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UNEMPLOYMENT AND WELFARE PARTICIPATION IN A STRUCTURAL VAR: RETHINKING THE 1990S IN THE UNITED STATES

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Indice

Abstract

A 1997 report by the Council of Economic Advisers started a large research effort about the effects of the unemployment rate on the welfare participation rate and vice-versa, with special regard to the 1990s in the United States. In this paper the relationship between the US unemployment rate and the welfare participation rate is examined in a structural VAR. It is found that the unemployment rate does not Granger-cause the welfare participation rate, while the converse is true. Moreover, a negative shock to the welfare participation rate predicts a reduction in the unemployment rate. The conclusion is that the decline in the welfare participation rate in the 1990s should be attributed to restrictive welfare reforms, not to the fall in the unemployment rate. Further, the political choice to reduce the welfare participation rate may have inflated the reduction in the unemployment rate, by increasing the number of people willing to accept peripheral jobs, for instance in the Eating and drinking places.

Keywords: Welfare, Unemployment, Structural VAR.
JEL code: J2, I3.

1. Introduction

The aim of this paper can be thought as twofold. First, it is argued that the decline in the welfare participation rate in the United States in the 1990s should be attributed to restrictive welfare reforms, not to the decline in the unemployment rate. Second, it is argued that the political choice to reduce the welfare participation rate - implementing restrictive welfare reforms - may have inflated the fall in the unemployment rate in the 1990s.

The paper has the following structure. Section 2 is shortly reviewing the literature on the welfare reforms occurred in the United States in the 1990s. Since a 1997 report by the Council of Economic Advisers (hereinafter CEA), there has been an increasing interest on the relationship between the unemployment rate and the welfare participation rate. Research has analyzed this relationship from a micro-econometric point of view using panel data. A macro-econometric perspective has not received attention yet. This paper takes the latter perspective using aggregate time-series data. Sections 3 to 5 present an empirical analysis based on a structural VAR model. The analysis is aimed to contribute to explain what happened in the 1990s, when both the welfare participation rate and the unemployment rate strongly decreased. Sections 6 and 7 discuss the results of the empirical analysis. Section 8 briefly summarizes the main conclusions. An Appendix provides further details on the main empirical analysis of this study, also discussing possible criticism.

2. A brief summary of the literature on the welfare reforms in the United States

During the 1990s, the United States deeply reformed their most important welfare program, the Aid to Families with Dependent Children

(hereinafter AFDC). The AFDC was created in 1935 with the Social Security Act (Title IV) in order to provide financial assistance to needy children, being fatherless or motherless (typically fatherless; the original name of the program was Aid to Dependent Children). At the beginning of the 1990s, the AFDC provided both financial and non-financial assistance to needy (income below a certain level) families with dependent children. Typical recipients were single parents, often mothers, and their dependent children (AFDC-Basic), or unemployed parents in two parent-families and their dependent children (AFDC-Unemployed Parent). The program was implemented by the States. State activities were subject to the approval of the Government, which financed them largely. The Department of Health and Human Services was in charge to control whether State activities were consistent with the AFDC law. However, since 1962, the Government could waive requirements of the law to allow States to carry out special policies. The actual use of waivers only started in the 1980s with some experiments. Afterwards, it became a rule. During the first three years of Clinton's Administration, 43 States received a federal waiver. As known, States receiving waivers deeply changed the nature of the AFDC program. They introduced time limits to aid and family caps, reduced exemptions to participation in mandatory activities (work or training), increased sanctions (CEA, 1997).

In 1996 the welfare reforms, begun at State level, were completed at federal level by the approval of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA). The Act replaced the AFDC by the Temporary Assistance for Needy Families (TANF). The federal guarantee of assistance to needy families with children disappeared. States received great discretion in defining their own programs, which became strongly work-oriented. States had to bring people from welfare to work, but they were given a Machiavellian out (Edelman, 1997). In fact, the new law allowed States to reach targeted shares of working caseloads over total caseloads by simply expelling non-working caseloads. Those policies begun with the waivers were strengthened, for instance time limits. People having spent 5 years (cumulated) in welfare assistance lost eligibility for aid. This lifetime limit interested half of caseloads in 1997 from close up (Edelman, 1997).

The monthly AFDC subsidy per family decreased a lot in the 1990s, reaching a new historical negative record every year (US Department of

Health and Human Services, 2000). It is un-doubtful that, in the last decade, policies helping low-income people were implemented too. Examples are the increase in the AFDC earnings disregard, the increase in the Earned Income Tax Credit (EITC) and the increase in the minimum wage. However, most of these policies were work-oriented on the lines of the welfare policies of the 1990s: they did not help the poor, they only helped the poor with a job.

A report by the CEA (1997) started a large research effort about the welfare reforms in the United States in the 1990s, as discussed in the recent reviews by Blank (2002) and Moffitt (2002). The welfare participation rate, i.e. the share of population receiving AFDC-TANF, has declined since its 1994 peak (see B in Figure 1). The decline was due to a reduction in the total number of caseloads. Caseloads decreased from 14.2 millions in 1993 to 5.7 millions in 2000 (June). A large part of the literature has focused on explaining why the welfare participation rate declined. The CEA (1997), for example, argues that the share of population on welfare has declined both because of the strong economy and because of welfare reforms. From 1993 to 1996, more than 40% of the decline can be explained by the decrease in the unemployment rate (see U in Figure 1). About 13-31% of the decline can be attributed to the federal waivers. Similar results can be found in Levine and Whitmore (1998), Wallace and Blank (1999), and Blank (2001). In contrast with the CEA (1997), Ziliak et al. (2000) argue that almost all the decline in the participation rate can be attributed to improved economic conditions in the States, and nothing to the waivers. In absence of economic factors, there would not have been any decline in the participation rate. Similar results are in Figlio and Ziliak (1999).

In 1999 the CEA extends the analysis to consider the effects of the 1996 welfare reform (PRWORA). The new report (CEA, 1997) maintains that 35-36% of the decline in the participation rate was due to the introduction of the TANF. Improved labor market conditions only explain 8-10% of the decline, much less than during the period of 1993-1996 (26-36% in the 1999 revisited estimates for the period of 1993-1996). Hence TANF had an impact on per-capita caseloads higher than waivers (12-15% in the 1999 revised estimates for 1993-1996), while the unemployment rate in post-TANF period affected per-capita caseloads less. Similar findings are in Schoeni and Blank (2000). O'Neill and Hill (2001) find a higher impact of the TANF on AFDC-TANF

participation.
As stressed by Bell (2001), there is a substantial agreement in the literature on the argument that the fall in the unemployment rate in the 1990s mainly or totally caused the fall in the welfare participation rate. There is less agreement on contributions of waivers and TANF, although most of the authors recognize that changing welfare policies affected welfare participation. In addition, while literature has made an effort to distinguish among various components of the welfare reform (for example, between the effects of family caps, time limits, work requirements, earnings disregard), there are not significant common results. Sometimes there are unexpected results: for instance, the CEA (1999) finds that family caps increased per-capita caseloads; Ziliak et al. (2000) have the same result for work-incentive waivers (earnings disregard). Sometimes results are more expected: for instance Grogger (2000; 2001) finds that time limits decreased welfare use; Kaushal and Kaestner (2001) have the same result for both family caps and time limits.
A common denominator of the literature is the lack of agreement on how to specify the estimated models from a dynamic point of view. The variability of interpretations, which is a key factor in explaining the variability of results on the effect of policies, is primarily due to the absence of a unitary theoretical framework explaining movements in the stock of per-capita caseloads. It has been also argued by Klerman and Haider (2002) that the estimated models on the stock of per-capita caseloads are generally mis-specified, as they contain a null or non-sufficient number of lags of the explanatory variables regarding exit or entry flows. Due to the shortness of the available time series, authors suggest a new procedure to study the stock of per-capita caseloads. The stock is simulated by means of a Markov-chain model, after having estimated parameters in the transition matrix with data on entry and exit flows. Unfortunately, data on flows are not available at aggregate level. In fact, Klerman and Haider estimate their ‘stock-flow model’ with data from California, and their results cannot be generalized.
A part of the literature has analyzed the effect of welfare reforms on labor market outcomes such as labor force participation, employment, and earnings. Research has specially focused on less-educated women, single mothers and female-headed families, i.e. typical adults and families on welfare assistance. Moffitt (1999), for example, finds

that waivers increased hours and weeks of work for less-educated women, but without increasing their weekly salaries or annual earnings. Schoeni and Blank (2000) have a more positive view of welfare reforms. These reforms reduced people dependence on welfare, increased earnings and reduced poverty in families with less-educated women. The benefits of the 1996 reform were less diffused than those deriving from waivers.

Some studies have dealt with the combined effect of various policy changes. For instance, Meyer and Rosenbaum (2000) discuss changes in fiscal and social policies related to single mothers (typical adults in the AFDC-Basic program), such as increased EITC, reduced welfare benefits, re-defined job-training programs and increased Medicaid. Single mothers registered a rise in both weekly-hours of work and employment rate, a rise not found in other low-wage groups and among single women without children. Authors attribute the increase in labor activity of single mothers mainly to the increased EITC. They found less evidence that reduced welfare benefits affected labor activity of single mothers. Similar results are in Blank et al. (2000). Instead, Kaushal and Kaestner (2001) show that States using waivers, particularly family caps and time limits, registered significant increases in work-hours of less educated single mothers. Grogger (2001) finds positive effects on labor activity of single mothers of both EITC and welfare reforms, particularly time limits. However, Ellwood (2000) stresses that the effects of reforms are hardly separable from those of EITC and economic expansion.

Leavers' studies have shown that most of ex-caseloads (adults) are holding a job at some observation in the first years following welfare exit. For instance, Martinson (2000) finds that only 20% of leavers has never worked in the first four years following welfare exit. Their salaries however are very low, between 5.50 and 8.50 dollars per hour.

This brief summary helps to stress that research on welfare reforms has focused on three main issues:

1. to what extent the fall in the unemployment rate since its 1992 peak affected the fall in the welfare participation rate since its 1994 peak;
2. to what extent the welfare reforms since 1992 reduced the welfare participation rate;
3. to what extent the welfare reforms affected the reduction in the unemployment rate, affecting both labor force and employment.

Regarding the third issue, an additional comment seems useful. The question is whether the welfare reforms forced people, who lost all or parts of their welfare assistance, to search for a job, and whether people found it. If so, a political choice to reduce the welfare participation rate may have affected the reduction in the unemployment rate in the 1990s.
In a general scenario, not strictly related to the 1990s, this literature seems to raise two important questions:

- whether the unemployment rate helps to predict the welfare participation rate; if so, how an exogenous shock to the unemployment rate affects the welfare participation rate (see point 1, and indirectly point 2);
- whether the welfare participation rate helps to predict the unemployment rate; if so, how an exogenous shock to the welfare participation rate affects the unemployment rate (see point 3).

Focusing on the 1990s, these two questions remain relevant. In fact, in the last decade, one might argue that the United States experienced a number of negative shocks to the unemployment rate, due to information revolution and investment recovery, and a number of negative shocks to the welfare participation rate, due to welfare reforms. This paper is aimed to answer the two questions of above by examining the relationship between the US unemployment rate and the welfare participation rate in a structural VAR model.

3. Data

The reviewed literature is based on panel data and on micro-econometric tools. For instance, the 1997 report by the CEA is based on State administrative data from 1976 to 1996, extended to 1998 in the second report (1999). The study by Ziliak et al. (2000) is based on the same data of the 1997 report by the CEA. Moffitt (1999) uses data for the period of 1977-1995 from the March Current Population Survey. Schoeni and Blank (2000) use the same source of Moffitt (1999), extending the sample up to 1999. Kaushal and Kaestner (2001) use the same source, focusing on the period of 1995-1999. Meyer and

Rosenbaum (2000) use data from the 1984-1996 Current Population Survey Outgoing Rotation Group File, and from the 1985-1997 March Current Population Survey.

Due to the micro-econometric approach, existing research has not yet analyzed the relationship between the unemployment rate and the welfare participation rate from a macro-econometric point of view. A macro-econometric analysis is interesting for various reasons. First of all, it is interesting because the literature has stressed that the reduction in the welfare participation rate was mainly or totally due to the decline in the unemployment rate (Bell, 2001 for a review). The positive influence of the unemployment rate on the welfare participation rate may appear clear when considering the existence of the AFDC-Unemployed Parent program since 1961. However, this influence may appear not clear when looking at the data at aggregate level. As Figure 1 shows, a decline (increase) in the unemployment rate is not necessarily associated with a decline (increase) in the welfare participation rate, although the two variables are positively correlated ($r = 0.49$, p-value = 0.001). Hence, a deeper analysis seems necessary.

The main empirical analysis in this paper is based on annual data for the period of 1960-2000 from Current Population Survey for the unemployment rate, and from the Department of Health and Human Services (DHHS) for the welfare participation rate. Data prior to 1960 are not used as the AFDC program was still Aid to Dependent Children, and the share of adults on the rolls was minimal. Moreover, the DHHS has not yet provided data on the welfare participation rate prior to 1960 (and posterior to June 2000). Both the welfare participation rate and the unemployment rate can be treated as stationary series. The KPSS test with intercept (no trend) does not reject the null hypothesis of stationarity in both two cases as the test-statistics for U and B are 0.19 and 0.33 respectively, while the critical value at 5% level is 0.46. Hence, non-transformed data are used in the empirical analysis.

4. Structural model

The main argument behind the empirical model in this paper is the following. As seen in Section 2, existing studies can be divided in two groups. The first group of studies has discussed the influence of the unemployment rate U on the welfare participation rate B (for instance CEA, 1997; CEA, 1999; Ziliak and Figlio, 1999; Ziliak et al. 2000, Klerman and Haider, 2002). These studies have also discussed the influence of the welfare reforms on B. The second group of studies has discussed the influence of the welfare reforms on employment and labor force (for instance Moffitt, 1999; Schoeni and Blank, 2000; Meyer and Rosenbaum, 2000; Grogger, 2001; Martinson, 2000). If a political choice to modify the share of population on welfare assistance may affect employment and labor force, then the second group of studies has indirectly discussed the influence of B on U. For completeness, it is worth to remind that the second group of studies has also discussed the influence of factors different from welfare reforms on employment and labor force. This paper puts together the first group of studies (those directly discussing the influence of U on B) and the second group of studies (those indirectly discussing the influence of B on U) in assuming that the relationship between U and B can be summarized by the following structural model:

(1) $$U_t = C_U + \sum_{i=1}^{p} \phi_i U_{t-i} + \sum_{i=0}^{p} \delta_i B_{t-i} + E_{Ut}$$

(2) . $$B_t = C_B + \sum_{i=1}^{p} \eta_i B_{t-i} + \sum_{i=0}^{p} \theta_i U_{t-i} + E_{Bt}$$

It is implicit that this model is strictly aimed to provide the simplest possible macro-econometric framework for the relationship between U and B, arising from the literature.

The structural shock in equation (2) is an exogenous shock to the welfare participation rate. For this reason, it can be properly thought as a political choice to modify the share of population on welfare

assistance. Analogously, the structural shock in equation (1) is an exogenous shock to the unemployment rate. For instance, a Keynesian economist would interpret it as an exogenous shock to the growth rate of effective demand which is transferred to the growth rate of GDP and, in turn, to the unemployment rate.
The reduced-form model is the following:

(3) $$y_t = A_0^{-1}c + \sum_{i=1}^{p} A_0^{-1}A_i y_{t-i} + A_0^{-1}e_t$$

where

$$y_t = \begin{bmatrix} U_t \\ B_t \end{bmatrix} \quad c = \begin{bmatrix} C_U \\ C_B \end{bmatrix} \quad e_t = \begin{bmatrix} E_{Ut} \\ E_{Bt} \end{bmatrix} \quad A_0 = \begin{bmatrix} 1 & 0 \\ -\theta_0 & 1 \end{bmatrix}$$

and A_i is a 2×2 matrix for i = 1,…, p.

To simplify notation, the model can be re-written in the following form:

(4) $$y_t = \Phi_0 + \sum_{i=1}^{p} \Phi_i y_{t-i} + v_t$$

where

$$E(v_t v_t') = A_0^{-1}E(e_t e_t')(A_0^{-1})'$$

and

$$E(e_t e_t')$$

is a diagonal matrix.

Structural decomposition is based on a Sims-Bernanke procedure as described by Enders (1995, pp. 324-327). Identification is Cholesky-type with the welfare participation rate ordered last. Therefore, it is assumed that a shock to the welfare participation rate does not have an immediate effect on the unemployment rate while the converse is true.

This assumption is consistent with the existing literature that primarily stresses the influence of the unemployment rate on the welfare participation rate (Bell, 2001). However, estimated IRFs are highly robust to a different ordering and to a generalized approach (Pesaran and Shin, 1998). They are also robust to a Blanchard-Quah identification (1989) assuming that the accumulated response of B to U converges to zero. The assumption that the accumulated response of B to U converges to zero should be justified on a theoretical ground. Unfortunately, no well-established theory on (the short-run and) the long-run relationship between U and B is available. Indeed, one reason to perform a VAR analysis is just to derive some stylized facts that can be modeled afterwards. However, the assumption that the accumulated response of B to U converges to zero can be justified on an empirical ground. It is, in fact, one of our main empirical results when using a Choleski-type identification (B last) or a generalized approach.

5. Estimation and stylized facts

The order of the VAR is chosen using the maximum likelihood ratio test. The best model has order p = 2 since the null hypothesis of

$$\Phi_2 = 0$$

is rejected. Akaike and Schwarz criteria confirm this choice. Therefore, the dynamic specification of the estimated model (the number of lags) is not arbitrarily chosen. This is a way to deal with the dynamic specification puzzle of existing research, described in Section 2 (see also Bell, 2001; Klerman and Haider, 2002).
The estimated reduced-form VAR is the following:

(5)

$$\begin{bmatrix} U_t \\ B_t \end{bmatrix} = \begin{bmatrix} 0.84 \\ 0.34 \end{bmatrix} + \begin{bmatrix} 0.94 & 0.47 \\ 0.05 & 1.71 \end{bmatrix} \begin{bmatrix} U_{t-1} \\ B_{t-1} \end{bmatrix} + \begin{bmatrix} -0.30 & -0.16 \\ -0.06 & -0.77 \end{bmatrix} \begin{bmatrix} U_{t-2} \\ B_{t-2} \end{bmatrix} + \begin{bmatrix} V_{Ut} \\ V_{Bt} \end{bmatrix}$$

Table 1 contains a Granger-causality test. Figures 2 and Figure 3 plot the impulse response functions (IRFs). The results seem very interesting. Following Christiano et al. (1996), the VAR approach is used to derive stylized facts. In this case, the empirical analysis suggests the following two facts:

1. The unemployment rate (U) does not Granger-cause the welfare participation rate (B). In the short-run, it is doubtful whether a shock reducing (increasing) U predicts a reduction (increase) in B (see confidence interval). The accumulated response of B to U converges to zero.
2. The welfare participation rate does Granger-cause the unemployment rate (at 10% level). In the short-run, a shock reducing (increasing) B predicts a reduction (increase) in U. The accumulated response of U to a negative (positive) shock to B converges to a negative (positive) number.

6. Has the fall in the unemployment rate caused the fall in the welfare participation rate?

The first stylized fact is at odds with the findings of a large part of the literature, for instance with the findings by the CEA (1997, 1999), Ziliak et al. (2000), Figlio and Ziliak (1999), Levine and Whitmore (1998), Wallace and Blank (1999), Blank (2001), Bartik and Eberts (1999). An explanation for this surprising result is that cited studies have focused on the effect of U on B without considering the interaction between U and B, instead captured by the VAR analysis. Data do not support the idea that the decline in the unemployment rate somehow led the decline in the welfare participation rate in the 1990s. This result is consistent with the fact that the UP recipients, those more directly affected by the level of unemployment, has never been more than 12% of total recipients, with an average of 8%. And, the average fells to 3% if only UP adults are considered (US Department of Health and Human Services, 1998).

If it is doubtful whether the unemployment rate affects the welfare participation rate, it is less doubtful whether welfare policy does it. Let's see why.
It is possible to recover the structural shocks to both the welfare participation rate and the unemployment rate from 1962 to 2000 using equation

$$e_t = A_0 v_t$$

Structural shocks

$$e_t = (E_{Ut}, E_{Bt})$$

are plotted in Figures 4-5. First of all, Figures 4-5 confirm that the 1990s were characterized by several negative shocks to both the welfare participation rate and the unemployment rate, as supposed in Section 2. It is worth to remind that a negative structural shock to the welfare participation rate can be interpreted as political choice to reduce the share of population on welfare rolls.
Further, a brief discussion of the effects of past welfare policies may help to understand the experience of the last decade. Let's, for instance, consider the late 1960s. The rise in the welfare participation rate in the late 1960s can be associated with the 'unconditional war on poverty' made by President Johnson (Moffitt, 2002). This 'war' started with the introduction of Food Stamps and Medicaid in 1965. AFDC caseloads were made automatically eligible, rising propensity of poor families to enter the AFDC program. Moreover various political groups, such as the National Welfare Rights Organization, encouraged needy families to apply for AFDC benefits. The politics of the 'Great Society' induced States to accept more applications. It also happened in force of Supreme Court decisions that imposed States to eliminate, being at adds with the Social Security Act, some restrictions to eligibility such as residency requirements or the so-called 'man-in-the-house rule'. In addition, in 1967, the Government decreased the benefit reduction rate from 1 to

. $\frac{2}{3}$

The impact of this change on the welfare participation rate was surely positive. In fact, a benefit reduction rate of

$$\frac{2}{3}$$

allowed families with income above of the guarantee level, say G, to be eligible, provided an income lower than

$$\frac{3}{2}G$$

Instead, the benefit reduction rate of 1 implied non-eligibility of every family with income above of the guarantee level.

Let's make an additional example on the possible link between the level of B and welfare policy intervention. In 1981, the Omnibus Budget Reconciliation Act (OBRA) moved the benefit reduction rate from

$$\frac{2}{3}$$

to 1. Except for few months of earnings disregard, a 100% benefit reduction rate made non-eligible many families with income a little above of the guarantee level. In addition, the OBRA introduced a federal income-limit for eligibility, and also included an eventual stepparent's income in calculation of total family income. The sum of these 1981 changes probably caused the recipients to decrease from 11.1 millions in 1981 to 10.4 millions in 1982.

An increase in B was also registered in the early 1990s. This increase can be - at least partly - related to the 1988 Family Support Act (FSA) and to its 1990 reinforcement. In 1988, Government made participation in the AFDC-UP program mandatory for every State receiving welfare matching grants. The new law had transitory rules for those States not offering the UP program in 1988 which had to build it up. The transition period expired in October 1990 and the number of States offering AFDC-UP jumped from 28 in 1990 to 52 in 1991. Further, the FSA made mandatory State medical assistance for AFDC families, rising propensity of poor to apply for AFDC.

In conclusion, the first stylized fact and some additional arguments (presented so far) make hard to believe that the decline in the welfare participation rate since its 1994 peak was mainly or totally due to the

decline in the unemployment rate, as the majority view suggests (Bell, 2001). The fall in B should be mainly or totally attributed to the restrictive welfare reforms, under the assumption that the literature is right in considering two main explanations for this fall (which is not obvious).
Let's guess, for a moment, that this conclusion is wrong. Then there are several questions to be answered. How could one explain the radical fall in the number of non-adult recipients in Figure 6? Have children left welfare for work like their parents? Have they lost eligibility due to income improvement of their parents? Since children do not generally work and the literature does not provide sufficient evidence of income improvement for adult welfare leavers (Weil, 2002), the fall in the number of non-adult recipients can only be explained as effect of restrictive welfare reforms (see also Edelman, 1997).
Regarding the second VAR stylized fact, it is consistent with various findings in the literature: for instance with the findings by Moffitt (1999), Schoeni and Blank (2000), Grogger (2001), Meyer and Rosenbaum (2000), Martinson (2000), Kaushal and Kaestner (2001). Data seem to support the idea that a political choice to contract (expand) the welfare participation rate can reduce (increase) the unemployment rate. The next Section is aimed to discuss theoretical issues behind this result. We also wonder whether the reduction in the welfare participation rate, due to a political choice, had an impact on the reduction of the unemployment rate in the 1990s.

7. Has the fall in the welfare participation rate inflated the fall in the unemployment rate?

The idea that the number of welfare caseloads can affect the official unemployment level is not new in the economic theory. It is associated, at least since 1937, with the concept of disguised unemployment introduced by Joan Robinson (1980). Disguised unemployment can be defined as the number of people holding peripheral jobs in an economy. In Robinson's view, total employment in an economy is given by the sum of regular employment, say R, and disguised unemployment, say

D. The latter is highly affected by the number of people willing to do peripheral jobs. In fact D can be lower than its potential level determined by the effective demand, while this is less likely to happen for R. The basic idea is the following: if public assistance allows more people to survive without doing peripheral jobs, then less people will be willing to do such jobs. Therefore, disguised unemployment could be lower than its potential level and official unemployment might be higher than its potential level. Formally, one could argue that R is always equal to the number of non-peripheral jobs available (determined by the effective demand), while D is the minimum between the number of peripheral jobs available, say Y (determined by the effective demand), and the number of people willing to do peripheral jobs, say X (negatively affected the number of people on public assistance). Then, if there is an excess of Y over X, a fall in the number of people on welfare rolls increases the level of disguised unemployment.

The economic expansion since 1993 increased both non-peripheral and peripheral job opportunities. The decrease in the number of caseloads, due to a political choice, probably increased the number of people willing to accept peripheral jobs (Solow, 1997), so boosting growth in disguised unemployment. The latter would have been lower in absence of the welfare reforms, as the increase in peripheral job opportunities would have been followed by a lower increase in the number of people willing to do those jobs.

This kind of reasoning suggests that the fall in the welfare participation rate since its 1994 peak, due to the welfare reforms, may have inflated the fall in the unemployment rate in the 1990s. Our second stylized fact supports this conclusion. Theoretically, a fall in the share of population on welfare assistance reduces the unemployment rate if the induced increase in the share of population with at least a peripheral job is higher that the induced increase in the share of population searching at least a peripheral job. In other words, a fall in B reduces U if the induced percent increase in total employment due to disguised unemployment is higher than the induced percent increase in total labor force (assuming that the fall in B has a negligible effect on the percent increase in total employment due to regular employment). It is possible to argue that the percent increase in total employment due to disguised unemployment, not exclusively induced by the fall in B, was not a minor issue from 1994

to 2000. In fact, some industries leading employment growth have been actually leading growth in disguised unemployment.

As known, services and retail commerce were the sectors with the highest absolute employment growth in the 1990s (Hatch and Clinton, 2000). One aim of this Section is to argue that these two sectors were characterized by presence of disguised unemployment in a certain share of total employment. In addition, more important, some industries of retail commerce and services, among those leading employment growth, have actually been leading growth in disguised unemployment.

In the famous dictionary *The New Palgrave*, Bhaduri (1987) writes that 'some persons may be unemployed in a disguised manner not only in the sense of having a very low earning rate i.e. income-wise unemployment but also in the sense of relatively light work intensity per day, i.e. time-disposition-wise unemployment. And, unless one believes in the neoclassical proposition that income necessarily reflects the marginal product, one would have to devise, a third (and separate) criterion of disguised unemployment in terms of abnormally low productivity of labour' (Bhaduri, 1987; p. 864). On the lines of Bhaduri, a sector can present disguised unemployment if some of the following features are features of the sector:

1. a low annual GDP per employed;
2. a low number of weekly hours of work;
3. a low hourly wage.

Table 2 suggests that retail commerce and services are likely to present disguised unemployment in a certain share of total employment, as they show the lowest values of productivity, work-time and wages both in 1994 and in 2000. Let's discuss two possible criticisms.

First, a lower product per employed in a sector can be due to a lower capital-labor ratio in the sector, not to workers less productive, qualified or 'worse' in some sense. The difficulty of measuring the capital-labor ratio actually used by each sector is well-known. This difficulty implies that data on the capital-labor ratios are not available. Table 2 tries to deal with this issue, providing data on the stock of private fixed assets per employed. Differences in these 'capital'-labor ratios can be used as proxies of differences in the actual capital-labor ratios. Of course, our 'capital'-labor ratios should be taken with caution, as data on public fixed assets used by each sector are not available. Taken into account the above, Table 2 shows that the sector of construction has a higher

average productivity than retail commerce and services, although the sector uses a lower stock of 'capital' per employed.
Second, a lower weekly work-time in retail commerce and services can be due to more qualified jobs in these sectors, not to more part-time jobs. However, this hypothesis is clearly at odds with data on wages. More qualified jobs should imply higher hourly wages, which is not the case.
To conclude, the coincidence of three disguised unemployment indicators makes quite likely a lower average quality of labor in retail commerce and services.
As retail commerce and services have a lower average quality of labor, some industries of the two sectors are likely to have a very low quality of labor, such that employment in these industries can be thought as disguised unemployment. Let's focus on those industries of retail commerce and services leading employment growth in the 1990s. Data from the US Census Bureau (in Table 3) report that there are four leader-industries in services, i.e. Help supply services, Computer and data processing services, Health services, Social services, while there is one leader-industry in retail commerce, namely Eating and drinking places.
Let's focus on Eating and drinking places. This industry includes all types of restaurants, but the most common types are those of fast-food where part-time jobs are typical (Bureau of Labor Statistics, 2003, pp. 122-125). The average weekly wage is very low: only 177 dollars in 2000, while the average in the private sector is 474 dollars. The industry experienced an employment growth of about one million people from 1994 to 2000, which can be - at least partly - considered as growth in disguised unemployment.
Similar arguments hold for Help supply services (and, partly, for Social Services). The 1994-2000 employment growth of this industry can be - at least partly - considered as growth in disguised unemployment. This is an industry employing temporary workers, actually used in other sectors or industries. As disguised unemployed are the first to lose their jobs when bad times arrive, Help supply services experienced very strong job losses since September 2000. In one year, the industry lost 45% of their 1994-2000 employment growth (see Table 4).
As stated before, we have focused on industries leading employment growth. Nevertheless, welfare reforms may have induced growth in

disguised unemployment in industries not leading employment growth, but still contributing to it.
An answer to the question entitling this Section is uneasy. Let's start from a simple year-to-year problem, where the two reference-years are 1994 and 2000. The percent increase in total employment

$$\frac{N_{2000} - N_{1994}}{N_{1994}}$$

can be seen as the sum of the percent increase in total employment due to regular employment

$$\frac{R_{2000} - R_{1994}}{N'_{1994}}$$

say *r* , and the percent increase in total employment due to disguised unemployment

$$\frac{D_{2000} - D_{1994}}{N'_{1994}}$$

say *d* .
As

$$N_{1994}$$

is available in the official statistics, a first step could be to estimate the level of disguised unemployment in the initial year

$$D_{1994}$$

A way to estimate disguised unemployment in a sector in a given year (and than in the whole economy in that year) is to make an assumption on the meaning of 'very low', 'relatively light' or 'abnormally low' in Bhaduri's definition. For instance, Eatwell (1995) maintains that a sector has disguised unemployment if it has a product per person employed less than 80% of that in manufacturing. Therefore, disguised unemployment is computed as the number of employed in the sector that would become unemployed if the product per person employed would be equal to 80%, instead than lower. As already argued, a lower productivity in a sector can be due to a lower capital-labor ratio in the sector, not due to less-productive or less-qualified workers in the sector.

Eatwell argues that 20% is a 'decent margin of error' to take into account this fact, justifying his choice as 'a rule of thumb'. One might argue that 20% is not a 'decent margin of error' as Eatwell does not provide a measurement of the capital-labor ratio in each sector. However, our data on the stock of 'capital' per employed seem to support Eatwell's criterion. In fact, the sector of construction shows a product per employed lower than manufacturing, but likely due to a lower capital-labor ratio (Table 2). Therefore, this sector should not be found to contain disguised unemployment using Eatwell's criterion. In fact, this sector has a product per employed higher than 80% of that in manufacturing. As reasonable, Eatwell's criterion detects disguised unemployment in retail commerce and services only.
Using Eatwell's criterion, Table 5 provide estimates of

$$D_{1994}$$

(14.9 millions) and

$$D_{2000}$$

(17.9 millions). These estimates allow to compute the percent increase in total employment due to disguised unemployment d . Our estimates suggest d = 2.4%. However, our estimates should be taken with caution because of two facts:

1. differences in wages and hours of work are not considered in computing disguised unemployment;
2. estimates are strictly dependent of the assumption of a 20% 'margin of error'.

In addition, it is important to stress that our computation does not allow to know the share of d explained by the fall in B, and that explained by other factors.
An answer to the question entitling this Section requires an additional step, after estimating d . We need to measure the percent growth in total labor force induced by the fall in the share of population on welfare rolls. The best available estimates, provided by Bartik (1998), suggest that the welfare reforms have increased labor force of about 1 million people from 1994 to 2000. Therefore, it is possible to calculate the

1994-2000 percent growth in labor force roughly due to the fall in B, say λ. Our computation suggests λ = 0.8%.
An appropriate conclusion of this Section is that a full answer to question entitling the Section cannot be provided as we do not know the share of *d* explained by the fall in B. A preliminary evidence can be based on both our second VAR stylized fact and the finding that *d* is much higher than λ. However, future research on this topic is needed and welcome.

8. Conclusions

A report by the Council of Economic Advisers (1997) started a large research effort about the effects of the unemployment rate on the welfare participation rate and vice versa, with special regard to the 1990s in the United States. In this paper the relationship between the unemployment rate and the welfare participation rate is examined in a structural VAR. It is found that the unemployment rate does not help to predict the welfare participation rate, while the converse is true. Moreover, an exogenous negative shock to the welfare participation rate predicts a reduction in the unemployment rate. The conclusion is that the decline in the welfare participation rate in the 1990s should be attributed to restrictive welfare reforms, not to the fall in the unemployment rate. Further, the political choice to reduce the welfare participation rate may have inflated the reduction in the unemployment rate, by increasing the number of people willing to accept peripheral jobs, for instance in the Eating and drinking places.

Appendix

This Appendix contains a number of technical notes on the main empirical analysis. It also highlights possible criticism.

The low dimension of the VAR negatively affects the generality of the study. A higher number of variables would make this study more general but also less closed to the existing literature. The choice of being as closed as possible to the existing research is aimed to strength assonances and dissonances.

Each time series used in this paper, namely U and B, has 41 annual observations. As the VAR model has required estimation of 10 parameters, the number of observations might be a source of distortion. However, to the extent of our knowledge, better data on national welfare caseloads are not available.

Another note is about the presence of unit roots. The autocorrelogram analysis suggests that each series can be represented as AR(2) process. The conceptual nature of each series indicates the need of an intercept. The estimated AR(2) coefficients and the intercept are statistically significant for both B and U. Every lag after the second is not significant. The AR(2) structure with intercept allows to run a ADF test with a intercept and one lagged difference. Test-statistics for U and B are

$$-2.35$$

and

$$-2.28$$

respectively, while the critical value at 10% level is

$$-2.60$$

The unit root hypothesis is not rejected in both two cases. This is a crucial point: if the series are non-stationary, our analysis may have some problems. However, it is unlikely that U and B are non-stationary series. In fact, it is well-known that unit-root tests have low power, i.e. low probability of rejecting a false null-hypothesis of a unit root (Enders, 1995 p. 251). Moreover, it is hard to think that the long-run multiplier of the unemployment rate is not finite. The same reasoning applies to the welfare participation rate. Further, all the IRFs in the VAR converge to zero (not shown in Figure 2), the accumulated IRFs converge to a finite number (Figure 3), and the KPSS test does not reject the null hypothesis of stationarity. In addition, our choice of not differencing data is consistent with the majority view. In fact, ' Sims (1980) and others, such as Doan (1992), recommend against differencing even if the variables contain a unit roots. They argue that the goal of VAR analysis is to determine the interrelationships among the variables, not the parameters estimates. […Further,] the majority view is that the form of the variables in the VAR should mimic the true data-generating process. This is particularly true if the aim is to estimate a structural model.'(Enders, 1995 p. 301).

Although it is unlikely that U and B are non-stationary series, the results of the ADF test suggest to inspect for a cointegrated relation (C.Eq.) between U and B. As the optimal order of the VAR is

$$p = 2$$

this information is used to run a Johansen cointegration test. The likelihood ratio criterion rejects every cointegration at 5% level. This result is confirmed using Engel-Granger procedure, for both (C.Eq.1)

$$U = \alpha_0 + \alpha_1 B + resid_1$$

and (C.Eq.2)

$$B = \beta_0 + \beta_1 U + resid_2$$

In both two cases, estimated residuals have AR(2) representation (as the autocorrelogram analysis suggests) without intercept. Every lag

after the second is not significant. The ADF test without intercept and with one lagged difference provides the following statistics:

$$-3.24$$

for the residuals of equation (1) and

$$-2.89$$

for the residuals of equation (2). Table B9 in Hamilton (1994) indicates that, for our case (case 2), the critical value at 5% is

$$-3.37$$

Then residuals are non-stationary.

A variance decomposition analysis shows that the variance in B explains 40% of the variance in U, while the variance in U explains only 10% of the variance in B. This result is affected by the low dimension of the VAR. However, the magnitude of the difference suggests that, in a more general framework, the variance in U explained by the variance in B is likely to be higher than the variance in B explained by the variance in U.

Our Granger-causality test provides a sufficiently clear indication on the Granger-exogeneity of B with respect to U. An unclear indication is regarding the Granger-exogeneity of U with respect to B, as the null-hypothesis that B does not Granger-cause U is rejected at 10% level (p-value 0.08). The choice of stressing that B may Granger-cause U is because this result is consistent with a part of the existing literature (as already stressed). Finally, it is important to underline that our Granger-causality results are to be taken with some caution due to the results of the ADF test.

Another note is related to identification. As known, identification of a structural model is controversial and it is uneasy to make the right choice. Our choice of a relatively simple method is due to the lack of a formal U-B theory, supporting a more complex identification method. We have chosen of 'letting data speak' in order to derive stylized facts that may be modeled by other researchers. As already stressed, our ordering is justified by the existing literature that primarily underlines the

influence of U on B. Therefore, the literature's agreement on the influence of U on B is criticized by our first stylized fact, under a non-favorable initial assumption. This should make the argument more convincing.

A final note is concerning with the VAR assumption of a relation between U and B linear in levels. A simple scatter plot suggests that the relation between U and B might be non-linear in levels. Under the assumption of a relation between U and B non-linear in levels while linear in logarithms, a structural VAR with the two main variables in logarithms can be estimated. The only difference with respect to the empirical analysis of this paper is related to the Granger-causality test: the null-hypothesis that lnB does not Granger-cause lnU is rejected at 5% level (p-value 0.03). This finding supports the argument that the welfare participation rate helps to predict the unemployment rate.

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Table 1

Granger Causality Tests (2 lags)

Null Hypothesis	F-stat.	P-value
B does not Granger Cause U	2.59	0.08
U does not Granger Cause B	1.63	0.20

Table 2

Disguised Unemployment Indicators and Stock of 'Capital' per Employed
Source: US Census Bureau (2001, p. 391). US Bureau of Economic Analysis
<http://www.bea.gov/bea/dn2/gpoc.htm> .
US Bureau of Economic Analysis
<http://www.bea.doc.gov/bea/dn/faweb/AllFATables.asp> .

Note: Public sector is not considered in this Table.

	Manufacturing	Construction	Transportation & Public Utilities	Wholesale Commerce	Retail Commerce	Finance, Insurance & Real Estate	Services
	Hourly Earnings (current dollars)						
1994	12.07	14.73	13.78	12.06	7.49	11.83	11.04
2000	14.38	17.14	16.22	15.18	9.45	15.07	13.88
	Weekly Hours						
1994	42.0	38.9	39.7	38.4	28.9	35.8	32.5
2000	41.5	39.3	38.5	38.5	28.9	36.3	32.7
	Annual GDP per Employed (current dollars)						
1994	66,764	55,214	102,172	77,766	30,262	181,960	43,224
2000	82,459	68,984	115,730	98,780	38,351	259,477	52,406
	Private Fixed Assets per Employed (current dollars)						
1994	75,719	18,742	357,602	56,914	23,523	1,317,798	22,006
2000	96,401	21,478	395,199	76,731	30,415	1,694,119	27,868

Table 3

Employment Change in 1990-2000 by Selected Industries (in Thousands)

	1990-1994	1994-2000	1990-2000
Retail commerce	709	2,826	3,535
General merchandise stores	–67	280	213
Food stores	29	271	300
Automotive dealers and service stations	84	267	351
Apparel and accessory stores	–34	50	16
Furniture and home furnishing stores	75	223	298
Eating and drinking places	547	1,009	1,556
Services	3,870	8,580	12,450
Hotels and other lodging places	–24	303	279
Hotels and motels	–27	300	273
Personal services	33	139	172
Laundry, cleaning, garment services	6	25	31
Beauty shops	11	44	55
Business services	1,308	3,299	4,607
Advertising	5	53	58
Personnel supply services	806	1,493	2,299
Employment agencies	75	95	170
Help supply services	733	1,398	2,131
Computer and data processing services	217	952	1,169
Prepackaged software	42	163	205
Data processing and software	35	52	87
Auto repair, services, and parking	130	154	284
Automotive repair shops	67	69	136
Motion pictures	75	148	223
Motion pictures theaters	3	17	20
Amusement and recreation services	193	502	695
Health services	1,218	1,107	2,325
Offices and clinics of medical doctors	224	371	595
Nursing and personal care facilities	218	158	376
Hospital	241	229	470
Home health care services	242	109	351
Legal services	34	69	103
Educational services	84	610	694
Social services	515	714	1,229
Membership services	108	387	495
Engineering and management services	132	803	935

Table 4

Employment Change in 2000-2002 by Selected Industries (in Thousands)

	2000-2001	2001-2002
Retail commerce	– 31	– 184
Eating and drinking places	24	– 106
Services	38	539
Business services	– 599	0
Personnel supply services	– 701	5
Help supply services	– 633	24
Computer and data processing services	52	– 33
Health services	323	270
Social services	171	85

Source: McMenamin et al. (2003, p. 7-8).

Table 5

Measuring Disguised Unemployment (in Thousands)

	1994 Level	2000 Level	1994-2000 Change
Retail commerce	8,887	9,685	797
Services	6,022	8,301	2,278
Whole economy	14,910	17,986	3,076

Note: Whole economy includes Public sector (no evidence of disguised unemployment in Public sector).
Source: US Census Bureau (2001, p. 391)

Figure 1

Unemployment Rate and Welfare Participation Rate

Source: US Department of Health and Human Services <http://www.acf.hhs.gov/news/stats/6097rf.htm>
US Bureau of Labor Statistics <http://www.bls.gov/cps/cpsaat1.pdf>.

Figure 2

Impulse-Response Functions

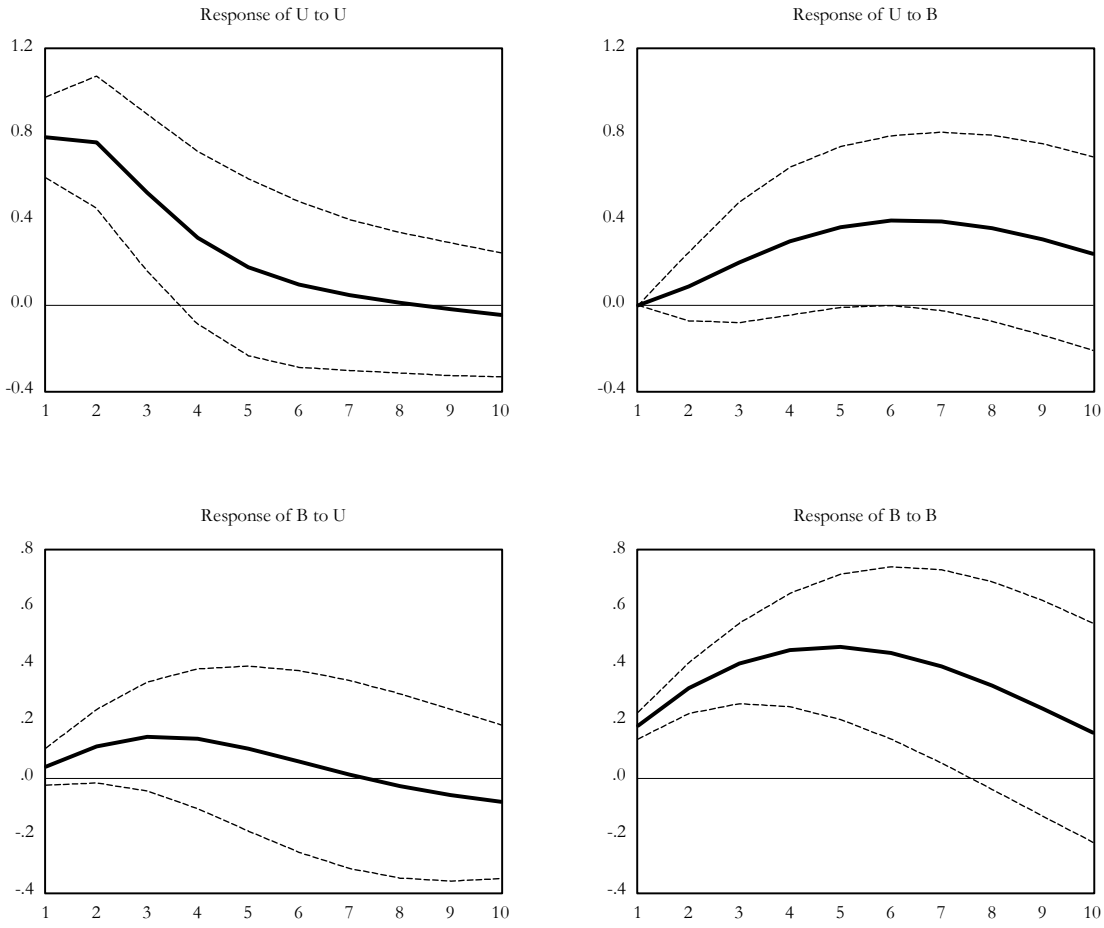

Figure 3

Accumulated Impulse-Response Functions

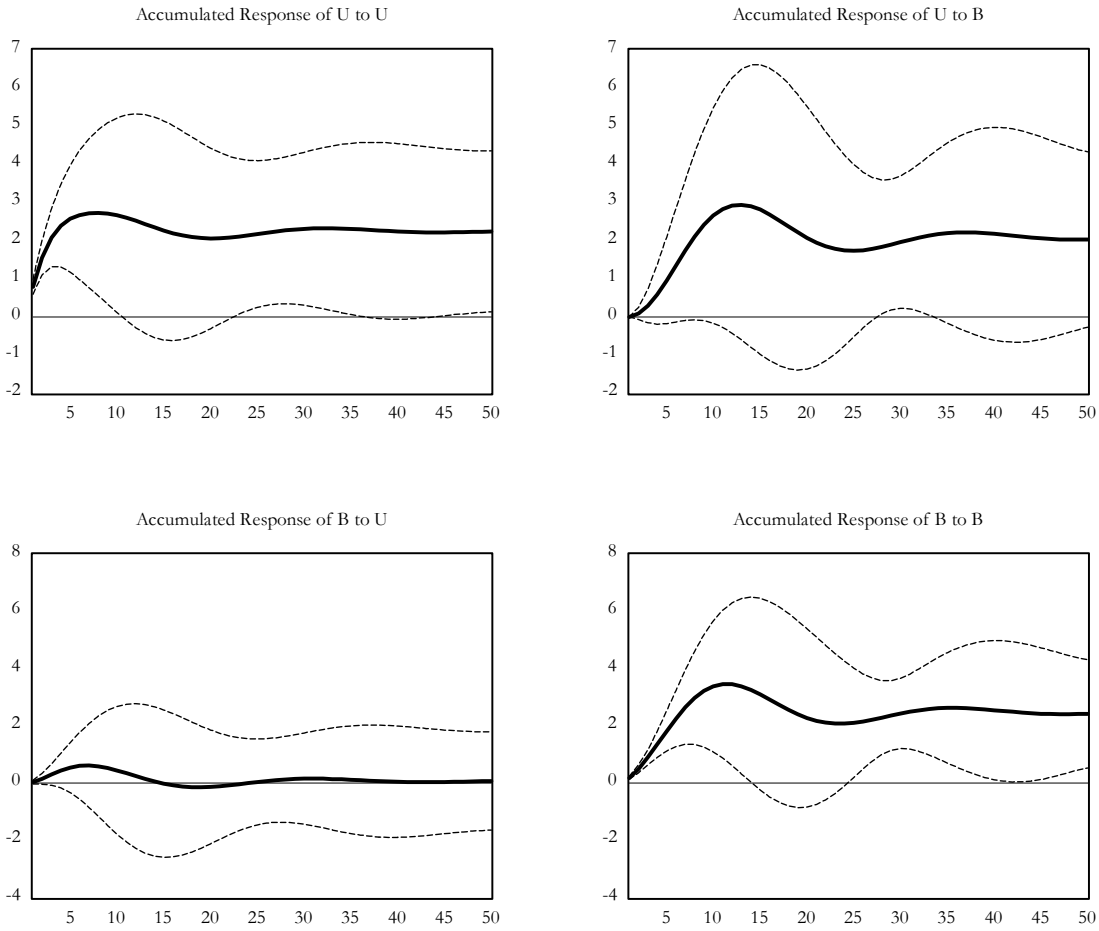

Figure 4

Structural shocks to the welfare participation rate

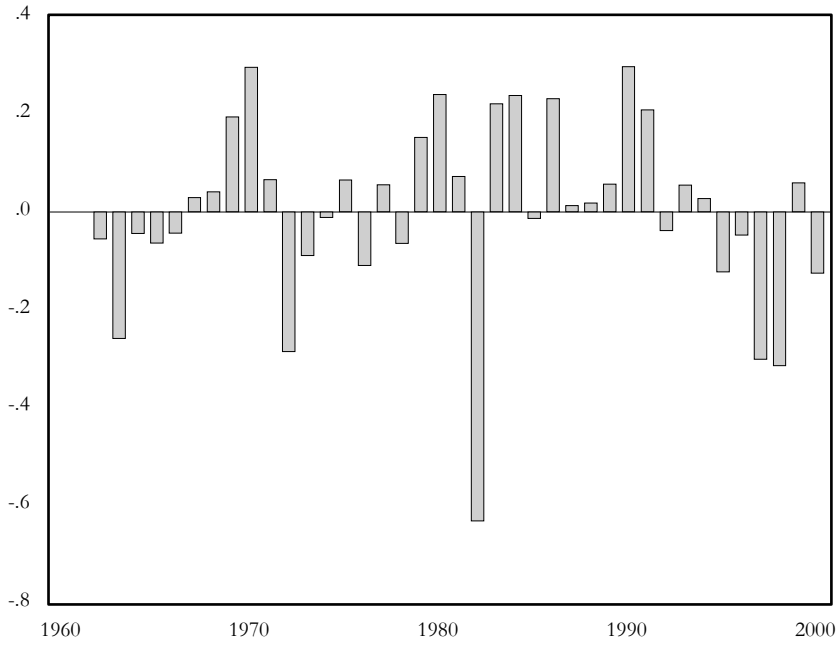

Figure 5

Structural shocks to the unemployment rate

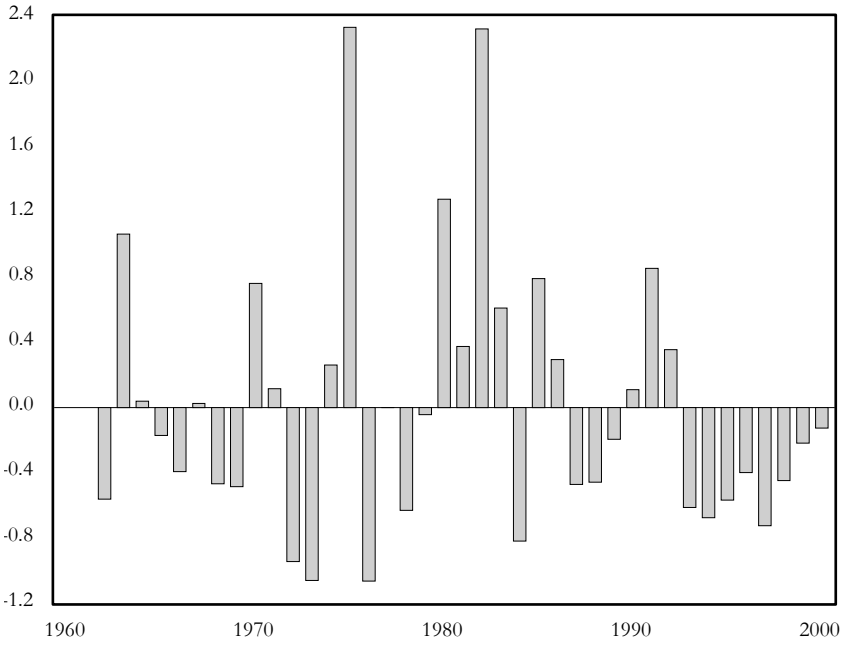

Figure 6

AFDC-TANF Recipients by Selected Categories (in Thousands)

Source: US Department of Human and Health Services <http://aspe.hhs.gov/hsp/indicators03/>