

The initial individual-level regressions are of the form:

$$Y = \alpha + \beta \cdot \ln(MW) + \gamma_B \cdot Black + X\delta + D_P \cdot \lambda + D_T \cdot \tau + \varepsilon \qquad (1)$$

Y is an indicator for employment, X is a vector of dummy variable controls (some of which drop out when we use narrower samples), including sex, number of children, marital status, age and education.[21] D_P and D_T are PUMA and year fixed effects. This regression is standard in the minimum wage-employment literature. The only role of race in equation (1) is to shift the employment rate.

The results are reported in Table 1, for a large number of low-skilled groups, following the usual approach in the minimum wage literature. Note that we have not included any cyclical control, while many minimum wage studies include an unemployment rate – sometimes calculated for a more-educated and/or older group assumed to be unaffected by the minimum wage. Given that we are estimating minimum wage effects for a number of age and education groups beyond the common focus on teenagers, it seemed inappropriate to assume we know which group's unemployment rate is unaffected by the minimum wage and hence a valid control. This issue is, a priori, less of a concern for our primary question of interest – differences in the effects of minimum wages on blacks vs. whites, although the business cycle may have different effects by race (e.g., Forsythe and Wu, 2021). Nonetheless, we estimated equation (1) for the same less-skilled subsamples we study with a control for the unemployment rate of prime-age, male, college-educated workers, and the results were not sensitive.

Turning to teens, the estimated effect of minimum wages on teen employment is negative but not significant, with an elasticity of −0.076. Broken out by gender, the results are not very different, although the point estimate and elasticity are a bit larger for male teens. The remaining rows move away from the usual focus on teenagers, with the model estimated for those with less education (high school at most, or less than high school), age (less than 30 or less than 25), and gender, and then the combinations of these.[22] None of the estimated minimum wage effects are significant at the 10% level. However, a very large share are negative: for high school dropouts (overall and females); for those under age 25 (overall and by sex); and for

[21] Ethnicity is not added as a control as it has little variation; only 2.6% of blacks have Hispanic ethnicity while the remaining 97.4% are non-Hispanics. For our analysis, we are only considering blacks and non-Hispanic whites, as noted earlier.

[22] Note that these low-skill groups have some overlap – e.g., there are many teenagers in the groups defined based on age below 25 or 30 and education less than high school or at most a high school degree. (For example, 78% of those with less than a high school degree and under 30 are teens, but on the other hand 41% of teens have a high school degree or more education.) Our goal was to define low-skill groups based on age, based on education, and based on both (the strictest definitions), rather than to study small mutually exclusive groups.

high school dropouts under 30 (overall and by sex). Overall, we obtain a negative estimate for most low-skill groups.[23]

Differences in employment effects by race

We next turn to our primary analysis – estimation of differences in minimum wage-employment effects by race. We augment equation (1) to include a full set of interactions with race:

$$Y = \alpha + \beta \cdot \ln(MW) + \beta_B \cdot \ln(MW) \cdot Black + \gamma_B \cdot Black + X\delta + X \cdot Black \cdot \delta_B$$
$$+ D_P \cdot \lambda + D_P \cdot Black \cdot \lambda_B + D_T \tau + D_T \cdot Black \cdot \tau_B + \varepsilon \qquad (2)$$

The point estimates we will obtain from equation (2) are identical to those we get from separate models estimated by race. But the interactive model lets us easily test the statistical significance of the race-minimum wage interaction. The race differences in estimated minimum wage effects, reported in Table 2, are striking. The estimated employment effects for whites are never statistically significant, although they are negative in most cases.

However, the race-minimum wage interactions are negative for *every* low-skill group we consider. And the overall estimated minimum wage effect for blacks is negative for *every* low-skill group we consider. Moreover, the estimated differences and the overall effects for blacks are statistically significant at the 1%, 5% or 10% level for many groups. For the overall effects, these include: teens (all, male and female); high school dropouts (all, male, and female); under 30, high school dropouts (all, male, and female); under 30, with at most a high school education (all, and male); and under 25, with at most a high school education (all, and male). Again, we also found more adverse employment effects for blacks for other combinations of these groups, such as high school dropouts under 25.[24] In general, when we consider low education (high school dropouts), or combinations of low education (up to at most a high school education) and being young, there is clear evidence of adverse effects of minimum wages on black employment – and more so for males.

In addition, when we look at elasticities, the race differences are more pronounced, because for

[23] We also found negative effects for additional combinations of these groups not shown in the table, such as high school dropouts under age 25.
[24] See Appendix Table A2 for the results for other low-education and low-wage groups not covered in Table 2.

every group we consider the employment rate is lower for blacks. As an example, looking at those with at most a high school education, under 30, and male, the estimated minimum wage coefficient for whites is 0.012, vs. −0.039 for blacks. But because the employment rate is 0.355 for blacks and 0.529 for whites, the elasticity difference is much larger (0.023 for whites vs. −0.110 for blacks). In addition, there are some cases of quite large elasticities for low-skilled blacks: −0.283 for black teens; −0.378 for black high school dropouts under 30; −0.418 for black male high school dropouts under 30; and −0.538 for black male high school dropouts under 25. These are much larger disemployment elasticities than are typical of most of the research literature (Neumark and Shirley, 2022). Moreover, there is some hint that minimum wages may be more adverse for employment of black men compared to black women.

Recent econometric work has highlighted potential biases in panel data estimates when there are pre-trends or heterogeneous (dynamic) treatment effects (e.g., Callaway et al., 2024; Wooldridge, 2021). The methods that have been developed for addressing these biases are applicable to simpler settings of dummy treatments, and treatments that do not turn on repeatedly (which is one way to think of successive minimum wage increases in a state). In contrast, in the minimum wage context we have a large number of treatment effects and the treatment is continuous. We are, on a priori grounds, less concerned about these biases in this paper, because in large part we focus on relative effects of minimum wages on blacks and whites. These comparisons likely net out any common shocks/changes for the low-skill groups we study. Moreover, as noted in regard to Table 2, the adverse effects of minimum wages for blacks are stronger when we focus on lower-skilled groups, such as both young and less-educated. The alignment of these differences with how we would predict minimum wage effects to vary with skill makes it less likely they are spurious. Nonetheless, we do a few things to try to give a sense of the likelihood of possible biases.

First, we have estimated the models in Table 2 allowing for up to three years of leading effects. (For this and the related analyses we consider here, we focus on state-level variation only, for which the core results are robust but analysis we discuss just below is more transparent.) For the two and three-year leading effects, we find no statistically significant estimates of the minimum wage for blacks, nor any indication of more adverse effects for blacks than whites. In a handful of cases there are significant one-year leads, which are generally negative and could reflect anticipation effects; moreover, this is not more common for blacks and hence does not suggest any adverse pre-trends that are stronger for blacks. Most importantly, the estimated effects associated with the minimum wage changes remain similar. These results are shown in Appendix Table A4. (Appendix Table A3 first reports the estimates corresponding to the specifications in Table 2 using variation in state minimum wages, showing that these are similar to the Table 2 results using PUMA-level variation.)

Second, we can define a subperiod after the last federal minimum wage increase (in 2009) when there are some never-treated states (those where the federal minimum wage continued to bind or there was no minimum wage change at the state level) that can be compared to ever-treated states (where the state minimum wage increased since 2009).[25] This can be useful because pre-treatment trends can be compared and comparisons between treated and untreated areas can be made that do not rely on regarding previously treated areas as untreated (although this does not permit as formal an analysis as some of the newer methods for two-way fixed effects models with dummy variable treatments – most recently Deb et al., 2024). We decided to start this analysis in 2011, which puts a couple of years between the last federal minimum wage increase and the end of peak labor market effects of the Great Recession (the unemployment rate peaked in 2009), and the start of the period we consider. We first estimated the models from Table 2 for this sub-period, and show that the results are very similar (Appendix Table A5) – which is itself a useful robustness check.

We can then examine trends in employment rates for blacks and whites for various low-skill subgroups. These results are reported in Figures 10 and 11. Figure 10 displays the trends in employment rates by race for the treated and never-treated states, for blacks and whites and for different skill groups. The figure also displays the number of minimum wage increases (by state) in each year, indicating a rising number of such increases once we get a few years past the 2011 start year.[26] Figure 11 reports similar

[25] There are 24 never-treated states – 21 where the federal minimum wage binds throughout, and three with a higher state minimum wage that was unchanged over this period. We in fact did this analysis at the PUMA level too, and the results are very similar.

[26] We found similar trends in employment rates for additional combinations of low-skill groups not reported in Figure 11, such as those under 25, those with at most a high school education under age 30, and high school dropouts under

information, but showing instead the differences between black and white employment rates. The latter is somewhat easier to interpret, since we ultimately are interested in how employment evolves differently for blacks and whites when the minimum wage increases.

Our core result from the prior regression analyses is that minimum wage increases reduce employment of low-skilled blacks (overall, and relative to whites). Hence the concern would be an indication that black employment was declining in the ever-treated areas relative to never-treated areas before the minimum wage increases occurred. As shown in the figures, there is little or no indication of black employment in ever-treated areas falling in relative terms to the never-treated areas. Indeed, if anything we tend to see faster-growing black employment in the ever-treated areas in the early years (e.g., for high school dropouts overall and under age 30). This evidence suggests that our panel data estimates should be reliable for this sub-period, and as noted above, these estimates yield similar results as the full-period estimates shown in Table 2.

Moreover, Figure 11 provides a relatively simple depiction and understanding of the relationships between minimum wages and employment rates for blacks and for whites over this sub-period. In particular, black and white employment rates are evolving similarly in the ever-treated and never-treated states in the early part of this sub-period, with the race differences declining somewhat in most panels of the figure. In the latter part of this sub-period, however, the race difference declines in the never-treated states, likely in response to the tightening labor market from about 2016 (which also can be seen in many panels in Figure 10, where the never-treated line for blacks moves closer to that for whites).[27] But in the treated states this does not happen – as reflected in the flattening or downward slope of the black dashed lines, corresponding to the ever-treated states. This seems consistent with rising minimum wages in these states offsetting the greater advantageous effect of the tightening labor market for lower-skilled blacks that would otherwise have occurred.

age 25.

[27] This improvement in minorities outcomes during a tight labor market has been described in Okun (1973), validated in, e.g., Hoynes (2000) and Jefferson (2008), and updated and analyzed further in Aaronson et al. (2019).

Variation in effects with share black in PUMA

For this analysis, we augment equation (2) to also allow the effects of minimum wages to vary not only with race but with the racial composition of the area (%Black):

$$Y = \alpha + \beta \cdot \ln(MW) + \beta_B \cdot \ln(MW) \cdot Black + \beta_{\%B} \cdot \ln(MW) \cdot \%Black + \gamma_B \cdot Black + \gamma_{\%B} \cdot \%Black$$
$$+ X\delta + X \cdot Black \cdot \delta_B + X \cdot \%Black \cdot \delta_{\%B} + D_P\lambda + D_P \cdot Black \cdot \lambda_B + D_P \cdot \%Black \cdot \lambda_{\%B}$$
$$+ D_T \cdot \tau + D_T \cdot Black \cdot \tau_B + D_T \cdot \%Black \cdot \tau_{\%B} + \varepsilon \qquad (3)$$

The model includes a full set of interactions with %Black, including the fixed year and PUMA effects, to ensure that we isolate the effects of variation in %Black on the effect of the minimum wage, rather than other omitted interactions of control variables with %Black.[28] Given that we now have to evaluate the effects of minimum wages (for blacks and whites) at different values of %Black, we report results for few low-skilled groups. In particular, we report them for the groups for which we found the clearest evidence of race differences in the employment effects of minimum wages in Table 2, and omit additional results for similar groups. We show result for teens, high school dropouts, and high school dropouts under age 30.[29]

In Table 3, we first report the estimated minimum-wage employment effect for whites, followed by the interactions with Black and %Black. Comparing the former to Table 2, the estimated employment effects for blacks are generally similar. In contrast, in *no* specification is the estimated effect of the minimum wage x %Black interaction statistically significant, and the sign of this estimated effect varies.

Table 3 also reports the implied estimated minimum wage effects at the 10^{th}, 50^{th}, and 90^{th} percentiles of the share black (always estimated for the entire population), along with the average white and black employment rates, the estimated elasticities, and the difference between the white and black elasticities. In general, the variation in black employment elasticities is consistent with the most adverse employment effects for blacks in the areas with the highest share black in the population. The only exception

[28] If we omit %Black x PUMA and %Black x year, we do not get as clear evidence of a black interaction, implying that minimum wages are tending to be increased in areas with high %Black and rising black employment (but within these areas, the results imply that higher minimum wages reduce black employment).
[29] As noted just above, we also found some evidence of stronger disemployment effects of minimum wages for blacks for other low-skill groups. However, our interest in this section is in variation in effects across the share black in an area, and since we do not find strong evidence of variation in effects, limiting the groups for which we report the evidence gives a fairly complete picture.

are female teens for whom the black employment elasticity is largest negative at the 50th percentile of the share black, and is smaller in absolute value at the extremes (the 10th and the 90th percentiles). Still, recall that the estimated coefficients underlying these differences ($\beta_{\%B}$) are never statistically significant.

To provide richer information on how minimum wage effects vary with the share black, Figures 12A-C show the estimates graphically for three groups (by way of illustration): female teens, male high school dropouts, and high school dropouts under age 30. These figures do not reveal any qualitatively different results than those reported in Table 3 (restricted to the 10th, 50th, and 90th percentiles), and reinforce the conclusion that while there are differences in the estimated effects of minimum wages on employment of blacks and whites, there is little evidence of differences in minimum wage effects for either blacks or whites across areas with varying share black that could underlie the differences based on an individual's race. Hence, our remaining analyses focus on the results based on differences in individuals' races but not the race composition of the areas where they live.

Nonetheless, it is critical to point out that the absence of differences in estimated minimum wage effects on whites and blacks across areas, based on the share black, does *not* mean that areas with a high share black are not hit disproportionately hard by higher minimum wage increases. They are, precisely because the share black is high and the adverse employment effects of minimum wages fall on blacks. Both Figure 6 and Figure 12 highlight the rather extreme extent of residential segregation by race. Looking at Figure 12, in particular, the very low share black at the first six or seven deciles of the share black implies that in most PUMAs, the overall effects of minimum wages will be minimal, whereas the overall effects would be quite strong in the higher deciles, where the share black is high because of the nonlinear nature of residential segregation.

The much larger implied employment effect in areas with a high share black is illustrated, by way of example, in Table 5, where we use the estimates from Tables 2 and 3 to do simple simulations of the effects of a higher minimum wage. Specifically, we consider the effects of an increase from the federal minimum wage of \$7.25 prevailing in 2019 (the end of our sample period) to the California minimum wage in that year of \$12. We present estimates for the high school dropouts under 30. We consider the effects of the minimum wage on employment at the 10th and 90th percentiles of the share black. We first use the estimates from Table 2 ("Homogenous effects") where the minimum wage effect does not vary with the share black, although the estimated elasticity still varies because the employment rate is different at the 10th and 90th percentiles. We then use the estimates from Table 3 ("Heterogeneous effects"). The conclusions are similar in the two simulations, consistent with the minimum wage-employment effect varying only weakly with the share black.

For high school dropouts under 30, the white population share at the 10th percentile is nearly one (100%), while the black population share at the 90th percentile is 0.56. As noted earlier, employment rates of blacks are a good deal lower than employment rates of whites (and employment rates of both groups tend to be lower in areas with a high share black). In this case, the difference between the white employment rate in white areas and the black employment rate in black areas is 0.157 (0.360 – 0.203), and the difference in the weighted employment rate between these areas is not much smaller (0.121). The minimum wage employment elasticities are larger in absolute value for blacks, and also larger for both groups in the areas with a high share black; these differences are more pronounced when we estimate effects that vary with the share black (Table 3, vs. Table 2). Because of the much larger elasticity for blacks, the average employment elasticity (weighting by population shares) is small in white areas (−0.015 or −0.028), and much larger (−0.214 or −0.266) in black areas. As a result, as shown in the final row of the table, the large minimum wage increase considered would only lower the employment rate of high school dropouts under 30 in areas at the 10th percentile of the share black by less than one percentage point. In contrast, the effect in areas at the 90th percentile of the share black would be a decline of 2.9 or 3.7 percentage points.

These last estimates are, in our view, striking. These are simple simulations based on the estimates. But they suggest that some of the larger minimum wage differences that now exist in the United States could account for a sizable share of the lower employment rate of less-skilled workers in areas with a high black share in the population – in the simulation considered, 2.9 to 3.7 percentage points relative to the 12.1 percentage point difference in employment rates between areas at the 10th and 90th percentiles of the share black. The difference in impacts in areas with a high share black arises because the adverse employment effects of higher minimum wages fall mainly on blacks.

What explains the stronger employment effects of minimum wages on blacks?

We have documented considerably stronger effects of minimum wages in reducing employment of black low-skilled workers than white low-skilled workers. Indeed, while we find significant negative employment effects for blacks, with quite large elasticities, we find no statistically significant effects for whites (and correspondingly the elasticities are much closer to zero). In this section, we explore why.

One explanation for this difference is that minimum wages could be more binding for blacks. It is true that blacks are younger and less educated than whites, and overall minimum wages are more binding for blacks. But recall that our regressions condition on young ages, low education, or both, and the spikes in the wage distribution for lower education and age groups were not that much more pronounced for blacks – although they were to some extent. The latter – i.e., wages lower for blacks even conditional on these observable skill measures, can occur because of lower unmeasured components of skill owing to early skill gaps (e.g., Carneiro et al., 2005), school quality differences (see, e.g., the evidence and other studies reviewed in Hanushek and Rivkin, 2009), or other pre-market factors (Neal and Johnson, 1996). Wages for blacks can also be lower conditional on age and education because these variables do not capture actual labor market or job tenure (nor does the ACS). Lower employment rates and higher unemployment rates for blacks would likely imply that their actual labor market experience is lower for the same potential experience, and that job tenure is also lower. Wages can also be lower for observationally similar blacks because of discrimination that results in lower wages for blacks.[30]

In addition, even if skills and wages are similar, when employers have to choose to cut back employment in response to a higher minimum wage increase, the job loss could fall mainly on blacks. This is another form of discrimination if there is no observed or unobserved skill difference that could justify such decisions. And given that employment adjustment to the minimum wage may come about mainly via slower

[30] There is a good deal of evidence of discrimination in hiring against blacks and other minority groups (Neumark, 2018). In search models (e.g., Black, 1995), hiring discrimination against a group by some employers will lower market wages for that group.

hiring (e.g., Liu et al., 2016; Portugal and Cardoso, 2006), hiring discrimination may be the culprit.[31,32]

We assess this question in two ways. First, we contrast the bindingness of the minimum wage for the different groups we study with the estimated employment elasticities. Second, and related, we compare the estimated employment effects with estimated wage effects. This latter comparison also provides information on the "wage elasticity" of employment stemming from variation in the minimum wage. This parameter is of interest because the larger it is (in absolute value, assuming the employment effect is negative), the less likely that a higher minimum wage raises earnings of the affected groups.

Figure 13 plots, for most of the groups we study in Table 2, the proportion below 110% of the minimum wage, and the estimated employment elasticities for blacks and whites.[33] The differences in the shares below 110% of the minimum wage for blacks and whites are generally less marked by age and education. These comparisons of bindingness across age groups and education groups confound several factors like ability (signaled by eventual education which is unknown for teenagers), how much people like to work during teenage (full time vs part time) and how it varies by race.

Figure 13 also displays the estimated employment elasticities. As we saw in the earlier tables, the employment effects are considerably more adverse for blacks. However, the new information in this figure is that these differences emerge even though the bindingness of the minimum wage is very similar for blacks and whites. This is apparent, for example, for: high school dropouts (all), for teenagers (all, male, and

[31] If the minimum wage has caused employers to adjust labor and other inputs so that many workers' marginal revenue products are equal to the minimum wage (consistent with spikes in the wage distribution at the minimum wage), then there is no cost to employers to discriminate against a particular group in reducing employment. (For an early version of this argument, see Stratton, 1993.) One still might expect some mitigation of discrimination from the threat of lawsuits. But research on the employment effects of the minimum wage suggests that higher minimum wages reduce both separations and hires. In this case, the discrimination that reduces black employment would come from the hiring side, for which U.S. discrimination law is considered weaker both because damages are low (as workers get hired sometime later) and it hard to identify a class for a class action lawsuit (Bloch, 1994). Moreover, the potential damages from discrimination against low-wage workers are low regardless.

[32] Yet another explanation is that the lower-skilled or younger blacks and whites that we study work in different industries with different elasticities of labor demand. However, the industry distributions are very similar across blacks and whites. For example, for teens, high school dropouts, and high school dropouts under age 30, respectively, the correlations between NAICS two-digit industry employment shares for blacks and whites are 0.98, 0.99, and 0.99. Furthermore, both blacks and whites (in each of these sub-groups) have the highest representation in the two industries – Retail and Food & Accommodation – which have been the primary focus of industry-specific studies examining the negative impacts of minimum wage increases (e.g., Kim and Taylor, 1995; Dube et al., 2010; Jha et al., forthcoming). We thus think industry composition plays little role.

[33] Appendix Figure A2 includes the remaining groups covered in Table 2 and Appendix Table A2.

female) and for and high school dropouts under 30 (all, male). For some groups like high school dropouts (female) and high school dropouts under 30 (female), the employment elasticities are more adverse for blacks even though the minimum wage is more binding for whites. Thus, this evidence does not suggest that the more adverse effects of minimum wages for black employment are attributable to minimum wages being more binding for blacks.

We can get a somewhat different perspective from comparing wage and employment elasticities. The wage elasticities are estimated using the same regression as in equation (2), although for log wages. The results are presented in Figure 14, which plots the estimated wage elasticities and employment elasticities for each group. Note that this figure includes some groups for which we did not report estimates in the earlier tables (but include them in Appendix). Given that these figures present the evidence in a compact way, they provide a way to display more of these estimates compactly. There are a number of observations to take away from the figure. First, in all cases, the estimated wage elasticities are (mostly) positive (and range up to about 0.3). This is to be expected, although one might expect less precise estimates relative to results using measured hourly wages like in the CPS; nonetheless, the point estimates are in the same range.[34]

Second, in every panel, groups with higher wage elasticities also have larger negative employment elasticities. This is clear from the plotted estimates, as well as the simple bivariate regression lines fitted to these points. This finding boosts the credibility of our employment estimates, in the sense that, within race, groups for whom wages are pushed up more by the minimum wage (for workers remaining employed) also experience larger job losses. However, recall that the estimated employed effects for whites were small – which is made clear in the figure by keeping the vertical axis the same for blacks and whites and noting that the white employment elasticities are much closer to zero.

Returning to our main inquiry, the third observation is that the wage elasticities are not larger for blacks than for whites, but rather are on average a bit lower (see the note to Figure 14). This is consistent

[34] For example, looking at the less-educated or teenagers, Neumark and Wascher (2011) report estimates in the range of about 0.15 to 0.3. The measurement error of relevance here is in the dependent variable, which should just lead to imprecision in estimating the effect of the minimum wage, not bias (assuming the measurement error is classical).

with what Figure 13 showed – that minimum wages are not much more binding for blacks than for whites once we condition on education and/or age.

Fourth, for similar wage elasticities, the employment elasticities for blacks are considerably larger (in absolute value). This is of course related to the evidence from Figure 13, but here we can see that black employment declines following minimum wage increases are much larger than those experienced by whites despite similar or smaller effects on wages. Moreover, wage elasticities are estimated from the employed only, so if blacks experience more job loss, there may be more selection out of the wage estimates of low-wage blacks than of low-wage whites. This would imply that wage elasticities for blacks could be biased upward, implying that the higher wage vs. fewer jobs tradeoff is even worse for blacks.

Together, we interpret this evidence as indicating that the stronger adverse employment effects of minimum wages on job opportunities for blacks are not necessarily explained by lower skills of blacks, or lower wages (even unrelated to skills). These are likely part of the story, given that minimum wages are generally a bit more binding for them. However, the evidence on wage effects does not establish that blacks' wages would be pushed up more – although this may be obscured by selection out of employment of lower-wage blacks in response to a higher minimum wage. It is possible that an additional factor is that employers simply choose to reduce employment of blacks more when reducing overall employment in response to minimum wage increases.

Finally, the ratios of the employment elasticities to the wage elasticities provide information on how likely minimum wages are to increase earnings.[35] For whites, the wage elasticities are largely in the 0.05 to 0.15 range, and the employment elasticities smaller (in absolute value), implying employment-wage elasticities that can be quite close to zero, in which case higher minimum wages increase earnings for white

[35] Freeman (1996) interprets the elasticity of employment with respect to the minimum wage as the elasticity of demand for minimum wage workers. He notes: "[I]f the elasticity of demand for minimum wage workers exceeds one [*in absolute value*], the minimum wage will reduce rather than increase the share of earnings going to the low-paid" (p. 641, italicized text added). But unless one is looking only at workers paid the minimum wage, the wage elasticity with respect to the minimum wage is well below one (a common value in many studies is around 0.15-0.3, as noted earlier). Thus, to estimate the elasticity of demand for minimum wage workers, and draw inferences about the effects of the minimum wage on earnings of minimum wage workers, one has to divide the employment elasticity by the wage elasticity.

workers. For blacks, in contrast, the employment and wage elasticities are of roughly comparable absolute magnitudes, and in fact in most cases the employment elasticity is larger in absolute value. In that case (and we remind the reader that our estimation of hourly wages is not ideal), blacks workers' earnings are likely to decline in response to higher minimum wages (even more so, if the wage elasticities for blacks are biased upwards).

Rather than speculate based on estimated employment and wage elasticities (and ignore potential effects on hours), in Table 4 we directly estimate effects on earnings (including zeros). The results are striking. For most definitions of low-skilled workers, the estimated earnings effects for whites are positive, and they are significant in some cases (for females < 25, and those with at most a high school education, overall and by gender). In sharp contrast, the estimated overall effects for blacks (in the third column) are much more likely to be negative, and significant in many cases (for seven groups at the 10% significance level or less). This is true for black teenagers (overall, and by gender), for high school dropouts under age 30 (overall, and males), and for those with at most a high school education under age 25 (overall, and males). Moreover, some of the negative elasticities are sizable, ranging to as much as −0.5, with the estimated adverse impacts sometimes considerably larger for black men. One broad conclusion from this evidence appears to be that young and less-educated black men, in particular, are harmed by higher minimum wages.

Conclusions

There are reasons to believe that the employment effects of minimum wages could be more adverse for black workers than for white workers. These more adverse effects could occur because of skill differences, Becker-type discrimination whereby employers devalue black workers' productivity and hence minimum wages are more binding, or because employers choose to reduce employment relatively more among blacks when responding to a higher minimum wage.

Despite these possibilities, and despite the very large literature on employment effects of minimum wages for low-skilled workers, race differences in employment effects have received little attention. In this paper, we turn to this question, using ACS data that provide very large samples of both blacks and whites.[36]

Effects of minimum wages on blacks and whites could also differ because blacks are whites are very residentially segregated. There is not as clear a prediction in this case. For example, industry composition of neighborhoods may differ, with concomitant differences in responses to minimum wages, businesses may be more marginal in areas with a higher share black (which is correlated with a higher share poor), labor market competition could be weaker in these areas if there is lower job density, and labor market networks can vary.

We use the ACS data to estimate standard minimum wage-employment regressions. We extend these analyses to the estimation of race differences in effects. These estimates point to substantial disemployment effects for low-skilled black workers, with some elasticities in the −0.2 to −0.3 range or higher. Moreover, these effects are much larger than for whites, for whom we generally do not detect adverse employment effects of minimum wages. The evidence of adverse effects of minimum wages mainly on low-skilled blacks – and more so on low-skilled black men – is reinforced by our estimated effects of minimum wages on both wages and earnings.

When we look at variation in effects across areas (PUMAs) with different share black in the population, we find no clear evidence of more adverse minimum wage effects in black areas – which of course could otherwise explain the larger job loss estimates for black workers than white workers. Rather, the race differences in employment effects are associated with an individual's race. Still, the effects of minimum wages will be much more adverse in areas with a higher black population share because of more adverse minimum wage effects for blacks – and the difference across areas is pronounced because of strong residential segregation by race.

We also explore whether lower skills or lower wages (whether because of unmeasured skill or discrimination) explain the more adverse employment effects of minimum wages for blacks. There is some evidence of this, although it is hard to be definitive because we can only estimate wage elasticities for those

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[36] It is possible that the small samples of blacks available in some states in the CPS have deterred a focus on race differences. And other datasets prominent in the minimum wage literature, like the QCEW and CPB, do not distinguish workers by race. The QWI does, however, and could potentially provide further evidence.

who remain employed. Another factor, which we regard as plausible, is that employers simply choose to reduce employment of blacks more when reducing overall employment in response to minimum wage increases.

Finally, we compare employment and wage elasticities. Our comparisons suggest that the adverse employment effects of minimum wages on blacks are sufficiently large, relative to the positive wage effects, that minimum wages seem quite likely to reduce earnings of black workers, while being more likely to increase earnings of white workers.

Recall that Milton Friedman called the minimum wage "the most anti-Negro law on our statute books." We cannot compare the effects of the minimum wage to other laws that may adversely affect blacks. And we do not believe higher minimum wages are enacted to harm blacks, or with knowledge that the benefits may accrue mainly to whites. But our evidence indicates that – when it comes to the labor market impacts of the minimum wage – the unintended consequence is that blacks appear to bear a steep cost, while whites bear very little cost and more likely benefit.

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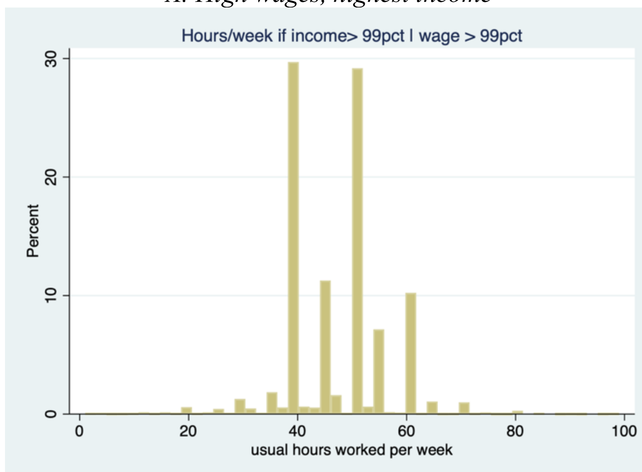
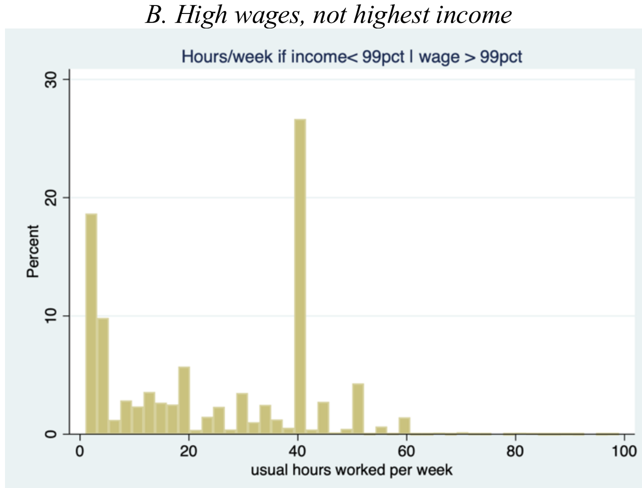
Figure 1: Reported Hours Distributions for High-Income and Lower-Income High-Wage Workers

A. High wages, highest income



B. High wages, not highest income



C. High wages, lower income

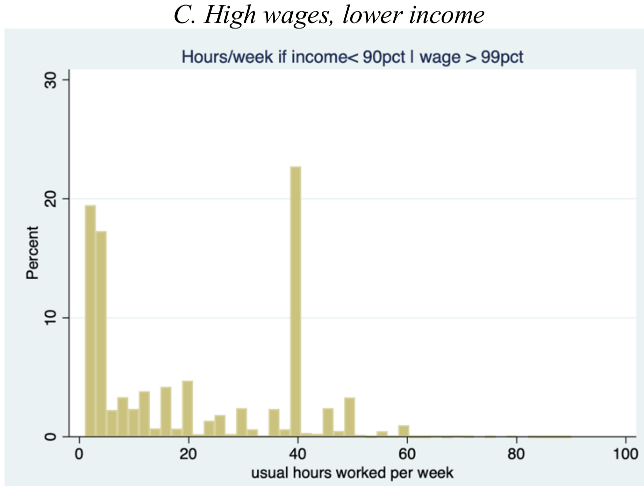


Figure 2: Distribution of Estimated Hourly Wages

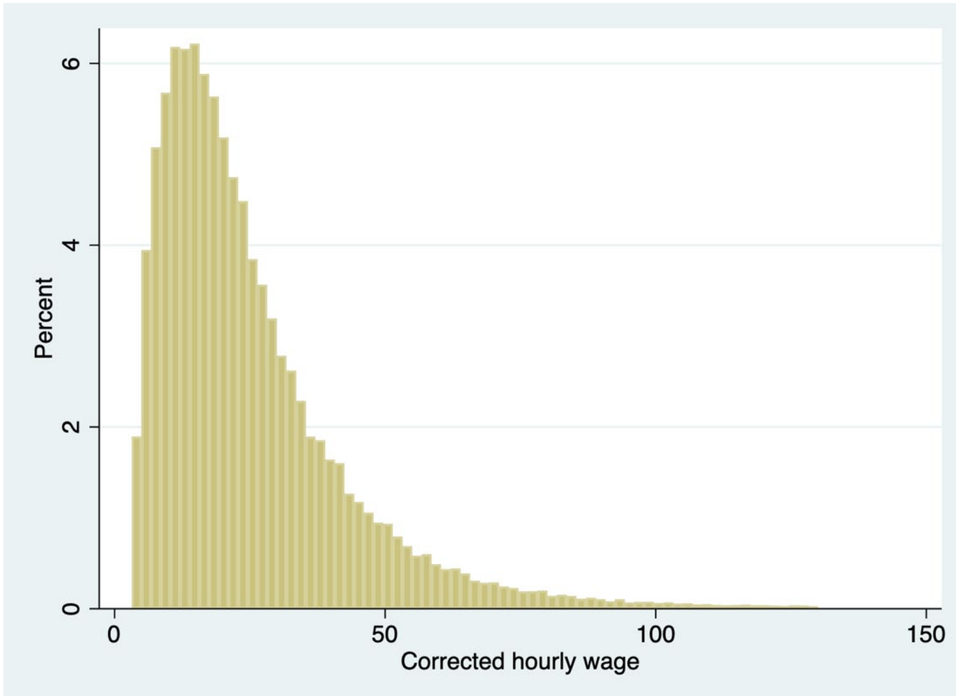
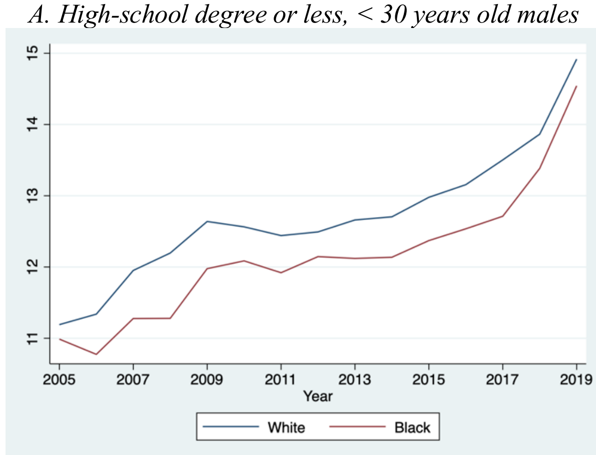
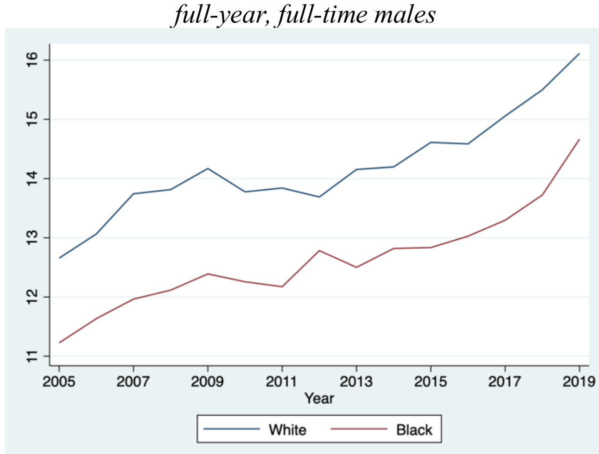


Figure 3: Hourly Wages by Year, Blacks and Whites

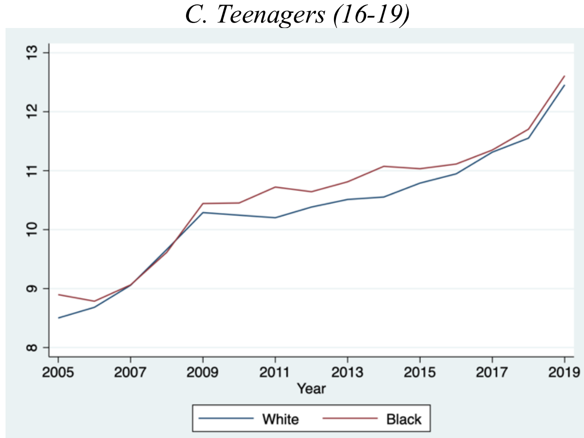
A. High-school degree or less, < 30 years old males



B. High-school degree or less, < 30 years old, full-year, full-time males



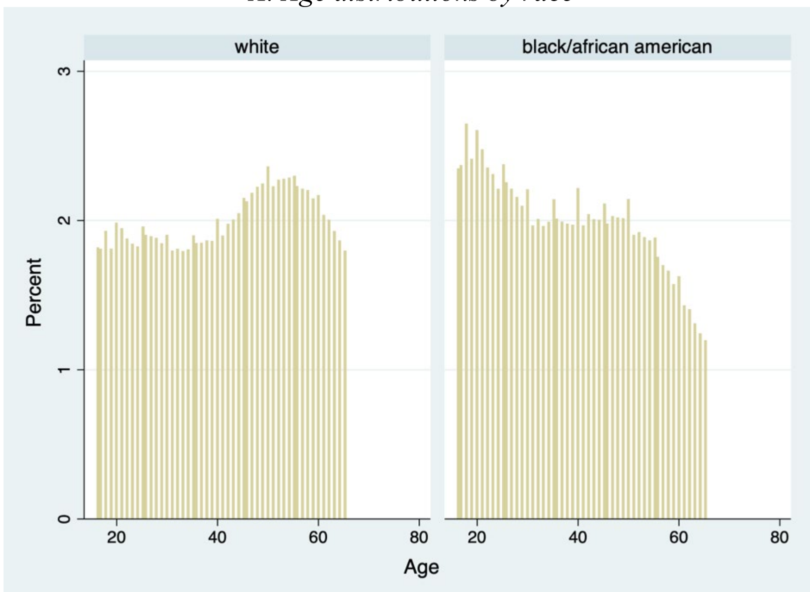
C. Teenagers (16-19)



Note: Wages in each year are in nominal terms (in the respective year's dollar value) and weighted by individual person weights.

Figure 4: Race Differences in Age and Education

A. Age distributions by race



B. Education distributions by race

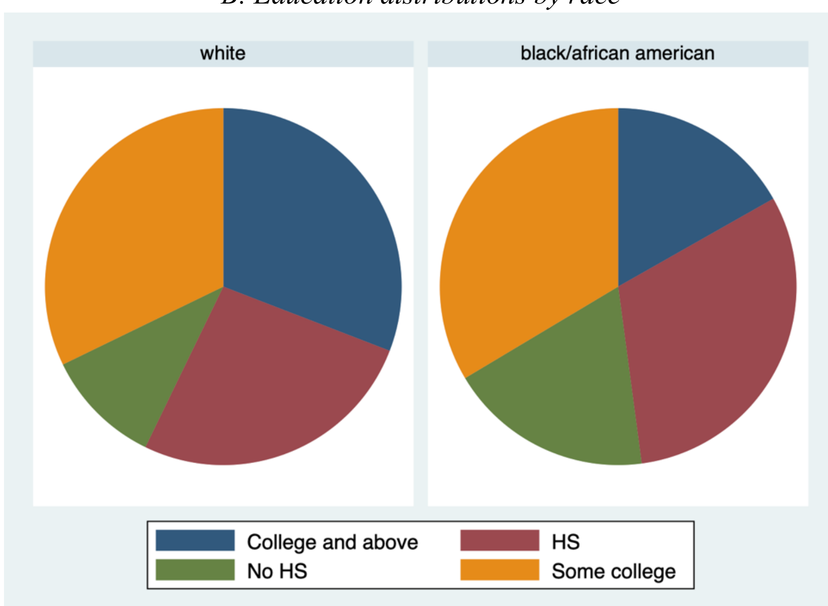
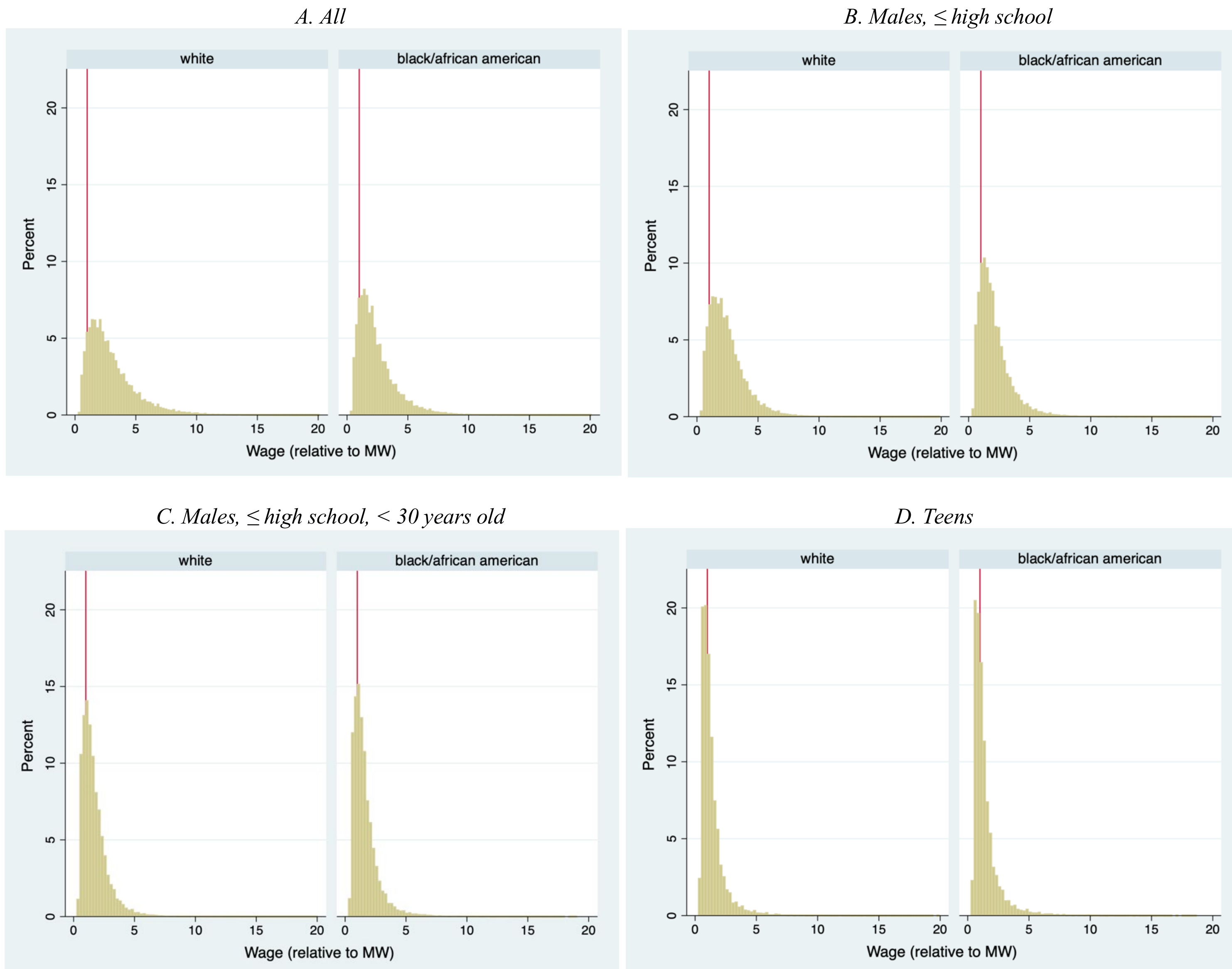
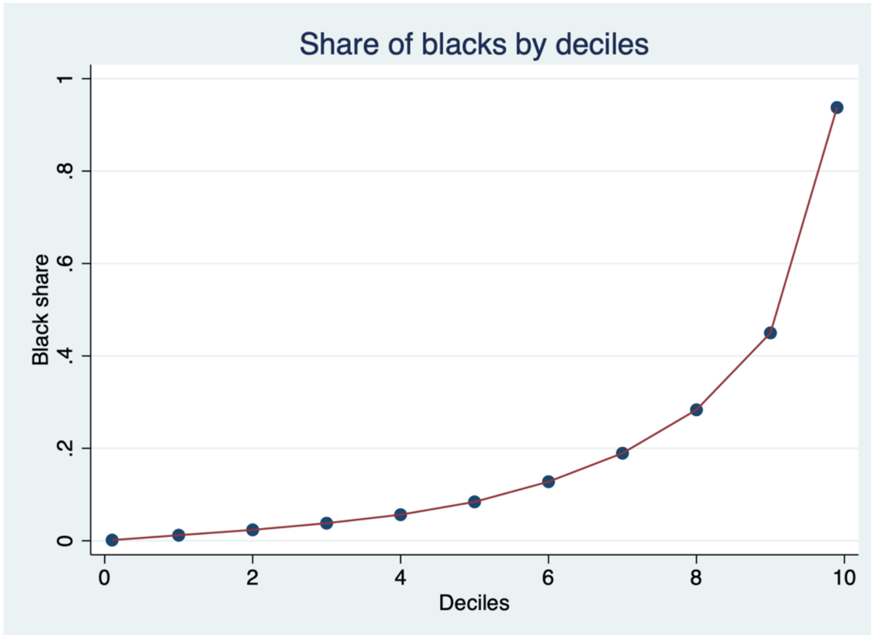


Figure 5: Wage Distributions of Blacks and Whites



Note**:** Wages on the x-axis are defined as relative to minimum wage in each year, i.e., wage/minimum wage and then pooled across years. Thus, the red spike represents if relative wage = 1 or wage = minimum wage in any year.

Figure 6: Share of Black Population by Deciles (by PUMA)



Note: The first point in the graph corresponds to the 1st percentile and the last point corresponds to the 99th percentile of share black at the PUMA level. The other points are the deciles (10th, 20th, etc., percentiles). The deciles/percentiles are based on individual-level data and weighted by individual person weights.

Figure 7: PUMA Share Black, Poor, Extremely Poor, and Low-Skilled among Whites and Blacks

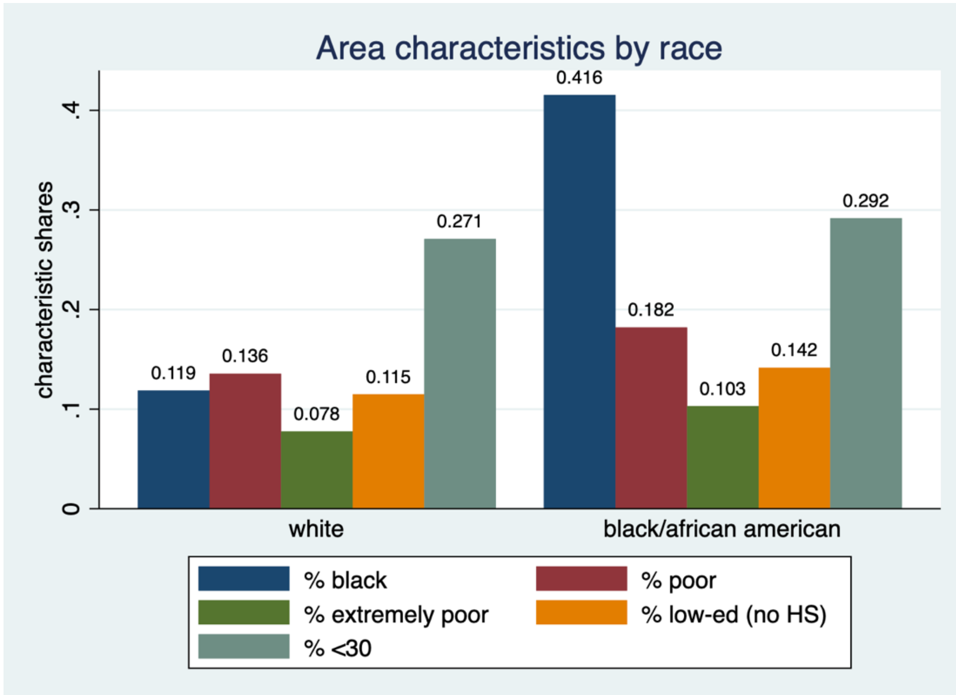
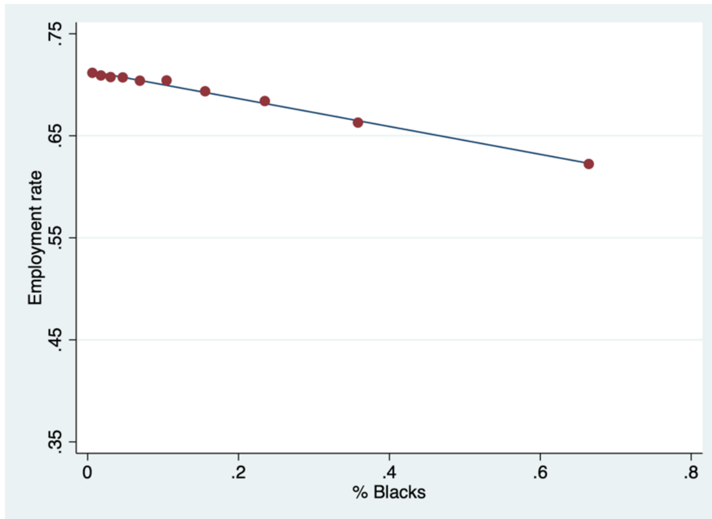
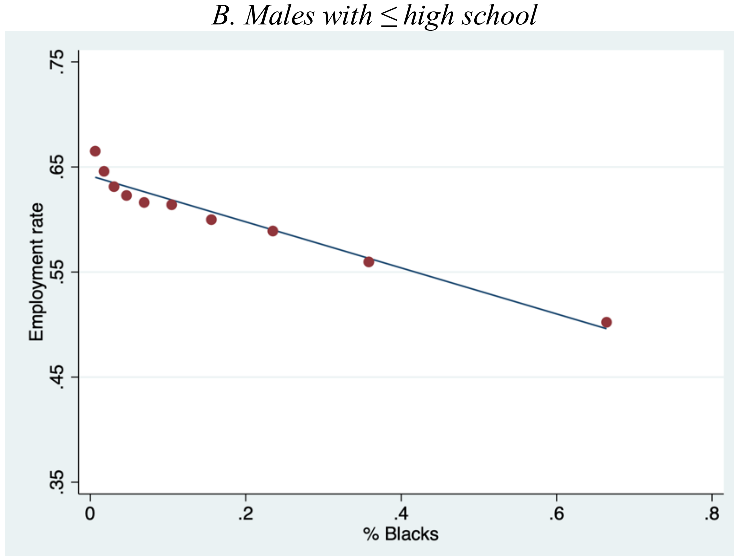


Figure 8: Employment Rate by Decile of Share Black

A. All



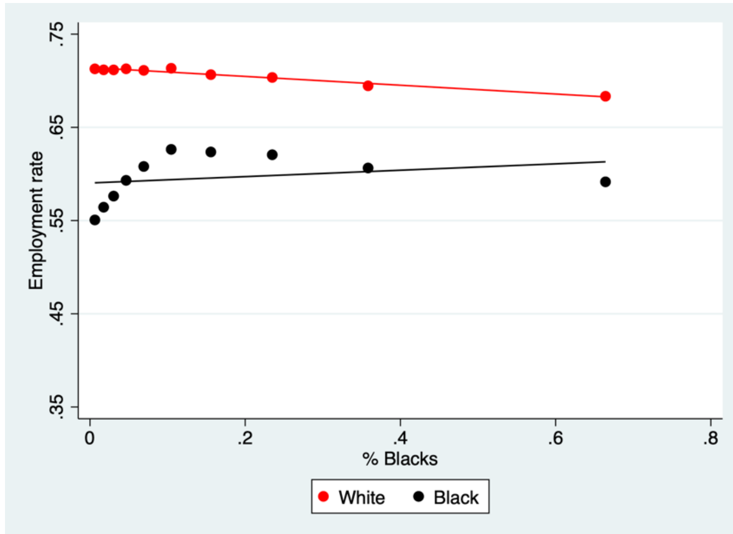
B. Males with ≤ high school



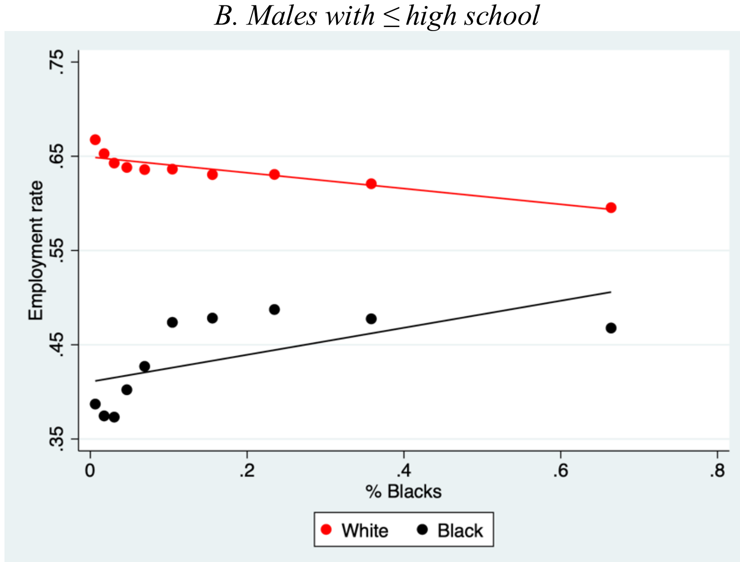
Note: The employment rate and % Black are measured by taking the weighted average over each decile (based on individual-level data and weighted by individual person weights). E.g., the first point (for the 1st decile) represents the weighted average employment rate and the weighted average share of blacks between 1st and 10th percentiles.

Figure 9: Employment Rate by Race and Decile of Share Black

A. All



B. Males with ≤ high school



Note: Same as Figure 8.

Figure 10: Employment Rates by Race and Treatment, and State MW increases (2011-19)

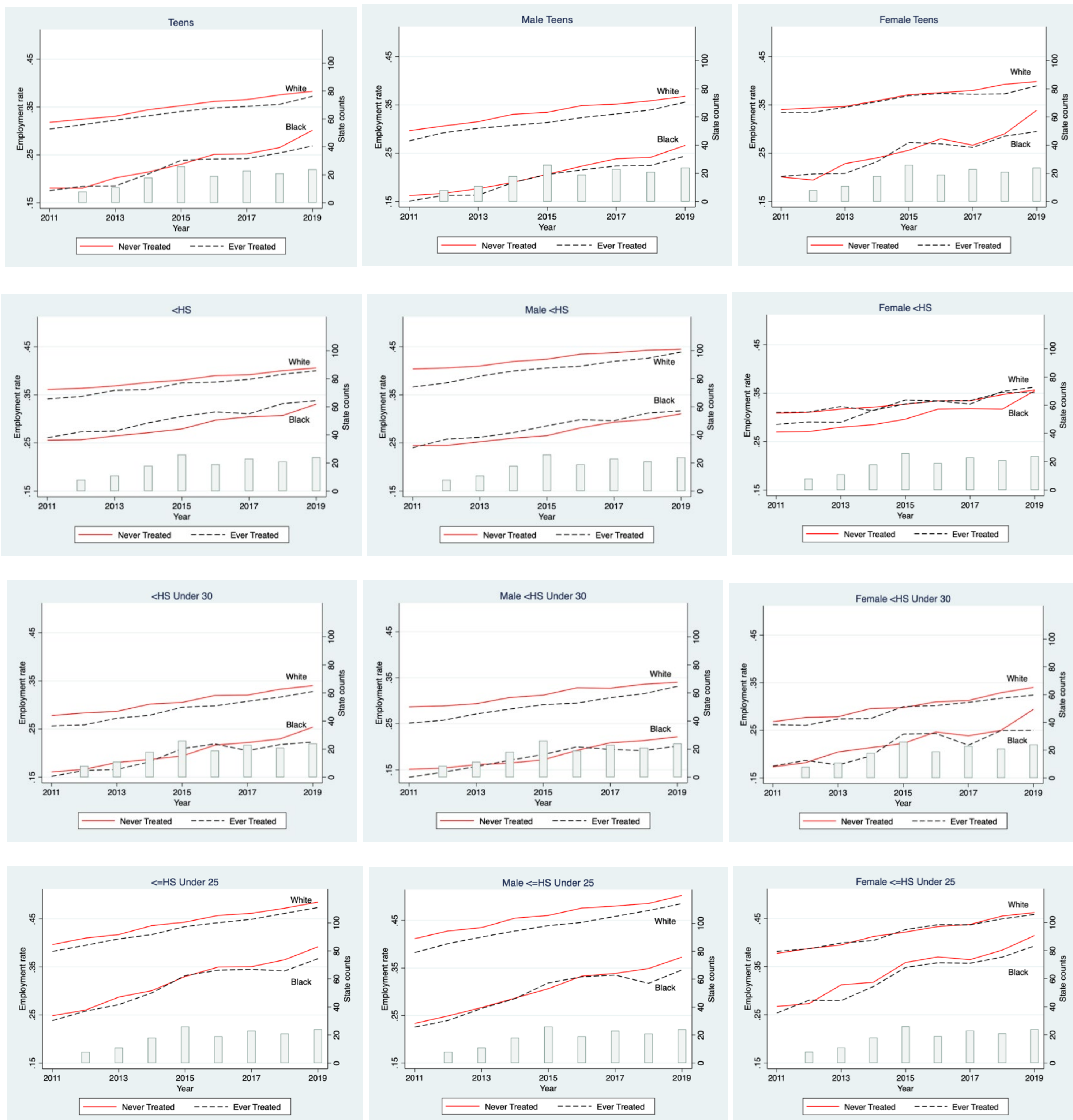
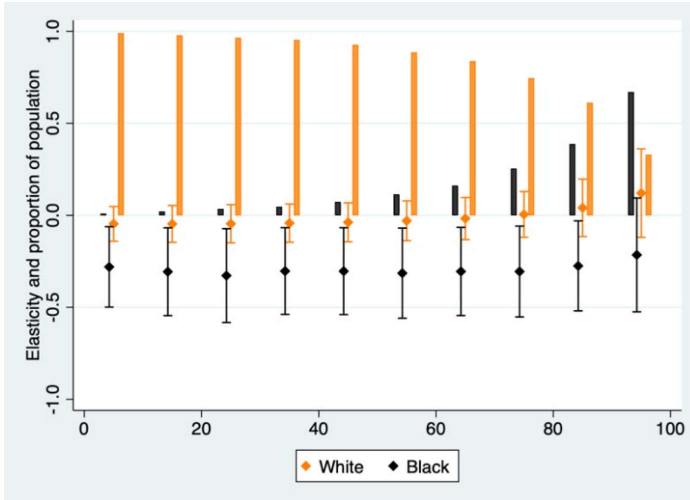


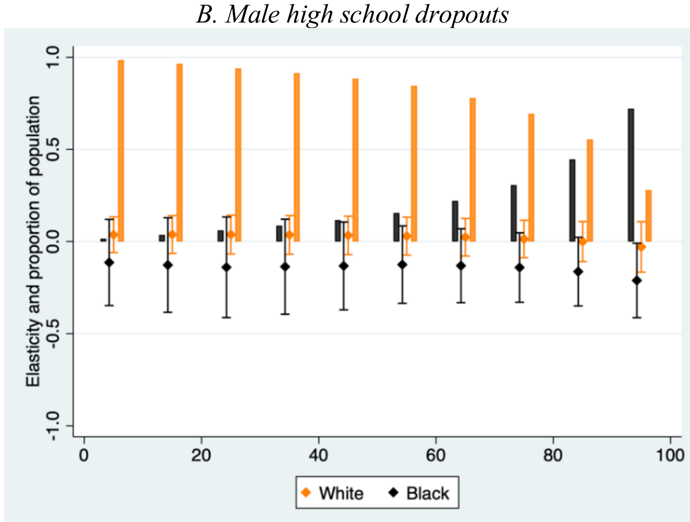
Figure 11: Difference in Employment Rates between Blacks & Whites by Treatment, and State MW increases (2011-19)

Figure 12: Estimated Minimum Wage Employment Effects for Blacks and Whites by Percent Black in Area (Selected Groups)

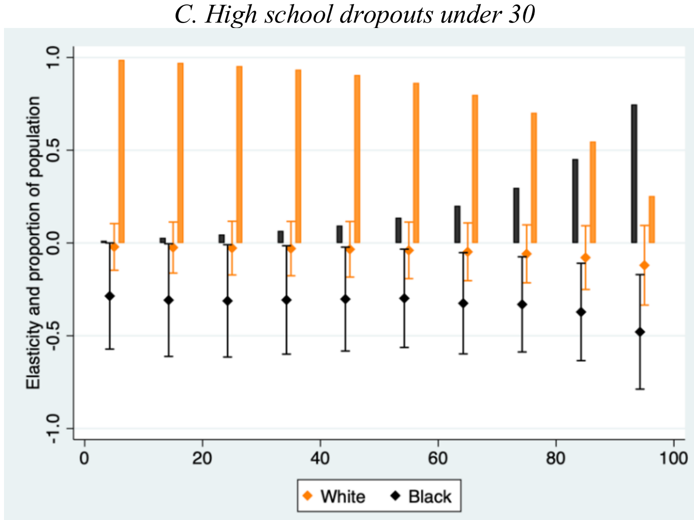
A. Female teens



B. Male high school dropouts

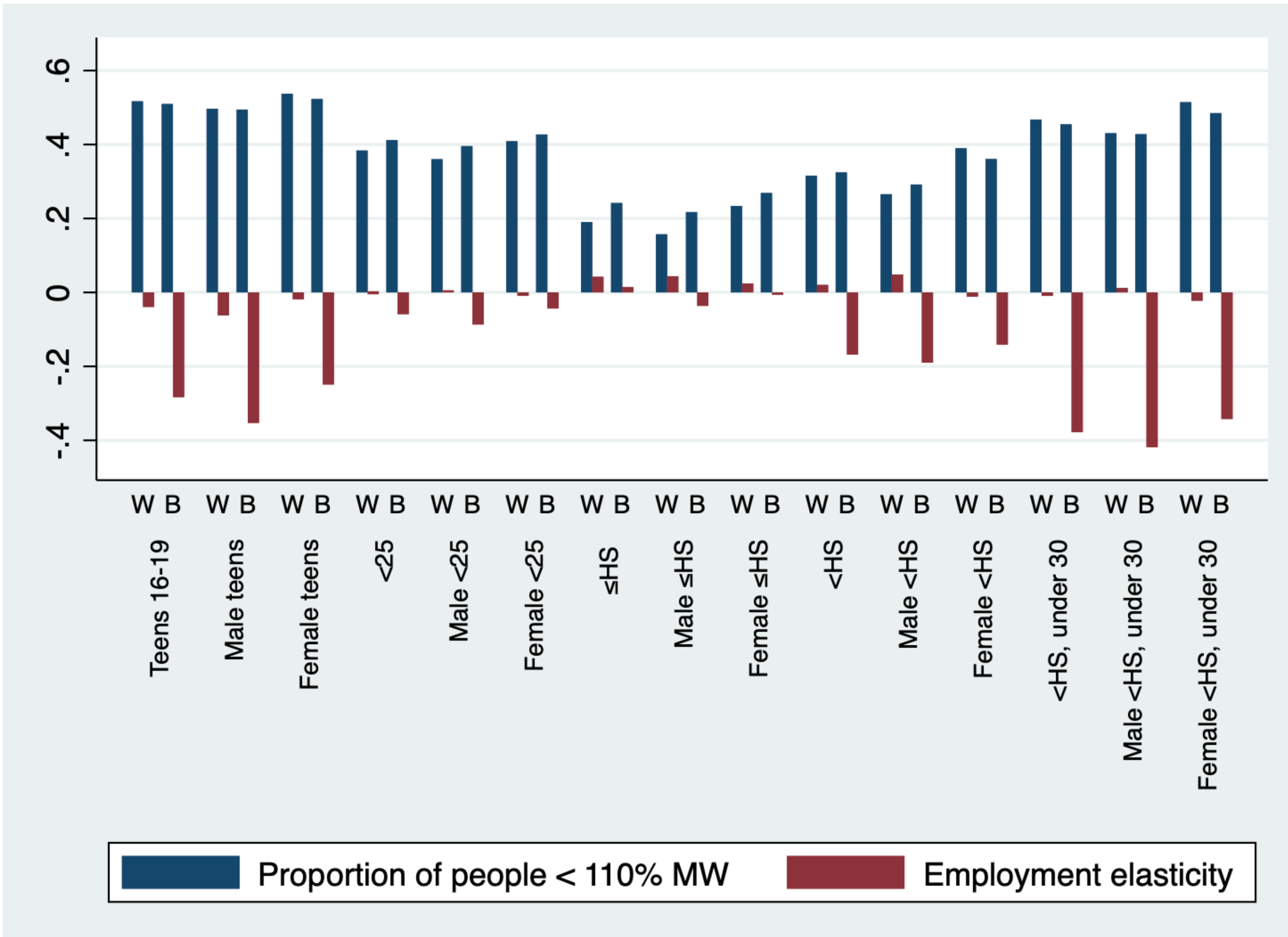


C. High school dropouts under 30



Note: The horizontal axis corresponds to the decile of the share black across PUMAS. Elasticities are measured at the midpoint of each decile (e.g., at the 5th percentile for the first 1st decile). The employment rate is the weighted (by individual person weights) average share employed in each decile.

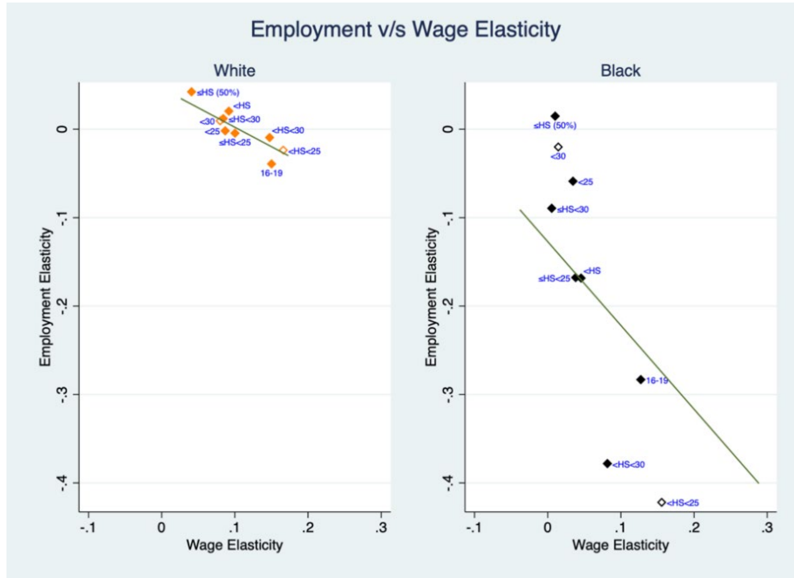
Figure 13: Shares below 110% of the Minimum Wage and Estimated Employment Elasticities



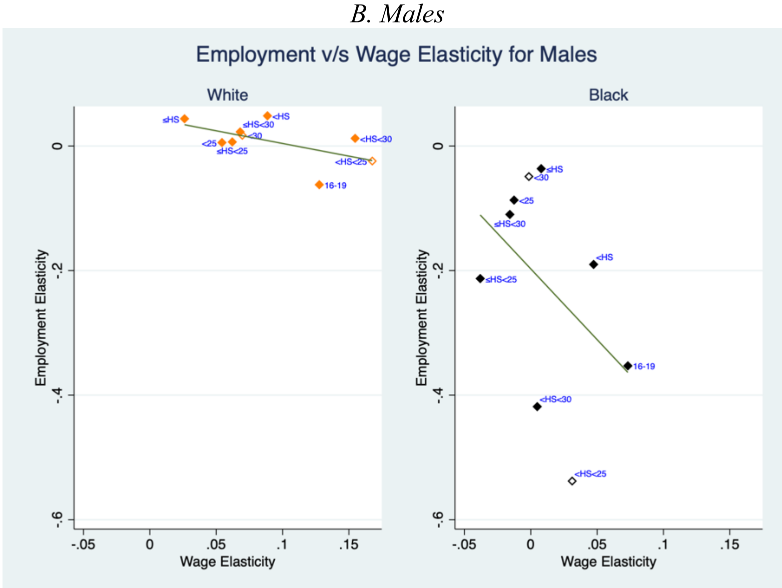
Note: Employment elasticities for at most a high-school education is estimated from a 50% random sample.

Figure 14: Employment and Wage Elasticities

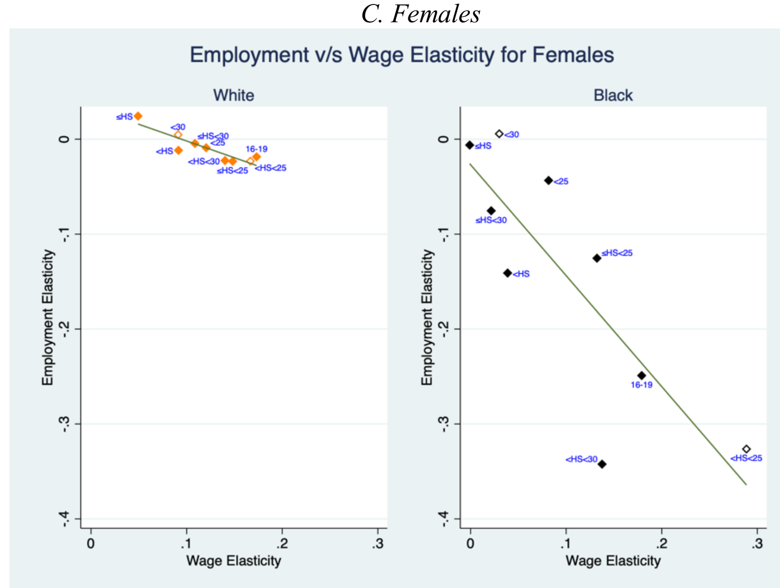
A. All



B. Males



C. Females



Note: Filled markers represent groups in Table 2 and hollow markers represent groups in Table A2. Average wage elasticities for Panel A: 0.11 (Whites) 0.06 (Blacks), Panel B: 0.09 (Whites) 0.01 (Blacks), Panel C: 0.12 (Whites) 0.10 (Blacks).

Table 1: Baseline Minimum Wage-Employment Regressions

Population	Employment effect (β)	Black effect (γ_B)	Avg. empl. rate	Empl. elasticity	N
Teens 16-19	-0.025	-0.080***	0.329	-0.076	1,855,113
	(0.019)	(0.004)		(0.058)	
Male teens	-0.029	-0.088***	0.310	-0.094	954,509
	(0.022)	(0.004)		(0.071)	
Female teens	-0.022	-0.070***	0.350	-0.063	900,602
	(0.019)	(0.004)		(0.054)	
< 25	-0.005	-0.082***	0.518	-0.010	3,833,332
	(0.015)	(0.004)		(0.029)	
Male < 25	-0.004	-0.106***	0.506	-0.008	1,962,020
	(0.018)	(0.004)		(0.036)	
Female < 25	-0.008	-0.054***	0.530	-0.015	1,871,312
	(0.014)	(0.004)		(0.026)	
≤ HS	0.015	-0.071***	0.566	0.027	9,139,046
	(0.017)	(0.005)		(0.030)	
Male ≤ HS	0.019	-0.122***	0.603	0.032	4,900,300
	(0.019)	(0.005)		(0.032)	
Female ≤ HS	0.011	-0.013**	0.524	0.021	4,238,746
	(0.014)	(0.005)		(0.026)	
< HS	-0.006	-0.080***	0.367	-0.016	2,776,506
	(0.020)	(0.005)		(0.054)	
Male < HS	0.001	-0.123***	0.394	0.003	1,541,189
	(0.024)	(0.005)		(0.061)	
Female < HS	-0.013	-0.022***	0.334	-0.039	1,235,317
	(0.018)	(0.006)		(0.054)	
< HS, < 30	-0.020	-0.105***	0.289	-0.069	1,397,624
	(0.024)	(0.004)		(0.083)	
Male < HS, < 30	-0.016	-0.134***	0.290	-0.055	769,149
	(0.027)	(0.005)		(0.093)	
Female < HS, < 30	-0.024	-0.065***	0.289	-0.083	628,473
	(0.025)	(0.005)		(0.087)	
≤ HS, < 30	-0.002	-0.107***	0.468	-0.005	2,790,522
	(0.020)	(0.004)		(0.042)	
Male ≤ HS, < 30	0.001	-0.146***	0.488	0.003	1,563,510
	(0.023)	(0.004)		(0.047)	
Female ≤ HS, < 30	-0.006	-0.053***	0.443	-0.012	1,227,012
	(0.021)	(0.005)		(0.047)	
≤ HS, < 25	-0.012	-0.107***	0.413	-0.029	2,178,302
	(0.020)	(0.004)		(0.048)	
Male ≤ HS, < 25	-0.011	-0.135***	0.420	-0.025	1,201,670
	(0.024)	(0.004)		(0.057)	
Female ≤ HS, < 25	-0.016	-0.069***	0.404	-0.040	976,632
	(0.020)	(0.004)		(0.050)	

Notes: The sample consists of ACS micro-data from 2005-2019 restricting to those aged between 16 to 65. Employment estimates are from linear probability models for an indicator of employment. The demographic controls included are race, sex, number of children, marital status, age and education. Fixed effects are at PUMA and year level. Minimum wages can vary across PUMAs over years. Employment elasticity for each population group is computed by dividing the employment effect (β) by the average employment rate of the group. ACS person sampling weights are used. Reported standard errors are clustered at the state level. The coefficients are statistically significant at the ***1%, **5%, or *1% level.

Table 2: Minimum Wage-Employment Regressions with Separate Effects by Race

Population	Empl. effect white (β)	Black-MW interaction (β_B)	Black overall effect ($\beta + \beta_B$)	Avg. white empl. rate	Avg. black empl. rate	White empl. elasticity	Black empl. elasticity	N	Black − white empl. elasticity
Teens 16-19	-0.014 (0.019)	-0.049*** (0.018)	-0.064** (0.024)	0.357	0.226	-0.039 (0.053)	-0.283** (0.106)	1,855,102	-0.244
Male teens	-0.021 (0.021)	-0.051** (0.020)	-0.072** (0.027)	0.338	0.204	-0.062 (0.062)	-0.353** (0.132)	954,447	-0.291
Female teens	-0.007 (0.021)	-0.055** (0.023)	-0.062** (0.025)	0.377	0.249	-0.019 (0.056)	-0.249** (0.100)	900,516	-0.230
<25	-0.001 (0.015)	-0.024 (0.016)	-0.024 (0.023)	0.547	0.408	-0.002 (0.027)	-0.059 (0.056)	3,833,327	-0.057
Male < 25	0.003 (0.018)	-0.036* (0.019)	-0.033 (0.026)	0.539	0.380	0.006 (0.033)	-0.087 (0.068)	1,962,011	-0.092
Female < 25	-0.005 (0.014)	-0.014 (0.021)	-0.019 (0.024)	0.555	0.437	-0.009 (0.025)	-0.043 (0.055)	1,871,287	-0.034
≤ HS (50% sample)	0.025 (0.016)	-0.017 (0.012)	0.007 (0.023)	0.591	0.475	0.042 (0.027)	0.015 (0.048)	4,571,159	-0.028
Male ≤ HS	0.028 (0.020)	-0.045*** (0.015)	-0.017 (0.024)	0.639	0.467	0.044 (0.031)	-0.036 (0.051)	4,900,299	-0.080
Female ≤ HS	0.013 (0.013)	-0.015 (0.017)	-0.003 (0.026)	0.534	0.486	0.024 (0.024)	-0.006 (0.053)	4,238,743	-0.031
< HS	0.008 (0.018)	-0.059*** (0.016)	-0.050** (0.023)	0.392	0.297	0.020 (0.046)	-0.168** (0.077)	2,776,503	-0.189
Male < HS	0.021 (0.023)	-0.075*** (0.019)	-0.054** (0.025)	0.433	0.284	0.048 (0.053)	-0.190** (0.088)	1,541,183	-0.239
Female < HS	-0.004 (0.017)	-0.040* (0.022)	-0.044* (0.026)	0.342	0.312	-0.012 (0.050)	-0.141* (0.083)	1,235,277	-0.129
< HS, < 30	-0.003 (0.024)	-0.073*** (0.021)	-0.076*** (0.026)	0.319	0.201	-0.009 (0.072)	-0.378*** (0.129)	1,397,602	-0.369
Male < HS, < 30	0.004 (0.027)	-0.081*** (0.024)	-0.077*** (0.028)	0.325	0.184	0.012 (0.083)	-0.418*** (0.152)	769,093	-0.431
Female < HS, < 30	-0.007 (0.026)	-0.068** (0.027)	-0.076** (0.032)	0.311	0.222	-0.023 (0.085)	-0.342** (0.144)	628,323	-0.320
≤ HS, < 30	0.006 (0.019)	-0.039** (0.018)	-0.033 (0.027)	0.499	0.369	0.012 (0.038)	-0.089 (0.073)	2,790,517	-0.101
Male ≤ HS, < 30	0.012 (0.023)	-0.051** (0.023)	-0.039 (0.028)	0.529	0.355	0.023 (0.043)	-0.110 (0.079)	1,563,494	-0.133
Female ≤ HS, < 30	-0.002 (0.019)	-0.025 (0.025)	-0.027 (0.035)	0.443	0.358	-0.005 (0.043)	-0.075 (0.098)	1,226,976	-0.071
≤ HS, < 25	-0.002 (0.021)	-0.050*** (0.017)	-0.052** (0.024)	0.445	0.310	-0.004 (0.047)	-0.168** (0.077)	2,178,295	-0.163
Male ≤ HS, < 25	0.003 (0.024)	-0.066** (0.025)	-0.063** (0.029)	0.458	0.296	0.007 (0.052)	-0.213** (0.098)	1,201,644	-0.219
Female ≤ HS, < 25	-0.010 (0.021)	-0.031 (0.020)	-0.041 (0.027)	0.429	0.327	-0.023 (0.049)	-0.125 (0.083)	976,575	-0.102

Notes: Same as Table 1. Note that in one case we use a random subsample of the full dataset (as indicated by the % reported); we did this when there were very large sample sizes and numbers of controls (with interactions). Additionally, all controls and fixed effects are interacted with race. The sample sizes sometimes differ slightly from Table 1 because the high-dimensional fixed effects estimator (*reghdfe* in Stata) can drop different numbers of observations for coefficients of fixed effects that cannot be estimated, depending on the specification.

Table 3: Minimum Wage-Employment Regressions with Separate Effects by Race & Share Black in Area

Population	Empl. effect, white (β)	Black-MW interaction (β_B)	%Black-MW interaction ($\beta_{\%B}$)	Effect at percentile of %Black	Avg. white empl. rate	Avg. black empl. rate	White empl. elas.	Black empl. elas.	Black − white empl. elas.
Teens	-0.023	-0.051*	0.037	10^{th}	0.398	0.292	-0.056	-0.251**	-0.196
	(0.019)	(0.026)	(0.040)				(0.047)	(0.118)	
				50^{th}	0.350	0.275	-0.055	-0.257**	-0.202
							(0.052)	(0.118)	
				90^{th}	0.303	0.217	-0.019	-0.263**	-0.244
							(0.068)	(0.119)	
Teens Male	-0.024	-0.036	-0.008	10^{th}	0.375	0.237	-0.065	-0.256	-0.192
	(0.024)	(0.028)	(0.051)				(0.064)	(0.176)	
				50^{th}	0.333	0.248	-0.075	-0.248	-0.173
							(0.065)	(0.156)	
				90^{th}	0.295	0.197	-0.095	-0.327**	-0.232
							(0.066)	(0.133)	
Teens Female	-0.021	-0.082**	0.096	10^{th}	0.422	0.364	-0.047	-0.279**	-0.232
	(0.021)	(0.035)	(0.062)				(0.048)	(0.108)	
				50^{th}	0.368	0.303	-0.035	-0.312**	-0.277
							(0.054)	(0.121)	
				90^{th}	0.313	0.237	0.072	-0.251*	-0.322
							(0.093)	(0.127)	
< HS	0.008	-0.039*	-0.043	10^{th}	0.417	0.279	0.017	-0.113	-0.131
	(0.020)	(0.020)	(0.033)				(0.048)	(0.117)	
				50^{th}	0.385	0.294	0.011	-0.118	-0.129
							(0.048)	(0.106)	
				90^{th}	0.373	0.300	-0.031	-0.168*	-0.137
							(0.044)	(0.085)	
< HS Males	0.017	-0.048**	-0.049	10^{th}	0.454	0.258	0.037	-0.120	-0.157
	(0.023)	(0.021)	(0.042)				(0.050)	(0.122)	
				50^{th}	0.424	0.274	0.031	-0.126	-0.157
							(0.052)	(0.109)	
				90^{th}	0.426	0.293	-0.011	-0.179*	-0.168
							(0.058)	(0.093)	
< HS Females	0.001	-0.024	-0.050	10^{th}	0.371	0.323	0.001	-0.073	-0.074
	(0.020)	(0.033)	(0.044)				(0.052)	(0.132)	
				50^{th}	0.337	0.321	-0.010	-0.085	-0.075
							(0.052)	(0.125)	
				90^{th}	0.308	0.308	-0.071	-0.148	-0.078
							(0.057)	(0.097)	
< HS, < 30	-0.008	-0.055**	-0.042	10^{th}	0.360	0.221	-0.023	-0.286**	-0.263
	(0.024)	(0.022)	(0.039)				(0.065)	(0.141)	
				50^{th}	0.307	0.221	-0.036	-0.299**	-0.263
							(0.075)	(0.135)	
				90^{th}	0.279	0.203	-0.095	-0.401***	-0.306
							(0.093)	(0.134)	

Population	Empl. effect, white (β)	Black-MW interaction (β_B)	%Black-MW interaction ($\beta_{\%B}$)	Effect at percentile of %Black	Avg. white empl. rate	Avg. black empl. rate	White empl. elas.	Black empl. elas.	Black − white empl. elas.
< HS, < 30, Males	-0.003	-0.047	-0.068	10th	0.365	0.198	-0.011	-0.257	-0.246
	(0.026)	(0.035)	(0.064)				(0.071)	(0.181)	
				50th	0.314	0.201	-0.029	-0.277*	-0.248
							(0.084)	(0.163)	
				90th	0.297	0.189	-0.114	-0.427***	-0.313
							(0.128)	(0.138)	
< HS, < 30, Females	-0.012	-0.073*	0.007	10th	0.354	0.268	-0.035	-0.317	-0.283
	(0.027)	(0.037)	(0.058)				(0.077)	(0.193)	
				50th	0.299	0.248	-0.039	-0.341*	-0.302
							(0.084)	(0.196)	
				90th	0.257	0.220	-0.036	-0.373**	-0.337
							(0.100)	(0.165)	

Notes: Same as Table 1. Additional controls include share black in the PUMA every year. All controls and fixed effects are interacted with race and share black. Employment rate is measured in a ± 5 percentile interval around the specified percentile – for e.g., employment rate for 10th percentile is calculated by taking the weighted average employment (weighted by individual person weights) in the interval between 5th and 15th percentile.

Table 4: Minimum Wage-Earnings Weighted Regressions with Separate Effects by Race

Population	Earnings effect white (β)	Black-MW interaction (β_B)	Black overall effect ($\beta + \beta_B$)	Avg. white earnings	Avg. black earnings	White earnings elasticity	Black earnings elasticity	N	Black − white earnings elasticity
Teens 16-19	62.908	-902.910***	-840.002**	2640.065	1922.450	0.024	-0.437**	1,855,102	-0.461
	(279.241)	(307.289)	(381.207)			(0.106)	(0.198)		
Male teens	-65.395	-869.190**	-934.585*	2822.391	1870.817	-0.023	-0.500*	954,447	-0.476
	(336.732)	(346.400)	(511.927)			(0.119)	(0.274)		
Female teens	196.179	-1017.121***	-820.942**	2447.591	1976.392	0.080	-0.415**	900,516	-0.496
	(265.673)	(356.113)	(359.037)			(0.109)	(0.182)		
<25	1118.091**	-971.015*	147.076	8711.434	6208.253	0.128**	0.024	3,833,327	-0.105
	(503.832)	(532.783)	(715.563)			(0.058)	(0.115)		
Male < 25	711.750	-802.396	-90.646	9653.385	6245.032	0.074	-0.015	1,962,011	-0.088
	(614.104)	(530.695)	(782.363)			(0.064)	(0.125)		
Female < 25	1548.506***	-1217.406**	331.100	7719.574	6170.582	0.201***	0.054	1,871,287	-0.147
	(439.423)	(604.747)	(698.071)			(0.057)	(0.113)		
≤ HS (50% sample)	2104.912**	-852.118	1252.794**	18770.427	12899.990	0.112**	0.097**	4,571,159	-0.015
	(937.680)	(725.644)	(570.157)			(0.050)	(0.044)		
Male ≤ HS	2209.586*	-1047.430	1162.155*	23751.276	14120.430	0.093*	0.082*	4,900,299	-0.011
	(1182.725)	(944.890)	(639.718)			(0.050)	(0.045)		
Female ≤ HS	1117.740**	-338.540	779.200	12931.881	11500.180	0.086**	0.068	4,238,743	-0.019
	(524.163)	(426.041)	(705.673)			(0.041)	(0.061)		
< HS	900.085	-822.178	77.906	8744.319	6501.108	0.103	0.012	2,776,503	-0.091
	(557.760)	(573.559)	(612.225)			(0.064)	(0.094)		
Male < HS	1460.036	-1525.090	-65.055	11631.152	7069.003	0.126	-0.009	1,541,183	-0.135
	(1027.170)	(931.078)	(670.993)			(0.088)	(0.095)		
Female < HS	357.590	-10.940	346.650	5188.473	5837.431	0.069	0.059	1,235,277	-0.010
	(312.370)	(910.539)	(797.953)			(0.060)	(0.137)		
< HS, < 30	-38.938	-627.104*	-666.043*	3374.205	2675.374	-0.012	-0.249*	1,397,602	-0.237
	(383.053)	(352.965)	(344.730			(0.114)	(0.129)		
Male < HS, < 30	97.480	-1544.427***	-1446.947***	4261.332	2770.605	0.023	-0.522***	769,093	-0.545
	(560.720)	(527.582)	(460.485)			(0.132)	(0.166)		
Female < HS, < 30	-151.930	431.295	279.365	2330.367	2557.187	-0.065	0.109	628,323	0.174
	(243.217)	(408.538)	(393.172)			(0.104)	(0.154)		
≤ HS, < 30	429.416	-715.147*	-285.731	9073.915	6703.965	0.047	-0.043	2,790,517	-0.090
	(602.132)	(396.682)	(557.792)			(0.066)	(0.083)		
Male ≤ HS, < 30	481.698	-1040.882*	-559.184	11308.153	7140.771	0.043	-0.078	1,563,494	-0.121
	(792.756)	(567.620)	(614.403)			(0.070)	(0.086)		
Female ≤ HS, < 30	412.2429	-414.4694	-2.226411	5575.026	6174.163	0.074	0.000	1,226,976	-0.074
	(442.202)	(543.413)	(763.011)			(0.079)	(0.124)		
≤ HS, < 25	160.852	-978.588*	-817.735*	5973.387	4335.080	0.027	-0.189*	2,178,295	-0.216
	(547.201)	(498.356)	(450.750)			(0.092)	(0.104)		
Male ≤ HS, < 25	-58.858	-1295.268**	-1354.127**	7236.496	4568.169	-0.008	-0.296**	1,201,644	-0.288
	(721.655)	(556.039)	(572.563)			(0.100)	(0.125)		
Female ≤ HS, < 25	389.270	-574.750	-185.481	4430.302	4056.508	0.088	-0.046	976,575	-0.134
	(417.588)	(609.653)	(556.050)			(0.094)	(0.137)		

Notes: Same as Table 2.

Table 5: "Simulated" Minimum Wage Effects on Employment in White vs. Black Areas for High School Dropouts under Age 30, Increase from $7.25 (Federal Minimum Wage) to $12 (California Minimum Wage in 2019)

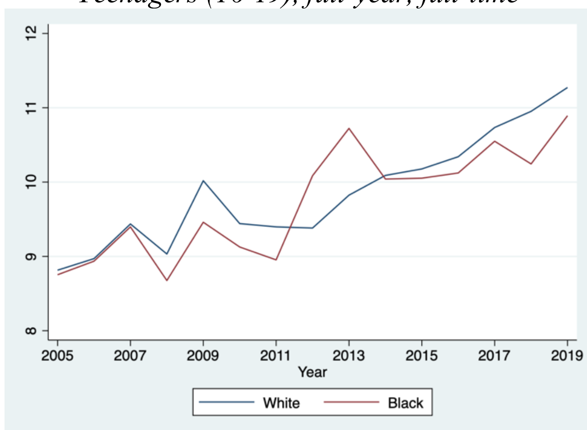
	Homogeneous effects by %Black (Table 2)		**Heterogeneous effects by %Black (Table 3)**	
Share black percentile	**10th**	**90th**	**10th**	**90th**
White sub-population share	.979	.440	.979	.440
Black sub-population share	.021	.560	.021	.560
White employment rate	.360	.279	.360	.279
Black employment rate	.221	.203	.221	.203
Weighted employment rate	.357	.236	.357	.236
White MW-empl. elas.	-.008	-.011	-.023	-.095
Black MW-empl. elas.	-.344	-.374	-.286	-.401
Weighted empl. elas.	**-.015**	**-.214**	**-.028**	**-.266**
Impact of MW increase ($7.25 to $12) on empl. rate	**-.003**	**-.029**	**-.006**	**-.037**

Note: "Sup-population shares" include only blacks and white, and refer to shares among high school dropouts under 30. Employment rate is measured in a ± 5 percentile interval around the specified percentile— for e.g., employment rate for 10th percentile is calculated by taking the weighted average employment (weighted by individual person weights) in the interval between 5th and 15th percentile. Minimum wage-employment elasticities for homogeneous effect by %Black are based on estimates in Table 2, and for heterogeneous effect by %Black are based on estimates in Table 3. Weighted employment rate and weighted elasticities are based on the sub-population shares. The last row is computed using separate elasticities and employment rates by race.

Appendix Figures and Tables

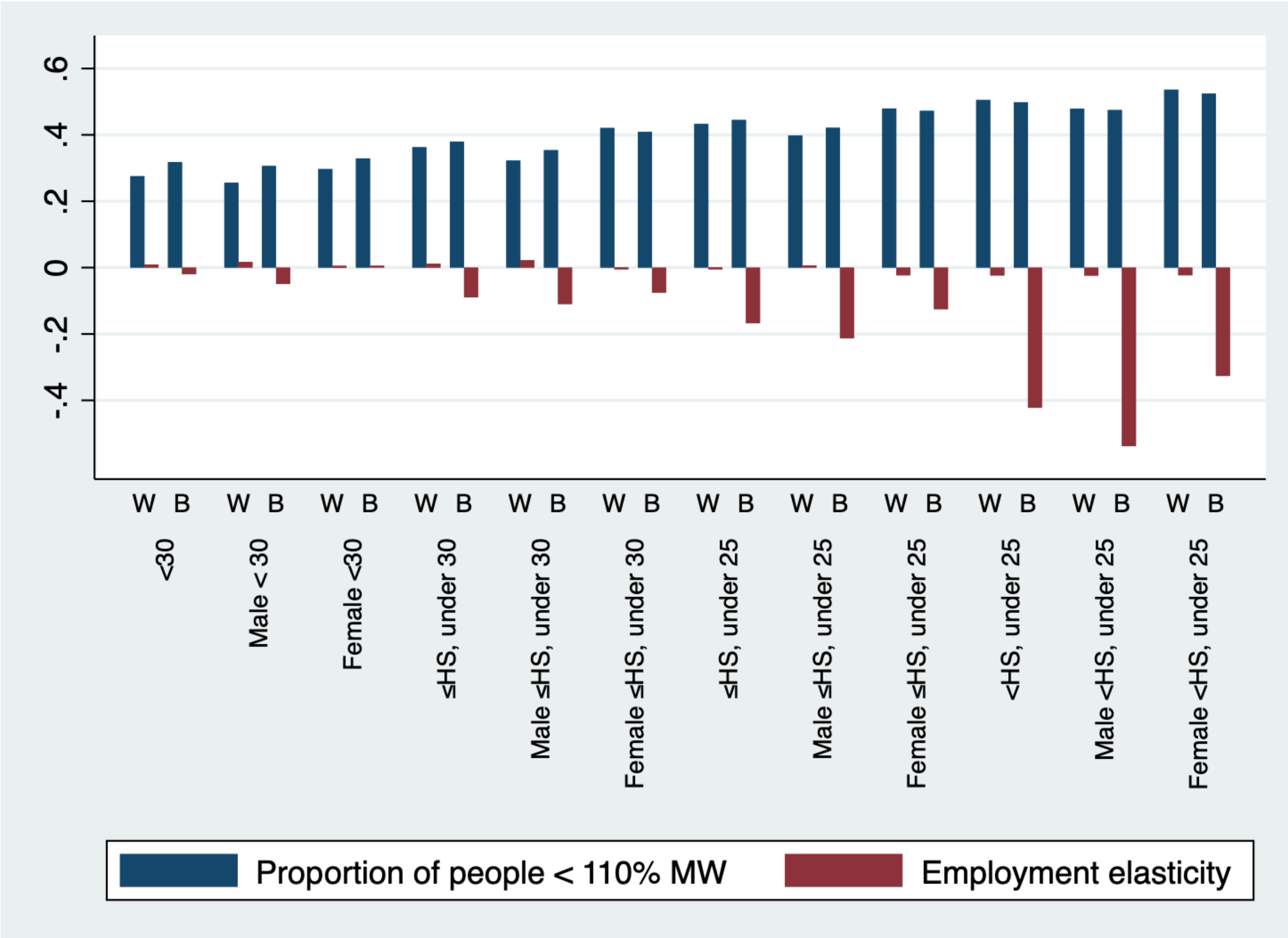
Appendix Figure A1: Hourly Wages by Year, Blacks and Whites

Teenagers (16-19), full-year, full-time



Note: Wages in each year are in nominal terms (in the respective year's dollar value) and weighted by individual person weights.

Appendix Figure A2: Shares below 110% of the Minimum Wage and Estimated Employment Elasticities



Appendix Table A1: HHIs (for Various Industries) for PUMAs with 10th and 90th Percentiles of Share Black (in 2019)

A. 10th percentile of share black (each PUMA weighted by population)

	Retail (NAICS = 44,45)	**Food & Accommodation (NAICS = 72)**	**Low wage (NAICS = 44,45,71,72,56,81)**	**All**
HHI (estab)	112.38	76.62	30.77	21.35
HHI (firm)	139.01	80.78	33.58	44.42
Count (estab)	1115	506	6253	14663
Employment	9110	8079	33544	100765

B. 90th percentile of share black (each PUMA weighted by population)

	Retail (NAICS = 44,45)	**Food & Accommodation (NAICS = 72)**	**Low wage (NAICS = 44,45,71,72,56,81)**	**All**
HHI (estab)	237.59	53.75	38.59	46.60
HHI (firm)	256.37	58.05	41.56	78.10
Count (estab)	807	334	4023	9276
Employment	7018	4639	19174	62182

Note: All are weighted average across individuals for PUMAS at the 10th and 90th percentiles of the share black based on individual-level data.

Appendix Table A2: Minimum Wage-Employment Regressions with Separate Effects by Race, Additional Groups

Population	Empl. effect white (β)	Black-MW interaction (β_B)	Black overall effect ($\beta + \beta_B$)	Avg. white empl. rate	Avg. black empl. rate	White empl. elasticity	Black empl. elasticity	N	Black − white empl. elasticity
<30	0.006 (0.012)	-0.016 (0.018)	-0.010 (0.022)	0.636	0.498	0.009 (0.019)	-0.020 (0.044)	5,798,461	-0.030
Male < 30	0.011 (0.015)	-0.034** (0.016)	-0.023 (0.020)	0.642	0.469	0.017 (0.023)	-0.049 (0.043)	2,940,571	-0.066
Female < 30	0.003 (0.011)	-0.001 (0.027)	0.003 (0.029)	0.628	0.528	0.005 (0.018)	0.006 (0.055)	2,857,877	0.001
< HS, < 25	-0.007 (0.023)	-0.066*** (0.024)	-0.073*** (0.024)	0.296	0.173	-0.024 (0.078)	-0.422*** (0.139)	1,252,129	-0.398
Male < HS, < 25	-0.007 (0.026)	-0.078*** (0.027)	-0.085*** (0.027)	0.290	0.158	-0.024 (0.090)	-0.538*** (0.171)	681,728	-0.514
Female < HS, < 25	-0.007 (0.026)	-0.056* (0.031)	-0.063** (0.029)	0.302	0.193	-0.023 (0.086)	-0.326** (0.150)	570,161	-0.303

Notes: Same as Table 2.

Appendix Table A3: State Minimum Wage-Employment Weighted Regressions with Separate Effects by Race

Population	Empl. effect white (β)	Black-MW interaction (β_B)	Black overall effect ($\beta + \beta_B$)	Avg. white empl. rate	Avg. black empl. rate	White empl. elasticity	Black empl. elasticity	N	Black − white empl. elasticity
Teens 16-19	-0.018 (0.022)	-0.064** (0.027)	-0.082** (0.036)	0.357	0.226	-0.050 (0.062)	-0.363** (0.159)	1,855,113	-0.312
Male teens	-0.025 (0.024)	-0.054* (0.030)	-0.079* (0.041)	0.338	0.204	-0.074 (0.071)	-0.387* (0.201)	954,510	-0.313
Female teens	-0.010 (0.024)	-0.073** (0.032)	-0.083** (0.035)	0.377	0.249	-0.027 (0.064)	-0.333** (0.141)	900,603	-0.307
<25	-0.001 (0.016)	-0.033 (0.026)	-0.033 (0.034)	0.547	0.408	-0.001 (0.029)	-0.081 (0.083)	3,833,332	-0.080
Male < 25	0.001 (0.019)	-0.029 (0.027)	-0.029 (0.038)	0.539	0.380	0.001 (0.035)	-0.076 (0.100)	1,962,020	-0.078
Female < 25	-0.002 (0.016)	-0.033 (0.035)	-0.035 (0.038)	0.555	0.437	-0.004 (0.029)	-0.080 (0.087)	1,871,312	-0.076
≤ HS (50% sample)	0.021 (0.016)	-0.017 (0.019)	0.004 (0.030)	0.591	0.475	0.036 (0.027)	0.008 (0.063)	4,571,162	-0.027
Male ≤ HS	0.029 (0.019)	-0.052** (0.021)	-0.023 (0.033)	0.639	0.467	0.045 (0.030)	-0.049 (0.071)	4,900,300	-0.095
Female ≤ HS	0.008 (0.013)	-0.012 (0.026)	-0.004 (0.034)	0.534	0.486	0.015 (0.024)	-0.008 (0.070)	4,238,746	-0.023
< HS	0.011 (0.020)	-0.065** (0.026)	-0.054 (0.036)	0.392	0.297	0.028 (0.050)	-0.182 (0.121)	2,776,506	-0.210
Male < HS	0.024 (0.022)	-0.081*** (0.025)	-0.057 (0.036)	0.433	0.284	0.055 (0.051)	-0.201 (0.127)	1,541,189	-0.256
Female < HS	-0.002 (0.019)	-0.047 (0.033)	-0.049 (0.039)	0.342	0.312	-0.006 (0.056)	-0.157 (0.125)	1,235,317	-0.151
< HS, < 30	-0.002 (0.026)	-0.090*** (0.029)	-0.093** (0.036)	0.319	0.201	-0.006 (0.082)	-0.463** (0.179)	1,397,624	-0.456
Male < HS, < 30	-0.002 (0.028)	-0.083** (0.031)	-0.084** (0.036)	0.325	0.184	-0.006 (0.086)	-0.457** (0.196)	769,150	-0.450
Female < HS, < 30	-0.002 (0.027)	-0.098** (0.038)	-0.100** (0.043)	0.311	0.222	-0.006 (0.087)	-0.450** (0.193)	628,474	-0.444
≤ HS, < 30	0.007 (0.020)	-0.056** (0.024)	-0.049 (0.036)	0.499	0.369	0.014 (0.040)	-0.133 (0.098)	2,790,522	-0.147
Male ≤ HS, < 30	0.012 (0.023)	-0.069** (0.029)	-0.057 (0.038)	0.529	0.355	0.023 (0.043)	-0.161 (0.107)	1,563,510	-0.183
Female ≤ HS, < 30	0.001 (0.020)	-0.038 (0.033)	-0.037 (0.044)	0.443	0.358	0.001 (0.045)	-0.103 (0.123)	1,227,012	-0.105
≤ HS, < 25	-0.003 (0.022)	-0.063** (0.024)	-0.066* (0.033)	0.445	0.310	-0.007 (0.049)	-0.213* (0.106)	2,178,302	-0.206
Male ≤ HS, < 25	-0.0004 (0.025)	-0.072* (0.030)	-0.073* (0.039)	0.458	0.296	-0.001 (0.055)	-0.247* (0.132)	1,201,670	-0.246
Female ≤ HS, < 25	-0.007 (0.022)	-0.050 (0.031)	-0.056 (0.038)	0.429	0.327	-0.016 (0.051)	-0.171 (0.116)	976,632	-0.155

Notes: Same as Table 2.

Appendix Table A4: State Minimum Wage-Employment Weighted Regressions with 1, 2 and 3 Period Lead interacted by Race

Population	Empl. effect white (β_W)	Black overall effect ($\beta_W + \beta_B$)	Empl. effect white, 1-year lead	Black overall effect, 1-year lead	Empl. effect white, 2-year lead	Black overall effect, 2-year lead	Empl. effect white, 3-year lead	Black overall effect, 3-year lead	N
Teens 16-19	-0.001	-0.028	-0.015	-0.060*	0.014	0.022	-0.019	-0.017	1,855,113
	(0.025)	(0.038)	(0.020)	(0.033)	(0.026)	(0.031)	(0.023)	(0.027)	
Male teens	-0.008	-0.033	-0.052*	-0.080*	0.068*	0.038	-0.032	-0.002	954,510
	(0.030)	(0.048)	(0.027)	(0.042)	(0.035)	(0.049)	(0.028)	(0.038)	
Female teens	0.007	-0.021	0.023	-0.043	-0.043	0.011	-0.005	-0.035	900,603
	(0.027)	(0.048)	(0.026)	(0.046)	(0.029)	(0.032)	(0.027)	(0.029)	
<25	-0.005	-0.009	0.009	-0.022	0.021	0.016	-0.029	-0.020	3,833,332
	(0.019)	(0.036)	(0.014)	(0.022)	(0.018)	(0.025)	(0.019)	(0.025)	
Male < 25	-0.013	0.006	0.011	-0.027	0.036	0.030	-0.035	-0.041	1,962,020
	(0.024)	(0.043)	(0.016)	(0.033)	(0.024)	(0.042)	(0.022)	(0.036)	
Female < 25	0.003	-0.019	0.009	-0.019	0.005	0.002	-0.023	0.002	1,871,312
	(0.018)	(0.047)	(0.016)	(0.039)	(0.024)	(0.047)	(0.022)	(0.035)	
≤ HS (50% sample)	0.016	-0.030	0.001	0.062***	0.007	-0.039	-0.002	0.010	4,571,162
	(0.014)	(0.026)	(0.009)	(0.021)	(0.019)	(0.024)	(0.014)	(0.017)	
Male ≤ HS	0.014	-0.054*	0.013	0.036	0.008	-0.019	-0.006	0.015	4,900,300
	(0.018)	(0.030)	(0.012)	(0.025)	(0.020)	(0.025)	(0.014)	(0.020)	
Female ≤ HS	0.009	-0.008	0.0002	0.027	-0.013	-0.007	0.012	-0.019	4,238,746
	(0.012)	(0.032)	(0.012)	(0.030)	(0.015)	(0.035)	(0.013)	(0.021)	
< HS	0.017	-0.061*	-0.018	0.005	0.026	0.009	-0.012	-0.007	2,776,506
	(0.017)	(0.032)	(0.017)	(0.030)	(0.026)	(0.031)	(0.019)	(0.022)	
Male < HS	0.034	-0.076*	-0.042**	0.011	0.045	-0.002	-0.009	0.013	1,541,189
	(0.021)	(0.039)	(0.020)	(0.035)	(0.034)	(0.039)	(0.026)	(0.028)	
Female < HS	0.002	-0.048	0.012	0.006	-0.007	0.018	-0.013	-0.027	1,235,317
	(0.020)	(0.041)	(0.023)	(0.039)	(0.026)	(0.042)	(0.019)	(0.028)	
< HS, < 30	0.012	-0.057	-0.020	-0.062*	0.023	0.024	-0.019	0.005	1,397,624
	(0.023)	(0.038)	(0.025)	(0.036)	(0.030)	(0.042)	(0.023)	(0.035)	
Male < HS, < 30	0.014	-0.044	-0.053**	-0.075	0.057	-0.005	-0.018	0.045	769,150
	(0.027)	(0.048)	(0.021)	(0.047)	(0.041)	(0.056)	(0.032)	(0.045)	
Female < HS, < 30	0.011	-0.078	0.026	-0.035	-0.028	0.046	-0.021	-0.035	628,474
	(0.030)	(0.052)	(0.041)	(0.051)	(0.032)	(0.045)	(0.024)	(0.039)	
≤ HS, < 30	-0.001	-0.038	0.015	-0.008	0.021	-0.008	-0.030	0.005	2,790,522
	(0.021)	(0.034)	(0.017)	(0.027)	(0.021)	(0.026)	(0.019)	(0.026)	
Male ≤ HS, < 30	-0.005	-0.060	0.012	-0.018	0.035	0.002	-0.030	0.022	1,563,510
	(0.026)	(0.049)	(0.015)	(0.037)	(0.024)	(0.035)	(0.020)	(0.037)	
Female ≤ HS, < 30	0.007	-0.011	0.021	0.006	-0.011	-0.028	-0.022	-0.009	1,227,012
	(0.024)	(0.047)	(0.029)	(0.051)	(0.027)	(0.048)	(0.023)	(0.034)	
≤ HS, < 25	-0.001	-0.027	0.0003	-0.034	0.021	-0.013	-0.025	0.007	2,178,302
	(0.022)	(0.034)	(0.019)	(0.025)	(0.025)	(0.027)	(0.020)	(0.027)	
Male ≤ HS, < 25	-0.003	-0.035	-0.010	-0.033	0.041	-0.027	-0.028	0.022	1,201,670
	(0.029)	(0.051)	(0.020)	(0.045)	(0.030)	(0.050)	(0.024)	(0.044)	
Female ≤ HS, < 25	-0.002	-0.013	0.020	-0.037	-0.012	-0.003	-0.018	-0.006	976,632
	(0.024)	(0.042)	(0.028)	(0.049)	(0.031)	(0.057)	(0.025)	(0.043)	

Appendix Table A5: State Minimum Wage-Employment Weighted Regressions with Separate Effects by Race (2011-19 sample)

Population	Empl. effect white (β)	Black-MW interaction (β_B)	Black overall effect ($\beta + \beta_B$)	N
Teens 16-19	-0.024 (0.023)	-0.071*** (0.025)	-0.095*** (0.033)	1,102,071
Male teens	-0.022 (0.026)	-0.059* (0.031)	-0.081** (0.037)	566,512
Female teens	-0.024 (0.023)	-0.082** (0.036)	-0.107*** (0.037)	535,559
<25	-0.009 (0.017)	-0.035 (0.025)	-0.045 (0.030)	2,316,065
Male < 25	-0.003 (0.019)	-0.043* (0.025)	-0.046 (0.032)	1,191,336
Female < 25	-0.016 (0.017)	-0.023 (0.039)	-0.038 (0.038)	1,124,729
≤ HS	0.023 (0.018)	-0.033 (0.022)	-0.011 (0.034)	5,303,440
Male ≤ HS	0.037* (0.020)	-0.061*** (0.022)	-0.024 (0.034)	2,904,857
Female ≤ HS	0.006 (0.017)	-0.001 (0.029)	0.005 (0.038)	2,398,583
< HS	0.006 (0.022)	-0.064** (0.027)	-0.058 (0.036)	1,578,033
Male < HS	0.028 (0.026)	-0.088*** (0.025)	-0.060* (0.032)	888,470
Female < HS	-0.020 (0.020)	-0.035 (0.039)	-0.055 (0.046)	689,563
< HS, < 30	-0.017 (0.031)	-0.096*** (0.028)	-0.113*** (0.035)	793,520
Male < HS, < 30	-0.004 (0.034)	-0.101*** (0.035)	-0.105*** (0.033)	439,165
Female < HS, < 30	-0.032 (0.032)	-0.089** (0.039)	-0.121** (0.047)	354,355
≤ HS, < 30	-0.004 (0.025)	-0.052** (0.025)	-0.056 (0.035)	1,628,568
Male ≤ HS, < 30	0.008 (0.027)	-0.072** (0.033)	-0.064* (0.036)	922,632
Female ≤ HS, < 30	-0.019 (0.025)	-0.025 (0.038)	-0.044 (0.049)	705,936
≤ HS, < 25	-0.014 (0.026)	-0.064*** (0.022)	-0.078*** (0.029)	1,264,819
Male ≤ HS, < 25	-0.007 (0.029)	-0.089*** (0.032)	-0.096*** (0.032)	703,696
Female ≤ HS, < 25	-0.024 (0.026)	-0.031 (0.035)	-0.055 (0.042)	561,123