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Abstract

During the economic expansion of the 1990s, the United States enjoyed both low inflation rates and low levels of unemployment. Juhn, Murphy, and Topel (2002) point out that the low unemployment rates for men in the 1990s were accompanied by historically high rates of non-employment suggesting that the 1990s economy was not as strong as the unemployment rate might indicate. We include women in the analysis and examine whether the Phillips curve relationships between real compensation growth, changes in inflation, and labor market slackness are the same for men and women and whether measures of "non-employment" better capture underlying economic activity, as suggested by Juhn, Murphy, and Topel's analysis. From 1965 to 2002 the increase in women's labor force participation more than offsets the decline for men, and low unemployment rates in the 1990s were accompanied by historically low overall non-employment rates. We find that women's measures of labor market slackness do as well as men's in explaining real compensation growth and changes in inflation after 1983. We also find some evidence that non-employment rates are more closely related to changes in inflation than other measures of labor market slackness; however, we do not find the same for real compensation growth.

I. Introduction

During the economic expansion of the 1990s, the United States enjoyed both low inflation rates and low levels of unemployment. These facts have led some observers (for example, Stiglitz 1997 and Staiger, Stock and Watson 2001) to question whether the structure of the economy has changed, permanently lowering the natural rate of unemployment or the Non-Accelerating Inflation Rate of Unemployment (NAIRU).

Against this backdrop, Juhn, Murphy, and Topel (2002) examine men's unemployment, labor force participation, and non-employment. In the 1990s, the non-employment rate (the fraction of weeks per year spent not working) was at a historic high compared to earlier periods of low unemployment. They conclude that although the 1990s saw very low unemployment rates for men, men shifting from unemployment to non-participation could, in part, explain these low rates. Under these circumstances, they suggested that one need not rethink the NAIRU. Instead, it may merely be that men were re-labeling their activity from unemployment to non-participation. Thus, a given low unemployment rate in the 1990s did not necessarily represent the same high level of underlying economic activity as the same unemployment rate in earlier periods. As such, declines in the unemployment rate in the 1990s did not put upward pressure on prices, leading to an extended period of both low unemployment rates and low inflation.

The Juhn, Murphy, and Topel analysis explicitly focuses on men. In this paper, we ask whether one would reach the same conclusion including women in the analysis, *i.e.*, that the low unemployment rate in the 1990s did not represent as much underlying economic activity as similar unemployment rates in earlier time periods. Second, we directly examine whether the Phillips curve relationships between real compensation

growth, changes in inflation, and labor market slackness are the same for men and women. It may be the case that men's unemployment rate, for example, puts a different amount of pressure on wages than women's unemployment rate. Additionally, we examine Juhn, Murphy, and Topel's suggestion that measures of "non-employment" may better capture underlying economic activity, and thus may be more closely tied to real compensation growth and changes in inflation.

Once women are included in the analysis, the 1990s again appear to be a period of robust economic activity, even when considering changes in labor force participation rates. Over the 1990s, women's increased labor force participation more than offsets men's decreased labor force participation. Thus, low unemployment rates were accompanied by historically low rates of non-employment. Although Phillips curve type analyses over the entire 1965-2002 period suggest that women's measures of labor market slackness are less closely related to real wage growth and changes in inflation than men's measures, these results mask stark differences over time. Splitting the sample in two, we find that women's measures of labor market slackness do as well as men's in explaining real compensation growth and change in inflation after 1983.

In section II of the paper we follow Juhn, Murphy, and Topel (2002) in analyzing labor force status, but construct the measures using both men and women. Next, we present results from Phillips curve estimates using separate measure of labor market slackness for men and women, as well as allowing the relationships to change over time. In the final section we summarize and discuss our results.

II. Labor Force Status of Men and Women

A. Data

Following Juhn, Murphy, and Topel (2002), we use the March Current Population Surveys (CPS) from 1979 to 2001 to examine changes in weeks worked over time.[1] In particular, we use survey questions about labor market status that refer to the previous year. We exclude people who may not have worked because of school or military service and those living in group-quarters. Juhn, Murphy, and Topel (2002) also limit their sample to men with 1 to 30 years of potential experience. Because we want to examine outcomes for women as well, and since potential experience may be a noisier measure of true labor market experience for women due to time out of the labor force for child-rearing, we limit our sample based on reported age rather than potential experience. When we limit the sample to younger individuals (aged 18-55), the results for men are nearly identical to those for the Juhn, Murphy, and Topel (2002) sample of men with 1 to 30 years of potential experience. In other cases, we examine individuals aged 18 and over.

Again following Juhn, Murphy, and Topel, we define the number of weeks of non-employment as 52 minus the number of weeks the individual reports working in the previous year. This measure combines weeks unemployed and weeks out of the labor force. The number of weeks of nonparticipation is defined as 52 minus the number of weeks worked last year and the number of weeks spent looking for work or on layoff. Weeks unemployed is defined as the number of weeks looking for work or on layoff.[2] We examine the percent of the year spent unemployed, out of the labor force, or

[1] We use the CPS data available through Unecon.

[2] In the CPS, weeks looking for work or on layoff applies to part-year workers. There is a separate question about weeks looking for work for nonworkers. Weeks not in the labor force is defined as 52

nonemployed. Here, percent of the year is just 100 times the number of weeks spent in a given state, divided by 52.

B. Results

In Figure 1a we present data on the percent of the year spent in unemployment, out of the labor force (not participating), or non-employment for men aged 18-55 from 1978 to 2000. Despite the fact that we use age to define our sample and Juhn, Murphy and Topel (2002) use potential experience, Figure 1a reproduces the basic results shown in their Figure 3. As expected, unemployment and non-employment rise during cyclical downturns and fall during booms. As Juhn, Murphy and Topel (2002) note, however, nonparticipation among prime-aged men is rising over this period. As a result, non-employment remains relatively high during the 1990s, even as unemployment falls to the lowest levels in the period shown.

Juhn, Murphy and Topel make the point that the 1990s did not represent a particularly robust labor market for men, especially for low-skilled men. They outline several potential reasons for this. Changes in labor demand may have led to deterioration of the labor market for low-skilled men, consistent with rising wage inequality over this period. In addition, changes in eligibility rules for disability insurance in 1984 may have allowed some men who were not previously eligible to withdraw from the labor market and collect disability insurance. Autor and Duggan (2003) point out disability payments are calculated in such a way that rising wage inequality increases the relative value of disability payments for low skilled men. This, in turn, may have increased the take-up

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minus weeks worked last year, minus the applicable variable for weeks spent looking for employment for part-year and non-workers.

rate of disability benefits. Thus, from the demand side, firms may have wanted to hire fewer low-skilled men. From the supply side, disability insurance may have become relatively more attractive to low-skilled men with health challenges leading some of them to withdraw from the labor force. In either case, the low unemployment rates for men in the 1990s would to some extent represent a re-labeling of activity from unemployment to non-participation rather than a change in economic activity.

Katz and Krueger (1999) make a related point about increasing incarceration rates over this period. The Current Population Surveys only canvas the non-institutionalized population. If incarceration is increasing, particularly among people who would likely have high unemployment rates, then it may not be surprising that measured unemployment rates among the non-institutionalized population declined over this period. Similarly, we show below that over the period we study, low-skilled men are decreasing their labor force participation, while higher-skilled women are increasing theirs. In all of these cases, the low-skilled, who may have higher frictional rates of unemployment due to search costs or matching problems, are removed from the labor force. If this trend characterizes the 1990s, then it is perhaps not surprising that the economy could sustain low rates of unemployment without rising inflation.

One of the reasons we care about whether the low unemployment rate in the 1990s really represents a robust labor market is because of the importance of the relationships between unemployment, wages, and inflation for policy decisions. But typically, policy makers do not look at the unemployment rate for a just single group, such as prime-aged men. Thus, it is worth asking what unemployment, nonparticipation,

and non-employment looked like for women and for the adult population overall during this period.

Figure 1b repeats the exercise above for women aged 18 to 55. The bottom line shows the percent of the year spent in unemployment. As for men during this period, unemployment is at its lowest level in the late 1990s. Unlike the measures for men, however, the percent of the year spent out of the labor force and the percent of the year spent in non-employment both decline throughout the period.

Figure 2 shows these measures for the entire adult population, aged 18 and over. Again, we clearly see that the percent of the year spent in unemployment is at its lowest levels during the late 1990s. Taking men and women of all ages together, the increase in women's labor force participation more than offsets the decline in men's labor force participation, resulting in an overall decline in nonparticipation over the period. As a result, the overall non-employment measure reaches historically low levels in the 1990s. This would again lead one to question why the 1990s saw such robust labor market activity coupled with little upward pressure on prices.

One might hypothesize that women and older people put less pressure on wage growth than prime-aged males because on average they tend to work fewer hours in a given week of employment. Thus, a given number of weeks worked represents different amounts of underlying labor market activity for different groups. In order to consider the differences in usual hours worked per week, we create a full-time-equivalent (FTE) measure of non-employment. Here, we weight the number of weeks worked by the number of hours typically worked in a given week, divided by 40. The FTE percent of year in non-employment tracks our original measure of percent of year in non-

employment quite closely. Toward the beginning of the period, FTE non-employment is somewhat higher than regular non-employment. By the end of the period, their relative positions are reversed. Using the FTE measure of percent of year in non-employment, one would still conclude that there has been a decline in the percent of year in non-employment over the 1990s.

These overall measures of labor market activity lead us to believe that the labor market of the 1990s was quite robust. Thus, one might again ask why there was not more upward pressure on prices. However, men and women's labor market activity measures may have fundamentally different relationships with wage and price changes if women and men put different pressures on wages, either because they work in different occupations, or because their wages are set by different processes. We examine this question in the next section.

III. Phillips Curve Type Analyses

A. Macroeconometric Model

Following Blanchard and Katz (1997), there are three simple equations, which macroeconometric models of the U.S. economy use to summarize the joint behavior of wage inflation, price inflation, and unemployment. Changes in prices are related to changes in wages as in equation (1), where p and w are the natural logarithms of the price index and nominal wages, respectively. Similarly, changes in the logarithm of wages are related to the unemployment rate as in equation (2), where u is the unemployment rate. Here, α_p and α_w are constants, and ε_{pt} and ε_{wt} are error terms.

(1) $\Delta p_t = \alpha_p + \Delta w_t + \varepsilon_{pt}$

(2) $\Delta w_t = \alpha_w + \Delta p_{t-1} + \beta u_t + \varepsilon_{wt}$

Combining equations 1 and 2, we get the standard Phillips curve formulation.

(3) $\Delta p_t = \alpha + \Delta p_{t-1} + \beta u_t + \varepsilon_t$

In our estimation, we focus on versions of equations (2) and (3) and examine the effects of changes in measures of labor market slackness on real compensation growth and changes in inflation. Specifically, we estimate:

(2a) $\Delta w_t - \Delta p_{t-1} = \alpha_w + \beta u_t + \varepsilon_{wt}$ and

(3a) $\Delta p_t - \Delta p_{t-1} = \alpha + \beta u_t + \varepsilon_t$

additionally allowing for lags of the dependent and right-hand-side variables in the estimation. The exact lag structure is explained in detail below.

B. Data Section

Following Aaronson and Sullivan (2000), we use both different measures of wage growth and different measures of labor market slackness in estimating the relationship between labor market status and compensation growth.

We use two measures of compensation[3]: Average Hourly Earnings from the Bureau of Labor Statistics (BLS) Current Employment Statistics and Hourly Compensation from the BLS Productivity and Costs Report. Average Hourly Earnings and Hourly Compensation are both available from 1964 through 2002.[4] Each of these compensation measures has somewhat different coverage. Average Hourly Earnings is

[3] Aaronson and Sullivan also consider compensation growth as measured by the Employer Cost Index (ECI). We do not consider the ECI here because it is not available before 1982.

based on data from the Payroll Survey and is calculated for production and non-supervisory employees on private non-farm payrolls (approximately 80% of total employment on private, non-farm payrolls). Because Average Hourly Earnings is based on a survey of employers, it does not cover the self-employed or unpaid family workers. In addition, Average Hourly Earnings does not include benefits such as health insurance. However, it does include overtime pay.

Hourly Compensation is also based on the Current Employment Statistics, so we would expect a certain amount of similarity between the two series. However, the Hourly Compensation measure also incorporates data from other sources, giving it wider coverage than Average Hourly Earnings. Hourly Compensation is calculated for the non-farm business sector, and includes estimates of earnings for the self-employed and unpaid family labor. Similar to Average Hourly Earnings, Hourly Compensation includes overtime compensation. However it also includes benefits. Additionally, whereas Average Hourly Earnings covers only the private sector, Hourly Compensation includes the public sector as well. Finally, Average Hourly Earnings are reported on a monthly basis while Hourly Compensation is reported quarterly.

We also estimate Phillips curve relationships represented by equation (3a) using change in inflation as measured by the Personal Consumption Expenditure Chain-Type Price Index (PCE). Throughout, all variables are averaged over the year to create annual data, and the compensation measures are inflation-adjusted using the lagged value of the PCE.

[4] Hourly Compensation is available from 1947 to the present, but we only use data from 1964 on to match data availability for Average Hourly Earnings.

We consider three measures of labor market slackness: the civilian unemployment rate for those 16 years and older, the civilian unemployment rate for those 25-55 years of age, and the non-employment rate (one minus the civilian employment-to-population ratio, multiplied by 100) for persons 16 years and older. For each measure of labor market slackness we use the measure for the overall population, men, and women. For each combination of compensation growth or change in inflation and labor market slackness, we estimate Phillips curve relationships.

The measures of labor market slackness used in this section are based on survey responses about activity in the previous week, unlike the measures in the previous section, which were based on weeks spent in various labor market activities during the previous year. Before turning to our Phillips curve type analyses, we verify that both measures of labor market status give us similar information about aggregate changes in men's, women's, and overall labor market activity. Figure 3a and 3b are comparable to Figures 1a and 1b, but use persons aged 16 and over. As in the earlier figures, we see that men's non-participation is rising over the period, hitting a new high in the late 1990s. At the same time, women's non-participation is falling fairly steadily. Figure 4 displays the statistics for men and women combined, including all years available for these measures. Vertical lines mark the 1978-2000 period used in the analysis above. Again, for the labor market as a whole, the unemployment rate is low, and non-employment and nonparticipation reach historical lows by the late 1990s.

C. Results

Table 1 presents summary statistics for changes in inflation, real wage growth, and our measures of labor market slackness. We graph compensation growth and inflation in Figure 5, overall measures of labor market slackness in Figure 6a, unemployment measures in Figure 6b, and non-employment measures in Figures 7a and 7b. Many researchers speculate that there have been changes in these relationships over time, thus in we present summary statistics for two time periods: 1965-1983 and 1984-2002. Below we describe the reasons for splitting the sample in this way in more detail.

Figures 5, 6a, and 6b confirm well-known facts about the U.S. economy. Inflation and unemployment have both been lower in more recent years. Real compensation growth has also been somewhat lower in the second half of the data, although growth rates were generally rising over the 1990s.[5] Unemployment is lower among prime-age individuals than among all individuals. Looking at Figure 6b, women are more likely to be unemployed than men; however, since 1983 the levels of unemployment for men and women and prime-aged men and women are much closer together. Finally, in Figure 7a we can see that women are more likely to be non-employed than men, but over the entire period, women's non-employment fell dramatically, while men's rose slightly. Because of the strong secular trend in men and women's labor force participation, when we turn to estimating real compensation growth and changes in inflation, we detrend the measures of non-employment. See Figure 7b.

[5] Note that Hourly Compensation has grown faster in both periods than has Average Hourly Earnings. This may be because Hourly Compensation includes benefits, and based on information from the Employer Cost Index the benefits component of compensation has been growing more quickly than the wage component in

Each non-employment series is detrended by subtracting off its Hodrick-Prescott filter trend component.[6]

Table 2 presents the results of our Phillips curve type analyses over the entire 1965-2002 period. As mentioned above and discussed in more detail below, there are many reasons to believe that these relationships have changed over time; however, we present results from the overall period for completeness and turn to estimates by separate time periods in the next section.

Columns 1 and 2 report results for our two measures of real compensation growth; column 3 presents results for the change in inflation. In each case, we include the optimal lag structure indicated by appropriate information criteria tests.[7] Hourly Compensation growth estimates include one lag of the dependent variable and the contemporaneous measure for labor market slackness. The Average Hourly Earnings growth estimates include one lag of the dependent variable, the contemporaneous measure of labor market slackness, and, depending on the given measure, between one and four additional lags of the measure of labor market slackness.[8] The change-in-inflation estimates include two lags of the dependent variable, and the contemporaneous measure of labor market slackness. In all cases, we cannot reject the null hypothesis of

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most years since the ECI began. However, the measures are also different in their coverage, so it is difficult to pin down the precise source of their difference.

[6] Following Ravn and Uhlig (2002) we set the smoothing parameter equal to 6 because we are using annual data.

[7] First we used Schwartz's Bayesian Information Criterion to choose the optimal number of lags of the dependent variable to include in each specification. Using the optimal dependent variable lag length as determined above, we then estimated a series of regressions allowing for current and 0 to 4 lags of each measure of labor market slackness and calculate the Bayesian Information Criterion (T*ln(RSS) + k*ln(T) where T is the number of observations, k is the number of parameters estimated, and RSS is the residual sum of squares) to choose the optimal lags of the measures of labor market slackness.

[8] Specifically, the BIC selects one lag of overall unemployment, 3 lags of men's and women's unemployment, 4 lags of prime age unemployment, 1 lag of men's prime age unemployment, 3 lags of women's prime age unemployment, and 1 lag of overall, men's, and women's detrended non-employment.

no autocorrelation. That said, we use Newey-West standard error estimates allowing for up to fourth-order autocorrelation.

Each group of results in the table summarizes one set of estimates. We report the adjusted R-squared, which allows us to assess which measure of labor market slackness explains the most variation in a given dependent variable. The implied "zero growth" rate is analogous to the "non-accelerating inflation rate of unemployment" or NAIRU. In the first two columns, it is the rate of labor market slackness consistent with zero real wage growth. In the third column, it is the rate of labor market slackness consistent with no change in the rate of inflation.[9] For detrended non-employment we have added back the average of the HP-filter trend component in order to consider the levels of non-employment associated with zero compensation growth and no acceleration in inflation. Next, we report the p-value for the F-statistic on the joint significance of the measures of labor market slackness followed by the p-value for the chi-squared statistic for the null hypothesis of no first-order autocorrelation.[10]

Consider the results for the overall unemployment rate in table 2. The first row reveals a pattern that is consistent throughout the table. The fraction of the variation in the dependent variable that is explained by the model is highest for real Average Hourly Earnings growth, next highest for real Hourly Compensation growth, and lowest for changes in inflation. Despite the differences in their definitions and coverage, the two measures of real compensation growth yield similar estimates for the rate of unemployment that is consistent with no growth in real compensation. The implied zero

[9] This is calculated from the regression results as the negative of the constant divided by the sum of the coefficients on the relevant measures of labor market slackness (Staiger, Stock, and Watson 1997).
[10] This is calculated using "Durbin's alternative test" because most estimates include a lagged dependent variable.

growth rate of unemployment is 7.7 percent for real Hourly Compensation growth and 6.7 percent for Average Hourly Earnings growth.

The implication of the Phillips curve econometric model is that lower unemployment increases inflation through wage growth, because in response to wage pressures, producers increase prices. Thus, one would expect that accelerating inflation would require that the unemployment rate be low enough to create real wage growth. The implied levels of labor market slackness associated with zero growth in inflation are consistent with this idea. In all cases, the estimate is below the implied level associated with zero growth in real compensation, meaning that unemployment has to be low enough to affect real compensation growth before it triggers inflation acceleration.[11]

The main point of this analysis is to compare the explanatory power of different measures of labor market slackness for both the overall population and men and women separately. First compare explanatory power across different overall measures of labor market slackness for real Hourly Compensation growth. Looking down column 1 at the first set of entries for each measure, we see that the prime-age unemployment rate explains the most variation in real Hourly Compensation growth (58 percent), with the overall unemployment rate explaining the second largest percentage (52 percent), and non-employment explaining the least (38 percent). This is also the case for the Average Hourly Earnings growth. These results suggest, perhaps not surprisingly, that what matters for compensation growth is the labor market tightness for those whom we think are most attached to the labor market. For estimates of the change in inflation, the results

[11] Alternatively, one could calculate the level of unemployment consistent with compensation growth equal to labor productivity growth. Over the analysis period, productivity growth averages 1.96 percent per year. This raises the level of unemployment further above the level associated with no acceleration in inflation. The same is true for prime-age unemployment rates.

are different in that the overall non-employment rate explains the most variation (48 percent). Prime age unemployment explains about 40 percent of the variation, and overall unemployment explains about 35 percent.

These results provide no evidence that overall non-employment explains real compensation growth better than measures of overall unemployment. However, this is not entirely consistent with what we might expect given the secular trends in labor force participation. If, over time, people are more or less inclined to label themselves as out of the labor force rather than unemployed, the non-employment rate should be a more consistent measure of labor market activity. Thus, we would expect that non-employment might be more closely associated with changes in compensation growth than measures of unemployment.[12] Below, we evaluate whether this might be true for men more than women and whether these relationships are changing over time.

Next, consider differences in men's and women's measures of labor market slackness in explaining changes in wages and prices. Recall that our analysis above shows that once women's labor market participation is taken into consideration, the 1990s again appear to be a period of remarkably robust labor market activity combined with low inflation. Juhn, Murphy, and Topel's interpretation that one need not rethink the 1990s implications for the natural rate of unemployment was based solely on the labor market outcomes for men. Since women's increased labor market participation more than offsets men's decreased labor market participation, the question of why the United States was able to maintain such low unemployment and inflation during the

[12] Additionally, we find the somewhat inconsistent result that the levels of non-employment associated with zero Hourly Compensation growth are below those associated with no acceleration in inflation. That said, levels of non-employment associated with compensation growth rates equal to average growth in labor productivity exceed those associated with no inflation acceleration.

1990s is germane. One possible explanation is that women's labor market slackness puts a different amount of downward pressure on wages and prices than does men's. For example, a one percentage point decrease in men's unemployment might have a different impact on wage growth than a one percentage point decrease in women's unemployment. There are many different models of the labor market that could generate such differences. Consider, for example, a segmented labor market where men and women do not compete for the same jobs. Alternatively, a model where men and women have very different reservation wages, perhaps because of differences in the value of their home production activities, could yield differences in the effect of men's and women's measures of labor market slackness on real compensation growth and changes in inflation. Also, provocative new evidence suggests that women are less likely to bargain for higher wages than are men, perhaps suggesting that their labor market activities put less upward pressure on wages, and thus prices (See Babcock and Leschever (2003)). An exhaustive assessment of the validity of these hypotheses is beyond the scope of this paper, but it is worth keeping in mind that there are many potential reasons that measures of labor market slackness for men and women might have different macroeconomic implications. It is an empirical question whether or not this is the case.

We now turn to an assessment of whether men's and women's measures of labor market slackness differentially explain measures of real compensation growth and changes in inflation. Looking down the R-squared statistics in the first column, men's measures of labor market slackness explain a greater share of the variation in real Hourly Compensation growth than women's measures of labor market slackness. The specification using men's overall unemployment rate explains about 58 percent of the

variation in real Hourly Compensation growth while the specification using women's overall unemployment rate only explains about 39 percent of the variation. The comparisons between men's and women's measures are similar for the specifications using prime-age unemployment (although the adjusted R-squared increases more for women's prime age unemployment than for men's).

Estimates for Average Hourly Earnings growth are somewhat different. In the case of overall unemployment, the women's measure explains only slightly less of the variation in the left-hand-side variable than the men's. For prime-age unemployment, the women's measure does a bit better. In fact, overall men's unemployment explains more of the variation in real Average Hourly Earnings growth than men's prime-age unemployment rate. Differences in coverage may account for some of the difference in the results for men and women between Average Hourly Earnings and Hourly Compensation. For example, since women are less likely to be supervisors than men and Average Hourly Earnings covers only non-supervisory workers, changes in Average Hourly Earnings growth rates may more closely reflect changes in women's compensation than the Hourly Compensation measure.

Next, consider the models that include the detrended non-employment rate as the measure of labor market slackness. Again, for both real Hourly Compensation growth and real Average Hourly Earnings growth, the men's measure of labor market slackness has greater explanatory power than the women's measure of labor market slackness. The men's detrended non-employment rate explains 40 percent of the variation in the growth of real Hourly Compensation and 74 percent of the variation in the growth of real Average Hourly Earnings. Women's detrended non-employment explains 34 percent of

the variation in real Hourly Compensation growth and 64 percent of the variation in real Average Hourly Earnings growth.

The results for changes in the inflation rate are similar to the previous results in showing that men's measures of labor market slackness explain a larger share of the variation in the dependent variable than women's measures of labor market slackness. What is particularly striking, however, is that the specification using men's non-employment rate explains more of the variation in changes in inflation (49 percent) than either the overall men's unemployment rate or the men's prime-age unemployment rate. In contrast, for the cases of real Hourly Compensation growth and real Average Hourly Earnings growth, corresponding measures of unemployment and prime-age unemployment explain more of the variation in the dependent variable than the non-employment rates.

In sum, there is fairly consistent evidence that men's measures of labor market slackness have more explanatory power in real compensation growth and changes in inflation than do women's measures of labor market slackness. Of all the measures, men's prime age unemployment explains the highest share of the variation in Hourly Compensation growth and men's detrended non-employment explains the highest share of changes in inflation. These results have several implications. First, if women's labor force activities are less relevant for changes in compensation and prices than are men's, Juhn, Murphy, and Topel's conclusions, which are based solely on men's labor force activities, may be right. In other words, the low unemployment and inflation that characterized the U.S. economy in the 1990s labor market need not lead one to question whether the natural rate has fallen. Second, there is some support for Juhn, Murphy, and

Topel's implication that non-employment is a more relevant labor market statistic to consider than (self-defined) measures of unemployment -- at least when considering changes in inflation. That said, it is somewhat surprising that non-employment does not also explain the largest share of the variation in real compensation growth given the channel through which measures of labor market slackness are expected to affect inflation.

Changes Over Time

The results above suggest that, in general, men's measures of labor market slackness are more closely related to growth in real compensation and changes in inflation than women's measures of labor market slackness. However, we know that women's labor market participation changed markedly over the years in our sample. Therefore, we now investigate whether the relationships between changes in inflation and real compensation growth and measures of men's and women's labor market slackness have changed as women's labor market participation increased. In other words, as women's labor market behavior was becoming more similar to men's, did their measures of labor market slackness begin to look the same in macroeconometric models?

Before examining Phillips curve estimates over different time periods, we first consider changes in men and women's labor force participation since 1964, in order to understand when one might expect to see a change in the effect of women's measures of labor market slackness. Figure 8a shows labor force participation rates by 5 education groups for men aged 25 years and over. We focus here on those 25 years and older to capture participation decision among individuals who are more likely to have completed

their formal education. Figures 8b and 9 show analogous numbers for women and the overall population, respectively.

Labor force participation declined for all men between 1964 and 2002, but there were large differences by education group.[13] Declines were steepest for those with less than a high school diploma. However, in the late 1990s, the decline in the participation rate among those men with only elementary education began to reverse, and by 2002, their participation rates were comparable to those of similarly educated men in 1979. For women, we see a very different picture. Participation rates were fairly flat for women with less than a high school diploma. For women with a high school diploma or more education, participation rates rose over this period. Combining women and men, we see that labor force participation declined among the lowest education groups, was relatively flat for those with a high school diploma, and increased among those with some college or a college degree. Over the period, low-skilled men were replaced in the labor force by relatively high-skilled women. As mentioned above, if higher skilled workers have lower frictional unemployment because they are easier to match to jobs or have lower search costs, this change could be another reason that the "natural" rate of unemployment appeared to be lower later in the period.

If in the later time period, women's labor force behavior is more similar to men's, then their labor market slackness measures maybe more closely tied to measures of real compensation growth and changes in inflation. Additionally, as women's labor force participation increased, the civilian labor force became increasing female. In 1965, 35

[13] The decline in men's labor force participation does not simply represent changes in retirement behavior. For men 25 to 54 years of age, the labor force participation rate declined from an average of 97 percent in 1964 to 91 percent in 2002. Over the same period, women's labor force participation increased from 45 to 76 percent. Authors' calculations based on monthly participation rates by age and sex from the BLS.

percent of the civilian labor force was comprised of women while by 2002, 47 percent of the labor force was female.[14] Mechanically, this means that women will also make up a larger share of the data on compensation. Thus, it might not be surprising to find closer relationships between women's measures of labor market slackness and real compensation growth in later years.

In figure 8b it appears that there is a change in women's labor force participation trends in the mid- to late-1980s. More highly educated women are increasing their labor force participation at a fairly steep rate until roughly the middle of the analysis period. In the latter part of the period, women's labor force participation rates flatten out. Additionally, as shown in figure 6b, men's and women's unemployment rates are more similar since the mid-1980s. From 1964 to 1983 women's rates of unemployment were nearly 1.5 percentage points higher than men's unemployment rates. Over the remainder of the period, women's unemployment rates averaged 0.1 percentage points below and 0.1 percentage points above men's rates for overall and prime-age unemployment, respectively.

In order to more formally establish a dividing year for our analysis, we tested for a structural break in women's labor force participation, using a sup Wald test (Cooper, Braga, Kennedy, and Piehl 2003).[15] We find evidence of a structural break in 1984, and thus we separate our sample in to two periods, 1965-1983, and 1984-2002.

[14] Based on authors' calculations from aggregate CPS data available from the BLS.

[15] First, we tested and rejected that women's labor force participation follows a random walk, using the Dickey-Fuller test. Next, we formed the sup Wald test by running separate regressions allowing the "post" period to be defined as starting with a different year in each regression (with the restriction that there are always at least 5 percent of the observations in either the pre or post periods). The largest F-statistic for the "post" dummy, measured against the appropriate critical values, indicates where the structural break occurs. Note that Monte Carlo simulations examining where this test would pick a structural break if women's labor force participation followed a straight time trend, place the break earlier in the period. See

Serendipitously, 1984 is also when eligibility rules for disability insurance were changed, which many observers associate with the decline in low-skilled men's labor force participation.[16]

Table 3 presents the results for the Phillips curve estimation with the sample split into two periods. Period one covers the 18 years from 1965 to 1983. Period two covers the 19 years from 1984 to 2002. For the estimates shown, we allow each specification to have a different lag structure, based on information criteria as described for the table 2 analysis. At the top of each column, we report which lags of the dependent variable are included in each specification. At the top of each group of reported results, we report the lags of the labor market slackness measure included in that estimation. In all cases, the contemporaneous measure of labor market slackness is also included. We have also run the regressions restricting the lag structure to be the same within each column.[17] The results are broadly similar.

Using a full set of interactions, we test, and reject, that the coefficients are equal in the two periods for all cases but do not report the results in this table.[18] Instead, we report the p-value for the F-test of whether the coefficients on the labor market slackness variables are jointly equal across the time periods. For real Hourly Compensation growth, we reject that the coefficients are equal on each of the overall measures of labor

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Cooper, et al. (2003) for more details. For men, we could not reject a unit root in labor force participation, which invalidates the sup Wald test for them.

[16] Other researchers have also noted important changes in the economy before and after 1984. Atkeson and Ohanian (2001) state that the business cycle, monetary policy, and inflation all are less volatile since 1984 than in the previous 15 years.

[17] In this case, we set the dependent variable lags equal to the maximum lag length selected by the BIC for that dependent variable in that particular time period. Similarly, we set the number of lags of the measure of labor market slackness equal to the maximum number of lags chosen for that labor market slackness type (unemployment, prime-age unemployment, or non-employment) within period. The results are available from the authors on request.

[18] These results are available from the authors on request.

market slackness. We can also reject joint equality for men's overall and prime-age unemployment rates as well as the detrended non-employment rate of women. Rejecting equality across the time periods for men's measures of unemployment and failing to reject equality across the periods for men's non-employment is concordant with the idea that non-employment is a consistent measure of men's labor market activity while unemployment rates are subject to changes in whether men define themselves as unemployed or out of the labor force. However, this pattern fails to hold up when looking at real Average Hourly Earnings growth or changes in inflation. In contrast, we reject equality of coefficients across periods on all labor market slackness measures when we look at real Average Hourly Earnings growth. For changes in the rate of inflation, we only reject the null hypothesis of equality of coefficients for women's overall and prime-age unemployment rates, failing to reject coefficient equality over time for all male measures of labor market slackness.

The additional results reported for each specification are defined as in the previous table. First consider estimates using Hourly Compensation growth. In period 1, the specifications using men's measures of labor market slackness explain more of the variation in the left-hand-side measure than do specifications that use women's measures. In period 2, this has reversed for both overall unemployment and for non-employment rates. For prime age unemployment the adjusted R-squareds are very close (0.536 for men's prime age unemployment and 0.523 for women's). For Average Hourly Earnings growth, men's and women's unemployment rates explain about the same fraction of the variation in both period 1 and 2. However, in the specifications that include detrended non-employment, the women's measure does worse than the men's in period 1 and the

about the same as the men's in period 2. The estimates using changes in inflation as the dependent variables show a similar pattern. Men's measures of unemployment explain somewhat more of the variation in changes in inflation than do women's in the earlier period. In the second period, each of the women's measures explains more variation than the men's.

Table 3 also has interesting implications for whether men's non-employment is a more consistent measure of labor market activity than unemployment measures. If this is the case, we would expect the men's rate of non-employment to explain more of the variation in real compensation growth and changes in inflation than men's measures of unemployment, particularly in the most recent period. While in general this is not the case, we do see this pattern in the inflation specifications. Indeed, in both periods, and for the overall, men's, and women's versions of the measures, detrended non-employment explains more of the variation in changes in inflation than do other measures of labor market slackness. Again, this result calls into question the precise mechanism through which real wage growth gets translated into changes in inflation. However, it also suggests that Juhn, Murphy, and Topel's insight that we should focus on non-employment rather than simply unemployment rates is important for changes in inflation.

In sum, the results in this section suggest that in the earlier period, women's labor market activities were less closely related to real compensation growth and changes in inflation than were men's. However, in the second period, when women constitute a larger fraction of the labor force, their labor market activities are more closely tied to growth in real compensation and changes in inflation as measured by adjusted R-squared statistics and, in fact, often fit the data better than the men's measures. Thus, when trying

to explain real compensation growth and changes in inflation, we conclude that one should use measures of labor market slackness that include both men and women.

Once again, then, the 1990s pose something of a puzzle. The first section of the paper demonstrated that when we include women in the analysis, labor market slackness, whether measured by unemployment or by non-employment, was low in the 1990s, and yet, they were accompanied by low and stable rates of inflation. This again leads one to question whether the "natural rate" of labor market slackness changed over time. We examine our data's implications for the "natural rate of labor market slackness" in the next section.

Implied Zero Growth Rates

Our analyses above allow us to calculate the rate of labor market slackness associated with no wage growth or no increase in inflationary pressure. We can use these calculations to examine whether this "natural rate" has changed between the two time periods. Here we focus on the measures of labor market slackness that include both men and women, and ask how the implied zero growth rates have changed over time.

In table 4 we present estimates of the levels of labor market slackness consistent with zero compensation growth and a constant inflation rate. One might alternatively calculate the levels of labor market slackness consistent with compensation growth somewhat above zero because increases in labor productivity can allow for positive compensation growth without leading to increases inflation. Thus, we also present estimates of the level of labor market slackness associated with compensation growth equal to average labor productivity growth in the period. For the detrended non-

employment rate specifications, we again add back the (within period) average of the HP-filter trend component to the calculations in order to report a non-employment rate level associated with the compensation growth assumptions and constant inflation. Standard errors for these estimates are calculated using the delta method with the Newey-West standard error estimates allowing for up to fourth-order autocorrelation.

In all but one case (prime age unemployment, Average Hourly Earnings growth, and average labor productivity growth), the level of labor market slackness in period 2 that is associated with either zero compensation growth or compensation growth equal to average labor productivity growth is lower than the corresponding level in period 1. However, the change in the prime-age unemployment rate associated with real Average Hourly Earnings growth either equal to zero or equal to labor productivity growth is not statistically different from zero.[19] Likewise, the fall in the non-employment rate associated with real Hourly Compensation growth set equal to either assumption is not different from zero. For no change in the rate of inflation, the level of labor market slackness fell in all cases and all changes are statistically different from zero. In sum, the results largely show that significantly lower rates of labor market slackness are consistent with no wage or inflation pressure in the latter period.

The table 4 results are consistent with the U.S. economy undergoing a change such that it can now sustain lower rates of labor market slackness without sparking wage and inflation pressure. Whether this constitutes a "structural change" depends on one's exact definition. The change could come from changes on the demand side—increased productivity, changes in production practices, etc.—that allow the economy to absorb a

[19] Testing the difference with the reported statistics and standard errors is not strictly correct given that the samples have some overlap in data; however, the importance of this distinction is likely to be small.

greater amount of economic activity more easily. However, these results are equally consistent with changes in the labor market, discussed above, such that in recent years low-skilled individuals have withdrawn from the labor force, and higher skilled individuals, who are thought to have lower frictional rates of unemployment, have taken their place. In some sense, which of these two explanations is correct makes little difference for some policy decisions. A policymaker asking whether currently measured rates of overall unemployment and non-employment are consistent with stable wages and prices could be told "yes" under either scenario. However, whether policies that tried to absorb those who are currently out of the labor force into employment would be equally consistent with stable wages and prices depends critically on whether the new lower "natural rate" is due to demand side or supply side changes.

D. Summary and Conclusions

Despite very low levels of unemployment in the 1990s, men's non-employment remained high compared to earlier periods. This finding led Juhn, Murphy, and Topel (2002) to conclude that the 1990s did not represent a historically robust labor market for men, particularly for low-skilled men. Thus, questions about whether the 1990s represented a new, lower "natural" rate of unemployment may have been misplaced. Here we show that once women are added to the analysis, this question appears to be relevant. Women's labor force participation increased dramatically during the period that men's was falling. Indeed, women's labor force participation increased enough to compensate for men's declining participation. Thus, overall non-employment levels are near historic lows in the 1990s.

We then examine the relationship between women's and men's measures of labor market slackness and real compensation growth and changes in inflation. Measures of unemployment for men and women tend to explain a higher percentage of the variation in real compensation growth than do measures of non-employment. Thus, non-employment may be an important concept for summarizing individual's activities, but in terms of predicting real compensation changes, people's self-definition of their activities seems to matter. This makes sense if it is disproportionately those who are actively searching for jobs who put downward pressure on wages. However, in models of changes in inflation, (detrended) non-employment measures, particularly for men, tend to explain as much or more of the variation than do measures of unemployment. This calls into question the exact mechanism through which real wage growth translates into changes in price inflation, and suggests that those interested in changes in inflation should consider non-employment in addition to more traditional measures of labor market slackness.

Although in the full period from 1965 to 2002, men's measures of labor market slackness tend to explain more of the variation in compensation growth and changes in inflation than do women's this result masks a stark change over the period. After 1984, women's measures of labor market slackness, or measures of labor market slackness that include women, tend to explain more of the variation in real compensation growth and changes in inflation than do measures based on men alone. This suggests that around the period when women's individual labor force participation begins to look much more like men's, women's measures of labor market slackness begin to behave very much like men's in econometric models of the macro economy.

Overall in the latter period, the U.S. economy appears able to sustain lower levels of unemployment and non-employment without upward pressure on wages and prices. Whether this is due to structural, demand side changes in the nature of the labor market and macro economy, or simply due to compositional shifts in the labor force toward higher skilled individuals who tend to have lower rates of unemployment and non-employment, is an open question.

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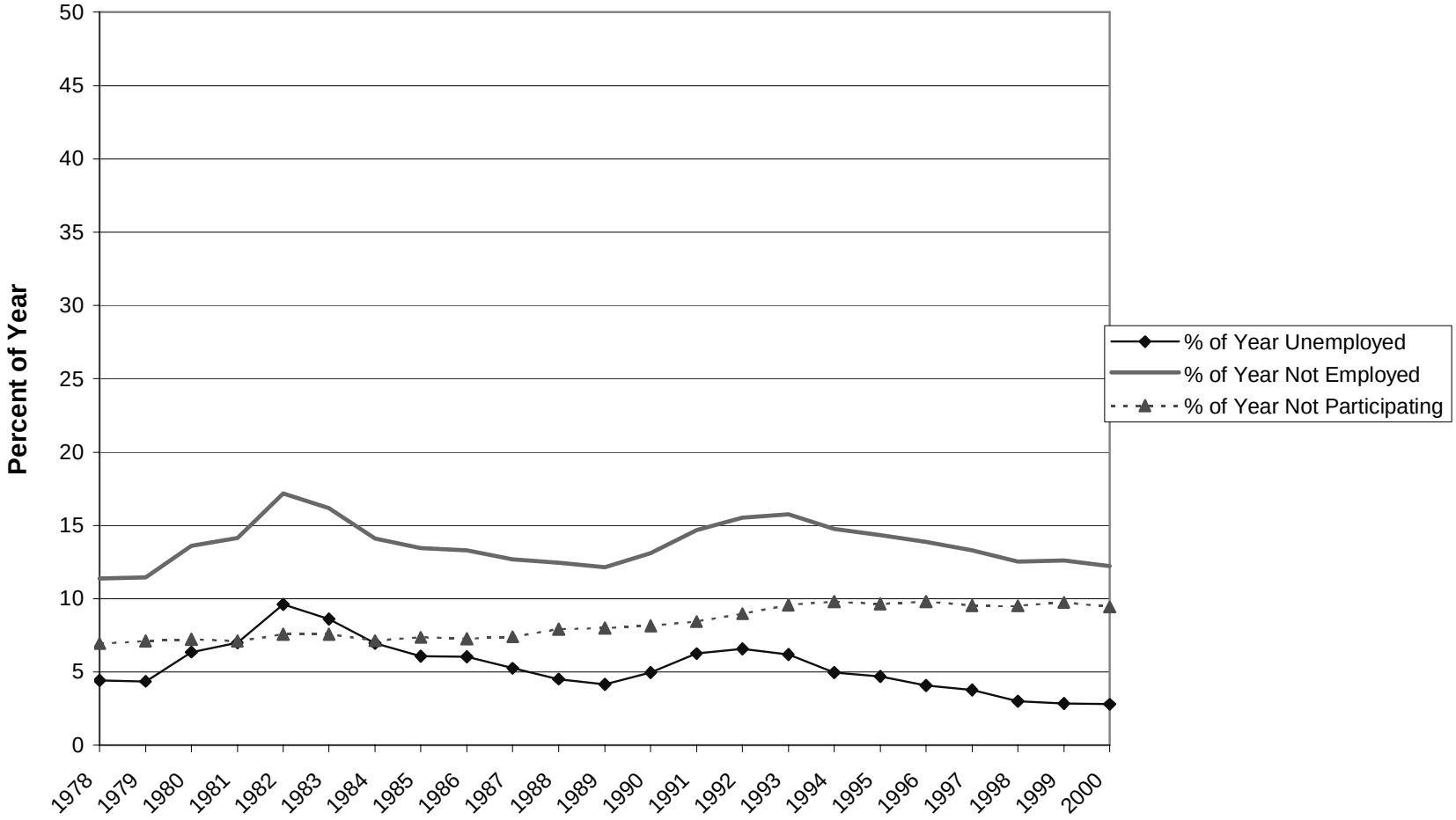
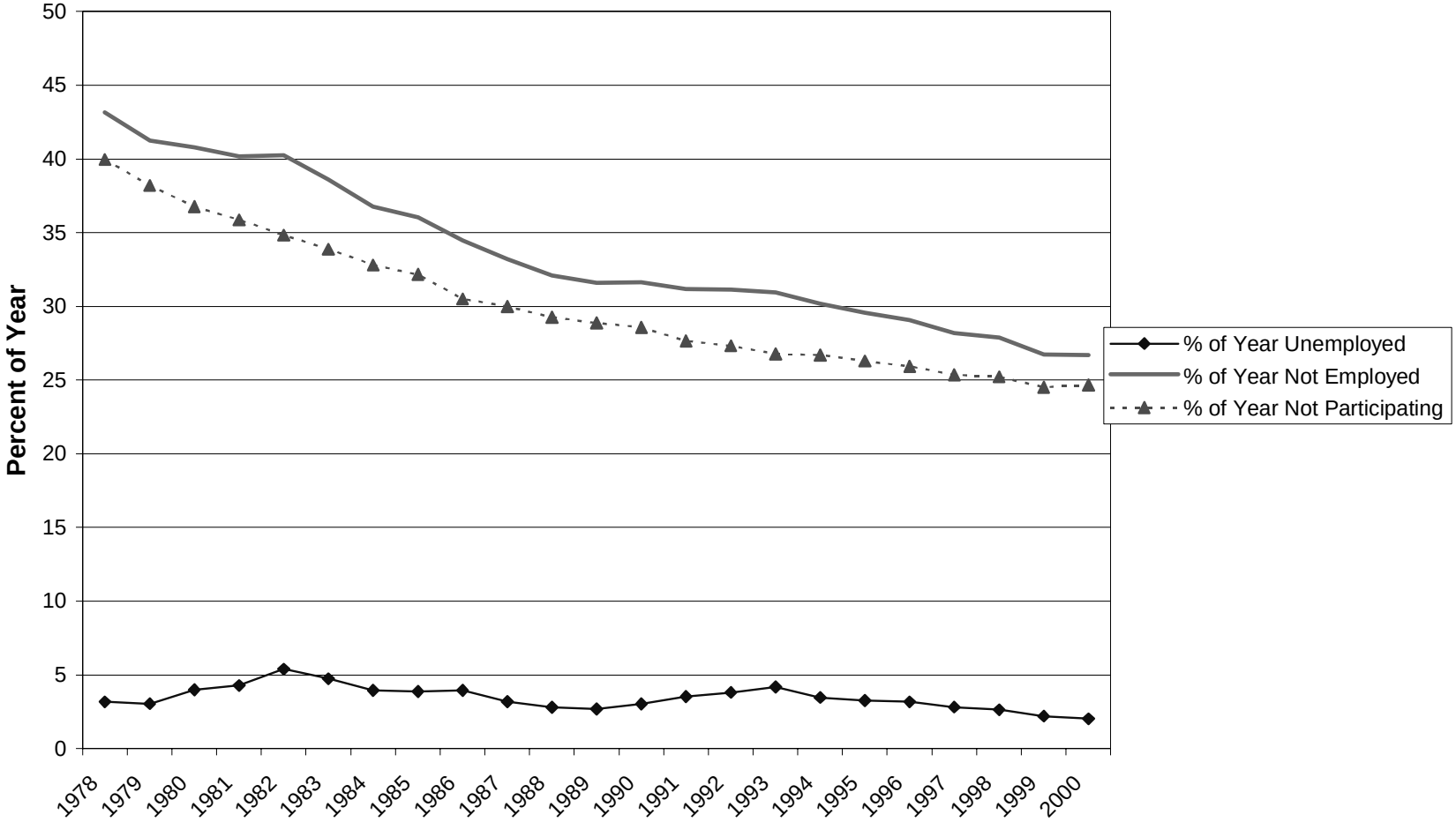
Figure 1a: Percent of Weeks Per Year in Unemployment, Nonparticipation, and Nonemployment, Men Aged 18 to 55



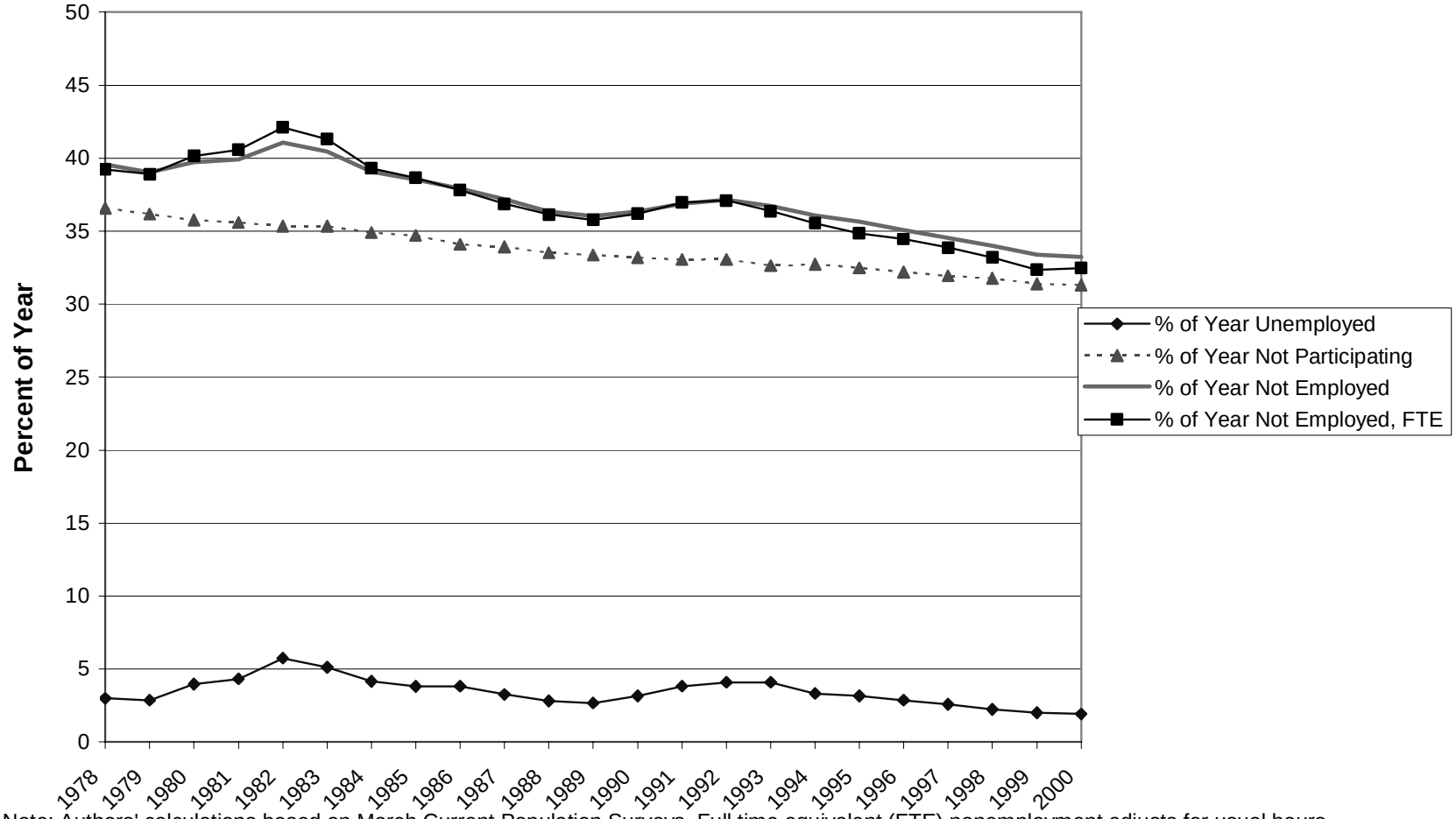
Note: Authors' calculations based on March Current Population Surveys. See text for details.

Figure 1b: Percent of Weeks Per Year in Unemployment, Nonparticipation, and Nonemployment, Women Aged 18-55



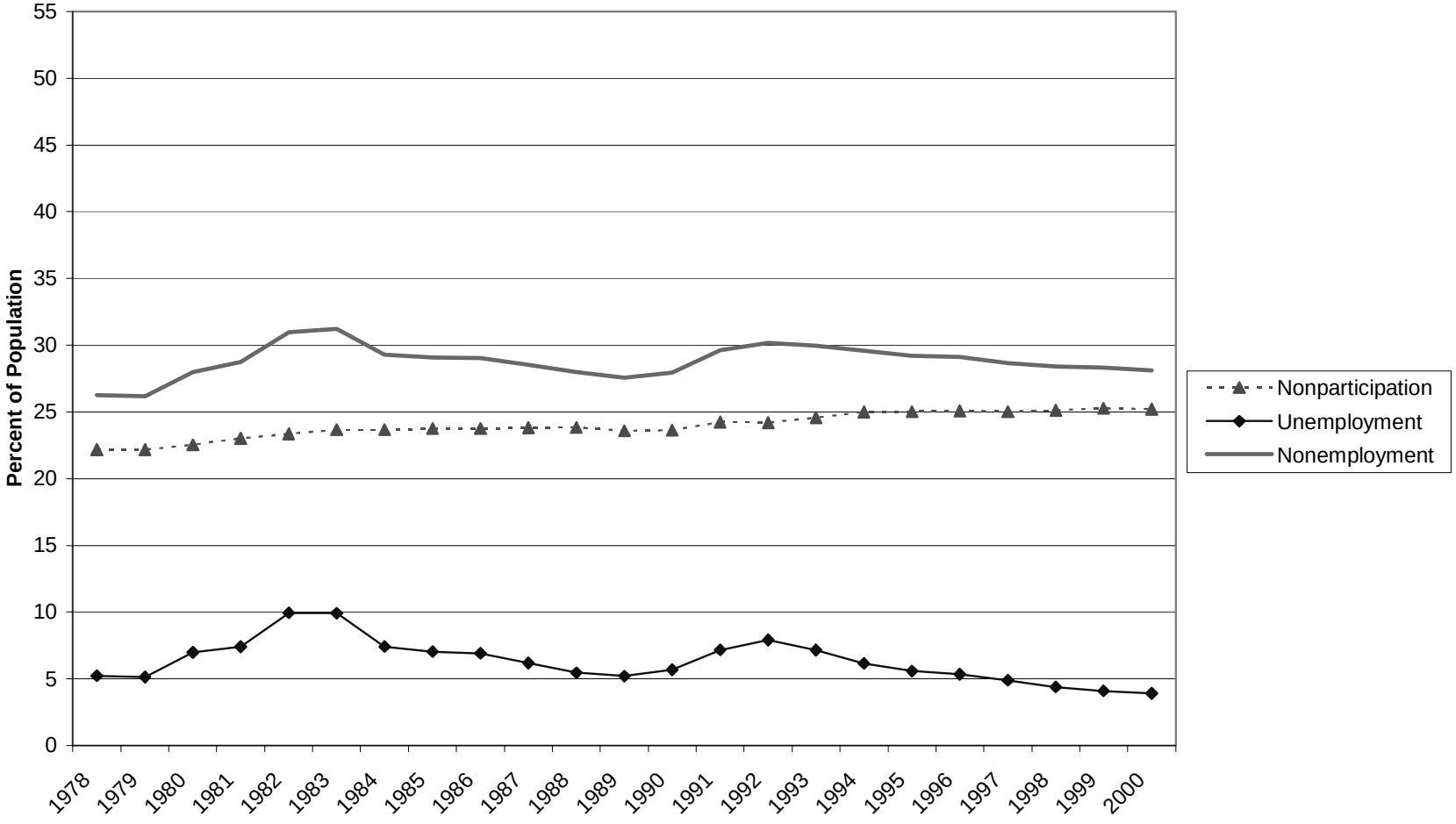
Note: Authors' calculations based on March Current Population Surveys. See text for details.

Figure 2: Percent of Weeks Per Year in Unemployment, Nonparticipation, and Nonemployment, Men & Women Aged 18 and over



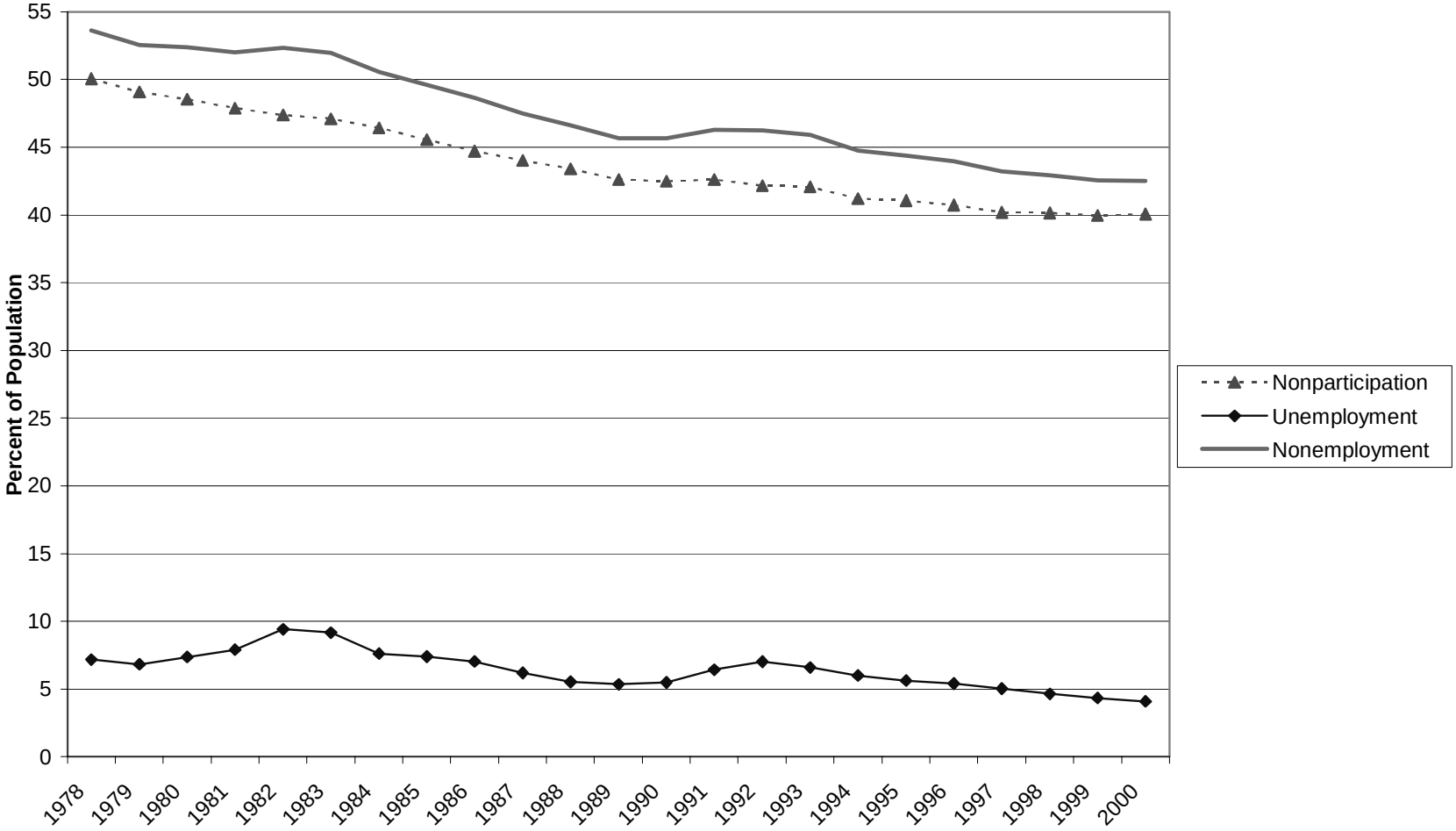
Note: Authors' calculations based on March Current Population Surveys. Full time equivalent (FTE) nonemployment adjusts for usual hours worked per week. See text for details.

Figure 3a: Unemployment, Nonemployment and Nonparticipation Rates, Men 16 and Over



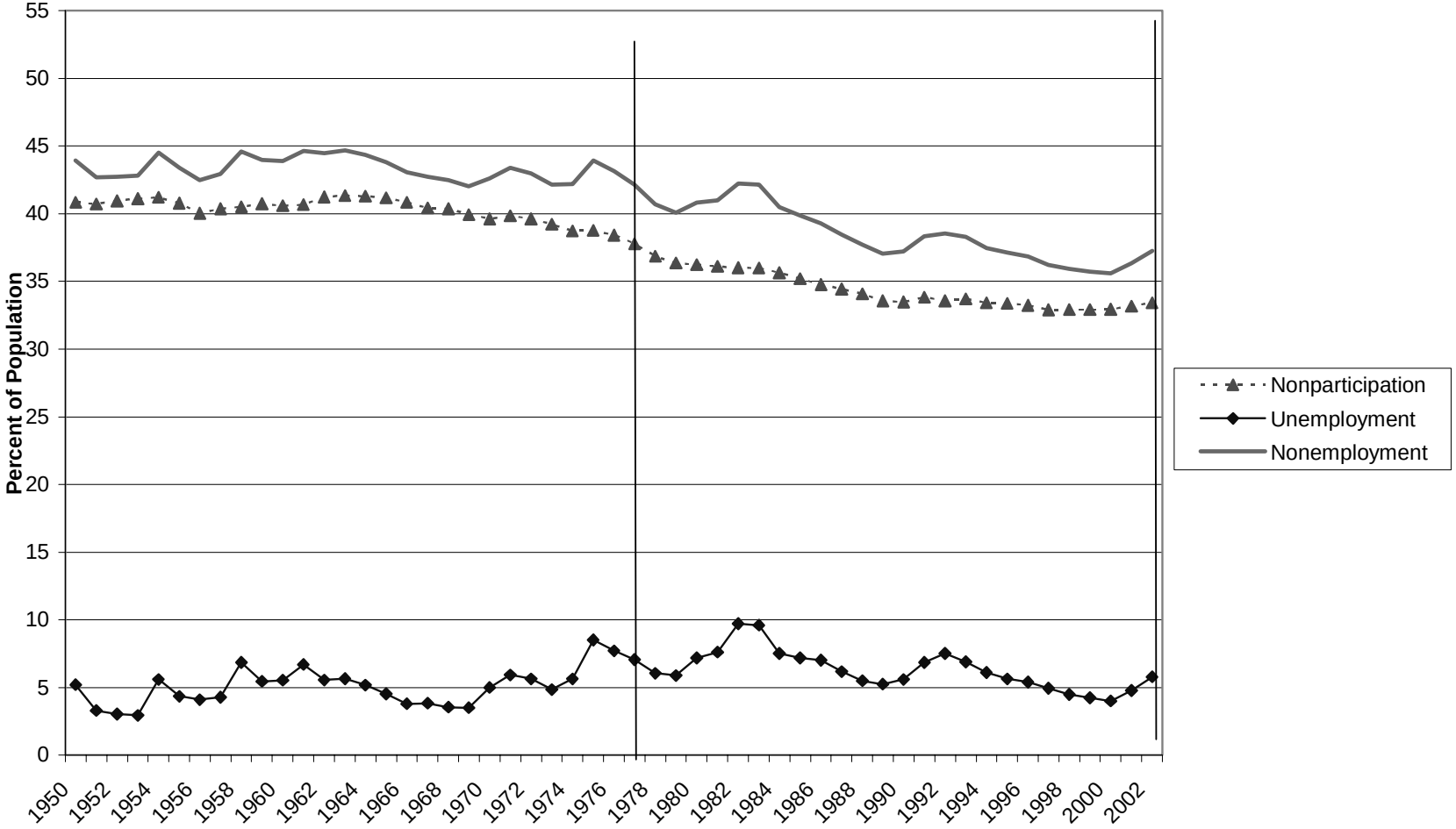
Notes: Data shown are annual averages of monthly aggregate CPS data available from the BLS.

Figure 3b: Unemployment, Nonemployment and Nonparticipation Rates, Women 16 and Over



Notes: Data shown are annual averages of monthly aggregate CPS data available from the BLS.

Figure 4: Unemployment, Nonemployment and Nonparticipation Rates, Men and Women 16 and Over



Notes: Data shown are annual averages of monthly aggregate CPS data available from the BLS.

Figure 5: Real Compensation Growth and Inflation 1965 to 2002

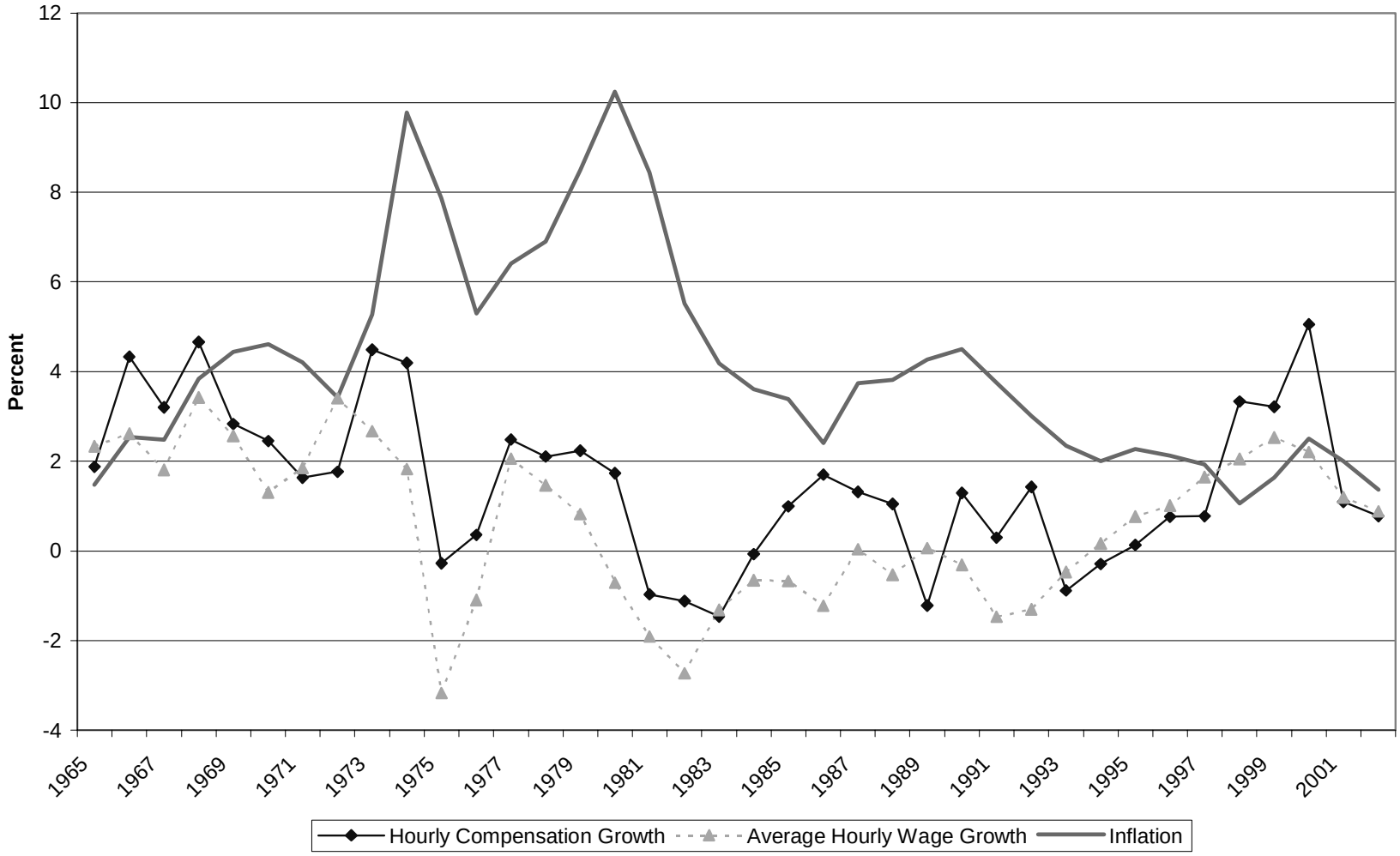


Figure 6a: Overall Measures of Labor Market Slackness 1965 to 2002

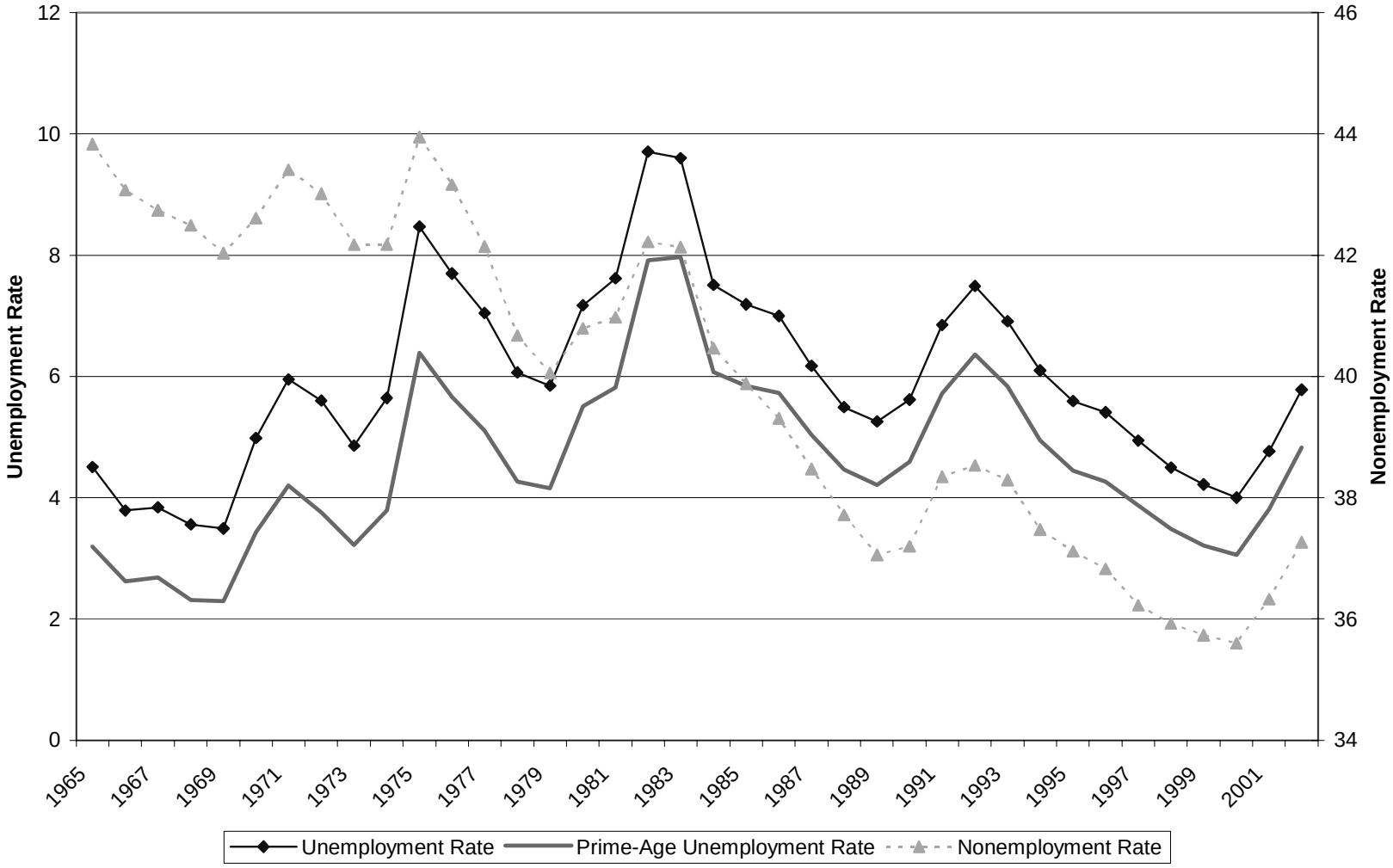


Figure 6b: Men's and Women's Unemployment Rates 1965 to 2002

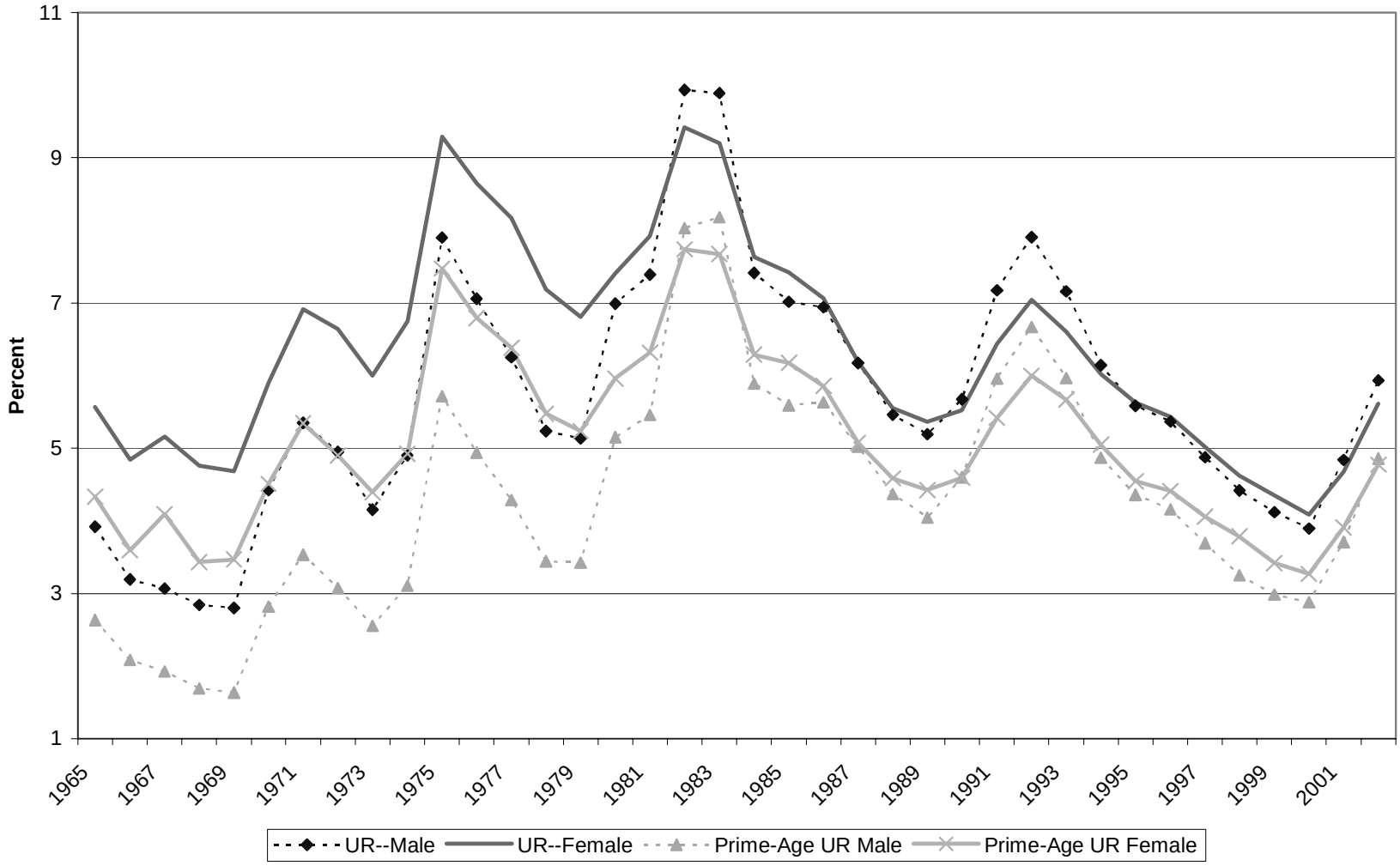


Figure 7a: Nonemployment Rates

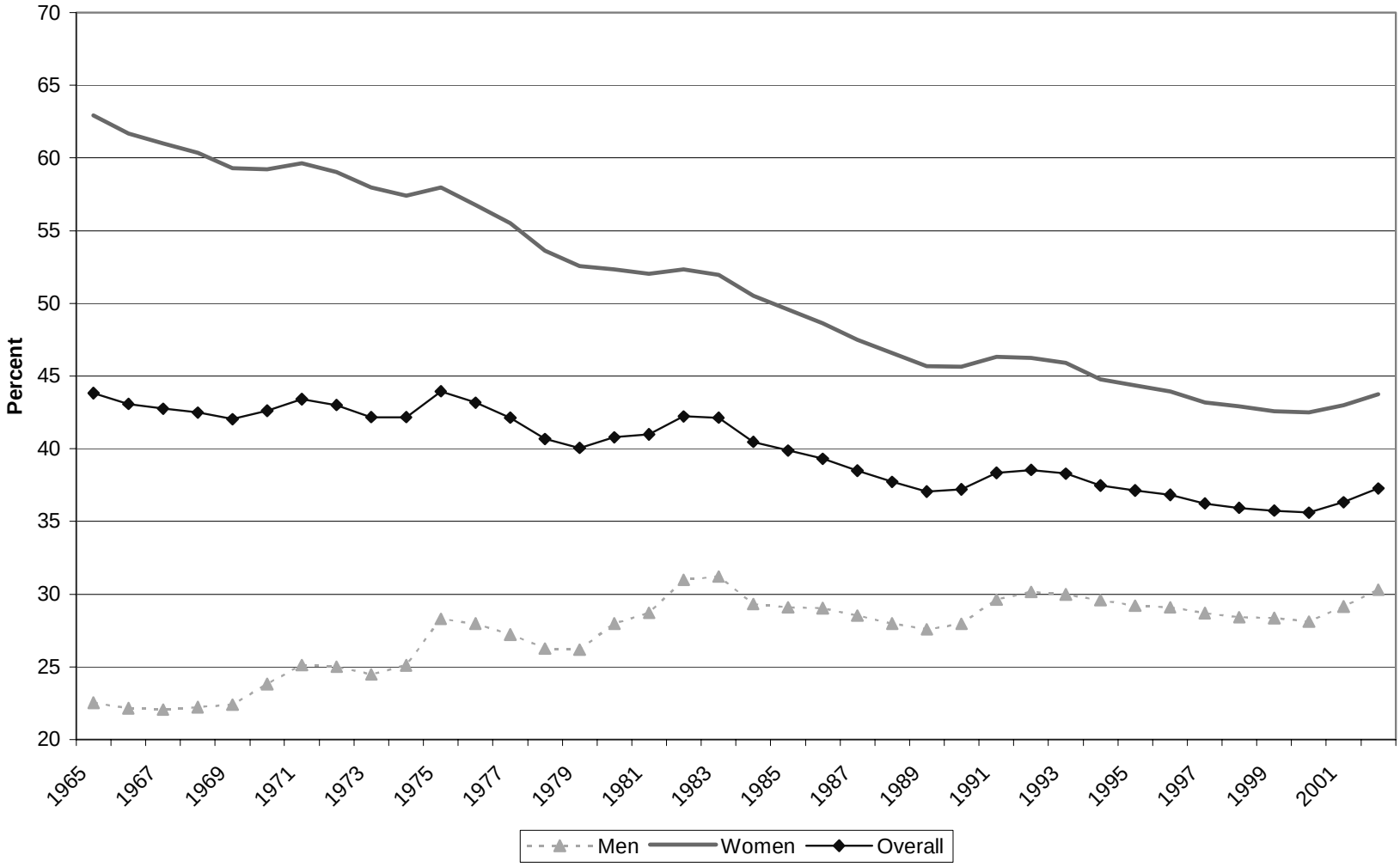


Figure 7b: Detrended Nonemployment Rates

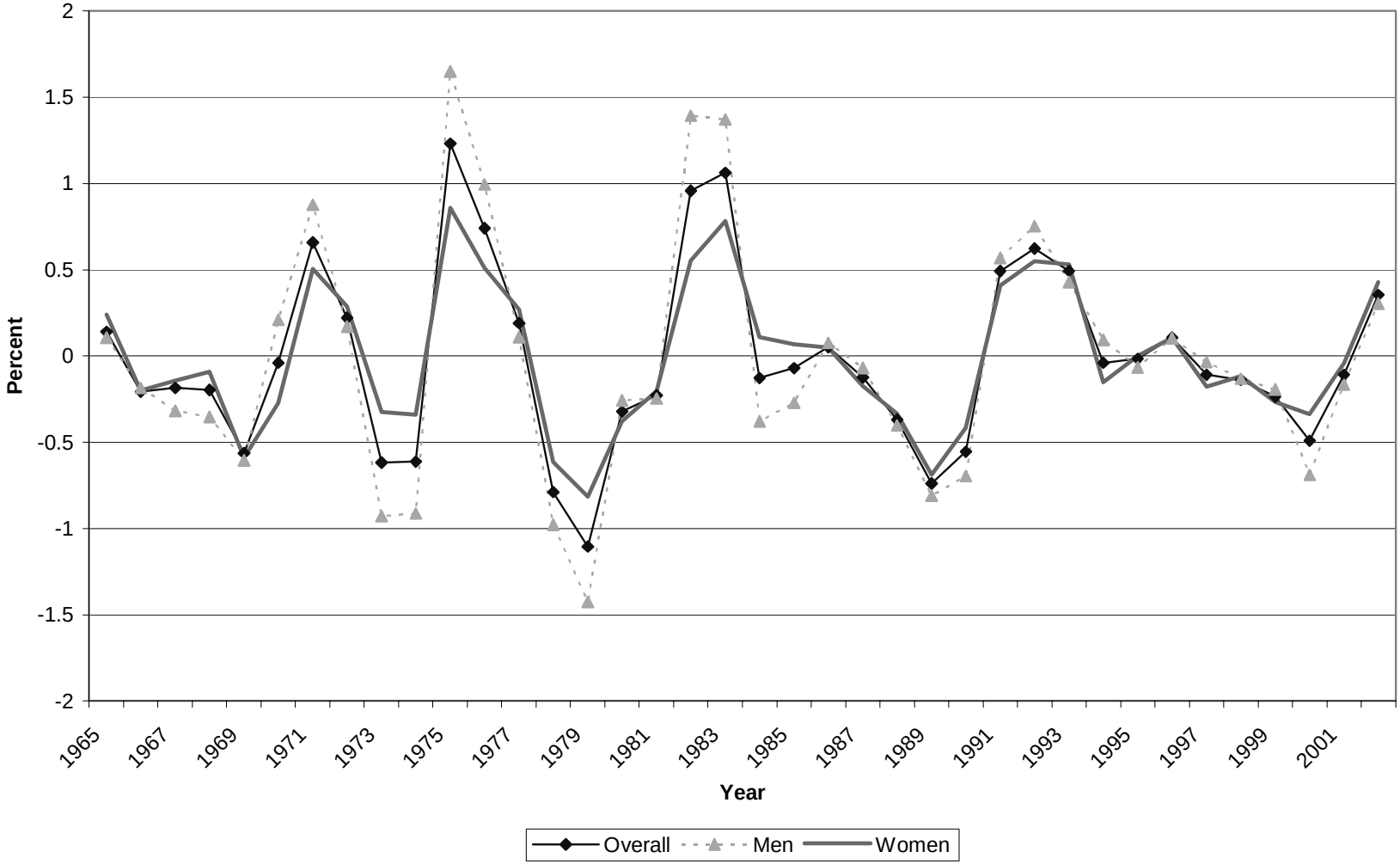
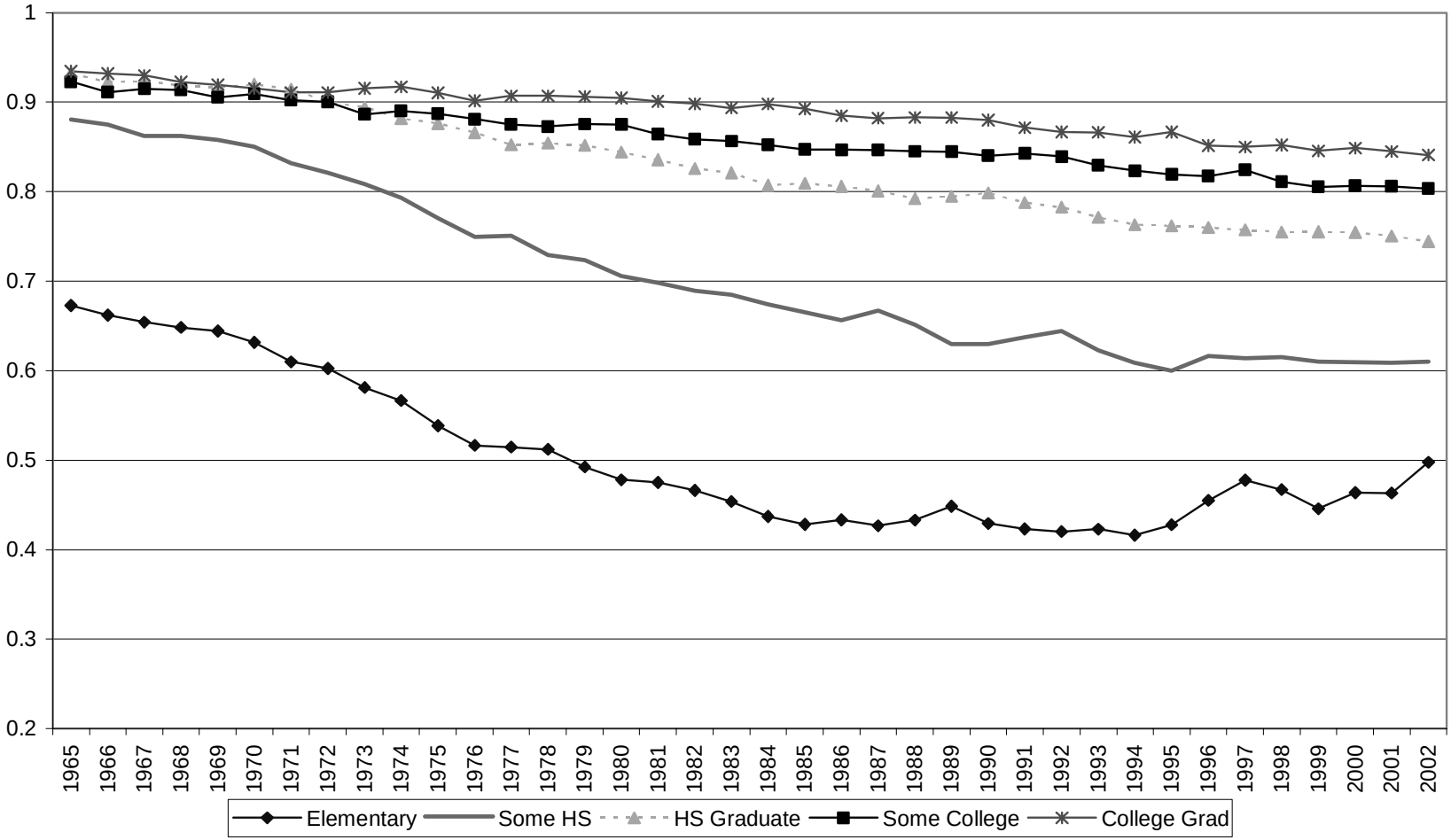
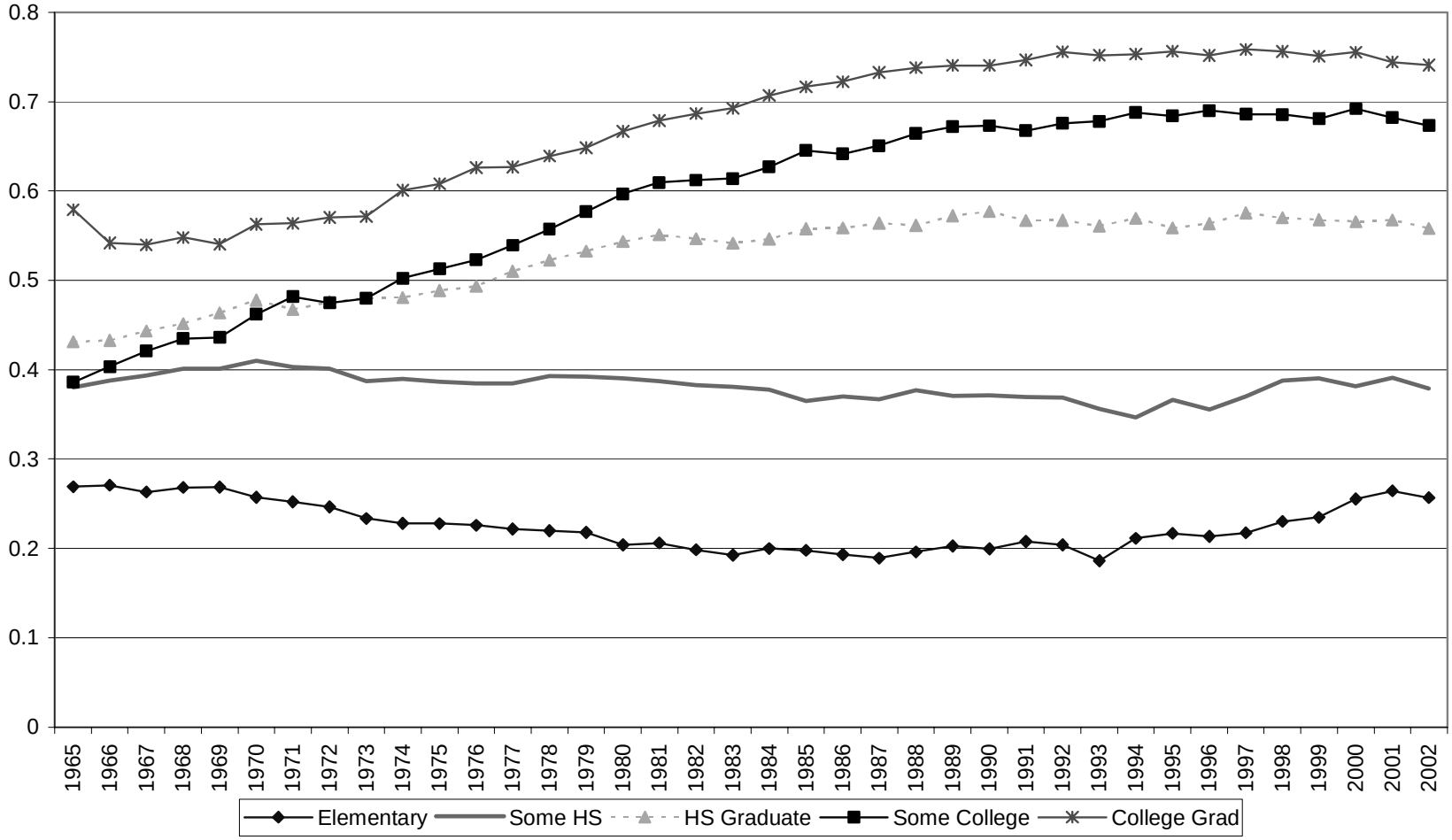


Figure 8a: Labor Force Participation Rates by Completed Education Levels: Men Aged 25 and Over



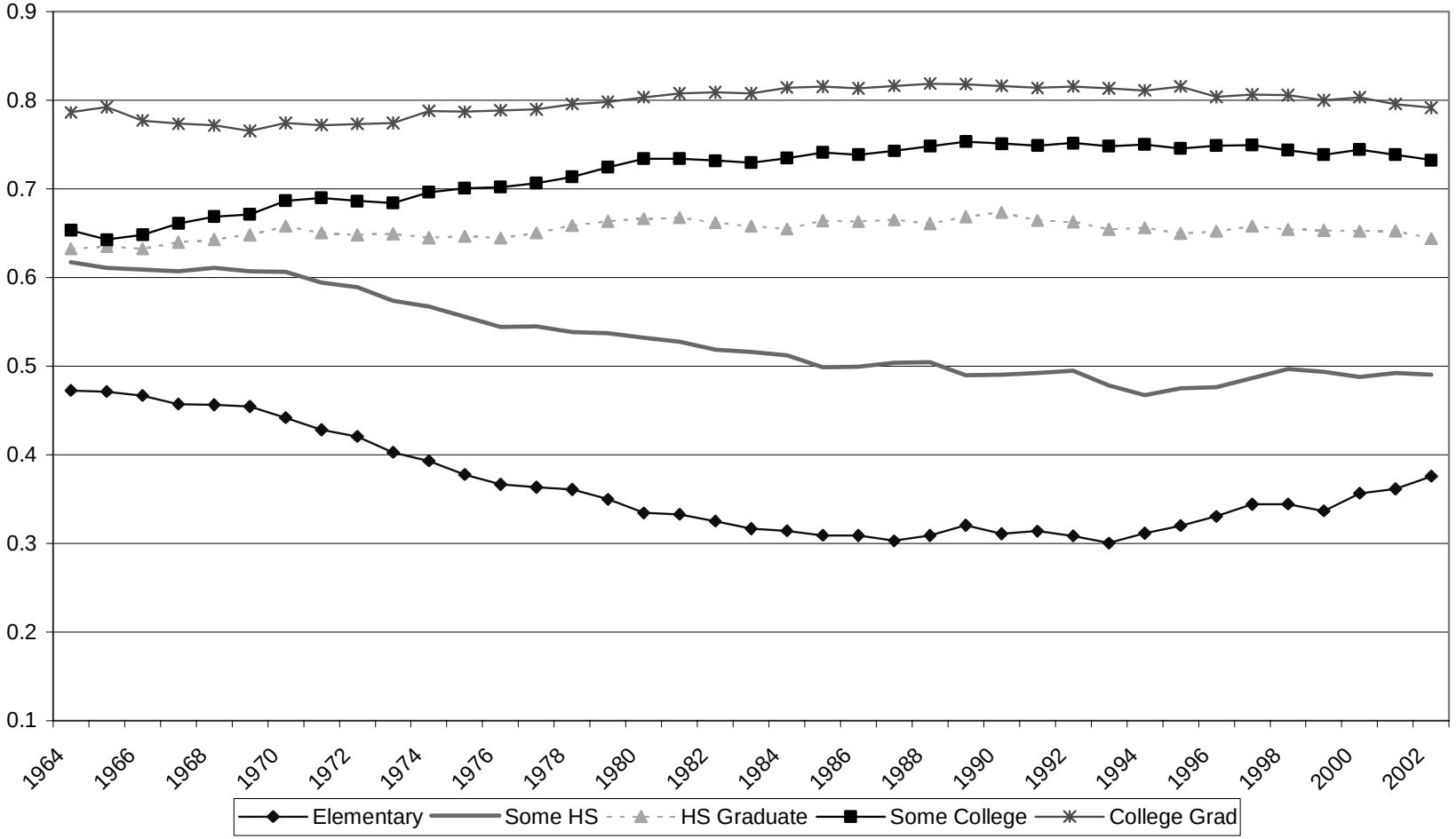
Notes: Based on authors' caculations from Current Population Survey data.

Figure 8b: Labor Force Participation Rates by Completed Education Levels: Women Aged 25 and Over



Notes: Based on authors' calculations from Current Population Survey data.

Figure 9: Labor Force Participation Rates by Completed Education Levels: Men and Women Aged 25 and Over



Note: Based on authors' calculations from Current Population Survey data.

Table 1: Summary Statistics
(Standard Errors)

	Overall 1965-2002	Period 1 1965-1983	Period 2 1984-2002
Inflation	4.207	5.774	2.724
	(0.388)	(0.560)	(0.233)
Change in Inflation	-0.003	0.150	-0.148
	(0.224)	(0.437)	(0.146)
Real Hourly	1.496	1.924	1.091
Compensation Growth	(0.289)	(0.460)	(0.343)
Real Average	0.562	0.827	0.311
Hourly Earnings Growth	(0.280)	(0.495)	(0.281)
Unemployment Rate			
Overall	5.993	6.164	5.832
	(0.256)	(0.460)	(0.251)
Men	5.750	5.637	5.857
	(0.284)	(0.520)	(0.269)
Women	6.379	6.984	5.805
	(0.236)	(0.370)	(0.237)
Prime Age Unemployment			
Overall	4.619	4.506	4.726
	(0.230)	(0.413)	(0.229)
Men	4.312	3.947	4.657
	(0.263)	(0.464)	(0.251)
Women	5.108	5.428	4.805
	(0.199)	(0.333)	(0.210)
Nonemployment			
Overall	39.827	42.213	37.567
	(0.435)	(0.242)	(0.316)
Men	27.488	25.947	28.948
	(0.420)	(0.679)	(0.179)
Women	50.928	56.709	45.450
	(1.051)	(0.806)	(0.545)
Number of Obs.	37	18	19

Notes: Compensation growth is inflation adjusted using the Personal Consumption Expenditure Chain-Type Prince Index.

Table 2: Estimated Relationships between Measures of Labor Market Slackness and Measures of Real Compensation Growth and Change in Inflation
(Standard Errors)

	Real Hourly Compensation Growth	Real Average Hourly Earnings Growth	Change in Inflation
Unemployment Rate			
Overall			
Adjusted R-square	0.5170	0.7472	0.3488
Implied "zero growth" rate	7.714	6.712	6.012
	(0.337)	(0.330)	(0.457)
P-value for joint sig. of UR lags	0.0000	0.0001	0.0000
P-value for AR(1)	0.5634	0.1778	0.8605
Male			
Adjusted R-square	0.5754	0.8147	0.3925
Implied "zero growth" rate	7.597	6.364	5.770
	(0.286)	(0.145)	(0.401)
P-value for joint sig. of UR lags	0.0000	0.0000	0.0000
P-value for AR(1)	0.9057	0.2381	0.7029
Female			
Adjusted R-square	0.3905	0.7966	0.2455
Implied "zero growth" rate	8.223	6.886	6.398
	(0.601)	(0.261)	(0.666)
P-value for joint sig. of UR lags	0.0009	0.0000	0.0109
P-value for AR(1)	0.4985	0.1219	0.3722
Prime Age Unemployment Rate			
Overall			
Adjusted R-square	0.5772	0.8410	0.4028
Implied "zero growth" rate	6.117	5.102	4.636
	(0.240)	(0.090)	(0.320)
P-value for joint sig. of UR lags	0.0000	0.0000	0.0000
P-value for AR(1)	0.8224	0.7583	0.7788
Male			
Adjusted R-square	0.5930	0.7732	0.4157
Implied "zero growth" rate	6.021	4.997	4.332
	(0.238)	(0.187)	(0.309)
P-value for joint sig. of UR lags	0.0000	0.0001	0.0000
P-value for AR(1)	0.8425	0.1677	0.4660
Female			
Adjusted R-square	0.4622	0.8351	0.3187
Implied "zero growth" rate	6.497	5.534	5.122
	(0.358)	(0.163)	(0.426)
P-value for joint sig. of UR lags	0.0000	0.0000	0.0006
P-value for AR(1)	0.3946	0.1370	0.3944

Detrended Nonemployment Rate			
Overall			
Adjusted R-square	0.3833	0.7109	0.4751
Implied "zero growth" rate	40.500	39.714	39.829
	(0.175)	(0.163)	(0.109)
P-value for joint sig. of Nonemp. lags	0.0113	0.0000	0.0000
P-value for AR(1)	0.756	0.3451	0.5432
Male			
Adjusted R-square	0.4025	0.7373	0.4879
Implied "zero growth" rate	28.309	27.371	27.489
	(0.193)	(0.190)	(0.129)
P-value for joint sig. of Nonemp. lags	0.0034	0.0000	0.0000
P-value for AR(1)	0.8886	0.1994	0.3155
Female			
Adjusted R-square	0.3390	0.6383	0.4220
Implied "zero growth" rate	51.549	50.798	50.931
	(0.216)	(0.179)	(0.103)
P-value for joint sig. of Nonemp. lags	0.0465	0.0000	0.0000
P-value for AR(1)	0.7174	0.7349	0.9599
Number of Observations	37	37	37

Notes: Columns 1 and 2 include one lag of the dependent variable and the contemporaneous measure of the relevant labor market slackeness. In addition for column 2 estimates lags of the relevant right-hand-side variables are included as follows: 1 lag of overall unemployment, 3 lags of men's and women's unemployment, 4 lags of prime age unemployment, 1 lag of men's prime age unemployment, 3 lags of women's prime age unemployment, and 1 lag of overall, men's, and women's detrended non-employment. Column 3 estimates include 2 lags of the change in inflation and the relevant contemporaneous measure of labor market slackenss. The implied "zero growth" rates are calculated as the negative of the constant divided by the sum of the coefficients on the relevant measure of labor market slackness. For non-employment we add back in the average of the HP filter trend component in order to report the implied rate in levels. Standard errors on the implied "zero growth" rates are calculated using the delta method with Newey-West standard error estimates for the underlying coefficients, allowing for up to fourth-order autocorrelation.

Table 3: Estimated Relationships between Measures of Labor Market Slackness and Measures of Real Compensation Growth by Period

	Real Hourly Compensation Growth		Real Average Hourly Earnings Growth		Change in Inflation	
	1965-1983	1984-2002	1965-1983	1984-2002	1965-1983	1984-2002
	Period 1	Period 2	Period 1	Period 2	Period 1	Period 2
Lags of the Dependent Variable	1	1-3	1	1	1-4	0
Unemployment Rate						
Overall						
P-value for UR coefficients equal	0.050		0.001		0.702	
Lags of the unemployment rate	1-2	0	1-4	1-2	0	1
Adjusted R-squared	0.799	0.514	0.856	0.861	0.571	0.199
P-value for joint sig. of UR lags	0.000	0.003	0.000	0.000	0.013	0.004
P-value for AR(1)	0.576	0.778	0.392	0.336	0.642	0.639
Male						
P-value for UR coefficients equal	0.024		0.007		0.712	
Lags of the unemployment rate	1-2	1	1-4	1-2	0	0
Adjusted R-squared	0.828	0.194	0.840	0.863	0.593	0.186
P-value for joint sig. of UR lags	0.000	0.014	0.000	0.000	0.006	0.001
P-value for AR(1)	0.947	0.643	0.683	0.415	0.495	0.691
Female						
P-value for UR coefficients equal	0.120		0.002		0.043	
Lags of the unemployment rate	1-4	0	1-4	1	1-4	1
Adjusted R-squared	0.732	0.517	0.844	0.842	0.572	0.224
P-value for joint sig. of UR lags	0.000	0.005	0.000	0.000	0.013	0.003
P-value for AR(1)	0.321	0.847	0.216	0.636	0.034	0.525

Prime Age Unemployment Rate						
Overall						
P-value for UR coefficients equal		0.040		0.001		0.489
Lags of the prime-age UR	1-2	1	1-4	1-2	0	0
Adjusted R-squared	0.826	0.527	0.854	0.861	0.610	0.170
P-value for joint sig. of UR lags	0.000	0.018	0.000	0.000	0.003	0.002
P-value for AR(1)	0.957	0.621	0.736	0.299	0.560	0.728
Male						
P-value for UR coefficients equal		0.042		0.005		0.381
Lags of the prime-age UR	1-2	1	1-4	1-2	0	0
Adjusted R-squared	0.823	0.536	0.807	0.860	0.623	0.173
P-value for joint sig. of UR lags	0.000	0.012	0.000	0.000	0.001	0.002
P-value for AR(1)	0.678	0.581	0.885	0.451	0.396	0.700
Female						
P-value for UR coefficients equal		0.154		0.012		0.038
Lags of the prime-age UR	1-2	0	1-4	1-2	1-4	1
Adjusted R-squared	0.754	0.523	0.869	0.856	0.606	0.256
P-value for joint sig. of UR lags	0.000	0.003	0.000	0.000	0.004	0.002
P-value for AR(1)	0.630	0.802	0.295	0.145	0.044	0.579
Detrended Nonemployment Rate						
Overall						
P-value for NR coefficients equal		0.006		0.034		0.023
Lags of nonemployment	1-2	1	1	1	1-4	0
Adjusted R-squared	0.583	0.389	0.688	0.816	0.679	0.340
P-value for joint sig. of Nonemp. lags	0.005	0.051	0.000	0.019	0.000	0.000
P-value for AR(1)	0.377	0.662	0.423	0.359	0.014	0.221
Male						

P-value for NR coefficients equal		0.473		0.042		0.596
Lags of nonemployment	1-2	0	1	1	1-4	0
Adjusted R-squared	0.590	0.358	0.726	0.809	0.692	0.284
P-value for joint sig. of Nonemp. lags	0.003	0.228	0.000	0.047	0.000	0.000
P-value for AR(1)	0.313	0.794	0.220	0.413	0.025	0.370
Female						
P-value for NR coefficients equal		0.002		0.035		0.034
Lags of nonemployment	1-2	1-3	1	1	1-4	0
Adjusted R-squared	0.546	0.535	0.582	0.819	0.609	0.379
P-value for joint sig. of Nonemp. lags	0.008	0.003	0.000	0.0004	0.013	0.000
P-value for AR(1)	0.508	0.220	0.824	0.301	0.086	0.139
Number of Observations	18	19	18	19	18	19

Notes: Each combination of dependent variable and measure of labor market slackness is estimated separately by time period. All estimates include the contemporaneous measure of the relevant right-hand-side variable. Additionally, lags of the dependent variable and the relevant labor market slackness measure are also included as reported in the table. Lag structure was chosen using information criteria as described in the text. The P-value for the F-test that the labor market slackness variable coefficients are equal across the time periods comes from a single regression including a full set of period interactions and the maximum number of lags included in the separate specifications.

Table 4: Estimates of Labor Market Slackness Levels Associated with Various Compensation Growth Rates and No Acceleration in Inflation

	Real Hourly Compensation Growth		Real Average Hourly Earnings Growth		Change in Inflation	
	1965-1983 Period 1	1984-2002 Period 2	1965-1983 Period 1	1984-2002 Period 2	1965-1983 Period 1	1984-2002 Period 2
Unemployment Rate						
zero	9.251	7.159	6.870	6.150	8.301	5.136
average labor productivity	10.965	9.040	8.584	8.031		
standard error	(0.653)	(0.325)	(0.191)	(0.197)	(1.168)	(0.528)
Prime-Age Unemployment Rate						
zero	7.205	6.048	5.198	5.042	6.284	4.225
average labor productivity	8.918	7.929	6.912	6.923		
standard error	(0.483)	(0.318)	(0.160)	(0.175)	(0.717)	(0.489)
Nonemployment Rate						
zero	40.796	38.084	42.021	37.328	42.413	37.430
average labor productivity	42.510	39.965	43.734	39.209		
standard error	(1.907)	(0.171)	(0.228)	(0.219)	(0.195)	(0.059)

Notes: Calculations are based on the estimates shown in Table 3 for the "overall" measures of labor market slackness. Standard errors, in parentheses, are calculated using the delta method. For the non-employment rate calculations we add back the average of the HP filter trend component for each period in order to show the level of non-employment associated with zero compensation growth and no acceleration of inflation. Average growth in labor productivity is equal to 1.71 percent in period 1 and 1.88 percent in period 2.

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