Economics Bulletin

Volume 29, Issue 4

Regarding the unemployment gap by race and gender in the United States

Herve Queneau
Brooklyn College of the City University of New York

Amit Sen
Xavier University

Abstract

We examine the level of persistence in the unemployment gap across both race and gender in the United States. The empirical evidence suggests that all unemployment gaps exhibit low levels of persistence. While the gender unemployment gap has disappeared and stabilized in the post–1980 period, there continues to be a substantial gap between the unemployment rates of blacks and whites.

Hervé Queneau acknowledges partial support for this paper from a PSC-CUNY Grant. Amit Sen acknowledges partial support for this paper from a Faculty Development Grant and the D. J. O'Conor Professorship at Xavier University.
Citation: Herve Queneau and Amit Sen, (2009) "Regarding the unemployment gap by race and gender in the United States", *Economics Bulletin*, Vol. 29 no.4 pp. 2749-2757.
Submitted: Aug 25 2009. **Published:** November 06, 2009.

1. Introduction

A number of studies in the literature have examined the unemployment gaps that exist across both race and gender in the United States, see Niemi (1974), DeBoer and Seeborg (1989), Flanagan (1976), Johnson (1983), Fairlie and Sundstrom (1999), and Fosu (2000).[1] The pattern of these unemployment gaps are indicative of progress toward racial and gender equality in the labour market, and can, therefore, provide valuable insight to policy makers regarding the impact of existing policies and the development of new policies. Some studies examine the extent to which human capital, personal and household characteristics, income, job turn-over, geographic location, and other variables explain the observed gaps in the unemployment rate between whites and blacks. For instance, Abowd and Killingsworth (1984) and Stratton (1993) find that approximately 20% to 40% of the observed racial unemployment gap for men can be explained by observable characteristics other than race such as educational attainment, labor market experience, and local labor market conditions. Other studies, such as Abell (1991), Ewing, Levernier, and Malik (2005), Rogers (2008), and Zavodny and Zha (2000), analyze the effects of monetary and fiscal policies on the unemployment rates of various demographic groups. For example, Abell (1991) and Ewing, Levernier, and Malik (2005) find that monetary and fiscal actions favour whites compared to blacks, and men compared to women.[2]

In this paper, we address two important issues related to the unemployment gaps that have important policy implications. First, we assess the level of persistence in the different unemployment gap series based on a class of unit root tests proposed by Perron (1997) that allow for structural breaks at an unknown break-date during the sample period. The characterization of an unemployment gap series as a unit root process implies that random shocks will have a permanent or highly persistent effect on the gap. On the other hand, the absence of a unit root in an unemployment gap series will suggest that shocks will have a temporary effect on this gap so that the gap will eventually return to its trend path. In this case, we will quantify the level of persistence so as to facilitate comparisons of the gender unemployment gap across race and of the racial unemployment gap across gender. Second, we will assess the underlying trends in unemployment gaps across both gender and race.

We use data on U.S. unemployment rate dis-aggregated by race (whites and blacks) and gender (male and female) over the sample period 1972-2008. Following Fosu (2000), the racial unemployment gap is measured as the ratio of black to white unemployment rate,

[1] Niemi (1974), DeBoer and Seeborg (1989), and Johnson (1983) examine differences in the unemployment rates by gender. Fosu (2000) examined the unemployment gaps across race and gender using unemployment data pertaining to the Detroit metropolitan area and the City of Detroit. Flanagan (1976) and Fairlie and Sundstrom (1999) discuss possible reasons that explain the observed racial unemployment gap.

[2] Zavodny and Zha (2000) find that monetary shocks do not affect the black unemployment rates adversely compared to the total unemployment rate. However, Rogers (2008) finds evidence that dis-inflationary monetary moves have an adverse effect on the black unemployment rate compared to the white unemployment rate.

and the gender unemployment gap is measured as the ratio of female to male unemployment rates.[3] In all cases, we find that the unemployment gap series should be modeled as a trend-break stationary process, and so shocks have a temporary effect on the respective unemployment gaps. Also, the level of persistence is relatively low across all the unemployment gap series. Although the black unemployment rate is substantially higher compared to the white unemployment rate for both men and women over the entire sample period, both gaps exhibit a decreasing trend. Finally, the female unemployment rate is higher compared to the male unemployment rate for both whites and blacks particularly over the post-1980 sample. The gender unemployment gap for blacks is slightly higher compared to that for whites.

Our empirical evidence shows that while the gender unemployment gap in the United States has been almost eliminated over the last two decades, there is a particular need for policy initiatives that help bridge the unemployment gap between blacks and whites. Therefore, policy makers should develop policies that aim at reducing the racial gap in important variables such as human capital accumulation and labor market access, and at enforcing anti-discrimination laws more effectively. In the next section, we present empirical evidence regarding the level of persistence in the gender unemployment gaps by race and the racial unemployment gaps by gender. Some concluding remarks appear in Section 3.

2. Data and Empirical Results

We use data for U.S. unemployment rates by race and gender, obtained from the Bureau of Labor Statistics website, over the sample period 1972:Q1 2008:Q3. We use dis-aggregated unemployment rate data corresponding to six demographic groups: White Total, White Males, White Females, Black Total, Black Males, and Black Females. To measure the unemployment gap by race or gender, we use the ratio (u^R) of the unemployment rate of one group to the unemployment rate of another group. Queneau and Sen (2007) argue that u^R is a normalized measure of the unemployment gap between two groups, and should be used to evaluate the gap over time.[4] In what follows, we consider five pair-wise comparisons: Black Total to White Total [$u^R(BW|T)$], Black Males to White Males [$u^R(BW|M)$], Black

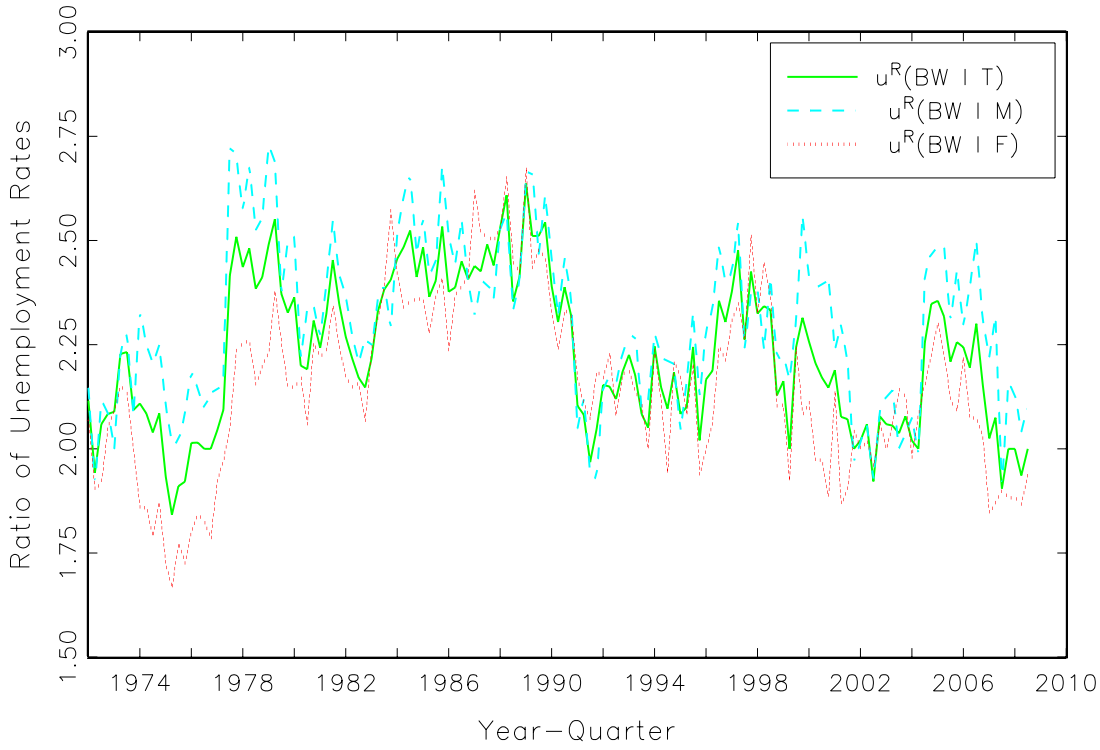
[3] Evidence on the gender unemployment gap for several OECD countries can be found in Queneau and Sen (2007).

[4] Queneau and Sen (2007) argue that the u^R ($=u^F/u^M$) measure of the gender unemployment gap, defined as the ratio of the female unemployment rate (u^F) to the male unemployment rate (u^M), is a better and more accurate measure of the gender unemployment gap over time compared to the difference measure u^D ($=u^F u^M$). The empirical evidence in Queneau and Sen (2007, 2009), based on a group of eight countries, shows that there is substantially less evidence of persistence based on the u^R measure compared to that based on the u^D measure. While we focus on the u^R measure for the race (gender) unemployment gap in this paper, analysis for the difference measures were analyzed as well, and these results are available from the authors upon request.

Females to White Females $[u^R(BW|F)]$, White Females to White Males $[u^R(FM|W)]$, and Black Females to Black Males $[u^R(FM|B)]$.[5] The u^R measure based on any two groups is equal to one if there is no difference between the unemployment rates of the two groups, and it is greater than (less than) one if the unemployment rate of one group is greater than (less than) the unemployment rate of the corresponding group.

The trends in unemployment gaps by race and gender are shown in Figures 1 and 2. The racial unemployment gaps, $u^R(BW|T)$, $u^R(BW|M)$, and $u^R(BW|F)$, are shown in Figure 1, and the gender unemployment gaps by race, $u^R(FM|W)$ and $u^R(FM|B)$, are shown in Figure 2. We also calculated the four-year average unemployment rates for each of these u^R series, see Table 1. It is clear that the black unemployment rate is consistently and significantly higher compared to the white unemployment rate (for males, females, and total). In all cases, the black unemployment rate is more than twice compared to the white

Figure 1: Ratio of U.S. Unemployment Rates of Blacks to Whites, 1972:Q1 – 2008:Q3

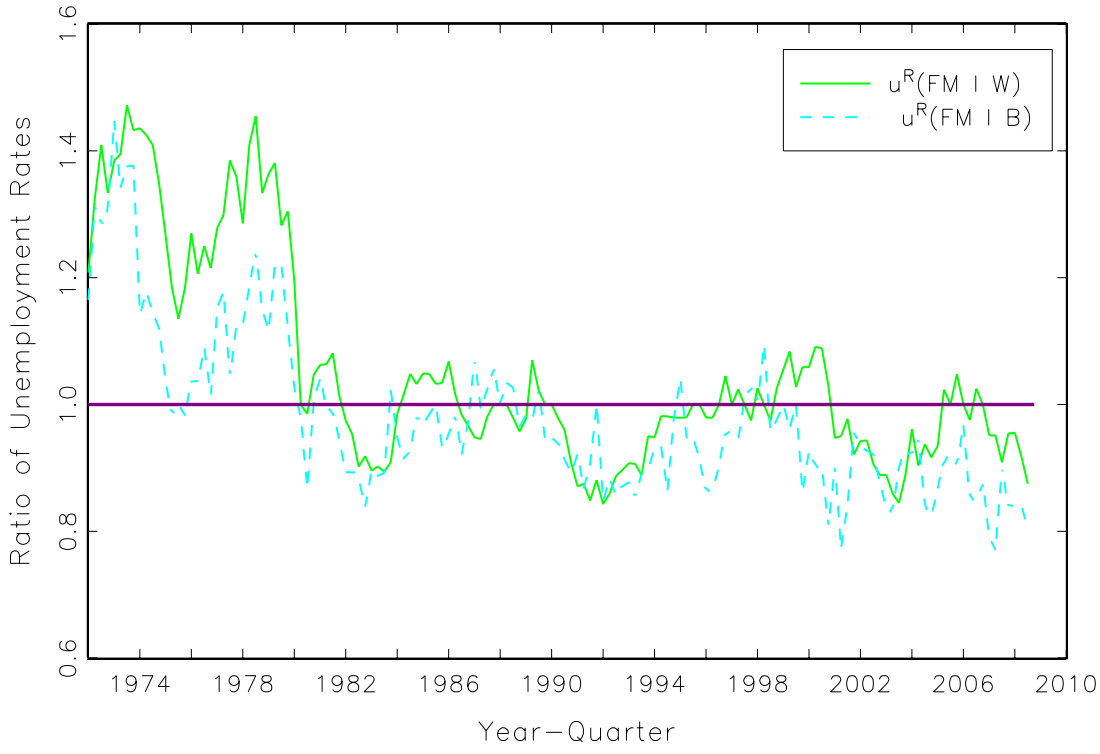


[5] The ratio of the female unemployment rate to the male unemployment rate is analyzed by Queneau and Sen (2007), and so we did not include this comparison in our paper.

Table 1: Average Gap in U.S. Unemployment Rates across Gender and Race Measured by the Ratio (u^R), 1972:Q1 2008:Q3

Period	$u^R(BW\|T)$	$u^R(BW\|M)$	$u^R(BW\|F)$	$u^R(FM\|W)$	$u^R(FM\|B)$
1972 - 1975	2.0478	2.1322	1.9116	1.3340	1.1996
1976 - 1979	2.2842	2.4326	2.0827	1.3173	1.1293
1980 - 1983	2.2855	2.3393	2.2340	0.9874	0.9412
1984 - 1987	2.4424	2.4829	2.4025	1.0097	0.9775
1988 - 1991	2.3571	2.3675	2.3654	0.9580	0.9588
1992 - 1995	2.1417	2.1895	2.1241	0.9368	0.9085
1996 - 1999	2.2752	2.3491	2.2221	1.0159	0.9612
2000 - 2003	2.1025	2.1831	2.0357	0.9472	0.8845
2004 - 2008	2.1366	2.2647	2.0403	0.9600	0.8663

Figure 2: Ratio of U.S. Unemployment Rates of Women to Men, 1972:Q1 – 2008:Q3



unemployment rate with the exception of $u^R(BW|F)$ over the period 1972-1976 when the black female unemployment rate is 91% higher compared to the white female unemployment rate. Although the racial unemployment gap seems to have fallen slightly during the post-1987 sub-period, there continues to be a wide gap in all cases. A comparison of the gender unemployment gap, however, reveals a different pattern. The gender unemployment gap for both blacks and whites falls through the entire sample, and the female unemployment rate is lower than the male unemployment rate over most of the post-1980 period.

Next, we turn our attention to the level of persistence the racial unemployment gaps, and the gender unemployment gap by race. In particular, we test for the presence of a unit root in each of our u^R series. A rejection of the unit root null hypothesis implies that any random shock to the unemployment gap has a temporary effect on the gap and the gap returns to its trend path. In this case, an examination of the trend-function coefficients will reveal whether the unemployment gap is stable, decreasing or increasing over time. On the other hand, if we are unable to reject the unit root null hypothesis, random shocks to the unemployment gap will have a permanent effect on the gap, and so the unemployment gap has a high level of persistence.

We use the statistic proposed by Perron (1997) to test for the presence of a unit root in each of the u^R series. The advantage of the Perron (1997) statistic over the usual Augmented Dickey- Fuller tests is that it allows for the presence of a break in the trend function at some unknown break-date which can capture a structural change in the labour market conditions during our sample period 1972-2008.[6] Perron's (1997) statistic is defined as:

$$t_{DF}^{min} = Min_{T_b \in \{[\lambda_0 T], [\lambda_0 T]+1, \ldots, T-[\lambda_0 T]\}} t_{DF}(T_b) \tag{1}$$

where $t_{DF}(T_b)$ is the t-statistic for $H_0 : \alpha = 1$ in the regression:

$$y_t = \hat{\mu}_0 + \hat{\mu}_1 \, DU_t(T_b) + \hat{\mu}_2 \, D_t(T_b) + \hat{\mu}_3 \, t + \hat{\mu}_4 \, DT_t(T_b) + \hat{\alpha} \, y_{t-1} + \textstyle\sum_{j=1}^{k^*} \hat{c}_{t-j} \, \Delta y_{t-j} + \hat{e}_t \tag{2}$$

with break-date T_b where $DU_t(T_b)$ is the intercept-break dummy that is equal to 0 if t = T_b and 1 if t > T_b, $DT_t(T_b)$ is the slope-break dummy that is equal to 0 if t = T_b and (t - T_b) if t > T_b, and $D_t(T_b)$ is a dummy variable that takes on the value of one for t = T_b+1 and zero otherwise. The extra 'k^*' regressors $\{\Delta y_{t-j}\}_{j=1}^{k^*}$ are included in the regression to account for additional correlation in the time series $\{y_t\}$, and it is determined using the data-dependent method described above.[7] The implied estimate break-date $\hat{T}_b(t_{DF}^{min})$ is the date at which the sequence $\{t_{DF}(T_b)\}_{T_b=[\lambda_0 T]}^{T-[\lambda_0 T]}$ is minimized.

We report Perron's (1997) calculated statistic, the estimated break-date, and the esti-

[6] Following Sen (2003), we use the Mixed model specification of the trend-break alternative that allows for a simultaneous break in the intercept and slope of the trend function.

[7] We use the $k(t-sig)$ data-dependent method of Perron and Vogelsang (1992) to choose the appropriate lag truncation parameter k^* which is typically unknown a priori.

mated trend-function coefficients for the $u^R(BW|T)$, $u^R(BW|M)$, $u^R(BW|F)$, $u^R(FM|W)$ and $u^R(FM|B)$ series in Table 2. The t_{DF}^{min} statistic is significant at the 1% level for all the series, and so the race unemployment gaps and the gender unemployment gap by race should be modeled as trend-break stationary processes. The estimated break-date $\hat{T}_b(t_{DF}^{min})$ for $u^R(BW|T)$ is 1989:Q3, for $u^R(BW|M)$ is 1977:Q1, for $u^R(BW|F)$ is 1988:Q4, for $u^R(FM|W)$ is 1979:Q3, and for $u^R(FM|B)$ is 1979:Q2. The estimated trend coefficients from regression (2), $\hat{\mu}_3$ and $\hat{\mu}_4$, imply that the gender unemployment gap for blacks and all the race unemployment gaps are falling over time. For example, the gender unemployment gap for blacks decreases by -0.0005/quarter, and the race unemployment gap for females falls by -0.0018/quarter. However, the gender unemployment gap for whites remains virtually stable as the trend coefficient in the post-break sample is - 0.0001. We also report the half-life of a unit shock (HL_α) implied by the estimated regressions to measure the level of persistence in all the unemployment gap series, see Table 2.[8] In all cases, the calculated half-life measures are very small ranging between 0.88 quarters for $u^R(BW|M)$ and 1.85 quarters for $u^R(FM|W)$ implying that the effect of random shocks dissipate fairly quickly so that the unemployment gap returns to its trend path.

Table 2: Mixed Model Unit-Root Tests for U.S. Unemployment Rate by Gender and Race, 1972:Q1 2008:Q3

Series	$\hat{T}_b$	k^*	$\hat{\alpha}$	$\hat{\mu}_0$	$\hat{\mu}_1$	$\hat{\mu}_2$	$\hat{\mu}_3$	$\hat{\mu}_4$	$\hat{\sigma}^2$	HL_α
$u^R(BW\|T)$	1989:3	7	0.5404[a]	0.9463	-0.1330	0.1056	0.0035	-0.0044	0.088	1.13
			(-5.60)	(5.59)	(-3.66)	(1.10)	(4.03)	(-3.93)		
$u^R(BW\|M)$	1977:1	7	0.4540[a]	1.1810	0.1882	-0.1643	-0.0008	-0.0005	0.118	0.88
			(-5.83)	(5.50)	(2.58)	(-1.31)	(-0.09)	(-0.06)		
$u^R(BW\|F)$	1988:4	7	0.4912[a]	0.9293	-0.1262	0.3560	0.0060	-0.0078	0.098	0.98
			(-5.72)	(5.67)	(-3.33)	(3.46)	(4.79)	(-4.75)		
$u^R(FM\|W)$	1979:3	6	0.6871[a]	0.3938	-0.1049	0.1003	0.0010	-0.0011	0.040	1.85
			(-6.04)	(5.47)	(-4.57)	(2.17)	(0.78)	(-0.89)		
$u^R(FM\|B)$	1979:2	7	0.4951[a]	0.5044	-0.1090	0.1341	0.0045	-0.0050	0.052	0.99
			(-5.79)	(4.58)	(-4.29)	(2.40)	(2.18)	(-2.44)		

Note: The superscripts a, b, c, and d denote respectively significance at the 1%, 2.5%, 5% and 10% significance level. The finite sample critical values for Perrons (1997) unit root test, taken from his Table 1 pp. 363 [with T=150, k(t-sig)], are: -4.38 at the 10% level, -4.65 at the 5% level, -4.96 at the 2.5% level, and -5.28 at the 1% level. The numbers in the parenthesis under the estimated trend-function coefficients are the respective t-statistics for the null hypothesis that the parameter is equal to zero. The number in parenthesis under the estimate coefficient of the first lag is the t-statistic for the null hypothesis that it is equal to one.

[8] See Andrews (1993) for a discussion of the half-lives measure for persistence.

3. Concluding Remarks

We examine the extent and level of persistence in the U.S. unemployment gap across both gender and race. While there is a relatively high unemployment gap between whites and blacks albeit with a decreasing trend, the unemployment gap between men and women is almost nonexistent. In addition, the level of persistence in all unemployment gaps is very low. Our results imply that over the sample period under consideration, 1972-2008, both women and blacks have made progress though the gains for women relative to men have been substantially greater than that for blacks relative to whites. This progress can be attributed to gains in human capital accumulation due to increased educational attainment and labor market experience, societal changes in men's attitudes towards women and, to a lesser extent, in whites' attitudes towards blacks, and the enactment of anti-discrimination laws since the 1960s. However, given that the racial unemployment gap continues to be substantial, policy makers should re-evaluate existing policies and devise new policies in order to bridge the gap in the unemployment rates between whites and blacks. Such policies should, in particular, aim to increase educational attainment for blacks and also improve the enforcement of anti-discrimination laws.

References

Abell, J. D. (1991). "Distributional Effects of Monetary and Fiscal Policy Impacts on Unemployment Rates Disaggregated by Race and Gender," *American Journal of Economics and Sociology*, **50**, 269-285.

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

Andrews, D. W. K. (1993). "Exactly Median-Unbiased Estimation of First Order Autoregressive Unit Root models," *Econometrica*, **61**, 139-65.

Banerjee, A., Lumsdaine, R. L., and Stock, J. H. (1992). "Recursive and sequential tests of the unit-root and trend-break hypothesis: Theory and international evidence," *Journal of Business and Economic Statistics*, **10**, 271-287.

DeBoer, L., and Seeborg, M. (1989). "The Unemployment Rates of Men and Women: A Transition Probability Analysis," *Industrial and Labor Relations Review*, **42**, 404-414.

Ewing, B. T., Levernier, W., and Malik, F. (2002). "The Differential Effects of Output Shocks on Unemployment Rates by Race and Gender," *Southern Economic Journal*, **68**, 584-599.

Ewing, B. T., Levernier, W., and Malik, F. (2005). "Modeling Unemployment Rates by Race and Gender: A Nonlinear Time Series Approach," *Eastern Economic Journal*, **31**, 333-347.

Fairlie, R. W. and Sundstrom, W. A. (1999). "The Emergence, Persistence, and Recent Widening of the Racial Unemployment Gap," *Industrial and Labor Relations Review*, **52**, 252-270.

Flanagan, R. J. (1976). "On the Stability of the Racial Unemployment Differential," *American Economic Review*, **66**, 302-308.

Fosu, A. K. (2000). "Racial and Gender Differences in Unemployment Patterns in an Urban Labor Market: The Case of Detroit," *Review of Black Political Economy*, **27**, 35-47.

Johnson, J. L. (1983). "Sex Differentials in Unemployment Rates: A Case for no Concern," *Journal of Political Economy*, **91**, 293-303.

Niemi, B. (1974). "The Female-Male Differential in Unemployment Rates," *Industrial and Labor Relations Review*, **27**, 331-350.

Perron, P. (1997). "Further Evidence on Breaking Trend Functions in Macroeconomic Variables," *Journal of Econometrics*, **80**, 355-385.

Perron, P., and Vogelsang, T. J. (1992). "Nonsationarity and Level Shifts With an Application to Purchasing Power Parity," *Journal of Business and Economic Statistics*, **10**, 301-320.

Queneau, H., and Sen, A. (2007). "Evidence Regarding Persistence in the Gender Unemployment Gap Based on the Ratio of Female to Male Unemployment Rate," *Economics Bulletin*, **5**, 1-10.

Sen, A. (2003). "On Unit Root Tests When the Alternative is a Trend-Break Stationary Process," *Journal of Business and Economic Statistics*, **21**, 174-184.

Schwartzman, D. (1997). "Black Male Unemployment," *The Review of Black Political Economy*, **25**, 77-93.

Stratton, L. S. (1993). "Racial differences in mens unemployment," *Industrial and Labor Relations Review*, **46**, 451-463.

Zavodny, M., and Zha, T. (2000). "Monetary Policy and Racial Unemployment Rates," *Federal Reserve and Bank of Atlanta Economic Review*, **85**, 1-16.