

The Great Recession, Race and Employment

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December 29, 2017

Abstract

The Great Recession had a devastating impact on labor force participation and employment. This impact was not unlike other recessions, except in size. The recovery, however, has been unusual not so much for its sluggishness but for the unusual pattern of recovery in employment by race. The Black employment-population rate has increased since bottoming out in 2010 while the White employment-population rate has remained flat. We examine trends in labor force participation and employment by race, sex, and age and determine that the explanation is a combination of an aging White population and an increase in labor force participation among younger Black people. We estimate the likelihood of labor force participation and employment among young men and women to control for confounding factors, such as changes in educational characteristics. We then decompose the gaps among groups and the changes over time in labor force participation using a Oaxaca-Blinder-like technique for non-linear estimations. We find that much smaller negative impacts of characteristics and greater returns to characteristics among young Black men and women than among young White men and women explain the observed trends.

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1 Introduction

The starting point for this paper is the following graph of employment population ratios by race between 2001 and 2016 (see Figure 1, below). As we can see, the employment-population ratio drops precipitously (as did so many other graphs during that period) for all racial groups. Black employment-population rates are well below that of other racial groups, which has been a consistent characteristic of the U.S. labor market for all the years for which we have this type of data. What is perhaps most remarkable about this graph, however is the divergence that occurs after things bottom out, between the end of 2009 and the end of 2010. Starting in mid-2011, the employment population rate for Blacks rises steadily, gaining about five percentage points by the end of 2016. No other group experienced such a dramatic rise. Latinos/as did see increases, but not as large. The White employment-population rate has been flat at about 60 percent since the end of 2009. The gap between White and Black employment-population rates has thus narrowed considerably.

Figure 1: Employment-Population Rate by Race, 2001 - 2016



The rest of this paper is organized as follows. The next section briefly reviews the literature on racial differences in labor force engagement. The following section breaks down the trend in Figure 1 in various ways, in an attempt to see what underlies the aggregate phenomenon. The fourth section contains a labor force supply analysis of young men and women. The penultimate section contains a comparative decomposition analysis to attempt to determine the relative importance of changes in characteristics versus returns to characteristics between 2007 and now. A final section contains concluding remarks and thoughts about directions for further research.

2 Literature Review

Much of the literature on racial patterns of employment to this point has focused on the relative disengagement of Black adults, and especially Black males, from the labor force and employment. The stylized facts, on which we will elaborate in the next section, are that Black male labor force participation is typically lower than that of White males, and that the unemployment rate for Blacks is typically twice that of Whites. This context is the reason that the recent increase in the employment-population rate for Blacks relative to Whites is so notable. It is also worth noting that the bulk of the literature looking at racial differences in labor force engagement has

focused exclusively on males.

Myers (1989) analyzes trends in labor force withdrawal over the 1970s and 1980s. He assesses the evidence for voluntary labor force withdrawal due to welfare benefits and finds some backing for this idea. But he concludes that most withdrawal is due to disability, school enrollment or retirement. The recovery from the stagflation of the late 1970s and early 1980s was characterized by substantial drops in unemployment rates, though not reaching previous lows. During the long expansion of the 1990s employment grew more quickly for Whites than for Blacks. The unemployment rate of Black men and women remained at least twice that of Whites, a persistent characteristic of the U.S. labor market. Spriggs and Williams argue that this gap in unemployment rates between black and white workers is what needs to be explained. Using spectral analysis of time series unemployment data, they find that even controlling for economic growth and "human capital" the two to one ratio in unemployment rates persists (Spriggs and Williams, 2000).

Western and Pettit point out that most studies of the relative employment-population rates of Blacks and Whites in the U.S. employ Current Population Survey (CPS) data, which samples the non-institutionalized population (Western and Pettit, 2000). Since at least the 1980s, incarceration rates for Black males have exploded relative to that of Whites, which means that the employment-population rate for Black males has become more and more overstated, compared to Whites. Adjusting for incarceration, the authors find that, among young high school dropouts, inequality in employment rates between Blacks and Whites is underestimated by about 45 percent.

Ellis and Ödland decompose differences in labor force participation between Black and White males between metropolitan areas of the United States into differences due to the composition of the labor force (by age, race, and education), the differences in labor force participation between different subgroups and the covariance between composition and participation rates (Ellis and Odland, 2001). They find that differences in participation rates, rather than differences in composition dominate the overall Black-White differences in labor force participation, suggesting that differences in local labor markets are more important than individual characteristics in driving participation.

Ewing et al. (2005) model the dynamics of the unemployment rate by race and sex. They find that shocks affect Black males and females much more than White males and females, but that the differences by sex were not as great. So, we expect to see greater changes in Black than in White unemployment rates in response to a change in the overall unemployment rate. Rodgers (2008) shows that contractionary monetary policies have race-specific impacts on unemployment. For Whites, these policies lengthen unemployment duration, while for African Americans, they increase the unemployment rate.

While persistent racial differences in employment statistics constitute circumstantial evidence in terms of racial bias, direct evidence is more elusive. Audit studies are an attempt to find the smoking gun. In perhaps the most widely-noted example, Bertrand and Mullainathan (2004) find significant discrimination in call-backs for job interviews based solely on differences in names on resumé: applicants with White-sounding names were 50 percent more likely to get a call for an interview than those with Black-sounding names. A recent meta-analysis (Quillian et al., 2017) of such field

experiments shows no decline over time in bias in hiring decisions.

3 Trends

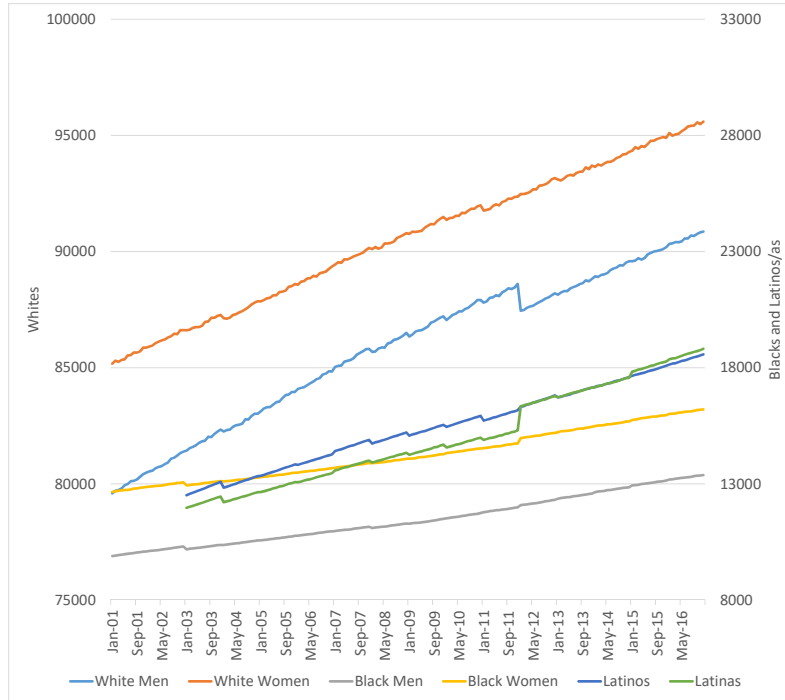
Changes in the employment-population ratio could be caused by a number of underlying changes. Differences in population growth could account for differences in the employment-population ratio, though such differences are unlikely to be such short-term phenomena. Changes in differences in labor force participation rates could also contribute to the overall trend. These changes are more likely to play out in a shorter time scale, and there seems to be evidence of such a change. Finally, changes in the ratio of unemployment rates could drive the overall trend as well. This last category would seem to be the least amenable to explanation, if true. Let's examine each in turn to see what can be learned from looking at the trends.

Since 2001, the civilian non-institutionalized labor force aged 20 years and more has grown quite slowly among white men and women (11.6 percent and 10.4 percent, respectively) while growing much faster among Black men and women (31.4 percent and 25.3 percent) and especially among Latinos/as (48.5 and 57.3 percent; see Figure 2, below). Nevertheless, the absolute growth among Whites was much larger, about 9 million each for men and women, while the Black and Latino population growth was about 3 and 6 million respectively. White and Black women are significantly more numerous than White and Black men, while among the Latino/a population the sexes are more balanced. It's also worth repeating the point that Western and Pettit (2000) make that this is the civilian non-institutionalized population, so those in the military and those that are incarcerated are not included. However, it does not appear that there has been a large increase in prison population in recent years. In fact, since its peak at 2.30 million in 2010, the prison population has been slowly shrinking in the U.S., reaching 2.17 million in 2015 (Kaeble and Glaze, 2016).

Over the same period, labor force participation has been declining for all races (see Figure 3). Some differences are unchanged. Latinos/as have the highest labor force participation rate throughout the period, while Blacks have the lowest. Asian labor force participation rates roughly track those of Whites. Between 2001 and 2016, the labor force participation rate for Whites dropped by 3.6 percentage points, that of Asians by 3.2 percentage points, Blacks by 2.8 percentage points and Latinos by 2.4 percentage points. However, between 2010 and 2016, while Whites' labor force participation rates continued to decline (by 2.2 percentage points), Blacks' labor force participation rate was relatively stable, averaging only 0.7 percentage points lower in 2016 than in 2010. Declines of Asian and Latino labor force participation rates fell between that of Whites and Blacks. Only among Black adults does the trend appear to be reversing in the last few years, bottoming out at 60.3 percent at the end of 2013 and rising to 61.8 percent by the end of 2016. This certainly looks like a promising lead to investigate the trend in the employment-population ratio.

Looking at the breakdown of the trends in the size of the labor force by race and sex over the last sixteen years (see Figure 4), we can see the results of the combinations of the two previous graphs. After growing steadily through 2008, the size of the White male and female labor force has stagnated since the end of the Great Recession. In

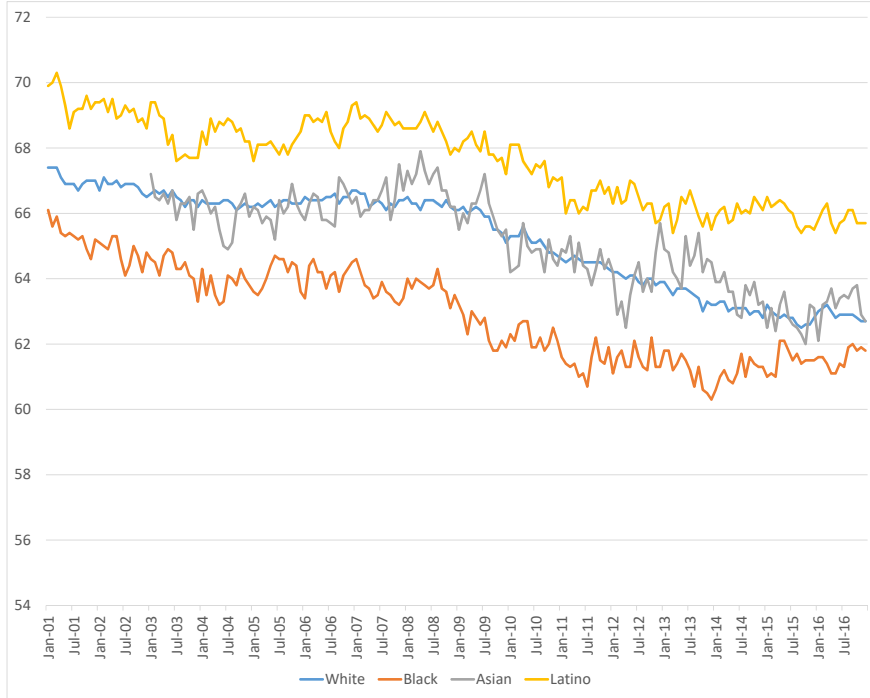
Figure 2: Population by Race and Sex (Thousands), 2001 - 2016



each case there was a gradual decline and then a gradual recovery so that by the end of 2016, the White male and female labor force were equal in size to their 2008 levels. Declining labor force participation effectively canceled out the population growth among White adults after the end of the recession. There is no such break in evidence for Black or Latino men or women. The rapid growth in population among these groups more than made up for declining participation rates in the 2000s and flat rates after the Great Recession. The growth of the Latino/a labor force was greater than that of the Black male or female labor force. Of course participation in the labor force, defined as it is as working or looking for work, is not the same as employment. So we still need to examine the role of the division of the labor force into the employed and the unemployed.

Figure 5 displays the recent trajectory of the difference in the unemployment rate between White adults and other groups. Almost as far back as data is available (in other words to 2003), unemployment rates among Asians have been lower than that among Whites. In 2015 and 2016, the gap has been smaller, slightly less than one percent. For Latinos, unemployment rates have been consistently higher, with an average of about 2.4 percentage points higher unemployment than Whites between 2001 and 2016. This contrasts with an average of 3.9 percentage points higher between 1973 and 2000. For Blacks, the difference is starkest. Black adults had an average of 5.6 percentage points higher unemployment rates since 2001. Although this is lower than

Figure 3: Labor Force Participation Rate by Race (Percent), 2001 - 2016



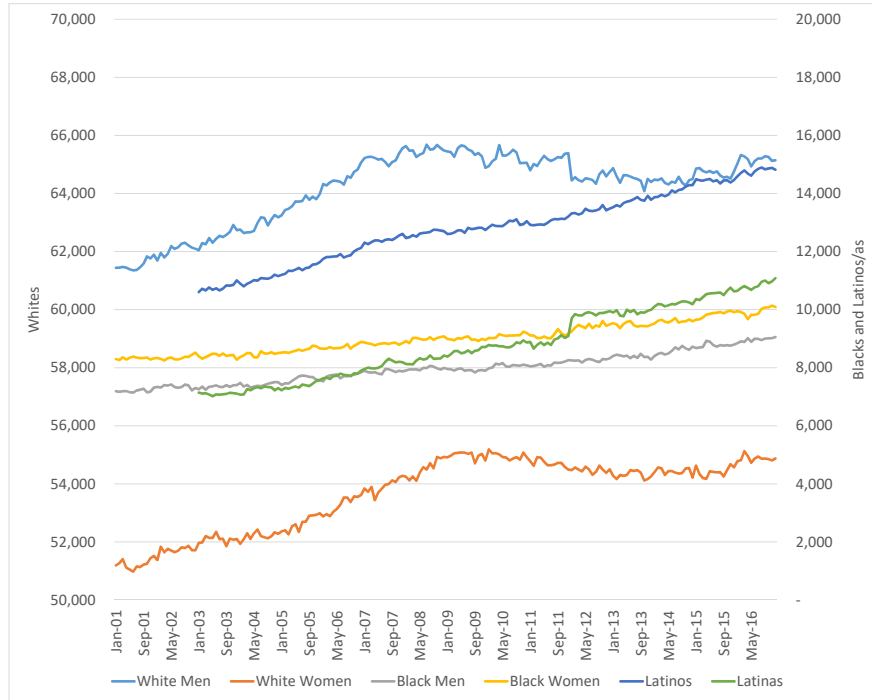
the 7.1 percentage point average for 1972-2000, the drop-off is not as great in relative terms as it has been for Latinos. The gap for Black adults bottomed out in the summer of 2007 at 3.4 percentage points, but quickly started rising as the Great Recession took hold, peaking four years later at 8.4 percentage points. Since August of 2011, the gap for Black adults has dropped to below 4 percentage points again by the end of 2016. While the absolute gap is an interesting perspective, the ratio of unemployment rates of other groups to that of Whites sheds more light on the dynamics (or statics, as it were) at work.

Figure 6 displays these ratios for Blacks, Asians and Latinos/as. The most remarkable aspect of these ratios is their consistency. Black unemployment rates are on average double that of Whites (and the years since 2000 are not exceptional in this: the same is true between 1972 and 2000 as well). The ratio for Latinos/as is even steadier at one and a half times that of Whites. Asian unemployment rates are slightly lower than those of Whites, with the exception of the early 2000s.

So the relatively large increase in the employment-population ratio among Black adults in the years since the end of the Great Recession looks like it can be explained by the rise in labor force participation rate combined with the decline in the relative rate of unemployment among Blacks. To a lesser extent, the same patterns are to be found among Latino/as as well.

A first thought about the differences in employment-population growth by race

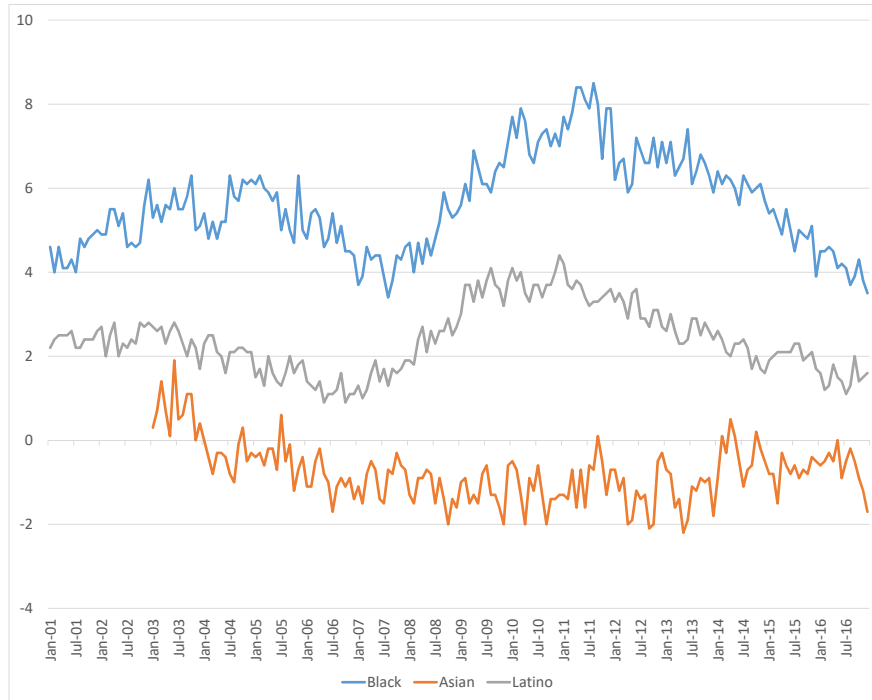
Figure 4: Labor Force by Race and Sex (Thousands), 2001 - 2016



since 2010 was that perhaps these differences could be explained by more Whites than Blacks opting for "early retirement" as a result of the Great Recession. Because White households tend to have much greater net worth, the thought was that they were in a better position to retire from the labor force than their Black counterparts. However, the employment-population rates of those over 65 years of age have not fallen (see Table 1). In fact they have grown by more than 3 percentage points since 2007 from 16.0 to 19.3 percent. White and Black elders have just about the same absolute change in employment-population rates over time (from 16.3 to 19.9 percent for White elders and from 13.3 to 16.8 percent for Black elders). The relative rate of increase is larger for Blacks than for Whites (26.7 compared to 21.9 percent) because of the generally lower level of employment-population rate for Blacks than for Whites. More generally, while the employment-population rate was falling for the entire population between 2007 and 2010, it was rising slightly for elders. After 2010, it has grown slightly faster for elders (3.2 percentage points) than for the rest of the population (3.1 percent). It is more among those under 65 years of age that the increase in the Black employment-population rate relative to that of Whites has occurred, with the largest absolute increase in White and Black employment-population rates (8.8 and 5.6 percentage points, respectively) happening among those between 25 and 34 years of age for Whites and those under 25 for Blacks between 2010 and 2016.

For the latter groups (less than 25 and 25 to 34 year olds), a closer look at changes

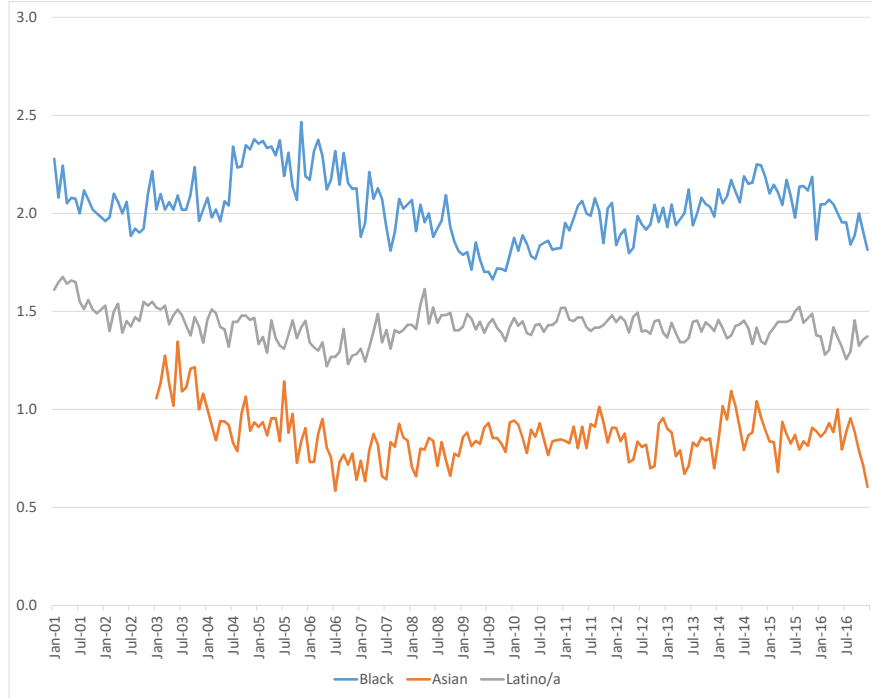
Figure 5: Difference in Unemployment Rate from Whites, by Race (Percent), 2001 - 2016



in unemployment rates and labor force participation rates is warranted. For Whites under 25, unemployment rates jumped from 9.9 percent in 2007 to 16.9 percent in 2010, thereafter falling back to 9.6 percent by 2016 (Table 2). For Blacks under 25, the unemployment rate grew from an already-large 20.6 percent in 2007 to 34.5 percent in 2010. Between 2010 and 2015 the rate fell back to 23.0 percent. For Whites and Blacks 25 to 34 years old, the trends were similar, but with smaller magnitudes than the younger group. So as far as the unemployment rate is concerned, the changes for Whites and Blacks followed a similar trend although, as always, the magnitudes were larger for Blacks.

The labor force participation rate for Whites under 25 fell from 67.7 to 65.2 percent between 2007 and 2010, ut then recovered only to 65.7 by 2016, still below the 2007 level (Table 3). That of Whites between 25 and 34 years of age fell from 85.0 to 84.3 then increased to 86.0 percent by 2016. For Blacks under 25 years old, labor force participation *grew* slightly between 2007 and 2010 from 57.1 to 58.0 percent then jumped to 60.8 percent by 2016. For Blacks between 25 and 34, labor force participation rates fell from 80.0 to 78.8 percent before rising to 81.1 percent in 2016. These groups had large increases in labor force participation rates relative to Whites between 2010 and 2016 (2.7 and 2.3 percentage points for those under 25 and those 25 to 34, respectively), and for the entire period (3.6 and 1.1 percentage points), despite encountering some of

Figure 6: Ratio of Unemployment Rate to Whites, by Race (Percent), 2001 - 2016



the highest net increases in their unemployment rates (2.3 and 2.6 percentage points between 2007 and 2016).

4 Analysis

Of course the object of this study, the employment population rate, is properly conceptualized as a product of intersecting social and economic processes. The first process is individuals' entry into the labor force. The second process is attaining employment. At a macro-economic level, we can decompose the employment-population rate simply:

$$E = LFPR * (1 - u) \tag{1}$$

In other words, the employment-population rate (E) is the product of the labor force participation rate (LFPR) and the employment rate (1 - u, where u is the unemployment rate). This relationship is of course merely an accounting identity at the macro level. However, at the micro level the unemployment rate and the labor force participation rate are not unrelated. The decision to enter the labor market or not will be influenced by the rate of unemployment, and differential rates of unemployment can be expected to have different impacts on the rate of labor force participation. In

Table 1: Employment-Population Rates by Race and Age Categories (Percent), 2007, 2010 and 2016

2007	<65	<25	25-34	35-44	45-54	55-64	>64	Total
White	75.8	61.0	81.5	82.0	80.8	64.2	16.3	64.1
Black	67.3	45.4	73.1	78.3	72.3	52.9	13.3	60.6
Latino	71.2	58.5	76.4	77.5	74.5	54.8	16.3	66.6
Other	72.1	52.9	74.4	78.8	77.1	61.6	15.1	65.2
Total	73.9	57.7	78.9	80.7	78.9	62.2	16.0	64.1
2010								
White	71.8	54.2	76.5	78.8	77.0	62.6	16.5	60.5
Black	60.2	38.0	64.3	69.1	66.4	51.4	12.9	54.0
Latino	65.0	46.9	70.1	71.3	68.8	55.2	15.6	60.4
Other	68.5	43.2	70.1	75.2	75.7	60.5	15.5	61.6
Total	69.2	49.5	73.2	76.0	74.7	60.6	16.1	59.8
2016								
White	74.6	59.3	82.1	81.1	79.7	65.0	19.9	61.0
Black	64.1	46.8	71.9	74.8	69.8	50.4	16.8	56.6
Latino	69.7	53.2	75.7	76.2	73.6	59.4	17.6	64.1
Other	71.8	47.9	76.4	79.5	76.9	63.3	18.7	63.4
Total	72.2	55.1	78.9	79.2	77.3	62.6	19.3	61.2

Table 2: Unemployment Rates by Race and Age Categories (Percent), 2007, 2010 and 2016

2007	<65	<25	25-34	35-44	45-54	55-64	>64	Total
White	3.8	9.9	4.0	3.1	3.0	2.8	2.8	3.8
Black	8.0	20.6	8.7	4.9	6.5	4.7	5.3	7.9
Latino	5.4	9.3	5.1	4.6	4.5	4.8	3.4	5.4
Other	4.7	11.4	5.2	4.2	3.0	3.2	4.2	4.6
Total	4.6	11.2	4.9	3.7	3.5	3.1	3.1	4.5
2010								
White	8.5	16.9	9.3	7.6	7.5	6.9	5.8	8.4
Black	16.4	34.5	18.4	14.5	11.8	9.5	12.6	16.2
Latino	12.9	22.1	11.8	12.1	11.7	9.1	9.7	12.8
Other	9.3	23.7	9.0	8.1	7.8	7.3	7.2	9.2
Total	10.1	20.8	10.8	9.2	8.4	7.3	6.6	9.9
2016								
White	4.1	9.6	4.5	3.4	3.1	3.5	3.3	4.0
Black	9.7	23.0	11.3	8.0	6.0	5.6	5.5	9.5
Latino	5.9	11.9	5.8	4.5	4.6	5.1	4.7	5.8
Other	4.7	12.4	5.7	2.7	3.6	4.2	3.4	4.7
Total	5.1	12.3	5.7	4.1	3.7	3.9	3.6	5.0

addition, different groups of individuals will have different responses and different experiences in the labor force and knowledge about those differences also enter into individuals' decision-making processes.

Analyses of labor supply often use a sample selection approach to explain wage

Table 3: Labor Force Participation Rates by Race and Age Categories (Percent), 2007, 2010 and 2016

2007	<65	<25	25-34	35-44	45-54	55-64	>64	Total
White	78.8	67.7	85.0	84.7	83.3	66.0	16.8	66.6
Black	73.1	57.1	80.0	82.4	77.3	55.5	14.0	65.8
Latino	75.3	64.5	80.5	81.3	78.0	57.5	16.8	70.4
Other	75.7	59.7	78.4	82.2	79.5	63.7	15.8	68.4
Total	77.4	65.0	82.9	83.7	81.8	64.2	16.5	67.2
2010								
White	78.5	65.2	84.3	85.2	83.2	67.2	17.5	66.0
Black	72.0	58.0	78.8	80.8	75.3	56.7	14.8	64.5
Latino	74.6	60.1	79.5	81.1	78.0	60.7	17.3	69.3
Other	75.5	56.7	77.0	81.8	82.1	65.3	16.7	67.9
Total	76.9	62.5	82.1	83.7	81.6	65.4	17.2	66.4
2016								
White	77.8	65.7	86.0	83.9	82.2	67.4	20.5	63.6
Black	71.0	60.8	81.1	81.3	74.3	53.4	17.8	62.5
Latino	74.1	60.3	80.4	79.7	77.2	62.6	18.5	68.0
Other	75.4	54.7	81.0	81.8	79.8	66.1	19.3	66.5
Total	76.1	62.8	83.7	82.5	80.3	65.2	20.1	64.4

and earnings differentials. Because wages are observed only for those who are employed, a regression of wages using that sample produces biased estimates of coefficients. The usual procedure is to first perform a probit maximum likelihood estimation of labor force participation, calculate the inverse Mills ratio from the results and use that in the wage regression (Heckman, 1979). This approach deftly omits a critical step in the whole scenario: the attainment of employment. It is not at all clear that the factors that determine employment are identical to either those that determine labor force participation or those that determine the wage. A stronger argument could be made for the latter.

Racial and sexual discrimination are socio-economic processes that run through both of these stages. A number of ways to theorize discrimination exist, of course. Much of neo-classical theorization of discrimination in the labor market rests on the idea that either the people discriminated against actually have individual characteristics that set them apart from those who are not or that the discriminating employers have a taste for discrimination. These approaches sidestep the question of systemic oppression based on race or sex. And for the time being we do as well.

With the Annual Social and Economic Supplement (ASEC) to the CPS we will examine to what extent differential labor market outcomes (labor force participation and employment status) are related to the characteristics of individuals and their families. This data set is in fact intended for just this sort of analysis. While we can use this data to show that there may be evidence for the existence of systemic oppression, it would be difficult if not impossible to use this data to draw conclusions about how those systems of oppression work themselves out. With this initial statistical analysis, we hope to provide a solid context for further elaboration of such processes. We use the ASEC datasets from 2007, 2010 and 2016: 2007 just before the Great Recession really

hit the labor market, 2010, after the initial impact of the American Reinvestment and Recovery Act and 2016, the latest year of data that is available. Given the findings above, the universe for the study is that of individuals 16 to 34 years old that are not in school or in the military.

In this first stage of the analysis we estimate the likelihood of entering the labor force for men and women separately using the probit model for each of three years (2007, 2010 and 2016):

$$P(\text{lfpr} = 1|x) = G(\alpha + \beta X + \mu) \quad (2)$$

As independent variables, we use individuals' age, age squared, years of education and its square, race,¹ the marital status of the individual, the number of the individual's own never-married children under 18 living in the household, family income net of the individual's earnings and census region (which we normalize by dividing by the mean). With the results of these maximum likelihood estimations, we calculate the inverse Mills Ratio. We then perform separate maximum likelihood estimations for men and women in the labor force being employed, again using the probit model. As independent variables, we use the individuals' age, age squared, years of education and its square, race, and census region in addition to the inverse Mills ratio calculated in the previous set of estimations.

We report the results of the probit estimation of labor force participation for all three years for young men in Table 4, below. In addition to the estimated coefficients of the objective function, we include marginal effects to clarify the interpretation of the results. The results for the most part reflect the broad trends outlined above. Young Black and Other males are less likely to be engaged in the labor force than young White men (the comparison group in these estimates), while young Latinos are more likely to participate in the labor force. More interesting are the changes within these categories over time as the Great Recession unwinds and the slow recovery takes hold. Black males grew slightly more likely to participate relative to White males between 2007 and 2016 (going from 10.9 to 6.8 percent less likely). Latino males' estimated likelihood of being in the labor force declined slightly from 3.4 to 2.2 percent more likely than White males between 2007 and 2010, while that of Other males dropped from 8.5 to 10.9 percent less likely than White males. Between 2010 and 2016, Others' relative likelihood recovered to 8 percent, while young Latinos became only 1.4 percent more likely to participate than young White males.

Young married men were estimated to be more likely to participate in the labor market than the non-married in all three years. From 12.3 percent more likely in 2007 they rose to 14.5 percent more likely in 2010 before returning to 12.5 percent more likely by 2016. The number of children in the household reduced the likelihood of participation by young men by close to zero percent per child, in 2007 and 2016, with only a slight rise to a 0.8 percent reduction in 2010. The impact of other family income was unchanged between 2007 and 2010, before falling by one third by 2016.

¹Racial categories are defined as follows in this study. Latinos/as include anyone identifying themselves as having Hispanic heritage. Everyone else is divided into White, Black and Other depending on how they identified themselves. White and Black individuals are those that identified themselves as White only and Black only, respectively. Everyone else is categorized as Other.

In terms of the impact educational achievement on participation, there are few surprises. The likelihood of participating increases with educational achievement in each year. In 2007 and 2010, an additional year of education increased the likelihood of participation by 2 percent. In 2016, this impact had risen to 3.3 percent. This effect is essentially linear. The effect of age increases by less than a percentage point between 2007 and 2010, but falls again to nearly where it was by 2016. Young men were more likely to be employed in all three regions than the North East and they all follow a similar pattern: a decline in their advantage between 2007 and 2010, followed by a recovery. Young men in the South were the most likely to be employed in all three years, ending up as 8.8 percent more likely in 2016. Finally, students were less likely to be employed, and increasingly so over time.

Table 4: Results of Probit Estimation of LFPR for Young Men by Year

	2007		2010		2016	
	β / SE	Mfx	β / SE	Mfx	β / SE	Mfx
Black	-0.383*** (0.001)	-0.109 (0.000)	-0.290*** (0.001)	-0.091 (0.000)	-0.208*** (0.001)	-0.068 (0.000)
Latino	0.118*** (0.001)	0.034 (0.000)	0.071*** (0.001)	0.022 (0.000)	0.042*** (0.001)	0.014 (0.000)
Other	-0.297*** (0.001)	-0.085 (0.000)	-0.347*** (0.001)	-0.109 (0.000)	-0.246*** (0.001)	-0.080 (0.000)
Married	0.430*** (0.001)	0.123 (0.000)	0.460*** (0.001)	0.145 (0.000)	0.382*** (0.001)	0.125 (0.000)
Number of children	-0.006*** (0.000)	-0.002 (0.000)	-0.026*** (0.000)	-0.008 (0.000)	-0.004*** (0.000)	-0.001 (0.000)
Family income	-0.054*** (0.000)	-0.015 (0.000)	-0.052*** (0.000)	-0.016 (0.000)	-0.029*** (0.000)	-0.009 (0.000)
Years of School	0.070*** (0.000)	0.020 (0.000)	0.064*** (0.000)	0.020 (0.000)	0.100*** (0.000)	0.033 (0.000)
Square of School Years	-0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.000 (0.000)
Age	0.588*** (0.000)	0.168 (0.000)	0.562*** (0.000)	0.177 (0.000)	0.526*** (0.000)	0.171 (0.000)
Age Squared	-0.011*** (0.000)	-0.003 (0.000)	-0.010*** (0.000)	-0.003 (0.000)	-0.009*** (0.000)	-0.003 (0.000)
South	0.238*** (0.001)	0.068 (0.000)	0.142*** (0.001)	0.045 (0.000)	0.269*** (0.001)	0.088 (0.000)
MidWest	0.139*** (0.001)	0.040 (0.000)	0.039*** (0.001)	0.012 (0.000)	0.086*** (0.001)	0.028 (0.000)
West	0.134*** (0.001)	0.038 (0.000)	0.040*** (0.001)	0.013 (0.000)	0.057*** (0.001)	0.018 (0.000)
Student	-0.600*** (0.001)	-0.172 (0.000)	-0.588*** (0.001)	-0.185 (0.000)	-0.658*** (0.001)	-0.215 (0.000)
Constant	-7.732*** (0.006)		-7.473*** (0.006)		-7.431*** (0.006)	

Likelihood estimates for young women are reported in Table 5, below. Black,

Latina, and Other young women all had lower estimated likelihood of labor force participation than young White women. Black women's estimated participation gap with White women shrank during the Great Recession dropping from 6.8 to 4.8 percent. This gap remained virtually unchanged in 2016. Young Latinas started out slightly ahead of Black women at 5.4 percent less likely than White women to participate in the labor force, but in 2016 were just as likely to be employed. Other young women started out 12.9 percent less likely to participate than White women and remained there in 2010, but by 2016 were 15.3 percent less likely than young White women to participate in the labor force.

While for young men marriage increases the likelihood of labor force participation, for young women the opposite is true, although the effect is similar in scale. Young married women were 13.2 percent less likely than their single counterparts to participate in 2007. This gap was virtually unchanged in either 2010 or 2016, when the gap was 13.4 percent. The number of children has a larger impact on women's labor force participation than on men, but has slowly decreased from 4.6 percent lower likelihood per child in 2007 to 3.5 percent less likely in 2016. Other family income had a slightly larger negative impact on women's labor force participation than on men's and while it remained unchanged during the Great Recession, it has since been cut by one quarter.

For young women the impact of education is roughly half as large as the impact of age. During the Great Recession both impacts increased, but since 2010, the impact of education has continued to rise, while the impact of age has fallen. Regional patterns for young women mirror those of young men, and young women also show a decreasing likelihood over time of combining school and work.

In order to confirm that the major change happening among employment-population rates was among young people, we present the results of a second stage of estimates of employment for young individuals. The results for young males are presented in Table 6, below. We first notice that the marginal effect of selection (the inverse Mills ratio) doubled between 2007 and 2010 (from 10.3 to 20.1 percent), whereas it fell significantly by 2016 (to 7.9 percent). This may be due to the high rate of unemployment in the Great Recession. Another way of saying this is that supply-side effects dominate young male employment in 2007 and 2016, while the same is not true in 2010, in which demand-side effects are clearly important. In probit estimates without the inverse Mills ratio for 2010, being a Black man reduced the likelihood of being employed by 11.2 percent relative to White men, while the inclusion of the selection correction increases that impact to 11.6 percent. Leaving out the correction for selection bias would clearly have an important if modest effect.

Moving on to the significance of race in determining employment outcomes, let us first note that young Black men are at the greatest disadvantage with respect to young White men in terms of estimated likelihood of being employed (6.2, 11.6 and 6.5 percent less likely, in 2007, 2010, and 2016, respectively). Black men clearly suffered relatively greater employment losses as a result of the Great Recession than any other group of young men. Latinos are 0.2 percent more likely than White males to be employed in 2007, but equally likely in 2010 and 2016. Other young males were 4.2 percent less likely than white men to be employed in 2007 and 2016, but the gap increased to 4.6 percent in 2010 indicating that they were not quite as hard hit by the

Table 5: Results of Probit Estimation of LFPR for Young Women by Year

	2007		2010		2016	
	β / SE	Mfx	β / SE	Mfx	β / SE	Mfx
Black	-0.183*** (0.001)	-0.068 (0.000)	-0.127*** (0.001)	-0.048 (0.000)	-0.124*** (0.001)	-0.047 (0.000)
Latino	-0.145*** (0.001)	-0.054 (0.000)	-0.113*** (0.001)	-0.043 (0.000)	-0.121*** (0.001)	-0.045 (0.000)
Other	-0.344*** (0.001)	-0.129 (0.000)	-0.333*** (0.001)	-0.127 (0.000)	-0.405*** (0.001)	-0.153 (0.000)
Married	-0.355*** (0.001)	-0.132 (0.000)	-0.346*** (0.001)	-0.132 (0.000)	-0.356*** (0.001)	-0.134 (0.000)
Number of children	-0.124*** (0.000)	-0.046 (0.000)	-0.114*** (0.000)	-0.043 (0.000)	-0.092*** (0.000)	-0.035 (0.000)
Family income	-0.057*** (0.000)	-0.021 (0.000)	-0.051*** (0.000)	-0.019 (0.000)	-0.037*** (0.000)	-0.014 (0.000)
Years of School	0.140*** (0.000)	0.052 (0.000)	0.188*** (0.000)	0.071 (0.000)	0.204*** (0.000)	0.077 (0.000)
Square of School Years	-0.002*** (0.000)	-0.001 (0.000)	-0.003*** (0.000)	-0.001 (0.000)	-0.003*** (0.000)	-0.001 (0.000)
Age	0.321*** (0.000)	0.120 (0.000)	0.360*** (0.000)	0.137 (0.000)	0.334*** (0.000)	0.126 (0.000)
Age Squared	-0.005*** (0.000)	-0.002 (0.000)	-0.006*** (0.000)	-0.002 (0.000)	-0.006*** (0.000)	-0.002 (0.000)
South	0.203*** (0.001)	0.076 (0.000)	0.193*** (0.001)	0.073 (0.000)	0.273*** (0.001)	0.103 (0.000)
MidWest	0.088*** (0.001)	0.033 (0.000)	0.028*** (0.001)	0.011 (0.000)	0.026*** (0.001)	0.010 (0.000)
West	0.082*** (0.001)	0.031 (0.000)	0.034*** (0.001)	0.013 (0.000)	0.053*** (0.001)	0.020 (0.000)
Student	-0.249*** (0.001)	-0.093 (0.000)	-0.331*** (0.001)	-0.126 (0.000)	-0.405*** (0.001)	-0.153 (0.000)
Constant	-5.231*** (0.005)		-6.205*** (0.005)		-5.904*** (0.005)	

recession as young Black men, but more so than Whites and Latinos.

Educational achievement had a small and largely counterintuitive impact on the likelihood of being employed. Between each year, the estimated impact of educational achievement on likelihood of being employed decreased, beginning at a modest extra 0.5 percent per year of education and ending up with 1 percent per year lower likelihood by 2016. The square of years of schooling was positive, indicating an eventual upward turn. This trend may reflect the occupational composition of the jobs lost during the recession. The Great Recession also temporarily increased the impact of age on the likelihood of being employed: a 4.8 percent per year increase in likelihood in 2007 grew to 8.5 percent by 2010, before falling back to 4.1 percent in 2016. The Great Recession clearly prevented younger men in particular from entering employment while it was still going on. Regionally, young men everywhere else were likelier

to be employed than those in the Northeast in 2007 and 2016, while those in the South and West were less likely in 2010, though about equally likely in 2007 and 2016. The Great Recession seems to have reduced the Mid-West males' advantage by one and a half percentage points.

Table 6: Results of Probit Estimation of Employment for Young Men by Year

	2007		2010		2016	
	β / SE	Mfx	β / SE	Mfx	β / SE	Mfx
Black	-0.515*** (0.001)	-0.062 (0.000)	-0.532*** (0.001)	-0.116 (0.000)	-0.527*** (0.001)	-0.065 (0.000)
Latino	0.017*** (0.001)	0.002 (0.000)	-0.003*** (0.001)	-0.001 (0.000)	-0.004*** (0.001)	-0.000 (0.000)
Other	-0.343*** (0.002)	-0.042 (0.000)	-0.209*** (0.001)	-0.046 (0.000)	-0.341*** (0.001)	-0.042 (0.000)
Years of School	0.039*** (0.001)	0.005 (0.000)	-0.033*** (0.001)	-0.007 (0.000)	-0.077*** (0.001)	-0.010 (0.000)
Square of School Years	0.004*** (0.000)	0.000 (0.000)	0.008*** (0.000)	0.002 (0.000)	0.009*** (0.000)	0.001 (0.000)
Age	0.396*** (0.001)	0.048 (0.000)	0.389*** (0.001)	0.085 (0.000)	0.330*** (0.001)	0.041 (0.000)
Age Squared	-0.007*** (0.000)	-0.001 (0.000)	-0.007*** (0.000)	-0.001 (0.000)	-0.006*** (0.000)	-0.001 (0.000)
South	0.096*** (0.001)	0.012 (0.000)	-0.054*** (0.001)	-0.012 (0.000)	0.118*** (0.001)	0.015 (0.000)
MidWest	0.252*** (0.001)	0.031 (0.000)	0.057*** (0.001)	0.012 (0.000)	0.127*** (0.001)	0.016 (0.000)
West	0.109*** (0.001)	0.013 (0.000)	-0.110*** (0.001)	-0.024 (0.000)	0.075*** (0.001)	0.009 (0.000)
Inv. Mills Ratio (young)	0.853*** (0.003)	0.103 (0.000)	0.921*** (0.002)	0.201 (0.000)	0.636*** (0.003)	0.079 (0.000)
Constant	-5.717*** (0.018)		-5.824*** (0.016)		-4.159*** (0.020)	

In Table 7, we present the corresponding results for young women. Again, the marginal effects of the inverse Mills' ratio is significant and large (though not as large as in the estimates for young men), indicating strong selection bias in the employment estimation. Black women are least likely to be employed relative to White women, but young Latinas and Other women are also less likely (with the exception of Latinas in 2007, who are estimated to be just as likely as young White women to be employed). All three groups saw their likelihood of being employed relative to young White women decrease significantly (by about 3 percentage points each) between 2007 and 2010. Between 2010 and 2016, they all regained most but not all of the ground they lost with respect to young White women. In 2016 young Black, Latina and Other women were about 5, 1 and 4 percent less likely to be employed than their White counterparts, respectively.

Both age and education were important determinants of the likelihood of being

employed for young women. Unlike for young men, however, additional years of education added to the likelihood of young women being employed. The marginal impact of education grew during the Great Recession, rising from 1.1 to 2.4 percent per year, but fell back to 0.8 percent per year. This implies that unemployment during the Great Recession fell more heavily on those young women with less education. Age has a greater impact than education in each of the three years but its impact follows the same pattern of growth during the Great Recession (from 1.7 to 3.7 percent per year of age) and falling off afterwards (to 2.9 percent). Although young women were less likely to be employed outside of the North East in 2007 (from 0.5 percent in the West to 1.1 percent less likely in the South), this started to change afterwards. By 2010, young women in the South and the Mid-West were slightly more likely to be employed than those in the North East (0.5 and 0.3 percent, respectively). Young women in the West lost ground relative to their Northeastern counterparts, falling to 1.4 percent less likely to be employed. Young women in all three regions gained ground on the North East between 2010 and 2016, becoming 2 percent more likely to be employed in the South, 0.7 percent in the Mid-West, and 0.3 percent in the West.

Table 7: Results of Probit Estimation of Employment for Young Women by Year

	2007		2010		2016	
	β / SE	Mfx	β / SE	Mfx	β / SE	Mfx
Black	-0.389*** (0.001)	-0.041 (0.000)	-0.418*** (0.001)	-0.073 (0.000)	-0.429*** (0.001)	-0.049 (0.000)
Latina	0.003** (0.001)	0.000 (0.000)	-0.142*** (0.001)	-0.025 (0.000)	-0.074*** (0.001)	-0.008 (0.000)
Other	-0.229*** (0.002)	-0.024 (0.000)	-0.327*** (0.001)	-0.057 (0.000)	-0.327*** (0.002)	-0.037 (0.000)
Years of School	0.103*** (0.001)	0.011 (0.000)	0.140*** (0.001)	0.024 (0.000)	0.068*** (0.001)	0.008 (0.000)
Square of School Years	0.001*** (0.000)	0.000 (0.000)	-0.000*** (0.000)	-0.000 (0.000)	0.003*** (0.000)	0.000 (0.000)
Age	0.164*** (0.001)	0.017 (0.000)	0.215*** (0.001)	0.037 (0.000)	0.256*** (0.001)	0.029 (0.000)
Age Squared	-0.003*** (0.000)	-0.000 (0.000)	-0.003*** (0.000)	-0.001 (0.000)	-0.004*** (0.000)	-0.000 (0.000)
South	-0.104*** (0.001)	-0.011 (0.000)	0.026*** (0.001)	0.005 (0.000)	0.178*** (0.001)	0.020 (0.000)
MidWest	-0.075*** (0.001)	-0.008 (0.000)	0.018*** (0.001)	0.003 (0.000)	0.058*** (0.001)	0.007 (0.000)
West	-0.048*** (0.001)	-0.005 (0.000)	-0.081*** (0.001)	-0.014 (0.000)	0.023*** (0.001)	0.003 (0.000)
Inv. Mills Ratio (young)	0.303*** (0.003)	0.032 (0.000)	0.483*** (0.003)	0.084 (0.000)	0.616*** (0.003)	0.070 (0.000)
Constant	-2.366*** (0.020)		-3.876*** (0.019)		-3.901*** (0.021)	

We have demonstrated that the racial gap in labor force participation among young

people is at least not all due to confounding factors. When we control for age, education, and family characteristics, there are still important differences in the shift over time in labor force participation, especially between young White and Black men. Therefore, we move on to decomposing the intersectional gaps in labor force participation among young people as well as the changes in labor force participation by race and sex over time. This will allow us to say something about the relative importance of the different groups' characteristics and the returns to those characteristics in driving the gaps in labor force participation, as well as their changes over time.

5 Decomposition

In order to better understand the differences in employment by race and sex, we can employ a technique similar to the Oaxaca-Blinder decomposition used in the wage gap literature. While Oaxaca-Blinder decomposes the difference in mean of a linear function, we are estimating a non-linear function. We therefore follow the method used by Fairlie (2005) for such a case.

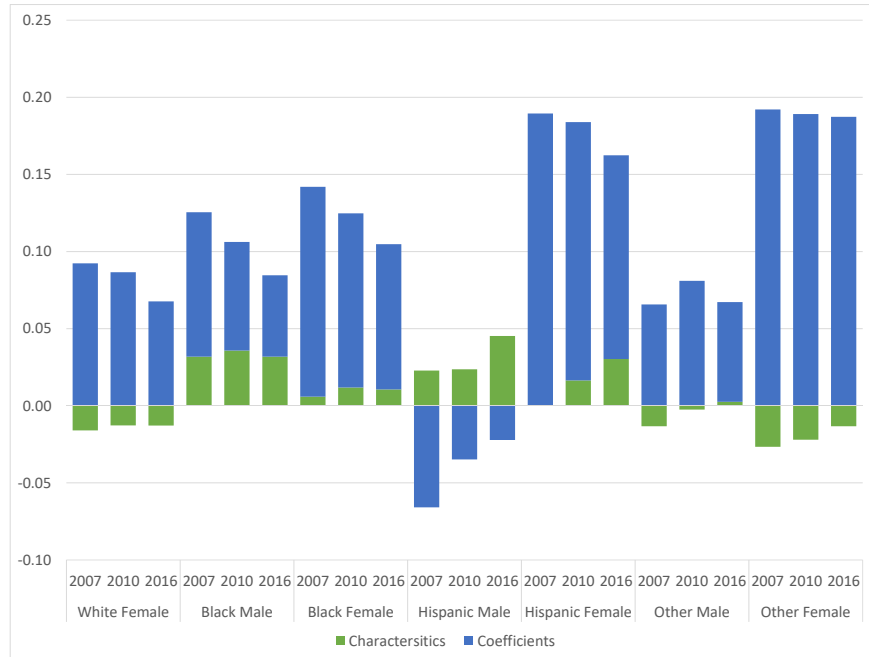
$$\bar{Y}^{WM} - \bar{Y}^{BM} = \left[\sum_{i=1}^{N^{WM}} \frac{F(X_i^{WM} \hat{\beta}^{WM})}{N^{WM}} - \sum_{i=1}^{N^{BM}} \frac{F(X_i^{BM} \hat{\beta}^{WM})}{N^{BM}} \right] + \left[\sum_{i=1}^{N^{BM}} \frac{F(X_i^{BM} \hat{\beta}^{WM})}{N^{BM}} - \sum_{i=1}^{N^{BM}} \frac{F(X_i^{BM} \hat{\beta}^{BM})}{N^{BM}} \right] \quad (3)$$

The first term is the difference due to characteristics and the second term is the difference due to the estimated coefficients on those characteristics. Getting these numbers is not hard: for each year, run a probit model maximum likelihood estimation on labor force participation for each subgroup and predict the probability using the results. Taking the average for each subgroup gives you the terms in the brackets. Note that the prediction using white males' probit results is used for the counterfactual term in each of the brackets. The independent variables (characteristics) use for this exercise were individual's marital status, number of children under 18, other family income, educational attainment, age, census region, and school enrollment status.

This results of this decomposition of the gap in labor force participation between young White men and young people in the seven other race-sex combinations are presented in Figure 7, below. A number of things need pointing to be emphasized. First, a negative number means a higher predicted LFPR for that group compared to white males. Second, the coefficient effect here is the effect of a given set of characteristics on the difference in the likelihood of being in the labor force between the group in question and young white men. Third the characteristic effect is the impact of differences in characteristics between a specific group and young White men on that difference. It is clear at a glance that the majority of the differences for most groups and years are due to the coefficient effect. In other words, for a given set of characteristics, those groups are less likely to be in the labor force than young White men.

Accordingly, for the most part, labor force participation is higher for young white males than for all the other groups. Young Hispanic males are the exception, at least through 2010. Clear trends over time emerge: for White women, Black and Latino men and women, the size of the coefficient effect is falling. Note especially that for young Black men, the characteristic effect is more or less unchanged between 2007 and 2016 (though there is a small uptick in 2010). The substantial decline in the gap in labor force participation between young White and Black men has to do with the returns to those characteristics: in 2007 it accounted for 9.4 percentage points of the gap, while in 2016 that amount was 5.3 percentage points. This leaves 3.2 percentage points gap due directly to differences in characteristics. This substantial difference leads to an important question: why are young Black men so much less likely than their White counterparts with similar characteristics to enter the labor force?² The significant drop in the leads to a second question: what has changed?

Figure 7: Decomposition of Changes in LFPR Gap During and After Great Recession, by Race and Sex



Moving on to decompose the changes in participation among groups over time,

²Survey responses to the question of why individuals were not working in 2016 indicate that young Black men were twice as likely as their White counterparts to be ill or disabled, four times as likely to report that they could not find work, and 25 percent more likely to be in school.

equation (3) becomes:

$$\bar{Y}^{2010} - \bar{Y}^{2007} = \left[\sum_{i=1}^{N^{2010}} \frac{F(X_i^{2010} \hat{\beta}^{2010})}{N^{2010}} - \sum_{i=1}^{N^{2007}} \frac{F(X_i^{2007} \hat{\beta}^{2010})}{N^{2007}} \right] + \left[\sum_{i=1}^{N^{2007}} \frac{F(X_i^{2007} \hat{\beta}^{2010})}{N^{2007}} - \sum_{i=1}^{N^{2007}} \frac{F(X_i^{2007} \hat{\beta}^{2007})}{N^{2007}} \right] \quad (4)$$

Thus we decompose the change in likelihood of labor force participation within a group between 2007 and 2010 into the change due to changes in characteristics (the first term in equation 4) and the change in returns to characteristics or coefficients (the second term in equation 4). We perform this calculation for each of eight race-sex categories and present the results for two time periods in Figure 8, below.

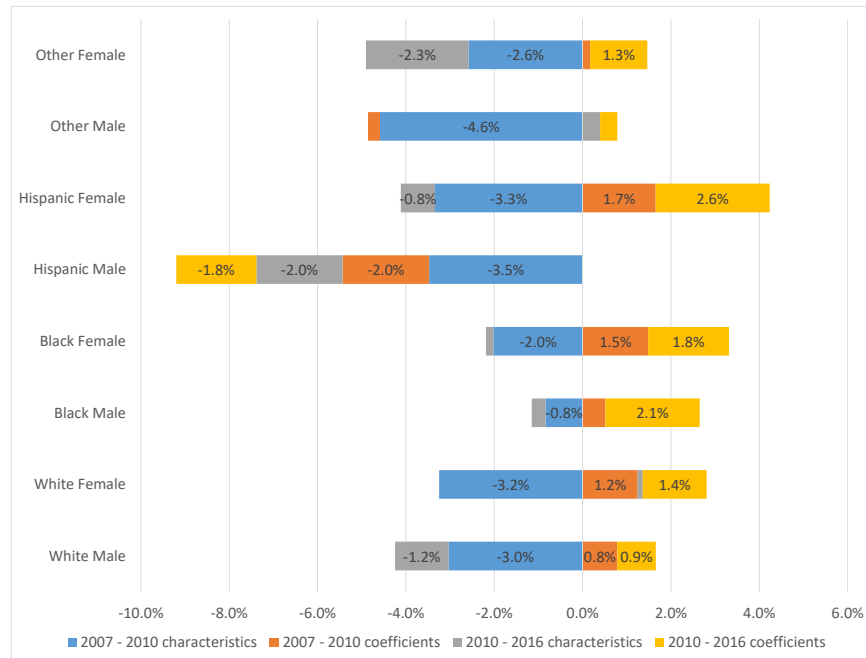
Again we see that Hispanic males are exceptional in the changes over time in their labor force participation. Both characteristic and coefficient effects explain reductions in labor force participation over time, totaling 9 percentage points between 2007 and 2016. Given the evidence above the most important comparison here is that between young White and Black men. For young White men, the characteristic effect explains a 3 percentage point reduction in labor force participation between 2007 and 2016 (the same is true for young White women), while for young Black men, the amount is 0.8 percentage points. This is to say that for young White men a significant shift in characteristics between 2007 and 2010 explains much of their reduced labor force participation in 2010. A smaller shift between 2010 and 2016 leads to an overall slight decline in labor force participation, as the recovery boosted the returns of young White men leading to an increase of 0.9 percentage points in their participation rate. Young Black men, by contrast had a negligible negative characteristic effect driving changes between 2010 and 2016, while their coefficient effect created a 2.1 percentage point boost to their labor force participation by 2016.

6 Conclusions

We have shown that the interesting trend in the employment-population rate of Black adults, compared to that of Whites, after the Great Recession can be explained by the entry of young Black individuals into the labor market after 2010. Unlike changes in unemployment rates, which have followed the racial patterns typical of U.S. recessions and recoveries, labor force participation patterns have deviated from previous historical patterns.

Examining the labor force series from the Bureau of Labor Statistics, it becomes clear that the changes in the overall trend in employment-population rates is due to the aging of the White population and the relative increase in young Black labor force participation. Our estimates of the likelihood of labor force participation demonstrate that the gap between young White and Black men and women has been shrinking when controlling for age, education, and household characteristics even during the Great Recession. Decomposing these estimates shows that young men and women's

Figure 8: Decomposition of Changes in Labor Force Participation of Young People During and After the Great Recession, by Race and Sex



characteristics have produced larger reductions in White than Black labor force participation, even as the positive impact of the returns to those characteristics has been greater for young Black men and women than for their White counterparts.

The next steps in further elaborating this analysis include deeper analysis of the decomposition of the returns to characteristics especially, as well as producing some added analysis of the mechanisms by which Black males, especially, but also Black females are excluded from employment as a matter of course in U.S. labor markets, and how this may be changing over time due to demographic or other factors.

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