Sam Houston State University
Department of Economics and International Business
Working Paper Series

On (not) Closing the Gaps: The Evolution of National and Regional Unemployment Rates by Race and Ethnicity

Donald G. Freeman
Sam Houston State University

SHSU Economics & Intl. Business Working Paper No. 11-01
June 2011

Abstract:

This paper conducts stationarity tests for levels and ratios of national and regional unemployment rates by race and ethnicity. Results indicate that both unemployment rates and ratios for the total population and for subgroups by race, ethnicity and region are stationary around changing means. The Black/White unemployment ratio has increased on average and the Hispanic/White unemployment ratio has decreased on average. Results are compared across regions of the US.

On (not) Closing the Gaps: The Evolution of National and Regional Unemployment Rates by Race and Ethnicity

By

Donald G. Freeman, PhD
Professor of Economics
Department of Economics & International Business
Sam Houston State University
P.O. Box 2118
Huntsville, TX 77341-2118
tel. 936-294-1265
fax. 936-294-3488
http://www.shsu.edu/~eco_www/faculty/freeman.html
freeman@shsu.edu

***JEL* Codes: D31, E24, I32**

Keywords: Unemployment; Outcomes by race and ethnicity; regional economics

Abstract

This paper conducts stationarity tests for levels and ratios of national and regional unemployment rates by race and ethnicity. Results indicate that both unemployment rates and ratios for the total population and for subgroups by race, ethnicity and region are stationary around changing means. The Black/White unemployment ratio has increased on average and the Hispanic/White unemployment ratio has decreased on average. Results are compared across regions of the US.

On (not) Closing the Gaps: Unemployment Rates

In non-White and White Populations

I. Introduction

The U.S. economy is characterized by persistent differentials in unemployment rates by race and Hispanic origin. Almost four decades ago, Leigh and Rawlings (1973) noted that "the ratio of the unemployment rate of black workers to that of whites has remained strikingly stable near 2 to 1 during the postwar period," and since then has remained well above 2.0 a good part of the time before finally declining in 2008 to 1.94 and further to 1.83 in 2010. The black/white disparity persists despite the near-doubling in completion rates of high school and college for blacks relative to whites since the early 1960s, and the passage since that time of a considerable amount of legislation aimed at ending discrimination in the workplace. Smaller but still substantial gaps exist historically between the rates of unemployment for Hispanics and whites, though as we show below, the latter gap has narrowed considerably.

Are these gaps converging at all in the long run? Are they the same in different regions of the country, where the proportions of minority populations differ? This paper will address these questions by conducting time series tests on unemployment rates for Whites, Blacks, and Hispanics and on the ratios of Black/White and Hispanic/White rates nationally and across the four regions of the U.S.: Northeast, Midwest, South, and West.

The experiences of these groups are very different over time and across space. Over the past 40 years, for example, white unemployment on an annual basis has only briefly exceeded 10 per cent, during 1982-83, and then only in the Midwest. By contrast, black unemployment in the Midwest has been *less* than 10 percent for only six years in the same period, during 1969-70 and 1998-2001. In another example, Hispanic unemployment rates have often matched and even

exceeded rates for blacks in the Northeast and West, but have remained well below black rates in the Midwest and South. Such disparities in outcomes call into question the concept of the unemployment rate, whether nationally of for a specific group or region.

Simple calculations like those above are enough to show that historical averages are different across groups and regions, but determining the degree of persistence of these differences requires a deeper analysis. At the extreme, rates for one or more groups may be non-stationary, or integrated of order one, implying differences may well diverge. Even when series are stationary, different subgroups may converge to different levels, so that gaps may persist over the long run.

The basic hypotheses to be tested are three:

1. That unemployment converges to a "natural rate": over time rates may fluctuate, but eventually converge to a rate that is, for a given group and a given region, constant over time. Even in periods of strong economic growth, some percentage of the population, amounting to millions of workers, are unemployed. Beginning in the 1960s, led by the work of Friedman (1968) and Phelps (1968), economists began to speak of the "natural rate" of unemployment. Broadly speaking, the natural rate, now termed the NAIRU, or Non-Accelerating Inflation Rate of Unemployment, was originally the rate consistent with imperfections in the supply side of the labor market, such as minimum wage legislation, or the frictions of searching for a job or transitioning to a different career. To try to reduce unemployment below its natural rate was to invite inflation as a consequence, as the excess demand for workers would result in additional wage gains without permanently reducing unemployment. If disaggregated unemployment rates have their own NAIRUs, this hypothesis may imply that the gap between black/white or Hispanic/white rates is permanent unless underlying conditions in the labor markets change.

2. That poverty and unemployment converge to natural rates, but that over time these rates may be subject to occasional shifts, or "structural breaks." As Friedman foresaw, the natural rate is not immutable. Imperfections in labor market conditions that give rise to the natural rate may themselves be subject to change: for example, better information, fewer rigidities, and more flexible regulations could lead to declines in the natural rate. On the reverse side, greatly enhanced worker protections and increasingly generous unemployment benefits likely contributed to significant increases in many European unemployment rates since the oil crises in the early 1970s. These shifts in the natural rate describe a moving target for adjustments to transitory shocks and could imply a narrowing of the gaps if, for example, educational differences between groups were to narrow.

3. That poverty and unemployment diverge; that is to say, that rates are the sums of random shocks, so that any new shock has a permanent effect. Blanchard and Summers (1986), noting relatively high rates of European unemployment and stable, not falling inflation rates, attributed persistent unemployment to groups of "insiders" and "outsiders," the former the remaining employed, who wish to preserve their relatively privileged status; the latter the unemployed, who lack the power or influence to get their jobs back. An alternative version of this story is that being detached from the labor market for a length of time makes the unemployed undesirable to employers, as skills erode or become obsolete in a dynamic environment. The term "hysteresis," denoting a system with memory, exhibiting path-dependence, describes unemployment that arises from being unemployed. Gaps between groups will be stable provided only that the series are *cointegrated*; that is, that their difference is stationary.

In the language of time series analysis, Hypothesis 1 is characterized by *stationarity*; Hypothesis 2 by *stationarity with structural breaks*; and Hypothesis 3 by *non-stationarity*. The techniques to be employed are straightforward applications of the Kwiatkowski, Phillips, Schmidt, and Shin (1992, hereinafter KPSS) test with the null hypothesis of stationarity, generalized to accommodate structural breaks (Hypotheses 1 & 2); and confirmatory analysis using augmented Dickey-Fuller (ADF) tests, with the null of non-stationarity, again accommodating the possibility of structural breaks (Hypothesis 3). The information from these tests will provide, in addition to evidence of stationarity, evidence of the evolution of "natural" rates of unemployment and poverty, and of the gaps between groups and regions.

The plan of the paper is as follows. Section II provides a brief review of previous literature. Section III describes the data and lays out the empirical approach; Section IV conducts stationarity tests on unemployment levels; Section V conducts stationarity tests on unemployment ratios; Section VI provides some additional discussion, and Section VII concludes.

II. Previous Research

Differences in black-white labor market outcomes have been long-standing research questions for economists; the literature on Hispanic-white outcomes is more recent but growing. Wage differentials appear to be largely explained by differences in human capital (Neal and Johnson, 1996), but unemployment differentials remain a difficult puzzle. R.B. Freeman (1973) documented the emergence and persistence of the gap between white and black unemployment rates in a wide-ranging analysis of the post-war experiences of blacks and whites in the labor market. Freeman (1973) observed that 1) black unemployment appeared to be more sensitive

than white unemployment to the business cycle; and 2) blacks were "first fired, last hired" at business cycle turning points.

Barrett and Morgenstern (1974) concluded that more frequent job changes were a major structural difference between the employment experience of blacks (and women) and whites; Betsey (1978) found that the consequences of unemployment spells were more serious for blacks than for whites: "Other things equal, blacks' unemployment duration increases considerably more with an earlier spell of unemployment than that of comparable whites." (Betsey, p. 196)

Levy (1980) constructed employability indexes for black and white male workers, using a number of controls including education, location, marital status, and employment experience, finding that the distribution of the employability for black males lay well to the left of that for whites. Of significance was the increase in the importance to employability of previous labor market experience from the early 1960s to the late 1970s; blacks scored relatively less well on this element.

Other explanations, notably Vedder and Galloway (1992) and Cogan (1982), emphasized the shift of blacks from low-unemployment occupations and regions (in particular, from Southern agriculture) into high-unemployment ones. Supply-side explanations emphasize the importance of human capital, particularly education. As noted above, however, the education gap between blacks and whites has narrowed considerably; work by Abowd and Killingsworth (1984), Stratton (1993), and Fairlie and Sundstrom (1997) can account for at most one-third the gap between black and white unemployment rates using individual characteristics.

In a recent contribution, Ritter and Taylor (2011) use individual characteristics from the 1979 National Longitudinal Survey of Youth (NLSY79) to account for all of the Hispanic-white, but only part of the black-white, unemployment differentials in samples of about 3,800 men and

4,000 women followed over a 23 year period. Ritter and Taylor then go on to develop a model of subjective worker evaluation based on the work of Shapiro and Stiglitz (1984) that emphasizes unemployment as a discipline device that compensates for management's imprecision in monitoring worker performance. Because majority managers are less precise in evaluating minority employees, the latter group faces higher unemployment rates as a consequence.[1]

Since the important paper by Nelson and Plosser (1982), time series analysis has generally affirmed the stationarity of the U.S. employment rate, though more recent work (e.g., Romero-Avila and Usabiaga, 2009) has emphasized the importance of accounting for structural breaks in the form of mean shifts, and very recent work suggests that non-stationarity cannot be rejected for state-level unemployment rates incorporating the most recent recession (Cheng, et al., 2011).[2] There are few studies that examine the stationarity of U.S. unemployment rates disaggregated by race or ethnicity; Murthy (2002) finds the national black unemployment rate to be non-stationary, but the details are not reported. This paper appears to break new ground by examining the stationarity of unemployment rates disaggregated not only by race and Hispanic ethnicity, but by Census Region as well.

II. Description of the Data[3] and Methodology

Unemployment rates are tallied for the total population; for the Black, Hispanic, and White populations; by Census region – Northeast, Midwest, South and West – and by race and

[1] Ritter and Taylor base their argument on Lang's (1986) language theory of discrimination. In this line of reasoning, white managers don't speak the same "language" (in the broadest sense of that term, including all modes of expression) as black employees, and are therefore less able to make accurate subjective assessments of performance. Left unaddressed in the paper is why the same phenomenon would not apply to Hispanics, some of whom at least do not speak the same (literal) language as their employers.

[22] Evidence for European economies, on the other hand, does support the existence of hysteresis in unemployment (i.e., non-stationary rates) (Røed, 1996; Romero-Avila and Usabiaga, 2009).

[3] See Data Appendix for sources of all data used in the paper.

Hispanic origin by region,[4] for a total of twenty annual time series spanning 1970 to 2010.[5, 6] These groupings reflect the different historical backgrounds and economic experiences of racial and ethnic groups in the U.S., and the different growth rates of the U.S. regions, especially the South, historically a lagging region that has been marked by a more rapid "catching up" in recent years. An important contribution of this work is to test whether unemployment persistence differs across different groups in the different regions.

Figure 1 shows the progression of unemployment rates by total, by race, and by Hispanic origin for the past 4 decades. Rates for all groups are strongly countercyclical, as expected, and move more together through time. Black and Hispanic rates appear to have more variation around business cycle turning points, but as we will see below, this is a matter for interpretation. Rates have climbed quickly in the wake of the most recent recession, remaining below previous annual peaks for Black and Hispanics, but setting a post-war annual average high for whites.[7]

[Figure 1 about here]

Figure 2 displays unemployment rates by group by region. The regional rates suggest a good deal of heterogeneity across groups, time, and space. As noted above, the differences across groups are not uniform across regions; blacks and Hispanics, for example, have more

---

[4]Data for Hispanics are not as reliable as data for Blacks and Whites, especially during the early years. Prior to 1983, Hispanic populations in the Current Population Survey (CPS) were not controlled to independent totals, so counts are not as reliable as later years. Hispanics may be of any race, and as classifications are self-reported, reporting conventions may change over time. Also, Hispanics were especially concentrated geographically during the 1970s, with over 60 percent of the population in six states – Arizona, California, Colorado, New Mexico, Nevada, and Texas – in 1975, and the majority in the Northeast and Midwest located in major cities.

[5]The four Census regions of the United States represent groups of States as follows: 1) Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont; 2)Midwest: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin: 3) South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia; 4)West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.

[6] To 2009 for regional data.

[7] The post-WWII monthly high for whites was 10.2 in both January and February, 1983.

similar rates in the Northeast and West than in the Midwest and South.[8] The recession of the early 1980s hit especially hard in the Midwest, where unemployment rates for blacks tend to be on average higher than any other region; whites and Hispanics in the Northeast were especially vulnerable to the mid-1970s downturn; the West appears to have been particularly affected by the recession of the early 1990s, and so on. The sharp response of all rates in all regions to the latest recession is a notable feature of the data.

[Figure 2 about here]

Black and Hispanic unemployment rates at the national level are expressed as ratios of Whites in Figure 3.[9] Here a different perspective emerges. The Black/White ratio was below two for several years in the 1970s, but rose thereafter and stayed above two until well into the last decade. There was in fact a long period in the 1980s when the ratio was 2.4 or higher. By contrast, the Hispanic/White ratio trended moderately downward during most of the 1970s before increasing steadily throughout the 1980s and 1990s, then declining quite rapidly throughout the late 1990s and into the 2000s. (Discussion of the "Fit" line in the diagrams is deferred to Section IV below).

[Figure 3 about here]

In none of the diagrams do we see evidence of long-term trends, but there are long stretches of local trend movements, both up and down. The open question is whether these local

[8] Blacks and Hispanics are not evenly distributed across regions. For blacks, the regional distribution of the total population is: Northeast, 17%; Midwest, 18%; South, 55%; West, 10%. For Hispanics: Northeast, 15%; Midwest, 8%; South, 38%; West, 39%.

[9] Freeman (1973) argued that the difference in unemployment rates was a more appropriate measure of the gap than the ratio of the rates because equal changes in the percentages of blacks (or Hispanics) and whites losing their jobs would leave the gap unchanged. While undoubtedly true, it is also true that equal percentage changes in the number *unemployed* (given an unchanged labor force) will cause the same percentage change in the difference, thus widening the gap. Moreover, it can be argued that there is a qualitative difference between a gap of four percentage points when the black unemployment rate is 14% and the white unemployment rate is 10%, say during a deep recession, and the same gap when the respective rates are 7% and 3%, say during "full" employment. The ratio is used here because changes in the ratio can be interpreted as differences in the percent changes of the number unemployed, or as the implied differences in the elasticities of the number unemployed to the change in GDP.

movements represent permanent or temporary displacements from stationary or local means. To answer this question, this paper employs now familiar variations of the Augmented Dickey-Fuller (ADF) unit root and Kwiatkowski, Phillips, Schmidt, and Shin (1992, hereinafter KPSS) stationarity tests wherein endogenous structural breaks are admitted. For the ADF test with the null of non-stationarity, the general form employs the autoregressive model

$$u_t = \alpha + \varphi_1 u_{t-1} + \varphi_2 u_{t-2} + \cdots + \varphi_k u_{t-k} + \varepsilon_t; \quad (1)$$

reparameterized as

$$\Delta u_t = \alpha + \gamma u_{t-1} + \sum_{i=1}^{k} \delta_i \Delta u_{t-i} + e_t; \quad (2)$$

with

$$\alpha = a + \lambda_1 DU_1 + \lambda_2 DU_2 \cdots; \; \gamma = -\left[1 - \sum \varphi_i\right];$$

$$\delta_1 = (\varphi_2 + \varphi_3 + \cdots), \;\; \delta_2 = (\varphi_3 + \varphi_4 + \cdots), \;\; \cdots$$

and the null of a unit root $H_0: \gamma = 0$. DU_i is a dummy variable = 1 for $t > T_\tau$, with $\tau = 1, \ldots m_i$, $m_i \geq 1$.

The location of each k is identified using the procedure developed by Bai and Perron (1998) utilizing global minimization of the squared residuals. The procedure is to estimate $u_t = a + \lambda_\tau DU_\tau + \eta_t$ for $\tau \in ([\rho T] \ldots [(1-\rho)T])$, where $\rho = 0.15$, identifying $\widehat{\tau_1}$ as the value that maximizes the F-statistic for the resulting estimation, provided that the max F exceeds 7.17.[10] Once a break has been identified, the series is re-estimated as $u_t = \hat{a} + \widehat{\lambda_1 DU_{\tau_1}} + \lambda_2 DU_{\tau_2} + \eta_t$, with $\tau_2 \in ([\rho\tau_1] \ldots [(1-\rho)\tau_1])$ or $\tau_2 \in ([\rho T + (1-\rho)\tau_1] \ldots [\rho\tau_1 + (1-\rho)T])$,

[10] 7.17 is the 10% critical value reported by Andrews (1993) to identify a single endogenous break in mean. Because I prefer to be somewhat biased toward finding breaks in the unemployment series, and because the 7.17 critical value identifies relatively consistent breaks in most of the unemployment series, as shown below, I do not re-estimate the critical values via a bootstrap, as is often done. One could also proceed by identifying structural breaks via minimization of γ in equation (3); estimates using this method on the national unemployment rates produced nearly identical results (available on request).

depending on whether or not $\tau_1 > 0.5T$. Again, if the max F to exclude $DU_{\tau 2}$ exceeds 7.17, the second break point is identified. The process could continue, but in the present case the number of breaks that could be identified was limited to three.[11]

The KPSS test with the null of stationarity employs a cusum-based test using the data generating model

$$y_t = r_t + \epsilon_t ; \qquad r_t = r_{t-1} + \lambda_1 DU_1 + \lambda_2 DU_2 + \ldots + u_t ,$$ a random walk, with $var\,(u) = \sigma_u^2$

Let $e_t = y_t - \hat{y}_t$ and $S_t = \sum_{j=1}^{t} e_j$, with the long-run variance of e_j defined as $\sigma^2 = \lim N^{-1} E\left[S_N^2\right]$, estimated by $\hat{\sigma}^2(p) = \frac{1}{N}\sum_{t=1}^{N} e_t^2 + \frac{2}{N}\sum_{j=1}^{p} w_j(p) \sum_{t=j+1}^{N} e_t e_{t-j}$ (see Newey and West, 1987). The KPSS test is then given by $KPSS = N^{-2}\sum_{t=1}^{N} S_t^2 / \hat{\sigma}^2(p)$; the null hypothesis is $H_0 : \sigma^2{}_u = 0$.

Critical values for both the ADF and KPSS tests are computed via simulations and are provided in the cited publications and as footnotes to the tables below.

III. Results of Stationarity Tests on Unemployment Rates

Table 1 displays results of structural break and stationarity tests for unemployment rates nationally, by region, by race and Hispanic origin, and by race and Hispanic origin by regions. The first panel presents rates for all races and ethnicity nationally and by region. In all cases, one or both of the ADF or KPSS tests indicates that the data are non-stationary if structural

[11] In the first case, identifying a large number of structural breaks is tantamount to over-fitting the data. In the second, as shown below, in the preponderance of cases the null of stationarity could not be rejected with two identified breaks.

breaks are not admitted. Again in all cases, the evidence is equally strong that the data are stationary if structural breaks *are* admitted. Because of the way the structural break variables are constructed, the pattern of unemployment can be constructed by adding from the "pre-break" level and moving to the right. Thus the estimated mean of the national unemployment rate is 5.2 from 1969 through 1975, jumps to 7.1 between 1975 and 1994, then falls to 5.6 from 1994 onward. The estimated mean at the end of the sample lies well below the mean of 6.3 for the entire sample, shown in the next-to-last column of Table 1. The final column provides the most recent observation for comparison.

[Table 1 about here]

The pattern established nationally is similar for the Northeast, though the latter break point is earlier, but differs in number of estimated breaks and pattern for the other three regions. The Midwest and South each have three breaks, with the first two similar to the national and Northeast, but the last an increase. The West starts out with a much higher mean than the rest of the country, and has a single negative break in the late 1980s. The long-term unemployment averages of the regions converge to a relatively narrow range, but the short-to-medium term experience of the regions exhibit considerable variation, reflecting the differential effects of business cycle timing.[12]

One obvious anomaly is that the end-of-sample mean national unemployment rate is below all of the regional mean rates. The discrepancy is accounted for by the existence of the third, positive break for the Midwest and South.[13] Further estimation on the national rate (not reported here) indicates that by lowering the threshold for a break to an *F*-statistic of around four

[12] Blanchard and Katz (1992) argued persuasively that unemployment differentials across regions were resolved by labor mobility.

[13] Unemployment rates for the Midwest and South fell well below those in the Northeast and West during the long expansion of the 1990s before all regions rebounded sharply in the recession beginning in 2007.

would identify four structural breaks (one increase, two decreases, and a final increase) in the national rate that would result in an ending mean of 6.282, in line with the average of the regional rates.[14]

In all cases of national unemployment by race and ethnicity save one, stationarity is indicated only when structural breaks are incorporated. All groups have an initial positive break in 1975, and all have a subsequent negative break in the mid-1990s. Unemployment for Blacks has an additional negative break in 1989. We observe that mean unemployment for Whites and Black increases, while that for Hispanics decreases. Even though the unemployment rate for Hispanics has declined, the greater weight of the Hispanic population, which has tripled its share of the labor force in the past four decades (Blacks held a relatively static share), puts upward pressure on the national rate.

The subcategories of regions by race and ethnicity exhibit similarities and differences from the national aggregates. In all cases with multiple breaks, the first break is positive and always in the 1975-1980 time period, and the second break is negative. There is a single case of a third break (negative), for blacks in the Midwest, and the West has two cases of single breaks, both negative, for Whites and Hispanics, which is consistent with the single break for the total region. The magnitude of the mean shifts for the regions by race and ethnicity tends to be somewhat larger than their aggregates or national averages by race and ethnicity, consistent with the level of disaggregation and greater variability. Hispanics experienced declines in unemployment in all regions over the sample, while for Blacks and Whites the results were mixed, with Blacks showing more increases and Whites more decreases.[15]

[14] Indeed, the severity and duration of the most recent recession and the concomitant increase in unemployment, especially long-term, is consistent with a shift in the NAIRU.
[15] Estimates by race and origin by region are only through 2009, so ending mean estimates will tend to be more optimistic regarding poverty rates than the national averages, which are through 2010.

In summary, the evidence indicates that unemployment rates are stationary around changing means. The general pattern is one of an initial, positive increase in unemployment in the mid-to-late 1970s, and a subsequent decline in the late 1980s to mid-1990s. These results are broadly consistent with those of Romero-Avila and Usabiaga (2009), who also find regime-wise stationarity for unemployment rates at the state level in the US, with similar timing for the breaks.

In the following section, we employ the methodology to examine the *ratios* of employment rates between Blacks and Whites and between Hispanics and Whites. Because *levels* of unemployment rates across groups will share common effects of the business cycle, structural impediments to labor mobility, minimum wage legislation, and so on, taking ratios will in principle better enable a comparison of relative changes in the economic fortunes of different groups, with the aim of determining whether we have seen any closing of the historical gaps.

IV. Results of Stationarity Tests on Employment Ratios

Table 2 displays results from structural break and stationarity tests for Black/White and Hispanic/White ratios for national and regional unemployment rates. The null of non-stationarity cannot be rejected for ADF tests of the ratios with no structural breaks; and in again in all cases but one (a different one), the null of stationarity can be rejected for KPSS tests when structural breaks are not considered. By contrast, when structural breaks *are* considered, the two tests are unanimous in concluding that the unemployment ratios are stationary around changing means.

[Table 2 about here]

In all cases for the Hispanic/White ratios, there are two structural breaks estimated, the first positive, the second negative. Both nationally and regionally, the coefficient of the second break is larger in magnitude so that the mean ratios at the end of the sample are less than the means at the beginning. The largest decline (-22%) is in the Midwest, but this region has the smallest Hispanic population. The South, however, with over one-third the nation's Hispanics, also has a substantial decline of 19%. The Northeast and the West, home to one-seventh and two-fifths the Hispanic population, respectively, saw declines of about 4-5%.

Although the year of the first break varies considerably among the regions, that for the second is fairly uniform, spanning the narrow interval of 1998-2001. With the notable exception of the Northeast, the ratio converges to a narrow range around 1.35, and the average has declined from about 1.6 to about 1.4. While still enduring substantially higher unemployment rates than whites, Hispanics have clearly been able to make progress in "closing the gap".

The pattern of the ratios for the Black/White populations is less consistent. The National and the Northeast and Midwest regions have three structural breaks, the West has two, and the South only one. In the two regions with higher ratios in the early years the ratio has declined and in the two with lower ratios it has increased, resulting in a narrower range in means (1.815 to 2.499) relative to 40 years ago. The net result has either been a small increase in the average ratio (using the National time series) or a slight decline (using the average of regions). The Northeast and West have sizable increases of 22.5 and 16.4 percent respectively, while the South and Midwest have declines of eight and six percent, also respectively. Because over one-half the nation's Blacks reside in the South, a small percent decline there offsets the larger gains in other regions.

As with Hispanic/Whites, the first of multiple breaks for the Black/White ratios is positive, and latter breaks (mostly) negative. The exception is the Northeast, with a positive second break in 1995 and a negative third break in 2000. The end result for blacks has been some mixed progress at the regional level, but overall very little progress in black unemployment rates pulling even with whites. The "strikingly stable" postwar ratio of 2.0 in black to white unemployment rates noted by Leigh and Rawlings in 1973 (and by many others around that time) remains just as striking nearly 40 years later.

There is a marked difference between estimated means and most recent experience for the two groups. The Black/White ratios for 2009 are all at least 0.20 less than their respective means; the same gap for Hispanic/White ratios never exceeds 0.20. In the Black/White cases, the between the last sample point and the mean is over two standard errors in all cases save the Northeast. Some of this end-point behavior is due to the greater sensitivity of the Black/White ratio, as discussed in the following section.

Referring back to Figure 2, however, the behavior of the two series is different in other respects as well.[16] Both series rise throughout the 1980s and peak in 1989, but the subsequent falloff results in a structural break and lower mean for the Black/White series while the Hispanic/White ratio reverses and leads to a higher mean and a sample maximum in 1995. Later in the 1990s, both series decline, but in this case the Black/White ratio reverses to reach a local maximum in 2005 before declining again to a sample minimum in 2009. The two previous local maxima for Black/White were followed by negative structural breaks; in the present situation the declining ratio is due to the more rapid increase in white unemployment, so the convergence of

[16] With the proviso, noted earlier, that the Hispanic unemployment data for the early 1970s are far less reliable than the White and Black series.

the two series may mark a relative, but not an absolute improvement in the economic fortunes of blacks.

V. Discussion

Local minima of the Black/White series occur at business cycle troughs—1975, 1982, 1991, 2001, and 2009—which implies that, in percentage terms, the black unemployment rate increases less slowly than the white unemployment rate during recessions. Indeed, as Table 3 demonstrates, there is a significant positive correlation between the change in both the Black/White and the Hispanic/White ratios and GDP growth at the national level, and for three of the four regions for the Black/White ratio and regional GDP growth. Only the correlation for the Northeast region is significant for the Hispanic/White ratio, though the sign for two others is positive.

[Table 3 about here]

It is true that the unemployment rates for blacks and for Hispanics increased more during recessions than for whites, as emphasized by Freeman (1973) and by Couch and Fairlie (2010). As shown in Table 4, the increase in rates for minorities has outpaced whites in every recession since 1970.[17] As far as unemployment levels, however, whether measured from peak month to trough month (as in the first three columns of the table), or measured as the change in annual averages during the recessionary period (so as to make the changes comparable to the annual averages used in the present study) the percentage increase in white unemployment is greater in almost every recession. The sole exception is the long recessionary period (actually two

[17]By comparison, however, the correlation between GDP growth at the national level and the gaps expressed as differences in unemployment rates was only 0.04 for the Black/White gap and 0.09 for the Hispanic/White gap.

recessions) of 1980-1982, when the percentage changes for blacks and for whites are roughly equal.

[Table 4 about here]

The point is not that blacks are somehow advantaged during recessions. Of the roughly 8 million additional unemployed workers in the US over the years 2007-2010, for every one hundred 67 were white, 15 were black, and 19 were Hispanic, versus proportions in the labor force of 76, 13, and 11, respectively. It is true that the elasticity of unemployment (levels) with respect to GDP has been higher for whites than for blacks during the past five recessions in the US, but this has as much to do with the fact that white unemployment is already a much lower percentage of the white labor force than the comparable percentage for black unemployment.

The cyclical phenomenon notwithstanding, attributing the persistence of the Black/White ratio to the "usual suspects" for the causes of unemployment is problematic, especially in the case of Blacks.[18] Demographics plays a role, albeit a small one. Unemployment rates decline with age, and the median age of the Hispanic population is 27, compared to the median age of 41 for the White population. Still, accounting for the differences in the age distributions between the two populations reduces the gap between the unemployment rates by only a little over one percentage point. Similar calculations reduce the gap between Blacks and Whites by an even smaller amount, only about three-quarters of a percentage point.

Unemployment rates also decline with respect to educational achievement, and gaps remain between Whites and the other groups on this score. Still, the number of Blacks with a high school diploma relative to Whites has risen from 64.5 percent in 1975 to 96.6 percent in

[18] Recall that Ritter and Taylor (2011) can account for the Hispanic/White gap by controlling for age, education, and other factors, but not for the Black/White gap.

2009, and the number of Blacks with a college degree has risen from 39.2 to 64.5 percent of Whites in the same time period, even as the ratio of unemployed has stayed roughly constant.

The educational gap between Whites and Hispanics is even more pronounced, with Hispanics with a high school diploma at rate only 71.1 percent of Whites (up from 57.7 in 1975), and with a college degree only 44.2 percent of Whites (up from 39.2 in 1975). Thus Blacks have seen greater relative gains in education than Hispanics, yet Hispanics have experienced lower rates of unemployment and even been able to close the gap somewhat with respect to Whites.[19] That the Hispanic/White gap has narrowed with the large influx to the labor force of new immigrants and higher native population growth only deepens the mystery.

VI. Conclusion

This paper has conducted tests of persistence for unemployment rates and unemployment ratios by race and ethnicity, by regions, and across both categories. Unemployment rates are found to be stationary around shifting means, with most rates having experienced an upward shift in the 1970s and a subsequent downward shift in the late 1980s-early 1990s, with the net effect being an increase in mean unemployment for whites and blacks. Hispanics are an important exception, with mean rates declining nationally and in all regions. Total regional unemployment in the West also declined by over one percentage point.

Unemployment ratios are also stationary around changing means, with multiple shifts for both Black/White and Hispanic/White ratios, but a marked difference in outcomes. Black/White ratios are mostly unchanged from four decades ago, with the Black/White ratio first increasing, and then decreasing, and finally settling at around 2, with a range from 2.5 in the Midwest to

[19] That the education gap helps to explain the Hispanic/White unemployment gap is important information, but places the problem only at one remove. High school dropout rates for Hispanics (18.2% in 2008) continue to be more than three times the rate of whites and twice the rate of blacks. (U.S. Department of Education, 2010).

about 1.8 in the West. The South, with a majority of the Black population, did see some improvement in the economic fortunes of Blacks relative to Whites.

Hispanics, on the other hand, have seen some closing of the gaps with the White population, with the national average unemployment ratio falling from about 1.65 to 1.42 over the sample. Declines were reported in all regions, with the largest drop experienced in the Midwest, but with a sizable decline in the South as well.

As previous research has shown, the persistence of the Black/White ratio cannot be explained by demographics or educational attainment alone. While both are factors, the difference in age distributions can only account for a very small percentage of the unemployment gap, and the differences in educational attainment have diminished markedly over the sample period. Moreover, the educational gap between Whites and Hispanics is much larger than that between Whites and Blacks, and yet the unemployment gap for the former is smaller and shrinking while that for the latter remains larger and stable.

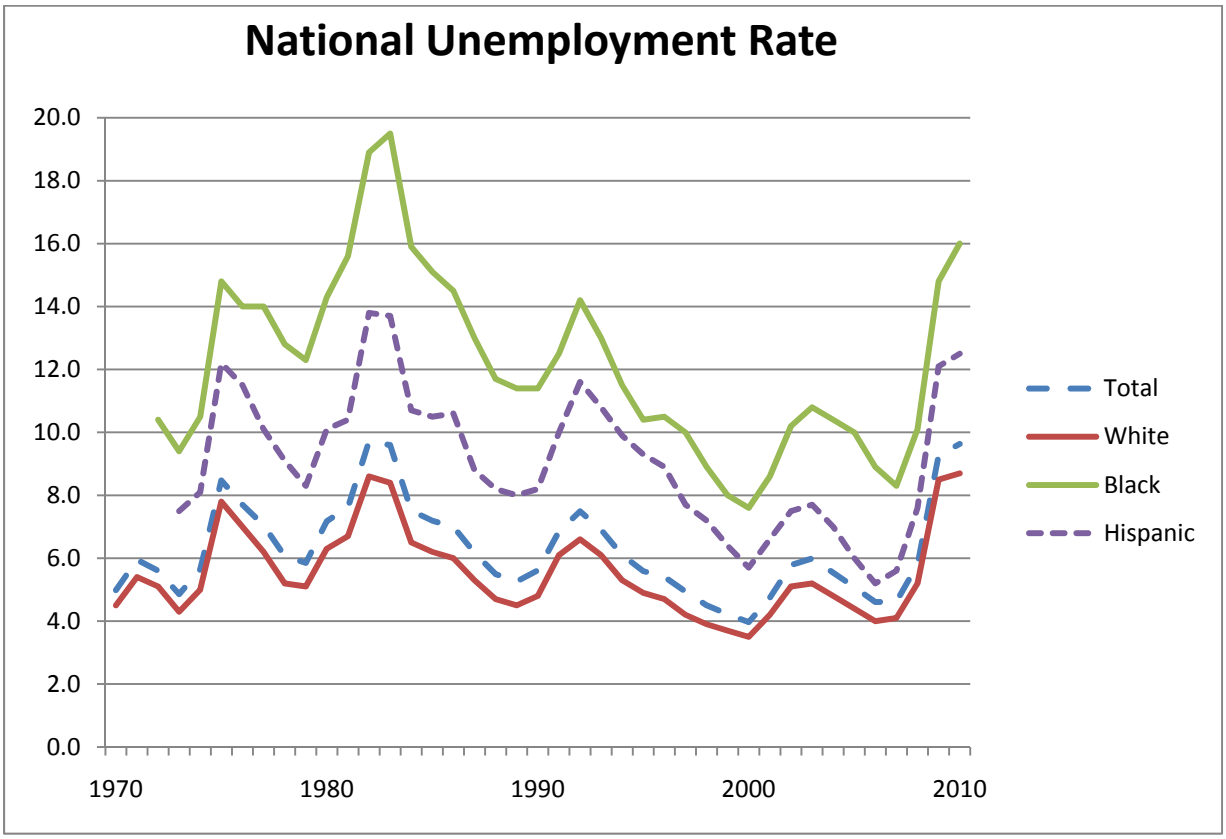
Some evidence is shown that minority/white unemployment ratios are procyclical, especially for the Black/White ratio. Procyclicality is partly due to the relatively larger percent changes in White unemployment during recessions, and that due to a relatively smaller base of unemployed for Whites.

The persistence of both of these gaps is troublesome given current demographic trends. A recently released report for the Census Bureau projects that minority children will be in the majority as early as 2019, four years ahead of the previous projection (Tavernise, 2011). While Hispanics accounted for the bulk of the increase (the number of Black children fell, but not as fast as the number of White children, and so still increased relative to whites), the continued existence of these gaps will put upward pressure on the unemployment rate for years to come.

Data Appendix:

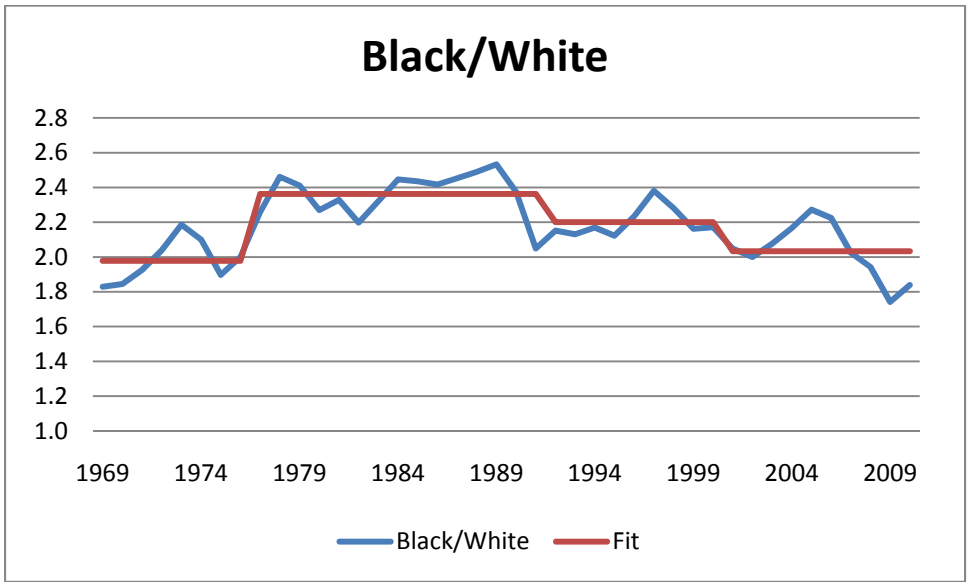
1. The source of regional GDP: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis, on the web at http://www.bea.gov/regional/gsp/.
2. The source of regional unemployment by race and region: From 1981-2009 Geographic Profile of Employment and Unemployment, downloaded from ftp://ftp.bls.gov/pub/time.series/gp/. From 1970-1980, U.S. Department of Labor, Bureau of Labor Statistics, Handbook of Labor Statistics, various issues. Washington : U.S. G.P.O. : [Available] from the Supt. of Docs.

Figure 1



Source: U.S. Bureau of Labor Statistics, Labor Force Statistics from the Current Population Survey, online at: http://www.bls.gov/cps/.

Figure 2: Unemployment Ratios with Estimated Means



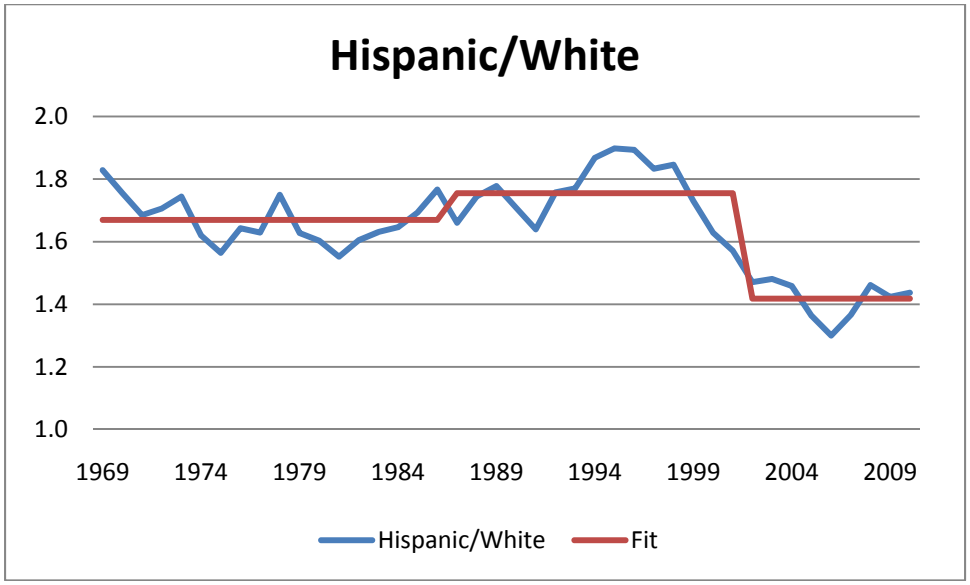


Figure 3: **Regional Unemployment Rates by Race, Hispanic Origin**

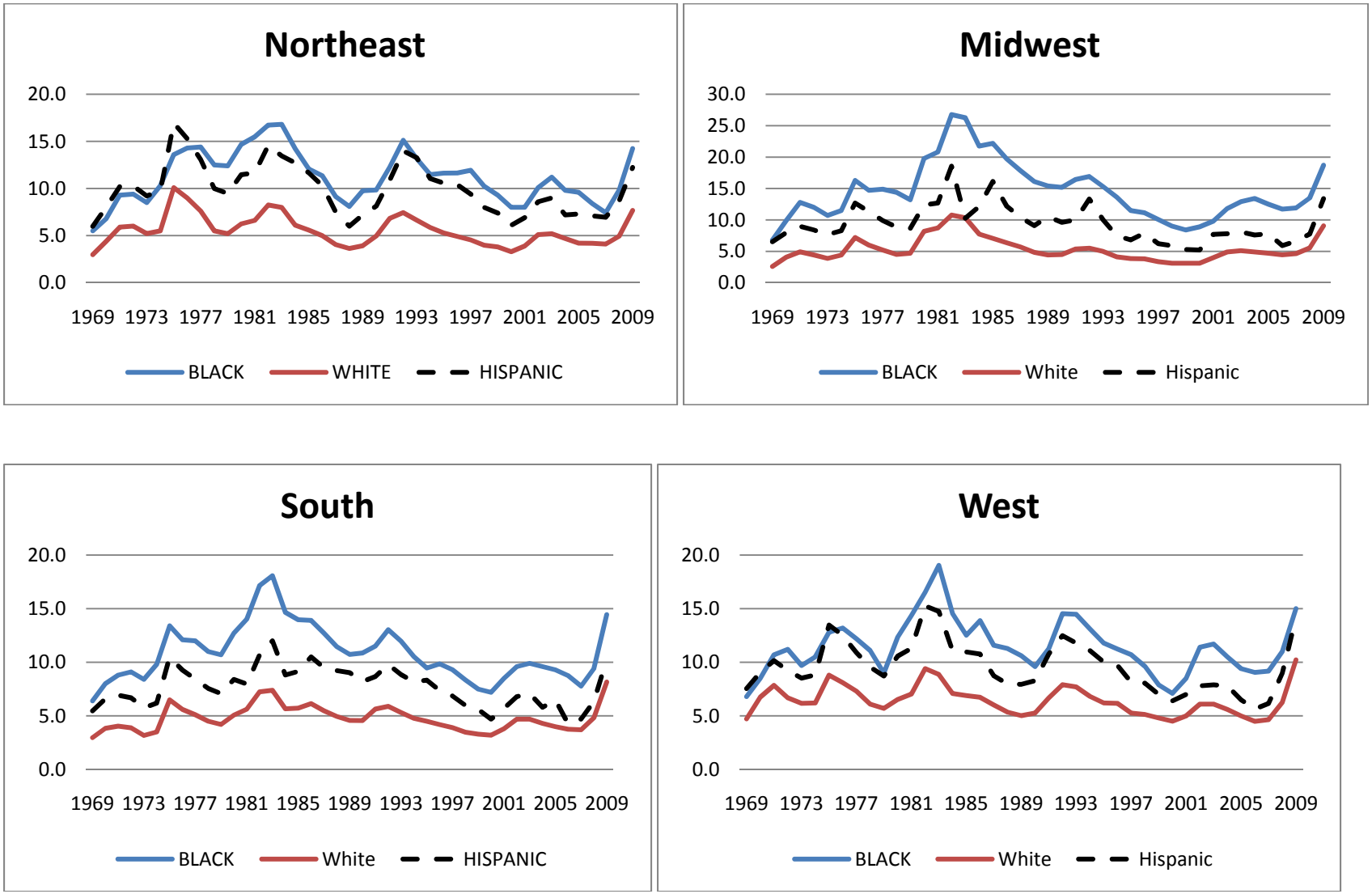


Table 1 Time series stationarity tests of national and regional black/white and Hispanic/white unemployment rates with and without structural breaks. Annual data, 1969-2010 (2009 for regional by race, ethnicity). *p*-value for statistical tests in ( )

	ADF test		KPSS Test		C	*DU*1	*DU*2	*DU3*	$C + \sum DU_i$		
	No Break	W/ Break(s)	No Break	W/ Brk(s)	Pre Break	Break year in ( )			W/ Brk(s)	Sample Mean	2010[a]
All Races, Ethnicity											
National	-2.204 (0.204)	-2.669* (0.043)	0.576*	0.127	5.217	1.838 (1975)	-1.455 (1994)		5.600	6.3	9.6
Northeast	-2.449 (0.128)	-3.356* (0.013)	0.667*	0.086	5.333	2.789 (1975)	-2.461 (1986)		5.661	6.1	8.7
Midwest	-1.998 (0.287)	-2.988* (0.036)	0.464*	0.124	5.433	3.216 (1980)	-3.671 (1988)	1.432 (2002)	6.410	6.0	9.4
South	-2.172 (0.217)	-3.651* (0.005)	0.434*	0.060	4.550	2.294 (1975)	-2.032 (1994)	1.187 (2002)	6.004	5.9	9.3
West	-2.392 (0.144)	-3.005* (0.034)	0.668*	0.091	7.467	-1.096 (1987)			6.371	6.7	11.1
National, by Race, Ethnicity											
White	-2.231 (0.195)	-3.396* (0.011)	0.336	0.240	4.633	1.795 (1975)	-1.315 (1995)		5.113	5.5	8.7
Black	-1.884 (0.339)	-3.886* (0.002)	0.654*	0.281	9.233	5.509 (1975)	-2.409 (1989)	-2.115 (1995)	10.218	12.2	16.0
Hispanic	-2.252 (0.188)	-3.227* (0.018)	0.671*	0.130	7.950	2.264 (1975)	-2.728 (1997)		7.486	9.1	13.0
Northeast, by Race, Ethnicity											
White	-2.362 (0.153)	-3.168* (0.022)	0.666*	0.091	5.003	2.260 (1975)	-2.313 (1985)		4.950	5.5	7.7
Black	-2.818* (0.056)	-3.785* (0.003)	0.458*	0.113	8.300	5.993 (1975)	-3.810 (1986)		10.483	11.2	14.2
Hispanic	-2.464 (0.124)	-3.136* (0.024)	0.745*	0.107	10.057	2.093 (1976)	-3.284 (1987)		8.866	10.0	12.2
Midwest, By Race, Ethnicity											
White	-1.775 (0.393)	-2.212 (0.202)	0.478*	0.082	4.717	3.390 (1980)	-3.502 (1988)		4.605	5.3	9.1

Black	-1.859 (0.352)	-2.294 (0.174)	0.706*	0.260	12.473	8.775 (1980)	-5.403 (1989)	-4.042 (1994)	11.803	11.2	18.7
Hispanic	-1.961 (0.304)	-3.111* (0.026)	0.816*	0.081	7.968	3.544 (1975)	-4.171 (1994)		7.341	9.4	13.4
South, By Race, Ethnicity											
White	-2.038 (0.270)	-2.308 (0.169)	0.316	0.109	3.568	1.928 (1975)	-1.194 (1995)		4.302	4.8	8.2
Black	-1.919 (0.323)	-2.945* (0.040)	0.702*	0.106	8.412	4.532 (1975)	-3.604 (1994)		9.340	10.9	14.4
Hispanic	-2.090 (0.248)	-3.273* (0.017)	0.784*	0.067	6.270	2.705 (1975)	-2.772 (1997)		6.203	7.7	10.3
West, by Race, Ethnicity											
White	-2.286 (0.177)	-2.853* (0.051)	0.567*	0.083	7.051	-1.129 (1987)			5.922	6.4	10.2
Black	-2.632* (0.086)	-3.321* (0.014)	0.390*	0.085	9.567	3.206 (1975)	-2.690 (1997)		10.083	11.5	15.0
Hispanic	-2.410 (0.139)	-3.126* (0.025)	0.777*	0.102	10.348	-2.568 (1998)			7.780	9.6	14.1

* significant at < 0.10.

[a] 2009 for region by race, ethnicity

Table 2. Time series stationarity tests of national and regional black/white and Hispanic/white unemployment ratios with and without structural breaks. Annual data, 1969-2010 (2009 for regional data)

	ADF test		KPSS Test		C	*DU*1	*DU*2	*DU3*	C + *DU*1 + *DU*2		
	No Break	W/ Break(s)	No Break	W/ Brk(s)	Pre Break	Break year in ( )			W/ Brk(s)	Implied from Table 1	2009
Black/White	*p*-value in ( )										
National	-2.258 (0.186)	-4.037* (0.001)	0.620*	0.190	1.997	0.385 (1976)	-0.162 (1991)	-0.167 (2000)	2.034	1.998	1.741
Northeast	-2.433 (0.131)	-2.751* (0.065)	0.947*	0.139	1.651	0.525 (1977)	0.309 (1995)	-0.460 (2000)	2.025	2.118	1.858
Midwest	-0.975 (0.762)	-3.989* (0.001)	0.568*	0.033	2.623	0.583 (1984)	-0.304 (1994)	-0.403 (2000)	2.499	2.563	2.060
South	-2.291 (0.175)	-3.730* (0.001)	0.893*	0.128	2.371	-0.186 (1992)	--		2.187	2.171	1.769
West	-2.955* (0.040)	-4.365* (0.000	0.898*	0.085	1.560	0.368 (1979)	-0.113 (1996)		1.815	1.703	1.469
Region Average B/W					2.208				2.176	2.184	1.806
Hispanic/White											
National	-1.189 (0.681)	-3.276* (0.015)	1.120*	0.219	1.646	0.085 (1986)	-0.337 (2001)		1.418	1.464	1.423
Northeast	-2.353 (0.155)	-3.631* (0.005)	0.255	0.068	1.800	0.172 (1991)	-0.283 (2000)		1.712	1.791	1.595
Midwest	-1.211 (0.688)	-2.791* (0.060)	0.609*	0.237	1.792	0.218 (1984)	-0.433 (1998)		1.380	1.594	1.476
South	-0.808 (0.816)	-3.105* (0.105)	1.200*	0.186	1.658	0.088 (1985)	-0.358 (1999)		1.355	1.442	1.259
West	-2.008 (0.283)	-3.400* (0.010)	0.954*	0.041	1.403	0.162 (1974)	-0.216 (1999)		1.346	1.313	1.312
Region Average H/W					1.581				1.402	1.448	1.373

Table 3. Correlations Between Unemployment Ratios and GDP Growth.[1] Annual Data, 1969-2010

Area	Black/White	Hispanic/White
National	0.481**	0.373*
Northeast	0.471**	0.480**
Midwest	0.418**	0.160
South	0.422**	0.232
West	0.232	-0.093

[1]GDP growth either at the national or regional level, to correspond with Unemployment.

**, *: Significant at the 0.01, 0.05 level, respectively

Table 4. Changes in National Unemployment Levels and Rates During Recessions, 1973-2009

	Percent Change in Unemployment Levels, Peak Month to Trough Month			Percent Change in Unemployment Levels, Annual Averages during Recession			Change in Unemployment Rate, Annual Averages During Recession		
Recession, Peak-to-Trough	White	Black	Hispanic	White	Black	Hispanic	White	Black	Hispanic
11/73 – 3/75	113.0	75.0	87.0	86.5	61.8	83.4	3.5	5.4	4.7
1/80 – 11/82[1]	58.6	59.6	79.0	76.7	62.4	114.1	3.5	6.6	5.5
7/90 – 3/91	35.4	2.2	20.3	50.3	30.2	74.8	1.8	2.8	3.4
3/01 – 11/01	16.6	11.9	4.6	48.9	36.4	41.8	1.6	2.6	1.8
12/07 – 6/09	110.4	82.6	95.5	107.0	80.3	121.8	4.6	7.7	6.9
Average	66.8	46.3	57.3	73.9	54.2	87.2	3.0	5.0	4.5

[1]Encompasses two recessions, from 1/80-7/80 and from 7/81-11/82.

References:

Abowd, J.M. and M. Killingsworth (1984). "Do Minority/White Unemployment Differences Really Exist?" *Journal of Business and Economics Statistics 2*, pp 64-72.

Andrews, D. W. K (1993). "Tests for Parameter Instability and Structural Change with Unknown Change Point," *Econometrica*. 61 (4), pp. 821-56

Bai, J., Perron, P. (1998). "Estimating and Testing Linear Models with Multiple Structural Changes," *Econometrica*. 66 (1). pp. 47-78

Barrett, N.S. and R.D. Morgenstern (1974). "Why Do Blacks and Women Have High Unemployment Rates?," *Journal of Human Resources* 9, PP 452-64.

Betsey, C. L. (1978). "Differences in Unemployment Experience between Blacks and Whites," *American Economic Review*, 68 (2), pp. 192-97

Blanchard, O. and L. Katz (1992). "Regional Evolutions," Brookings Papers on Economic Activity 1, pp. 1-61

Blanchard, O. and L Summers (1986). "Hysteresis in Unemployment," NBER Working Paper 2035 (Cambridge, MA).

Cheng, K.M., N. Durmaz, N. Kim, and M. Stern (2011). Hysteresis vs. Natural Rate of US Unemployment, Auburn University Working Paper AUWP 2011-01.

Cogan, J. (1982). "The Decline in Black Teenage Employment, 1950-70," *American Economic Review* 72 (4), pp. 621-38.

Couch, K.A. and Fairlie, R. (2010). "Last Hired, First Fired? Black-White Unemployment and the Business Cycle," *Demography* 47 (1), pp. 227-247

Fairlie, R.W. and W.A. Sundstrom (1997). "The Racial Unemployment Gap in Long-Run Perspective," *American Economic Review* 87(2), pp 306-10.

Freeman, D.G. (2000) Regional Tests of Okun's Law, *International Advances in Economic Research*, pp. 557-570.

Freeman, D.G. (2001) Panel Tests of Okun's Law for Ten Industrial Countries, *Economic Inquiry,* pp. 511-523.

Freeman, R.B. (1973). "Changes in the Labor Market for Black Americans, 1948-72," *Brookings Papers on Economic Activity* 1, pp. 67-131.

Friedman, M. (1968). "The Role of Monetary Policy," *American Economic Review*, 58, pp 1-17.

Kwiatkowski, D., Phillips, P. C. B.; Schmidt, P.; Shin, Y. (2002). "Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root," *Recent Developments in Time Series*. Volume 1, pp. 52-71, Elgar Reference Collection. International Library of Critical Writings in Econometrics. Cheltenham, U.K. and Northampton, Mass.: Elgar

Lang, K. (1986). "A Language Theory of Discrimination," *Quarterly Journal of Economics* 101, pp 363-83.

Leigh, D.E. and V. L. Rawlins (1973). "On the Stability of Relative Black-White Unemployment," *Monthly Labor Review*, pp. 30-32.

Levy, F. (1980). "Changes in Employment Prospects for Black Males," *Brookings Papers on Economic Activity*, 2, pp. 513-37.

Murthy**,** Vasudeva N. R. (2002). "Macroeconomy and the Well-Being of Low-Income African American Families," *Journal of Economics and Finance* 26 (3), pp. 327-33

Neal, D.A. and W.R. Johnson (1996). "The Role of Premarket Factors in Black-White Wage Differences," *The Journal of Political Economy* 104, PP. 869-895.

Nelson**,** C.R. and Plosser, C. I. (1982). "Trends and Random Walks in Macroeconomic Times Series: Evidence and Implications," *Journal of Monetary Economics*, 10 (2), pp. 139-62

Phelps, E.S. (1968). "Money-Wage Dynamics and Labor-Market Equilibrium," *Journal of Political Economy*, 76, pp 678-711.

Ritter, J.A. and L. J. Taylor (2011). "Racial Disparity in Unemployment," *Review of Economics and Statistics* 93, pp. 30-42.

Romero-Avila, D. and C. Usabiaga (2009). "The Unemployment Paradigms Revisited: A Comparative Analysis of U.S. State and European Unemployment," *Contemporary Economic Policy,* 27 (3), pp 321-34.

Shapiro, C. and J. Stiglitz (1984). "Involuntary Unemployment as a Worker Discipline Device," *American Economic Review* 74, pp 433-44.

Stratton, L.S. (1993). "Racial Differences in Men's Unemployment," *Industrial and Labor Relations Review* 46, pp. 451-63.

Tavernise, Sabrina. (2011). "Numbers of Children of Whites Falling Fast," *The New York Times*, April 6.

U.S. Department of Education, National Center for Education Statistics. (2010). *The Condition of Education 2010* (NCES 2010-028), Table A-19-2.

Vedder, R.K. and L. Gallaway (1992). "Racial Differences in Unemployment in the United States, 1890-1990," *Journal of Economic History* 52(3), pp. 696-702.