The Disparate Labor Market Impacts of Monetary Policy

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Abstract

This paper estimates two widely used approaches to identify the differential impacts that monetary policy has on the labor market outcomes of teenagers, minorities, out-of-school youth, and less-skilled individuals.

Evidence from recursive VARs and ADL models that use information on disinflationary initiatives by the Federal Reserve indicate that the employment-population ratio of minorities is more sensitive to disinflationary monetary policy than whites, primarily falling due to an increase in unemployment and not a decline in labor force participation. Teenagers are found to disproportionately bear the brunt of disinflationary monetary policy, particularly African American teenagers.

Young out-of-school less educated men and women bear the largest costs of disinflationary monetary policies. Their employment-population ratios fall due to increased difficulty in obtaining employment.

Key Words:

Monetary Policy
Federal Funds Rate
Labor Market Outcomes
Teenagers, African Americans, Hispanics, and Out-of-School Youth

I.   Introduction

This paper examines the impact that contractionary monetary policy as measured by an increase in the Federal Funds Rate has on the labor market outcomes of minorities, teenagers, and less-skilled workers. It adds to the large and well developed literature that identifies different relationships between aggregate demand, macroeconomic policies and the economic outcomes (e.g., poverty) of various socio-economic groups, and that attempts to explain the constant 2-to-1 ratio of the black-white unemployment rate.[1,2]

For example, Romer and Romer (1998) find that a decline in the Federal Funds Rate lessens poverty. A cyclical boom created by expansionary monetary policy is associated with lower poverty in the short run. In the long run, low inflation and steady growth in aggregate demand is associated with lower poverty. Romer and Romer conclude that since the effects of monetary policy are "inherently temporary", a strategy with the goals of low inflation and stable aggregate demand has the greatest chance to permanently lower poverty.

More recently, Thorbecke (2001) estimated differential impacts of monetary policy across racial and ethnic groups. The motivation for his inquiry is based on theoretical work in Blanchard (1995) and Blanchard and Katz (1997). The former argues that an adverse aggregate demand shock such as a monetary contraction has "ladder effects", adversely impacting lower income individuals who are positioned at lower steps of the ladder. The latter asserts that unskilled individuals have significantly higher labor supply elasticities than skilled individuals. Thus, a fall in the demand for labor as economic growth slows will have a more detrimental impact on the employment prospects of less-skilled workers. As a result, low-skilled individuals will bear a greater cost of disinflationary monetary policy. Since African American and Hispanic incomes are significantly below whites, Thorbecke claims that contractionary monetary policy will have a more adverse impact on minorities than whites.

Focusing solely on the unemployment rate, Thorbecke finds that from March 1973 to December 1996, impulse-response functions from recursive Vector Autoregressions (VARs) reveal that increases in the Federal Funds Rate increased African American and Hispanic unemployment rates by 50 to 90 percent more than whites. Then, by using the disinflationary episodes identified in Romer and Romer (1989, 1994b), Thorbecke finds that anti-inflationary policy shocks increase unemployment among nonwhites more than twice as much as they do among whites. Thorbecke concludes that the "Federal Reserve should take account of these effects when implementing disinflationary policy."[3]

This paper uses these two approaches to explore whether disinflationary policy lowers the employment-population ratio by acting primarily through raising the unemployment rate or reducing the labor force participation rate. I estimate recursive VARs and Autoregressive distributed lag (ADL) models that extend Thorbecke's monthly time series from December 1996 to September 2002. Doing so includes the Federal Reserve's efforts to resist slowing the economy down from 1995 to 2000 and its subsequent preemptive efforts to respond to inflationary pressures by starting a series of increases in the Federal Funds Rate in June, 1999. It also includes the data shortly after September 11, 2001: a period in which the Federal Reserve was very active. Due to these changes, I first show that the residuals from the VARs are still homoscedastic and check whether the macro time series used in the analysis are stationary.

I then show that disinflationary policy as measured by an increase in the Federal Funds Rate lowers the employment-population ratio by primarily acting through raising the unemployment rate and not reducing the labor force participation rate.[4] An increase in the Federal Funds Rate lessens aggregate labor demand, leading to a decline in the probability of employment. Unemployment increases because of a growth in new entrants and the increased time it takes those out of work to find a job. The increase reduces job search, leading to a modest decline in labor force participation.

To estimate monetary policy's disparate labor market impacts in greater demographic detail, I disaggregate the employment-population ratio, unemployment rate, and labor force participation rate not only by race and age, but I also focus on out-of-school youth (ages 16 to 24). They have the least skills and have decided in the short-term to forgo further investments in their formal education. Here, I estimate whether increases in the Federal Funds Rate place a greater burden on out-of-school teenagers, minorities and less-educated men and women.

The findings can be summarized as follows:

- An increase in the Federal Funds Rate typically lowers the employment-population ratios of minorities and less-skilled by increasing their unemployment rates and not decreasing their labor force participation rates.

- African American unemployment rates, particularly teen African American unemployment rates are more sensitive to an increase in the Federal Funds Rate than whites.

- Out-of-school teenagers and less educated out-of-school young men and women (ages 16 to 24) bear the brunt of an increase through higher unemployment rates.

The organization of this paper is as follows. Section II describes the methodology and Section III describes the data. Section IV describes the results. Section V concludes.

II.   Methods

Recursive VAR Approach

Recursive VARs are a popular econometric tool for describing the dynamic relationships among macro economic variables and measures of monetary policy, such as the Federal Funds Rate.[5] An attractive feature of recursive VARs is that they do not require specifying a complete structural model of the economy. The assumption of a recursive ordering means that economic variables at a particular time period (e.g., month) are determined in a block recursive way. By placing the Federal Reserve's policy

variables after the goods markets variables, such as the unemployment rate, the variables associated with good markets (e.g., output, prices, and employment) are first determined, and then followed by the Federal Reserve setting its policy instrument.[6] The Federal Reserve's policy decisions are influenced by the macroeconomy, but policy has an impact with a lag.

Formally, a VAR is a regression of an *n x 1* vector of endogenous variables, y_t, on lagged values of itself:

$$1) \qquad y_t = A_1 y_{t-1} + ... + A_p y_{t-p} + e_t, \qquad E(e_t e_t^{'}) = \Omega.$$

As long as stability conditions are met, Equation (1) can be inverted and written as an infinite vector moving average process:

$$2) \qquad y_t = e_t + C_1 e_{t-1} + C_2 e_{t-2} + C_3 e_{t-3} + ...$$

Interpreting this equation is not easy because the individual error terms can be contemporaneously correlated. To obtain orthogonalized innovations, the Cholesky factorization is used to create a lower triangular matrix P such that O is the variance-covariance matrix of e_t. Doing this allows Equation (2) to be rewritten as:

$$3) \qquad \begin{aligned} y_t &= PP^{-1}e_t + C_1 PP^{-1}e_{t-1} + C_2 PP^{-1}e_{t-2} + ... \\ &= \Gamma_0 v_t + \Gamma_1 v_{t-1} + \Gamma_2 v_{t-2} + ... \end{aligned}$$

where $G_i = C_i P$, $v_t = P^{-1}e_t$, and $E[v_t v_t^{'}] = I$. Equation (3) expresses the endogenous variables (y_t) as functions of the orthogonalized residuals.

Typically, one component of v_t represents shocks to monetary policy, enabling the creation of impulse-response functions to describe the impact that unanticipated policy changes have on the path of the goods market variables (e.g., output, prices, and labor market outcomes). A well known drawback to assuming a recursive structure is that the impacts are sensitive to the variables' ordering. To respond to this issue, I switch the ordering of the Federal Funds Rate and find qualitatively similar results.

To measure the impact of monetary policy, many researchers use the Federal Funds Rate. Bernanke and Blinder (1992), Christiano et al. (1996), and Friedman and Kuttner (1996) show that the Federal Funds Rate is a good measure of monetary policy.[7] However, Rudebusch (1998) and others have raised valid concerns that the Federal Funds Rate does not fully capture monetary policy, and have developed alternative measures (e.g., one-step ahead forecast errors of the Federal Funds Rate) . Yet, Bagliano and Favaro (1998) show that even though the Federal Funds Rate is not highly correlated with alternative measures of monetary policy shocks, "the descriptions of the monetary transmission mechanism obtained by impulse response functions estimated are not substantially different from each other." Since it is not clear that the benefits of developing a more complex transmission mechanism outweigh the costs, I use the Federal Funds Rate to measure monetary policy.

The variables in the VAR are ordered as follows: industrial production growth, the percent change in the Consumer Price Index for Urban Consumers, the Commodity Research Board spot price index, a labor market outcome (e.g. unemployment rate), the Federal Funds Rate, nonborrowed reserves, and total reserves.[8] Industrial production growth, the percent change in the Consumer Price Index, the spot price index, and the labor market outcome describe goods markets. The Federal Funds Rate, nonborrowed reserves and total reserves capture the Federal Reserve's policy instruments.

To identify an increase in the Federal Funds Rate's differential labor market impacts, I estimate a VAR and impulse response function for each demographic group (e.g., 16 and over African Americans). The impulse response functions simulate the effect of an increase in the Federal Funds Rate on the three major labor market outcomes: the employment- population ratio, the unemployment rate and labor force participation rate.[9] Because of these relations, I will be able to determine whether a decrease in a demographic group's employment-population ratio is due to an increase in the unemployment rate (increased length of job search) or to a reduction in the group's labor force participation rate (departure

from the labor force). Since VARs are symmetric, they also describe the impacts that inflationary policy, a decline in the Federal Funds Rate has on the three labor market outcomes.

The Impact of Disinflationary Episodes on Labor Market Outcomes

Another approach to identifying the labor market impacts of changes in monetary policy is to examine data that signal policy actions on the part of the Federal Reserve. Romer and Romer (1989) examine records of the Board of Governor's policy deliberations and identify periods of monetary shocks during which "the Federal Reserve attempted to exert a contractionary influence on the economy in order to reduce inflation." This definition excludes increases in the Federal Funds Rate that emerge from concerns other than inflation and all monetary expansions. Taken together Romer and Romer (1989, 1994) identified 1947:10, 1955:09, 1968:12, 1974:04, 1978:08, 1979:10, and 1988:12 as meeting their criteria for a disinflationary episode.

From January 1989 to September 2002, the Federal Reserve on two occasions slowed the economy with increases in the Federal Funds Rate. The first was a series of increases in February 1994 and the second was a series of increases that started in June 1999. I add these two disinflationary episodes to Romer and Romer's identified episodes. From my review of the Federal Reserve Board of Governor's actions, I conclude that these two episodes fit Romer and Romer's criteria. The minutes that led to the February 1994 and June 1999 episodes are presented in the Appendix.

To identify the effect that these disinflationary episodes have on a particular demographic group, I estimate:

4) $y_t = A(L)\,y_{t-1} + B(L)\boldsymbol{p}_{t-1} + C(L)D_{t-1},$

where y_t denotes a labor market outcome for a given demographic group, A(L) and B(L) are unrestricted polynomials in the lag operator L, p_t denotes the percent change in the consumer price index for urban consumers, C(L) is estimated as a fourth-order polynomial distributed lag, and D_t represents dummy

variables for the Romer dates plus the two that I identified. The A(L) and B(L) polynomials contain seven lags. The impact of the Romer and Romer dates on y_t are robust to changes in the order of A(L) and B(L). To maintain consistency with the VARs, C(L) has 48 lags.

III.   Data

Published monthly employment-population ratios, unemployment rates, and labor force participation rates for ages 16 and over and teenagers come from the U.S. Bureau of Labor Statistics (BLS). The series span from January 1948 to September 2002; however, data disaggregated that explicitly identifies African Americans and Hispanics is first published in March 1973.

To obtain greater demographic detail for young adults, I use published data from BLS's October Supplement of the Current Population Survey. This Supplement which is published each October provides employment-population ratios, unemployment rates and labor force participation rates of out-of-school 16 to 24 year olds by age, race, gender and educational attainment. Labor market outcomes disaggregated by age and race become available in October 1970. The tradeoff for this additional demographic detail is that the data is only available for October of each year, effectively reducing the frequency from a monthly to an annual time series. This decline in frequency might impact my ability to make strong conclusions about monetary policy's effect on out-of-school youth. It may also weaken the validity of the assumption implied by the recursive ordering that monetary policy innovations are contemporaneously uncorrelated with output and inflation.

Monthly time series data for the Federal Funds Rate, industrial production, total reserves, and nonborrowed reserves come from the Federal Reserve Board of Governors. Monthly values for the CPI-U come from the Bureau of Labor Statistics and the monthly spot price index comes from the Commodity Research Board. I used industrial production instead of GDP and the CPI-U instead of the GDP deflator. Industrial production and the CPI-U are available monthly while GDP and the GDP deflator are only

available quarterly. In the VAR specifications for the 16 and over population, growth in industrial production, and changes in consumer prices are measured as month to month changes. In the VARs that focus on out-of-school youth, I use the October values of the macro data. Percent changes in industrial production and the CPI are calculated as October-to-October changes.

The series used in Thorbecke ranges from March 1973 to December 1996. Extending the time series to September 2002 requires that I ensure that each time series remains stationary and the VARs residuals remain homoscedastic. Using augmented Dickey-Fuller tests, I found that the logarithm of the reserve series have unit roots.[10] First-differencing each series removed the unit roots.[11] The African American, white and Hispanic employment-population ratios and African American unemployment rate appear to have unit roots, but the racial and ethnic differences in which I am most interested do not have unit roots.[12]

I constructed the residuals from the VAR: industrial production growth, the percent change in the Consumer Price Index for Urban Consumers, the logarithm of the Commodity Research Board spot price index, a labor market outcome (e.g., unemployment rate), the Federal Funds Rate, the change in the logarithm of nonborrowed reserves, and the change in the logarithm of total reserves.

The residuals are homoscedastic. They are relatively stable over this period, typically remaining within two-standard deviations. The only series that I am concerned about are the nonborrowed and total reserve series. The residuals two months after September 11, 2001, are quite large, but quickly return to lying within 2 standard deviations. The extraordinary events of September 11th and the Federal Reserve's responses explain their size.[13, 14]

Finally, I computed the standard deviation of the residual Federal Funds Rate from the VAR. It ranges from 123 to 125 basis points.[15] This figure is important because it represents the size of a one standard deviation increase in the Federal Funds Rate, the rate's simulated increase in the impulse

response functions. It may seem large since Thorbecke's value for the 1973 to 1996 period was 58 basis points. However, in the five months from February 1994 to June 1994, the residual Federal Funds Rate increased by 125 basis points.

IV.   Results

Figures 1, 2 and 3 plot the effect of positive innovations in the Federal Funds Rate on the black-white and Hispanic-white differences in employment-population ratios, unemployment and labor force participation rates.[16] A one-standard deviation increase in the Federal Funds Rate leads to the African American employment-population ratio falling more than the white employment-population ratio. The larger African American decline reaches a maximum difference of 0.11 percentage points in the 31st month, with the difference ranging from 0.40 and 0.19 percentage points. The impulse response functions for the Hispanic-white difference indicate that there are no differential effects on the employment-population ratio.

A one-standard deviation increase in the Federal Funds Rates generates a maximum difference of 0.15 percentage points between the African American and white unemployment rates in the 27th month. The lower bound of the 95 percent confidence interval implies that a differential of 0.07 percentage points exist. The upper bound implies a differential impact of 0.25 percentage points. No significant differences exist between the impact of an increase in the Federal Funds Rate on the Hispanic and white unemployment rates. The impulse response functions for the racial and ethnic differences in labor force participation rates are small and have little precision. Collectively, this evidence indicates that African American's greater difficulty with finding employment as measured by their employment-population ratio is solely due to a larger increase in their unemployment rate. Contractionary monetary policy lessens the number of jobs, but does not create significant barriers such that African Americans leave the labor force.

To explore whether less-skilled and less-educated Americans, are more sensitive to disinflationary

monetary policy as measured by an increase in the federal funds rate, I estimate separate VARs for African American and white 16 to 19 year olds. The advantage to estimating models for teenagers is that I can observe using monthly data whether African American youth labor market outcomes respond differently than white youth labor market outcomes or labor market outcomes of the population in general. However, a major drawback to using the published monthly data for 16 to 19 year olds is that it mixes labor market and schooling decisions. Using monthly data, I can not identify the effects of monetary policy on out-of-school youth, such as high school dropouts, who have the least education and skills and have signaled in the short term, little intention to re-enroll in school. As a result, they are at the greatest risk of being adversely impacted by contractionary monetary policy. If the assumption is accepted that the differences between the skills of in-and out-of-school youth are not too large, then the impulse response functions of all teenagers will provide a conservative estimate of monetary policy's impact on out-of-school youth.

Figure 4 presents the effect of positive innovations in the Federal Funds Rate on racial differences in teenage employment-population ratios, unemployment rates and labor force participation rates. African American teenagers are impacted more than white teenagers by an increase in the Federal Funds Rate. By the 20th month, a one-standard deviation (1.25 percentage points) increase in the Federal Funds rate is associated with the teen African American employment-population ratio falling by 0.19 percentage points more than the teen white employment population ratio, with the 95 percent confidence interval ranging from 0.05 to 0.33 percentage points. The magnitude of this teenage impact exceeds the estimated impact for the general population.

The greater sensitivity of African American teenagers is due not only to a larger increase in their unemployment rate, but also a larger decline in their labor force participation rate. A one-standard deviation increase in the Federal Funds Rates generates a maximum difference of 0.29 percentage points

between the African American and white unemployment rates in the 23rd month. The lower bound of the 95 percent confidence interval implies that a differential of 0.07 percentage points exist. The upper bound implies a differential impact of 0.51 percentage points. The teenage African American labor force participation rate's larger decline reaches a maximum of 0.14 percentage points in the 20th month, with a lower bound of 0.03 percentages points and an upper bound of 0.25 percentage points.

The impulse response functions indicate that disinflationary monetary policy reduces teenage employment opportunities, raising unemployment and lowering labor force participation, particularly for African American teenagers. Since the impulse response functions do not return to their pre-shock levels, an interesting question that is beyond the scope of this paper is whether the reduced labor force participation leads to reenrollment in school or an increase in teen idleness (non-employed and non-enrolled in school).

Out-of-school Youth

This section presents exploratory estimates of the link between contractionary monetary policy and the labor market outcomes of out-of-school youth. The time series are October-to-October changes from 1973 to 2001. The VARs are restricted to two lags and the impulse response functions are estimated for eight periods. Even with this reduction in the time series frequency, the estimates are quite plausible.

The impulse response functions from the unemployment rate VARs for out-of-school youth by age are shown in Figure 5. The maximum increase in the unemployment rate of 20 to 24 year olds is one half the peak increase of 16 to 19 year olds. A one-standard deviation increase (1.51 percentage points) in the Federal Funds Rate increases the unemployment rate of out-of-school teenagers (16 to 19 years old) by 0.56 percentage points in year 2, compared to a 0.27 percentage point increase in year 2 for 20 to 24 year olds. The confidence intervals suggest that unemployment rises for these demographic groups. In

year 2, the increase among 16 to 19 year olds lies within a range of 0.16 to 0.96 percentage points and among 20 to 24 year olds within a range of 0.06 to 0.49 percentage points.

To make these estimates comparable to the monthly time series for the 16 years old and over population, I multiply the 16 to 19 year old estimates by 0.82 (the ratio of the standard deviations of the residual Federal Funds Rate: 1.24/1.51). Doing this yields a maximal effect on unemployment from a 124 basis point increase in the Federal Funds Rate of 0.46 percentage points. For 20 to 24 year olds I multiply 0.27 by 0.765 (1.24/1.62), generating a 0.21 percentage point increase. The comparable figures for a 124 basis point change in the 16 and over white and African American population are 0.14 and 0.28 percentage point increases in the unemployment rate. The same one standard deviation increase raises the teen African American and white unemployment rates by 0.52 and 0.22 percentage points, respectively.[17]

The impulse response functions for young out-of-school African Americans and whites are adversely impacted by disinflationary monetary policy, with a larger effect for African American youth. These effects are dampened because of my inability to disaggregate each race's series by educational attainment and age.

The importance of disaggregating by educational attainment is shown in Figure 6. The figure presents the impulse response functions for young men and women by educational attainment. The impulse response functions for out-of-school men and women have similar responses to disinflationary monetary policy. The Figure shows that unemployment rates of nonenrolled young male high school dropouts and graduates are adversely impacted. A one-standard deviation (1.39 percentage points) increase in the funds rate generates a maximum increase of 0.55 (with a 95 percent confidence interval of 0.17 to 0.93) percentage points in the unemployment rate of male high school dropouts. For women with no more than a high school degree, the increase in the federal funds rate raises unemployment by 0.50 percentage points, with a lower bound of 0.03 percentage points and an upper bound of 0.97 percentage

points. When made comparable to the monthly series, the estimate translates into a 0.49 and 0.45 percentage point increases in the unemployment rates of male and female high school dropouts. Men and women high school graduates are adversely impacted, but the magnitude is not as large.

To summarize, even though the out-of-school youth estimates in this section are derived from annual data, they strongly suggest that these young men and women are more sensitive to monetary tightening than the general population and the population of all 16 to 19 years olds (except African American teenagers). Since the VARs are symmetric, stimulative monetary policy would be expected to yield disproportionate benefits to minorities and less-skilled individuals.[18]

Isolating Disinflationary Episodes

Table 1 presents estimates of the racial and ethnic differences in the sensitivity of the employment-population ratio, unemployment rate, labor force participation rate to disinflationary episodes. A contractionary monetary policy episode causes the African American employment-population ratio to fall by 0.12 percentage points more than the white drop in their employment-population ratio. The estimate is measured with precision (t-statistic = 2.23). The larger drop in the Hispanic ratio reaches a peak of 0.12 percentage points; however, it has little precision.

The increase in the unemployment rate during a disinflationary episode is the dominant factor in causing the African American employment-population ratio to fall more than the white employment-population ratio. The size of the difference peaks at 0.33 percentage points, with a t-statistic of 4.27. The racial difference in labor force participations peak at 0.11. The t-statistic is -1.90, indicating a moderate level of precision. Similar to the VAR models, increases in the unemployment rate and not reductions in labor force participation are the primary channel through which disinflationary policy operates to widen the racial difference in employment-population ratios.

The timing of the peaks provides support for this claim. The earlier widening in the employment-population ratios is due to a faster departure of African Americans from the labor force than whites. The labor force participation difference peaks in month 18. As the difference begins to fall, the unemployment rate difference expands and peaks in month 38. This peak coincides with the peak in the difference in employment-population ratios.

To conclude this section, I report the teenage racial difference's response to disinflationary episodes. To maintain comparability with the previous results, the models were allowed 48 lags for the disinflationary episode to have an effect. However, those models still had the difference expanding in the 48th month and they were measured with precision.[19] Because of this, I extended the lag structure of the disinflationary episode and found that at 52 lags the effect reached a peak prior to the last lag. Table 1 contains these results.

The size of the difference in the teen African American and white employment-population ratio reaches a peak of 0.27 percentage points, meaning that a contractionary monetary policy episode raises the difference between teenage African American and white employment-population ratios by 0.27 percentage points, peaking in the 37th month. The t-statistic of 1.42 implies that the estimate is measured with minimal precision; however, this will be due to the interaction of the unemployment and labor force participation rates. The difference in unemployment rates peaks in the 39th month at 1.14 percentage points, with a t-statistic of 3.30. The racial difference in labor force participations peaks at 0.36 percentage points in month 30. The t-statistic is -1.70, indicating a moderate level of precision. Teenage African Americans clearly bear the brunt of disinflationary monetary policy.

They too have a dynamics similar to adults, except the erosion in relative opportunities is larger. The differences in teenage employment-population ratios start to expand due to a faster departure of teenage African Americans from the labor force than teenage whites. The labor force participation

difference peaks in the 30th month. As the difference begins to narrow, the teen unemployment rate difference expands and peaks in the 39th month. This peak roughly coincides with the peak in the difference in teen employment-population ratios. The fact that the difference in labor force participation rates is narrowing as the difference in unemployment rates is expanding probably explains why the estimated impact on the difference in employment-population ratios is noisy.

V. Summary

This paper utilizes macro time series models to estimate whether disinflationary monetary policy has differential labor market impacts. Using recursive VAR and ADL models, I find disinflationary monetary policy as measured by increases in the Federal Funds Rate typically lowers the employment-population ratios of minorities and less-skilled by increasing their unemployment rates and not decreasing their labor force participation rates. African American unemployment rates, particularly teen African American unemployment rates are more sensitive to disinflationary monetary policy than whites. Out-of-school teenagers and out-of-school men and women with no than a high school degree (ages 16 to 24) bear the brunt of disinflationary monetary policies through higher unemployment rates.

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Table 1: Racial and Ethnic Differences in Responses Following Disinflationary Episodes
(t-statistics in parentheses)

Response of:	African American minus White		Hispanic minus White		Teen African American minus White	
	Max Effect	Month	Max Effect	Month	Max Effect	Month
Employment-Population Ratio	-0.124	33	-0.118	48	-0.270	37
	(2.230)		(0.732)		(1.418)	
Unemployment Rate	0.329	38	0.150	48	1.142	39
	(4.270)		(1.010)		(3.304)	
Labor Force Participation Ratio	-0.107	18	-0.062	16	-0.361	30
	(1.900)		(0.820)		(1.699)	

Notes: The table shows the results from the racial differences in the labor market outcomes of 16 and over whites and African Americans on seven own lags, seven lags for the percent change in the CPI-U, and 48 lags on the beginning of disinflationary episodes. Each are fourth order polynomials. For the Teenagers, column (3) shows the results from the difference in the labor market outcomes of 16 to 19 year old whites and African Americans on seven own lags, seven lags for the percent change in the CPI-U, and 52 lags on the beginning of disinflationary episodes. Each are fourth order polynomials.

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APPENDIX
Relevant Federal Open Market Committee Excerpts

The following are selected quotes from the February 3-4, 1994 and June 29-30, 1999 FOMC meetings. Prior to 1998, the FOMC Secretariat produced a transcript that contains member's names. The detailed transcripts are available at www.federalreserve.gov/fomc/transcripts.

February 3-4, 1994:

Mr. Forrestal: on the price side, for the first time in a long time our directors have talked a little about seeing some price increases.

Mr. Melzer: we project that the CPI will move up sharply in 1994 and will be even high in 1995. Indeed, there may be some early warning signs that the economy's disinflationary course has already come to an end.

Ms. Phillips: I think that we're now seeing some major risks on the inflation front

Vice Chairman Mcdonough: with the unemployment rate coming down to what we think is a reasonable estimate of the NAIRU—in the low 6 percent area—we do have to be considerably concerned about inflation.

Chairman Greenspan: while we may not find it in the broader price indexes, there was at least an inkling that the presumption that inflationary indicators are all quiescent is, as I said, sort of fraying at the seems… The presumption that inflation is staying down is very hard to maintain.

Vice Chairman Mcdonough: …send the right signal in the sense that the federal reserve, the central bank, is being watchful, as it should be. And we would be moving earlier in the economic cycle than the fed has done historically…

Mr. Jordan: …that 25 basis point move would be viewed clearly as the first of a series of moves.

Mr. Boehne: this is as good as it gets in terms of convincing evidence to move.

Mr. Forrestal: We certainly has a demand surge in the fourth quarter and it would appear that that is going to continue to some extent.

Mr. Syron: What we all want to do very clearly is to maximize long-term growth in the economy, controlling real growth. As Larry Lindsey said, controlling prices is a mechanism for doing that.

Chairman Greenspan: (reading the statement he plans to release) …the decision was taken to move toward a less accommodative stance in monetary policy in order to sustain and enhance the economic expansion… this is the first firming of reserve market conditions by the Committee since early 1989.

APPENDIX continued:
Relevant Federal Open Market Committee Excerpts

June 29-30, 1999:

"The members' concerns about inflation had increases appreciably since the meeting in late March"

"Indeed, in the absence of some policy firming most of the members saw tightening labor markets and an updrift in measured inflation as a significant risk.'

"it remained unclear how long faster gains in productivity could continue be offset increases in labor costs and avert an intensification of price inflation"

"most members had become increasingly worried about the risks of an overheating economy and rising inflation over time."

"the concerns about the outlook for inflation tended to focus on the risk that, in the absence of an appreciable moderation in overall demands, very tight labor markets would at some point foster significantly faster increases in labor compensation that could no longer be offset by stronger productivity growth…. The higher labor cost increases would in turn generate more rapid price inflation."

"the declines in commodity and other import prices that had helped to suppress inflation and inflation expectations over the last two years were not likely to be repeated.

"…an increase of ¼ percentage point in the federal funds rate to an average of around 5 percent. In the view of most members, such a policy move represented a desirable and cautious preemptive step in the direction of reducing what they saw as a significant risk of rising inflation."

"the persisting strength of domestic demand augmented by increasing demand from abroad would show through at some point to even tighter labor markets and higher inflation… In these circumstances a small preemptive move at this time would provide a degree of insurance against worsening inflation later."

ENDNOTES

[1] For general studies, see, for example, Hoynes (2000), Romer and Romer (1998), Moorthy (1988), Korenman and Okun (1989), Spriggs and Williams (2000) and Blank and Blinder (1996), Shulman (1991), Wilson, Tienda and Wu (1991), Badgett (1994), and Clark and Summers (1981, 1990).

[2] For studies on race and ethnicity, see, for example, Reimers (2000), Freeman and Rodgers (2000), Freeman (2001), Hoynes, Hines and Krueger (2001). A second round of studies continues to find gains, but they have not made up the lost ground that occurred from the 1970s to 1980s (Holzer and Offner (2001) and Milanovich (2002)).

[3] Thorbecke also provides a narrative of how the disinflationary monetary of policy in 1974 and the Volcker disinflation from 1979 to 1982 had a greater cost to African Americans. In an unpublished study, Carpenter (2000) compares African American and African American youth unemployment to aggregate U.S. unemployment and finds that contractionary policy increases the unemployment rates more than the national jobless rate.

[4] It is well known among labor economists that an individual's probability of employment or in the aggregate, the economy's employment-population ratio depends on the product of the labor force participation rate and one minus the unemployment rate. The employment-population ratio can be written as:

$$\frac{E}{P} = \frac{LF}{P} \times (1 - UR)$$

where E denotes employment, P denotes the civilian population, LF denotes the labor force (E + U), and UR denotes the unemployment rate.

[5] See Christiano et al (1999) for an excellent discussion of VARs.

[6] Several well-known studies that use the recursive method include Bernanke and Blinder (1992), Sims (1992), Christiano and Eichenbaum (1992), Eichenbaum and Evans (1995), Grilli and Roubini (1995), Armour, Engert, and Fung (1996), Cushman and Zha (1997) and Christiano, Eichenbaum and Evans (1998).

[7] Bernanke and Blinder (1992) show that the Federal Reserve's supply curve for nonborrowed reserves is perfectly elastic at the Fed's funds rate target. Christiano et al. demonstrate that an increase in the funds rate is related to a statistically significant decline in holdings of the Federal Reserve's nonborrowed reserves and M1. Friedman and Kuttner find that the funds rate moves in the predicted direction if the Fed were using it as a policy instrument. In response to news about higher inflation, it increases. In response to information about a larger unemployment gap, the funds rate falls. Carpenter (2000) argues for the Federal Funds Rate use because even though it was not the Fed's main instrument from 1979 to 1982, it was the key instrument over the period of analysis. Even if the reserves were targeted, the Board did not ignore the Federal Funds rate.

[8] The importance of industrial production and the CPI-U is well known. It may not be well known that the Commodity Research Board spot price is a component of the Bureau of Economic Analysis' index of leading indicators. Total reserves and nonborrowed reserves are both included. Christiano et al. show that these two variables have different responses to an increase in the Federal Funds Rate. Nonborrowed reserves experience a persistent drop, consistent with the existence of a liquidity effect. The drop in total reserves is initially quite small. However, over the simulated time horizon of the impulse response function, total reserves fall. The Federal Reserve protects short-run reserves by increasing borrowed reserves.

[9] The employment-population ratio is defined as the share of the civilian population that is employed. The labor force participation rate is the share of the civilian population that is either employed or actively searching for a job. The unemployment rate is the share of the labor force (employed plus unemployed) that this actively searching for a job.

[10] The MacKinnon approximate p-values were 0.24 and 0.33.

[11] First-differencing these two series causes their correlation to drop from 0.99 to 0.76.

[12] The MacKinnon approximate p-values for the African American and Hispanic employment-population ratios are 0.28 and 0.27. The p-value for the African American –white difference is 0.04 and the Hispanic –white difference is 0.00. The p-value for the African American unemployment rate is 0.14, but the p-value for the racial difference is 0.06.

The p-value for the Hispanic labor force participation rate is 0.17. The ethnic difference's p-value is 0.00.

[13] Although not on the scale of September 11th, Bagliano and Favero (1998) find evidence of large residuals in 1984 when sudden borrowing increased by Continental Illinois.

[14] Immediately after September 11th, the Federal Reserve Board to a variety of actions that led to unexplainable (large residuals) movements in reserves. Following the terrorist attacks on September 11, 2001, the Committee established or enlarged reciprocal currency (swap) arrangements with the European Central Bank, the Bank of Canada, and the Bank of England. The purpose of these arrangements was to facilitate the functioning of U.S. financial markets by providing as necessary through the foreign central banks the liquidity in dollars needed by European, Canadian, and British banks whose U.S. operations had been disrupted by the disturbances in the United States. On September 17, 2001, the Committee members voted unanimously to ease reserve conditions appreciably further, consistent with a reduction in the federal funds rate of 50 basis points to a level of 3 percent. In conjunction with these policy moves, the Federal Reserve would continue to supply, as needed, an atypically large volume of liquidity to the financial system. As a consequence, the Committee recognized that the federal funds rate might fall below its target on occasion until more normal conditions were restored in the functioning of the financial system (FOMC Transcripts for September 17th, 2001).

[15] Excluding the post September 11, 2001 segment of the time series has no impact on the standard deviations. They range from 1.23 to 1.26.

[16] The VARs and impulse response functions are estimated using STATA Version 8.0. An earlier version reported confidence intervals based on the VARs asymptotic standard errors. The confidence intervals reported in this version are based on standard errors constructed from bootstrapped samples of 500. In most cases, the standard errors yield smaller confidence intervals. See Lutkepohl (1993, Section 3.7) for a discussion of the standard errors and STATA version 8.0 for a detailed description of the bootstrapping program.

[17] These estimates were generated from the same VARs and impulse response functions in Figures 1-4, but the unemployment rate of a particular demographic group is placed in the model and not the racial or ethnic difference. The detailed estimates are available from the author upon request.

[18] For example, Romer and Romer (1994a) provide evidence that during the early 1960s and early to mid-1990s, economic growth would have been lower in the absence of expansionary monetary and fiscal policy. Further, Bernanke (1990) asserts that the Federal Reserve's responses to the 1987 stock market crash prevented a major financial market crisis and subsequent real decline in GDP.

[19] At the 48th lag, the estimates were -0.764 and 2.044.