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City-Specific Racial Differences in the Labor Supply of Women*

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Abstract: Theoretical and empirical analyses typically ignore geographic variation in female employment and racial differences in female employment outcomes. We document that there is substantial heterogeneity in female employment with respect to geographic location, race, and their interaction. We show that a parsimonious set of area-level controls explains a substantial portion of that heterogeneity. Our results suggest that analyses that ignore geographic variation may misstate the determinants of female employment, possibly producing erroneous conclusions and policy prescriptions. They also suggest that understanding geographic heterogeneity is crucial to understanding racial differences in female employment as well as female employment itself.

Keywords: female employment, locational variation, white and black women, employment rate

JEL Codes: J16, J15, J22, R23

1. INTRODUCTION

Female labor supply is a topic of substantial active research.¹ As women become a larger part of labor force and the gender gap in educational attainment narrows, understanding female employment becomes crucially important. Traditionally, much of labor economics focused on men and considered women to be secondary earners. Newer studies of women's employment outcomes show that women and men often have different key decision factors. Women have become in many cases equal earning partners in their families. However, their decisions concerning careers, marriage, fertility, and household production are much more entangled than the decisions of men. For example, Black et al. (2014) show that while commuting time is very important in the employment decisions of white married women,

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¹Blundell and Macurdy (1999) provide an excellent survey of the literature on female labor supply and Killingsworth and Heckman (1986) review earlier results.

especially those with young children, it plays virtually no role in employment decisions of married men. Rosenthal and Strange (2012) provide evidence that female-owned businesses experience fewer agglomeration externalities than male-owned businesses, in part because women are more affected by commuting costs. Patrick et al. (2016) similarly show that women's motivations for self-employment are different from the motivations of men. Studies like these show that models of labor supply developed for men do not necessarily apply to women and highlight the importance of better understanding labor supply decisions of women.²

Most studies of labor supply are conducted at the national level. When men constituted the majority of the labor force and were the primary subject of analysis, this was not a problem. According to Black et al. (2014), employment rates for married men vary little across locations. In contrast, for white married women, Black et al. (2014) show that there is large variation across metropolitan areas. This suggests that locational factors play a more important role in employment outcomes for women than for men. In this paper, we document two stylized facts. First, women have very different employment rates in different cities. Second, these patterns of geographic variation in employment rates are quite different between white and black women.

Our first point is most closely related to Black et al. (2014). While that paper focuses on white married women, we do not restrict our analysis to married women. We find that white women have employment rates that vary widely across metropolitan areas, even after controlling for the usual set of labor supply variables.

Next, we analyze employment rates for black women.³ There is an extensive literature on black-white differences in female labor supply behavior.⁴ Most of this literature has focused on national differences and the possible role that geography plays in determining these differences has been largely unexplored. In this paper, we find that there is a wide variation in employment rates for black women across metropolitan areas. More importantly, however, the patterns of geographic variation in employment rates are quite different between white and black women. Consider, for example, two large cities, Minneapolis and New York. In 2015, in Minneapolis, the employment rate of white women was 83 percent, but the employment rate of black women was only 67 percent (a 16 percentage point difference). On the other hand, in New York City, the employment rates for white and black women were almost identical at 75 and 73 percent, respectively. We document more generally that such

²Numerous other studies have shown other differences between men and women that could affect their labor market behavior. For instance, Borhans et al. (2005) demonstrate the importance of social capital, while Bacolod (2017) focuses on the role of cognitive skills.

³We had to abandon our study of Hispanic and Asian women as their sample sizes were too small on a city level.

⁴Much of the literature on black-white differences in female labor supply has focused on black women's historically higher attachment to the labor force. Goldin (1977) documented that rates of black female labor force participation were substantially higher than white rates between 1890 and 1970, hypothesizing that slavery may have resulted in racial differences in attitudes towards work, and ultimately labor force participation. Bouston and Collins (2014) present evidence of intergenerational transmission of such attitudes towards work among women, providing support for Goldin's hypothesis. Lehrer (1992) shows that, while childbirth does not depress labor force participation as much for blacks as it does for whites, the racial gap is decreasing in education. Blau and Kahn (2007) find that the wage elasticity of female labor supply is smaller for blacks than for whites.

geographic and racial differences in female employment rates are widespread and persistent over time.

These differences demonstrate that it is a mistake to treat the female labor force as a homogeneous entity. Empirical studies predicated on the idea of a homogeneous female labor force might lead to erroneous conclusions and result in public policies with unexpected consequences. Understanding all the factors that lead to this geographical and racial heterogeneity is a complex theoretical and empirical problem. Our goal here is much less ambitious. Using Public Use Micro Samples (PUMS) of the 50 largest metropolitan areas in the United States, we show that there is substantial heterogeneity in the employment rates of white and black women, as well as in the racial differences in those rates. While we do not attempt to uncover the underlying explanations for this heterogeneity, we do show that about three-quarters of it can be explained by a relatively simple panel of city-specific factors. However, we emphasize that the explanatory power of these factors should not be interpreted causally. Our hope is to motivate a stream of future papers to explain the empirical regularities that we identify here.

The paper proceeds in three additional sections. Section 2 describes the data, Section 3 reports the empirical findings, and Section 4 offers concluding remarks.

2. DATA

This study focuses on the employment of black and white non-Hispanic women who live in the 50 largest Metropolitan Statistical Areas (MSAs) in the U.S. The data used in the analysis are the Public Use Micro Samples (PUMS) from the 2000 Census and a 5-year pooled sample of the American Community Surveys (ACS) from 2011-2015.⁵ We use the 2000 Census sample because it is the last year for which the large sample is available. We include the most recent data from the ACS, but because of the smaller samples sizes of the ACS we pool the last 5 years of the data. For simplicity, we refer to this pooled sample as the 2015 sample.

The sample is restricted to individuals aged 25 to 55.⁶ Two racial/ethnic groups are considered: white non-Hispanic women and black non-Hispanic women. Individuals with imputed values of key outcome and explanatory variables are excluded from the analysis.

We use the Metropolitan Statistical Area (MSA) as the unit of geographic analysis because it represents a well-defined geographic area where people both live and work, i.e. a “local labor market.” Data support quickly becomes an issue for any analysis performed at the MSA level, especially for black women. Because of this, our analysis is focused on the largest 50 MSAs.⁷

The IPUMS data provide information on employment status. The three main categories are employed, unemployed, and not in the labor force. Individuals’ true labor force participation status is difficult to discern, particularly for women, who are more likely to be the margin along which households adjust their labor supply (Black et al., 2014). Consequently,

⁵Data were provided by Minnesota Population Center; see Ruggles et al. (2015).

⁶This excludes individuals who could still be in school and also those who might have retired early.

⁷Because of the small sample size, we did not include Hispanic women in our analysis.

the analysis here primarily looks at the “employment rate” as the measure of labor force participation in a local labor market, thereby including women who are reported as unemployed with those who are out of the labor force.⁸ Included in the sample are women in the armed forces, but they constitute only a fraction of a percent of the sample.

3. EMPIRICAL INVESTIGATION

3.1. Overview of the Racial and Locational Differences in the Employment of Women

Table 1 provides an overview of female employment in the U.S. by race. Panel A presents statistics for all of the U.S. and for the sample of the 50 largest MSAs, while Panel B provides a summary of MSA-specific statistics. As Panel A shows, about 75 percent of white women in the U.S. were employed in 2000. By 2015, this rate had decreased to 73.66 percent. Black women in the U.S. were less likely to be employed than white women in both periods, with the black female employment rate increasing slightly from about 70 percent in 2000 to 70.5 percent in 2015. The statistics for the sample of the 50 largest MSAs show a similar pattern. Employment rates of women in these MSAs are only slightly higher than in the U.S. on average.

Next, we calculate employment rates for white and black women in each of the 50 MSAs. Panel B of Table 1 summarizes these results. MSA-specific employment rates of white women, for example, varied between 66.7 and 83.6 percent in 2000 and between 64.4 and 83.5 percent in 2015. Thus, in some MSAs the employment rate of white women was as much as 10 percentage points below the national employment rate, while in other MSAs the employment rate of white women was as much as 10 percentage points above the national employment rate. This locational variation is significantly larger than variation over time over the past several decades. While there are many factors (such as an increase in educational attainment of women over time) that explain the cross-time variation in women’s employment, these factors are not likely to be able to explain the cross-city variation at a given point of time.

The locational variation in employment rates of black women is similarly large. MSA-specific employment rates of black women varied between 64.8 and 78.5 percent in 2000 and between 58.4 and 79.2 percent in 2015.

Table 2 compares MSA-specific ratios of employment rates of white women to employment rates of black women (entries less than one indicate that black women are less likely to be employed). The table shows that, while in some MSAs black women have higher employment rates than white women, in other MSAs black women have lower employment rates than white women.

In short, the descriptive statistics show that there is substantial cross-city variation in the employment rates of both white and black women. Of course, it could be that the differences in demographic composition across MSAs produce this variation in employment. We next turn to more careful examination of the role of MSA-specific factors on female employment.

⁸The employment rate is calculated as an employment/population ratio. The definition of employment varies somewhat across years. Generally, individuals are considered employed if they worked at least one hour for

Table 1: Employment Rates of Women

Panel A: Employment Rates				
	2000		2015	
	White	Black	White	Black
U.S.	75.05	69.99	73.66	70.5
N	1,880,122	257,201	1,748,039	259,273
50 Largest MSAs	75.53	70.9	75.19	71.79
N	844,120	160,487	809,105	167,455

Panel B: Summary of Employment Rates of 50 Largest MSAs				
	2000		2015	
	White	Black	White	Black
min	66.74	64.75	64.35	58.38
25%	74.04	68.66	72.35	67.33
median	75.61	71.61	74.5	70.68
75%	77.42	73.83	77.33	74.78
Max	83.64	78.51	83.48	79.21
25-75 spread	3.38	5.17	4.98	7.45
min-max spread	16.9	13.76	19.13	20.83
Mean	75.69	71.4	74.8	70.72
st. dev.	2.99	3.56	3.57	4.6
N	50	50	50	50

Notes: Authors' calculations. Data are from 2000 Census PUMS and pooled 2011-2015 ACS. Sample consists of white non-Hispanic and black non-Hispanic women who are 25-55 years old and are not in school. In Panel B, each data point is the race-specific employment rate in one of the 50 largest MSAs.

3.2. Role of Locational Factors in Women's Employment

In order to properly analyze the effect of location-specific factors on female employment, we estimate a linear probability model of employment with and without MSA fixed effects. The dependent variable is an individual woman's employment status multiplied by 100 (that is, it has the value of 100 if a woman is employed and 0 otherwise). The coefficients, therefore, can be interpreted as percentage points. We include a set of standard demographic controls, such as age, age squared, marital status, number of children, and a set of controls for education

pay for someone else or worked in a family or own business (Ruggles et al., 2015).

Table 2: Summary of White/Black Employment Ratios of 50 Largest MSAs

	2000	2015
min	0.97	0.93
25%	1.01	1.01
median	1.06	1.05
75%	1.1	1.1
max	1.25	1.27
mean	1.06	1.06
st. dev.	0.06	0.08
N	50	50

Notes: Authors' calculations. Data are from 2000 PUMS and pooled 2011-2015ACS. Each data point is the MSA-specific ratio of white women's employment rate to black women's employment rate. Sample consists of white non-Hispanic and black non-Hispanic women who are 25-55 years old and are not in school.

level. We estimate these models separately for white and black women who live in the 50 largest MSAs.

The results are in Table 3. Columns (1) and (2) report results for white and black women, respectively, from a specification that does not include MSA fixed effects. The specification reported in columns (3) and (4) includes MSA fixed effects. Comparing columns (1) and (2), three points are worth mentioning. First, black women's employment is much less sensitive to the presence and number of children than white women's employment. Second, the direction of the relationship between marriage and employment is different for white and black women. A married white woman in 2000 was 7.88 percentage points less likely to be employed than a similar unmarried white woman. The effect had decreased to 3.78 percentage points in 2015. In contrast, a married black woman in 2000 was 3.26 percentage points more likely to be employed than a similar unmarried black woman. This effect remained virtually unchanged over time. Third, and consistent with the existing literature, comparing results for 2000 in Panel A and 2015 in Panel B shows that women's employment became less sensitive with respect to most demographic characteristics over time (see, e.g., Blau and Kahn (2007)).

Columns (3) and (4) add MSA fixed effects to the linear probability model. While controlling for MSA fixed effects does not change the effect of demographic characteristics on the employment status of women, it does significantly improve the fit of the regression. For the white regressions, the R^2 increases from 0.06 to 0.77 in 2000 and from 0.07 to 0.77 in 2015 when MSA fixed effects are included. Similarly, for the black sample, the R^2 increases from 0.09 to 0.74 in 2000 and from 0.095 to 0.75 in 2010 when MSA fixed effects are included. Not surprisingly, we find that MSA fixed effects are jointly very significant, with near-zero p -values for the F-tests of joint significance.⁹

The results in Table 3 confirm that MSA-specific factors play an important role in

⁹The results from a regression that pools data from both sample periods and includes time fixed effects are similar.

Table 3: Individual Women's Employment OLS Regressions

Panel A: 2000	(1)	(2)	(3)	(4)
	White	Black	White	Black
Age	2.16 (0.002)	1.35 (0.002)	2.17 (0.002)	1.33 (0.002)
Age ²	-0.03 (0.000)	-0.02 (0.000)	-0.03 (0.000)	-0.02 (0.000)
Married	-7.88 (0.004)	3.26 (0.004)	-8.00 (0.004)	2.83 (0.004)
N children	-5.42 (0.001)	-1.06 (0.002)	-5.44 (0.001)	-1.00 (0.002)
Education Dummies	Y	Y	Y	Y
MSA FE	N	N	Y	Y
N	832,412	156,304	832,412	156,304
R ²	0.0649	0.0934	0.7732	0.7398
F-stat of joint significance of MSA FE			74.18	15.96
Panel B: 2015	(1)	(2)	(3)	(4)
	White	Black	White	Black
Age	0.59 (0.002)	2.13 (0.002)	0.63 (0.002)	2.11 (0.002)
Age ²	-0.01 (0.000)	-0.03 (0.000)	-0.01 (0.000)	-0.03 (0.000)
Married	-3.78 (0.005)	3.54 (0.005)	-3.87 (0.005)	3.17 (0.005)
N children	-4.92 (0.001)	-0.91 (0.002)	-4.97 (0.001)	-0.89 (0.002)
Education Dummies	Y	Y	Y	Y
MSA FE	N	N	Y	Y
N	802,828	164,425	802,828	164,425
R ²	0.0711	0.0952	0.7714	0.7479
F-stat of joint significance of MSA FE			65.86	12.74

Notes: Authors' calculations. Data are from 2000 PUMS and pooled 2011-2015 ACS. Sample consists of white non-Hispanic and black non-Hispanic women who are 25-55 years old, not in school, and live in the 50 largest MSAs. The dependent variable is employment status multiplied by 100 (0 or 100), so the coefficients can be interpreted as percentage points. Education controls include dummy variables for the following levels of education: less than high school, high school, some college, bachelor's degree, and advanced degree. All coefficients are statistically significant at the 1 percent level. Standard errors are clustered at the MSA level.

Table 4: Correlations between MSA Fixed Effects

		White		Black	
		2000	2015	2000	2015
White	2000	1			
	2015	0.9212 (0.00)	1		
Black	2000	0.2908 (0.04)	0.1439 (0.32)	1	
	2015	0.3107 (0.03)	0.2919 (0.04)	0.6993 (0.00)	1

Notes: Authors' calculations. For each year and each race, the MSA fixed effects are from individual women's employment OLS regressions (see Table 3). P-values are in parenthesis. Data are from 2000 PUMS and pooled 2011-2015 ACS. Sample consists of white non-Hispanic and black non-Hispanic women who are 25-55 years old, not in school, and live in the 50 largest MSAs.

women's employment outcomes and that otherwise similar women living in different cities can have substantially different probabilities of being employed. It comes as no surprise that female employment varies between cities. There is, after all, geographic variation in economic conditions, culture, history, geography, policy, law, institutions, and a whole host of other factors, including city-level differences in individual-level characteristics driven by self-selection into residential location. The results also accord well with previous findings by Black et al. (2014) and Hirsch et al. (2017) that local factors explain differences in employment among females and the probability of multiple job holdings.

The impressive explanatory power of the MSA effects suggests that, rather than city-to-city fluctuations around the national average, these factors cause large, systematic geographical differences in female employment. Reiterating this point, Table 4 presents correlation coefficients (and their *p*-values) between MSA fixed effects in different years, for different races. Correlations across time for the same race are especially high. For example, the correlation between MSA fixed effects in 2000 and 2015 for white women is 0.92. This means that MSAs with high employment rates of white women in 2000 still had high employment rates of white women in 2015 and that MSAs with low employment rates of white women in 2000 still had low employment rates of white women in 2015. Cross-racial correlation coefficients of the MSA fixed effects are also statistically significant in both 2000 and 2015.

These results show that there are locational effects in employment outcomes for women that a standard set of demographic characteristics cannot explain. These effects are persistent across time and correlated across racial groups. The rest of the paper is dedicated to understanding the MSA locational effects and their implications for racial differences in female employment.

3.3. Determinants of Locational Effects

What determines the MSA-specific component of female employment? While there is an expansive body of studies of local labor markets in urban and regional economics, economists have only recently started exploring the intersection of labor and urban economics.¹⁰ As a result, there is limited research on how specific characteristics of local labor markets affect employment behavior and outcomes.

One important feature of local labor markets that affects employment appears to be commuting time. In particular, Black et al. (2014) show that labor force participation of white married women is negatively affected by commuting times within the metropolitan area.¹¹ A labor supply model with a fixed time cost of commuting introduces a non-convexity to the budget constraint. This non-convexity makes an individual with a longer commute more likely to prefer a corner solution, corresponding to non-participation. The authors use the MSA average commuting time of white men as a measure of how difficult it is to commute in that MSA. Since white men's labor force participation rates are high and consistent across MSAs, the measure is not subject to endogeneity concerns.

Initially, we follow the Black et al. (2014) approach and investigate the relationship between the MSA fixed effects calculated in Table 5 and MSA commuting times that we compute as white men's average commuting time.¹² Specification (1) in Table 5 reports the results of regressions of the MSA employment fixed effects on the average commuting time for white men, separately for white and black women in 2000 and in 2015. For white women, the relationship between the fixed effects and commutes is indeed negative and statistically significant. Thus, the typical white woman living in MSAs with a relatively long commute is less likely to be employed than a demographically identical woman living in an area with a shorter commute. In contrast, fixed effects for black women are not sensitive to commuting times. This racial difference in the relationship between commuting time and employment is consistent with the existing literature on racial differences in female labor supply, which finds that black women are more attached to the labor force and, as a consequence, their labor supply is less elastic with respect to external factors (such as wages and fertility).

¹⁰See Black et al. (2009) and Moretti (2011, 2013).

¹¹Hirsch et al. (2017) also show that commuting time affects people's decisions to have multiple jobs.

¹²In principle, we could answer the same question by pooling the data for both time periods and estimating the employment regression with and without commuting time (and the other area-level factors considered below). Our preferred approach of regressing the MSA fixed effect on area-level factors is advantageous in that (i) it does not constrain the MSA fixed effect to be the same in both periods, (ii) the slope coefficients give a simple summary of the relationship between the regressors and the fixed effects, and (iii) the R^2 from the regressions are easily interpreted as the fraction of the variation in the fixed effects explained by the regressors.

Table 5: Determinants of MSA Fixed Effects

Panel A: 2000	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	White				Black			
MSA commute \times 100	-0.188*** (0.0511)	-0.181*** (0.0430)	-0.180*** (0.0475)	-0.154*** (0.0509)	-0.0627 (0.0678)	-0.0496 (0.0505)	-0.0228 (0.0563)	-0.0663 (0.0556)
White men unemployment rate		-1.555*** (0.400)	-1.291*** (0.419)	-1.796** (0.680)		-2.750*** (0.619)	-3.470*** (0.727)	-2.513** (0.966)
Industrial composition	N	N	Y	Y	N	N	Y	Y
Region dummies	N	N	N	Y	N	N	N	Y
R ²	0.232	0.356	0.727	0.823	0.021	0.332	0.589	0.714
Adjusted R ²	0.216	0.328	0.629	0.699	0.000	0.303	0.441	0.499
Panel B: 2015	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	White				Black			
MSA commute \times 100	-0.112* (0.0646)	-0.0714 (0.0541)	-0.0988* (0.0491)	-0.108* (0.0592)	-0.0145 (0.0975)	0.0615 (0.0647)	0.0694 (0.110)	0.0184 (0.115)
White men unemployment rate		-0.837** (0.343)	-0.706 (0.517)	-0.154 (0.646)		-1.584*** (0.408)	-2.029** (0.853)	-2.255*** (0.714)
Industrial composition	N	N	Y	Y	N	N	Y	Y
Region dummies	N	N	N	Y	N	N	N	Y
R ²	0.067	0.164	0.634	0.789	0.001	0.219	0.350	0.745
Adjusted R ²	0.048	0.129	0.502	0.632	-0.020	0.186	0.116	0.555

Notes: Dependent variables are MSA fixed effects from female employment regressions using the 50 largest MSAs for the 2000 and 2011-2015 periods. Industrial composition denotes MSA-specific proportions of all men and women aged 25-55 working in (1) agriculture, (2) mining, (3) construction, (4) manufacturing, (5) transportation, communication, and other public utilities, (6) wholesale trade, (7) retail trade, (8) finance, insurance, and real estate, (9) personal services, (10) entertainment and recreational services, (11) professional services, and (12) public administration. Regions dummies are based on Census and ACS regions (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific). Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Of course, our measure of MSA commutes could be picking up some other MSA-specific factors. To account for this possibility, and to further explore the determinants of the MSA fixed effects, we add additional MSA-level characteristics in specifications (2) through (4). First, to control for the local labor market's economic condition, we include the MSA-specific unemployment rate of white men.¹³ The results are reported in specification (2) of Table 5. Not surprisingly, MSAs with higher unemployment rates (i.e., worse economic conditions) have lower MSA fixed effects of women's employment. Clearly, local economic conditions matter. The MSA-specific component of female employment is smaller for similar women living in MSAs with higher unemployment rates.

Next, we add controls for the industrial composition of the local labor market. Geographic variation in industrial composition may lead to geographic variation in female employment rates either if there are industry-level differences in female employment or if women select into industries with different overall employment rates than men. To control for industrial composition, we calculate MSA-specific proportions of all men and women aged 25-55 working in each of a number of high-level industrial classifications.¹⁴ Inclusion of these controls in specification (3) of Table 5 improves the power of our regressions to explain employment.¹⁵

Finally, we also include region dummies in specification (4) of Table 5.¹⁶ These effects will absorb local variation in female employment that operates on geographic scales more coarse than the MSA. For example, there may be agglomeration externalities or differences in infrastructure that affect multiple labor markets within a given region. Alternatively, there may be region-level differences in histories of, and cultural attitudes towards, female employment.¹⁷ As the table shows, these region dummies do help explain the MSA effects, particularly in the later sample.

While additional controls improve the fit of the regressions in Table 5, they do not change the conclusion that MSA commutes affect employment for white women, but not for black women. However, commuting times alone explain, at most, a quarter of the variation in MSA fixed effects for white women (and nearly none of the variation in those effects for black women). Including unemployment, industrial composition, and region dummies explains over 70 percent of the variation in MSA fixed effects for both races and sample

¹³We cannot use the female unemployment rate as it is mechanically related to women's employment rate. The unemployment rate for Black males might be affected by factors not directly related to local economic conditions.

¹⁴The classifications, which include (1) agriculture, (2) mining, (3) construction, (4) manufacturing, (5) transportation, communication, and other public utilities, (6) wholesale trade, (7) retail trade, (8) finance, insurance, and real estate, (9) personal services, (10) entertainment and recreational services, (11) professional services, and (12) public administration, are based on the 1990 industrial classification scheme provided by IPUMS.

¹⁵It might seem logical that local housing prices could affect women's employment as well. However, a careful analysis by Johnson (2014) finds "little evidence of a positive effect of house prices on married women's labor force participation."

¹⁶Region dummies are based on Census and ACS regions (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific).

¹⁷Several papers (see Fernández and Fogli (2009) and Blau et al. (2013)) show that cultural norms and beliefs transfer over generations and affect work and fertility behavior even after controlling for other demographic characteristics.

periods.¹⁸

Though these additional controls explain a substantial fraction of the variation in MSA-specific determinants of female employment, they should be interpreted with care for two reasons. First, the inclusion of a large number of explanatory variables in the richest specifications will mechanically increase the R^2 . Notice, however, that including these variables causes similar (though naturally smaller) increases in the adjusted R^2 as well, as Table 5 shows.¹⁹ Second, the MSA regressors should not be interpreted as causal determinants of female employment rates. The significance of the region dummies, for example, only means that female employment outcomes in one area are correlated with those in other nearby areas. Similarly, while the explanatory power of the industrial composition controls may be a consequence of industry-specific differences in female employment or differential selection of women into occupations, it may also reflect unobserved factors like local cultural norms or unobserved preferences that correlate with industrial composition. At the same time, while the MSA-level factors that we examine help explain local differences in female employment, they do not diminish the significance of those differences to policy analysis and future theoretical and empirical work on female employment.

3.4. Determinants of Racial Differences in Location Effects

The results presented above establish two stylized facts. First, there is substantial geographic variation in the employment of females of both races. Second, while local factors such as commuting time, unemployment rates, and industrial composition help explain this variation, they do so differently for black and white women. In this section, we explore the determinants of racial differences in the city-specific components of female employment.

A natural starting point for such an explanation is to ask to what extent racial differences in female employment are explained by racial differences in the geographic distribution of women, rather than by racial differences in the local components of female employment. To answer this question, we perform Oaxaca-Blinder decompositions of female employment into two parts: one that is explained by differences in the MSAs in which black and white women reside and another that is explained by within-MSA differences in the employment of black and white women.

A complication of this approach is that the unconditional relationship between location and female employment reflects both city-specific labor supply and demand shifters and geographic differences in demographic factors such as age, education, marital status, and fertility. To isolate and analyze the former component, on which our interest centers in this paper, we begin by removing the component of residential location that is explained by such demographics. To this end, let λ_{ji} be an indicator for whether a woman i resides in metropolitan area j . Similarly, let $\tilde{\lambda}_{ji} = \lambda_{ji} - x_i\beta_r$, $r \in \{w, b\}$, be the residual from a (race-specific) regression of λ_{ji} on demographic covariates. The residuals $\tilde{\lambda}_{ji}$ can be viewed as the part of a woman's residential location that are not explained by her demographic char-

¹⁸Hirsch et al. (2017) find that a similar panel of area characteristics help explain multiple job holdings.

¹⁹Similarly, the change in the R^2 when a new set of variables is added to the regression should not be interpreted as the explanatory power of those variables, since this change is sensitive to the order in which the variables are included.

acteristics (equivalently, these residuals can be viewed as the difference between a woman's residence in area j and the probability that she lives there predicted by her demographic variables).

Suppose further that a woman's employment status is determined by the (race-specific) equation $emp_i = \sum_j \gamma_{jr} \cdot \tilde{\lambda}_{ji} + \epsilon_i$. The Oaxaca-Blinder decomposition of the white-black difference in female employment can then be written as:

$$\mathbb{E}(emp|w) - \mathbb{E}(emp|b) = \sum_j \left\{ \gamma_{jw} \left[\mathbb{E}(\tilde{\lambda}_{ji}|w) - \mathbb{E}(\tilde{\lambda}_{ji}|b) \right] + (\gamma_{jw} - \gamma_{jb}) \mathbb{E}(\tilde{\lambda}_{ji}|b) \right\}. \quad (1)$$

The first term in the sum is the “explained” part of the white-black difference in female employment. It represents the expected difference in employment (after controlling for demographic characteristics) that would arise from the fact that whites and blacks live in different areas, holding the effect of location constant. The second term in the sum is the “unexplained” part of the difference. It represents the difference arising because employment outcomes differ between whites and blacks in each MSA, holding the geographic distribution constant between blacks and whites.²⁰

The results of the decompositions are presented in Table 6. In both 2000 and 2015, the explained part of the decomposition is relatively small and statistically insignificant. The difference in expected employment between white and black women comes almost entirely from the unexplained part of the decomposition. Hence, the observed differences in the employment of white and black women are not because they live in different places, but rather because there are city-specific differences in the supply and demand for female workers of different races. Put differently, while cities matter, they matter differently for black women than they do for white women.²¹

The results of this decomposition raise a natural second question: what explains racial differences in the local components of female employment? Put differently, how can we explain the “unexplained” variation from the decompositions presented above? To shed light on this question, in Table 7 we report the results of the regressions similar to those in Table 5, but with the black-white differences in the MSA fixed effects serving as the dependent variable (instead of the race-specific MSA fixed effects themselves). As the results indicate, the same factors that help explain race-specific MSA fixed effects also help explain white-black differences in those effects, though the magnitudes and standard errors of the coefficients are more sensitive to the specification and sample used to estimate them than those presented previously in Table 5.

MSA commutes are negatively related to the racial differences in MSA fixed effects in most specifications in 2000, though the relationship is not as strong in 2015. Furthermore, while local economic conditions (as measured by the unemployment rates of white men) explain some of the variation in racial differences in MSA fixed effects, they are statistically insignificant in most specifications. Adding a panel of controls for industrial composition

²⁰Note that “unexplained” in this context means unexplained by differences in residential location.

²¹We obtain nearly identical results under an alternative decomposition that uses black women as the reference group.

Table 6: Oaxaca-Blinder Decompositions of Racial Differences in the Employment Rates of Women

	2000	2015
White	73.99*** (0.63)	73.83*** (0.53)
Black	69.69*** (0.84)	68.36*** (0.90)
Difference	4.31*** (0.73)	5.46*** (0.98)
Explained	-0.08 (0.27)	-0.05 (0.24)
Unexplained	4.38*** (0.67)	5.51*** (0.97)

Notes: Oaxaca-Blinder decompositions of white-black differences in female employment in 50 largest MSAs for 2000 and 2011-2015 into components explained and not explained by residuals from regressions of MSA indicators on demographic variables (number of children age, age², non-labor income, marital status, and education indicators). Standard errors in parentheses, clustered on MSA.

increases the R^2 of the regression to about 0.58 in the 2000 sample and 0.41 in the 2015 sample. As noted above, since these controls may reflect the influence of unobserved area-level factors that correlate with industrial composition, their explanatory power should be interpreted with some care. Moreover, even if local differences in industrial composition themselves cause racial differences in MSA fixed effects, the underlying source of this relationship remains unknown. Lastly, adding indicators for Census regions increases the R^2 of the regressions to over 0.7 in both years, though this suggests mainly that the MSA-level fixed effects are correlated within such regions.

4. CONCLUDING REMARKS

The findings presented in this paper highlight striking heterogeneity of female employment with respect to geographic location, race, and their interaction. Accounting for, and ultimately explaining, this heterogeneity is essential to better understanding and modeling female employment outcomes. Given the amount of variation in employment of women by city and by race, for example, our results suggest that it is meaningless to talk about “the” employment rate of women in the U.S as a way to describe the labor force participation of women.

Our results also suggest that explanations of employment outcomes for white women cannot be easily extended to black women. Either white and black women have systematically different preferences or, if they have the same preferences, there are important unobserved area-level factors that typically are not included in empirical models of employment. Obvious candidates for these omissions are cultural norms, differences in social and/or family

Table 7: Determinants of Racial Differences in MSA Fixed Effects

Panel A: 2000	(1)	(2)	(3)	(4)
MSA commute \times 100	-0.125* (0.0699)	-0.131* (0.0694)	-0.157* (0.0836)	-0.0881 (0.0857)
White men unemployment rate		1.195 (0.746)	2.178*** (0.775)	0.718 (1.161)
Industrial composition	N	N	Y	Y
Region dummies	N	N	N	Y
R ²	0.065	0.110	0.581	0.726
Adjusted R ²	0.045	0.020	0.291	0.412
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Panel B: 2015	(1)	(2)	(3)	(4)
MSA commute \times 100	-0.0971 (0.0836)	-0.133* (0.0791)	-0.168 (0.113)	-0.126 (0.122)
White men unemployment rate		0.747 (0.458)	1.323 (0.976)	2.101** (0.801)
Industrial composition	N	N	Y	Y
Region dummies	N	N	N	Y
R ²	0.027	0.069	0.413	0.747
Adjusted R ²	0.007	0.002	0.182	0.486

Notes: Dependent variables are white-black differences MSA fixed effects from female employment regressions using the 50 largest MSAs for the 2000 and 2011-2015 periods. Industrial composition denotes MSA-specific proportions of all men and women aged 25-55 working in (1) agriculture, (2) mining, (3) construction, (4) manufacturing, (5) transportation, communication, and other public utilities, (6) wholesale trade, (7) retail trade, (8) finance, insurance, and real estate, (9) personal services, (10) entertainment and recreational services, (11) professional services, and (12) public administration. Region dummies are based on Census and ACS regions (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific). Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

structure, and fertility decisions. A growing literature highlights the fact that cultural norms affect economic behavior. Blau (2015), for example, shows that “immigrant source-country gender roles influence immigrant and second-generation women’s behavior in the United States.”

Understanding female employment is important because women account for an increasing portion of the labor force. While our results suggest that local factors such as commuting time, unemployment, industrial composition, and Census region help explain geographical variation in female employment, and racial differences in that variation, more research is

needed to uncover the underlying causes of these relationships.

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