Unemployment and Welfare Participation in a Structural VAR: Rethinking the 1990s in the United States

Corrado Andini

Department of Public Economics
University of Rome 'La Sapienza'
Via Castro Laurenziano 9
00161 Rome Italy
Email: corrado.andini@uniroma1.it

Please send correspondence to:
Corrado Andini
Via Cassano 257
80144 Napoli Italy

Acknowledgements

I am indebt for their useful comments to Annamaria Simonazzi, Bruno Chiarini, James Ziliak, Luca Stanca, Luis Catela Nunes, the participants at the 24th Conference of the IWPLMS (Rome, Italy), the anonymous referees of the 5th Path to Full Employment Conference (Newcastle, Australia), the participants at the 14th Biennial Conference of the AISSEC (Naples, Italy). I also thank Rebecca Blank for providing me with data used in Section 6. A previous version of this manuscript is published as a CELPE discussion paper. Findings and opinions of this paper do not necessarily represent the views of any of the persons mentioned above. Any mistake is my responsibility.

Unemployment and Welfare Participation in a Structural VAR: Rethinking the 1990s in the United States

ABSTRACT

The Council of Economic Advisers (1997) started a large research effort about the relationship between the US unemployment rate and the welfare participation rate, with special regard to the 1990s. In this paper, this relationship is examined in a structural VAR over the period of 1960-2000. 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. These results are robust to State and year heterogeneity over the period of 1990-1998. A first implication is that - contrarily to the majority view - the decline of the welfare participation rate in the last decade should be mainly 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.

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

Contents

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 mainly 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 reviewing the literature on the welfare reforms occurred in the United States during the last decade. 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 the welfare participation rate and the unemployment rate manifested a strong positive association. Section 6 inspects for robustness of VAR results with respect to State and year heterogeneity over the last decade, using panel data. Sections 7 and 8 discuss the main implications of the stylized facts arising from the VAR analysis. Section 9 concludes the article. A short Appendix provides some further details on the main empirical model of this study.

2. A summary of the literature

2.1 Welfare policy in the 1990s

During the 1990s, the United States deeply reformed their most important welfare program, the Aid to Families with Dependent Children (hereinafter AFDC). The reforms led to the end of the program in August 1996. 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 cash and in-kind assistance to needy (income below a certain level) families with dependent children. Typical recipients were either 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 AFDC program was implemented by the States. Activities of each State were subject to the approval of the Government, which financed State expenditures in a share ranging from 50% to 80% (matching grant). The Department of Health and Human Services (DHHS) was in charge to control whether State activities were consistent with the AFDC law. However, since 1962, the DHHS could waive law requirements in order to allow States to carry out special policies. The actual use of waivers started in the 1980s but it only became a common practice in the first half of the 1990s. Indeed, from 1993 to 1996, President Clinton awarded a federal waiver to 43 States. As well known, States receiving waivers deeply changed the nature of the AFDC program by introducing time limits to aid and family caps, by reducing exemptions to participation in mandatory activities (either work or training), by enhancing sanctions (CEA, 1997).

In August 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). Indeed, 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). In addition, the monthly AFDC subsidy per family decreased a lot in the 1990s reaching a new historical negative record every new year (US Department of Health and Human Services, 2003).

All in all, the last decade dated several restrictive reforms, but it was not only a period of social retrenchments since 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. All these policies were work-oriented on the lines of the welfare policies of the 1990s. Indeed, they all shared a common feature: they only helped the poor holding a job.

2.2 Caseload studies

A report by the CEA (1997) has started a large research effort about the welfare reforms in the United States in the 1990s, reviewed by Blank (2002) and Moffitt (2002). The welfare participation rate, i.e. the share of population receiving AFDC-TANF, has declined since a peak in 1994 (Figure 1). The decline is consequence of a drastic reduction in the total number of caseloads, decreased from 14.2 millions in 1993 to 5.7 millions in 2000. A large part of the literature has focused on explaining why the welfare participation rate declined. The CEA (1997), for instance, argues that the share of population on public assistance has declined both because of the strong economy and because of welfare reforms. From 1993 to 1996, about 31-45% of the decline can be attributed to the decrease in the unemployment rate (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. (1997; 2000) argue that almost all of the decline in the welfare 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 share of population on welfare rolls. Similar results are in Figlio and Ziliak (1999) and Bartik and Eberts (1999).

Figure 1 here

In 1999 the CEA extends its previous analysis taking the effects of the 1996 welfare reform (PRWORA) into account. The new report (CEA, 1999) maintains that 35-36% of the decline in the welfare participation rate is 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 revisited estimates for the period of 1993-1996). Hence, TANF has affected per-capita caseloads more than waivers (12-15% in the revised estimates for 1993-1996), while the unemployment rate in post-TANF period has affected per-capita caseloads less.

Some studies have analyzed the impact on economic and political factors on the use of

welfare (dummy variable), instead than on the welfare participation rate (per-capita caseloads). For instance, Grogger (2001) argues that the fall in the unemployment rate has reduced the welfare use less than welfare reforms, while O'Neill and Hill (2001) maintain that this conclusion holds for TANF, but not for waivers.

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 has contributed to the fall in the welfare participation rate and the welfare use. There is less agreement on contributions of waivers and TANF. 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 have increased per-capita caseloads; and Ziliak et al. (2000) have the same result for work-incentive waivers (enhanced earnings disregard). Sometimes results are more expected: for instance Grogger (2000; 2001) finds that time limits have decreased welfare use.

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 considered 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. Klerman and Haider (2004) have even argued that the all models having the stock of per-capita caseloads as dependent variable are misspecified as containing a null or non-sufficient number of lags of the explanatory variables (including the unemployment rate). Due to the shortness of the available panel data, these authors suggest a new procedure (called 'stock-flow' approach) to study the stock of per-capita caseloads, which avoids need of many lagged regressors. Unfortunately, they use data on caseload flows which are not available at national level. Indeed, they use data from California and, therefore, their results are not necessarily valid at national level.

2.3 Welfare-to-work studies

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 or female-headed families, i.e. typical adults or families on welfare assistance. Moffitt (1999), for instance, finds that waivers have 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 the welfare reforms, arguing that the reforms have reduced people dependence on welfare, increased earnings and reduced poverty in families with less-educated women (the benefits of the 1996 reform seem 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, such as increased EITC, reduced welfare benefits, re-defined job-training programs and increased Medicaid. Single mothers have 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. The authors attribute the increase in labor activity of single mothers mainly to the increased EITC. They find less evidence that reduced welfare benefits have 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, have 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) suggests caution as the effects of reforms are hardly separable from those of EITC and economic expansion.
Finally, leavers' studies have shown that most of former adult recipients hold 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. Salaries of leavers, however, are either low or very low (between 5.50 and 8.50 dollars per hour).

2.4 A summing up

Our 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 has affected the fall in the welfare participation rate since its 1994 peak (caseload studies);
2. to what extent the welfare reforms since 1993 reduced the welfare participation rate (caseload studies);
3. to what extent the welfare reforms affected the reduction in the unemployment rate, by affecting both labor force and employment (welfare-to-work studies).

In a general scenario, not strictly related to the 1990s, reviewed 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, and indirectly point 2).

Focusing on the 1990s, these two questions remain relevant. Indeed, over 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 the 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 CEA (1997) uses State administrative data from 1976 to 1996, provided by the US Department of Health and Human Services and the Bureau of Labor Statistics. In a second report, the CEA (1999) extends this sample up to 1998. Ziliak et al. (1997; 2000) use monthly observations from 1986 to 1996. A different approach is taken by Moffitt (1999) who uses individual data for the period of 1977-1995 from March Current Population Survey. Schoeni and Blank (2000) use the same source as Moffitt (1999), but extending the sample up to 1999. Kaushal and Kaestner (2001) also use the same source, but focusing on the period of 1995-1999. Meyer and Rosenbaum (2000) focus, instead, on the period of 1984-1997.
Due to a 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. One reason of performing a macro-econometric analysis

is the agreement in the literature on the argument that the reduction in the welfare participation rate was mainly due to the decline in the unemployment rate (Bell, 2001). Although a 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, it seems unclear when looking at national-level data. 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 useful.
The main empirical analysis in this paper is based on annual data for the period of 1960-2000 (Figure 1). 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. As Table 1 suggests (ERS and KPSS tests), both the welfare participation rate and the unemployment rate can be treated as stationary series. Hence, non-transformed data are used in the empirical model.

Table 1 here

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 (caseload studies)[1]. The second group of studies has discussed the influence of the welfare reforms on employment and labor force (welfare-to-work studies)[2]. 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. 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:

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

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

It is implicit that this model is strictly aimed to provide the simplest macro-econometric framework for the relationship between U and B, arising from the literature (see also Appendix). The structural shock in equation (2) is an exogenous shock to the national welfare participation rate. For this reason, we can interpret it as a federal 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.
The reduced-form model is the following:

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

where $y_t = \begin{bmatrix} U_t \\ B_t \end{bmatrix}$, $c = \begin{bmatrix} C_U \\ C_B \end{bmatrix}$, $e_t = \begin{bmatrix} E_{Ut} \\ E_{Bt} \end{bmatrix}$, $A_0 = \begin{bmatrix} 1 & -\delta_0 \\ -\theta_0 & 1 \end{bmatrix}$ 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:

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

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, our impulse-response functions (IRFs) are highly robust to a different ordering and to a generalized approach (Pesaran and Shin, 1998).

5. 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 (Bell, 2001; Klerman and Haider, 2004).

Equation (4) with order p = 2 is named Model 1. It is estimated by Ordinary Least Square (OLS) and the results are presented in the columns (a)-(b) of Table 2. Fitted series are plotted in Figure 1, Granger-causality tests are in Table 3, while Figures 2-3 contain IRFs. Following Christiano et al. (1996), we use the VAR approach to derive stylized facts. Specifically, our analysis suggests the following two facts:

Table 2 here
Table 3 here
Figure 2 here
Figure 3 here

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 a neighborhood of 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.

The above implies - among other things - that the unemployment rate significantly responds to a permanent shock to the national welfare participation rate (like a federal welfare reform), while the converse is not true.

6. How well our stylized facts fit the 1990s? A panel VAR analysis

It is of interest to inspect whether results of Model 1 are robust to State and year heterogeneity over the 1990s. To do this, it is useful writing Model 1 in its following reduced-form:

$$U_t = C_U + \phi_1 U_{t-1} + \phi_2 U_{t-2} + \delta_1 B_{t-1} + \delta_2 B_{t-2} + \text{resid}U_t \quad (5)$$

$$B_t = C_B + \eta_1 B_{t-1} + \eta_2 B_{t-2} + \theta_1 U_{t-1} + \theta_2 U_{t-2} + \text{resid}B_t \quad (6)$$

where, clearly, $\text{resid}U_t = V_{Ut}$ and $\text{resid}B_t = V_{Bt}$. Therefore, a natural step onward is to carry on estimating a Panel-VAR model in the following reduced-form (Arellano, 2003, p. 117):

$$U_{st} = u_s + u_t + \phi_1 U_{st-1} + \phi_2 U_{st-2} + \delta_1 B_{st-1} + \delta_2 B_{st-2} + \text{resid}U_{st} \quad (7)$$

$$B_{st} = b_s + b_t + \eta_1 B_{st-1} + \eta_2 B_{st-2} + \theta_1 U_{st-1} + \theta_2 U_{st-2} + \text{resid}B_{st} \quad (8)$$

where u_s and b_s contain State specific effects, while u_t and b_t contain year effects. Equations (7)-(8) are named Model 2.

In order to assess whether results of Model 1 can be specifically associated with the 1990s, Model 2 is estimated - using annual State-level data from the CEA (1999) - over the sample period of 1990-1998. Particularly, Model 2 is estimated by Generalized Method of Moments (GMM).

Before presenting estimation results, it is of interest to inspect data persistency. Following Blundell and Bond (2000), we estimate several AR(1) processes for each series[3] using OLS, Fixed Effects (FE) as well as GMM. The latter method uses as instruments all available lags of unemployment or welfare participation up to t–2. This allows to assess whether to worry about presence of weak instruments due to highly persistent series.

Table 4 shows that, for the welfare participation rate, two-step difference-GMM (say GMM2 DIFF; see Arellano and Bond, 1991) performs poorly due to weak instruments. Indeed, the estimated coefficient is lower than the one from FE which is based downward in presence of State effects. However, two-step system-GMM (say GMM2 SYS; see Blundell and Bond, 1998) does not work better due to second order auto-correlated residuals (this problem cannot be solved by reducing the number of instruments). Indeed, the estimated coefficient is higher than the one from OLS which is based upward in presence of State effects. This suggests to choose the appropriate GMM estimator for Model 2 by using the Hansen difference test, which in turn suggests to estimate Model 2 by GMM2 SYS (see Table 2).

Table 4 here

Estimation results for Model 2 are presented in Tables 2-3. We begin using as instruments all available lags of unemployment and welfare participation up to t–2. A non-singular

instrument matrix is obtained by 'collapsing' the number of instruments[4] (Roodman, 2004a; 2004b). Nevertheless our procedure fails when B is treated as dependent variable (equation (8)) since residuals are found to be second order auto-correlated. Instead, Model 2 looks suitable for B when using as instruments all lags up to t–3 (Blundell and Bond, 2000, p. 332).
Although not reported, OLS estimates of equation (8) in Model 2 - which are consistent in absence of State heterogeneity - are not closed to GMM2 SYS estimates of equation (8), suggesting that State specific effects mattered. The latter is less likely for equation (7), whose reported estimates are closed to those obtained by OLS (see also the AR(1) estimates for the unemployment rate in Table 4). Finally, year dummies are jointly significant in both equation (7) and (8).
All in all, results of Model 2 support those from Model 1. Therefore we carry on discussing the implications of the stylized facts in Section 5, focusing on the last decade.

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

Our first stylized fact (Section 5) is at odds with the findings of several caseload studies (Section 2). An explanation for this surprising result is that quoted studies have focused on the effect of U on B without modeling the interaction between U and B, instead captured by a VAR analysis. Another explanation may be related to sample differences as described in Section 3 and Section 6.
Our result does not support the idea that the decline in the unemployment rate has somehow led the decline in the welfare participation rate in the 1990s. This is consistent with the fact that the UP recipients, those more directly affected by the level of unemployment, have never been more than 12% of total recipients, with an average of 8%. And, this average fells to 3% if only UP adults are considered (US Department of Health and Human Services, 1998). In addition, our result is consistent with the fact that a fall in the unemployment rate might not imply a rise in the share of employed population since a fall in the share of active population might completely offset the rise in 1–U. And, if the share of employed population remain unchanged, the share of assisted population is more likely to remain unchanged despite the fall in U.
If it is doubtful whether the unemployment rate affects the welfare participation rate, it is less doubtful whether federal welfare policy has some influence. To show why, let's first recover the structural shocks to both the welfare participation rate and the unemployment rate from 1962 to 2000 using equation $e_t = A_0 v_t$. These are plotted in Figures 4-5 and confirm what supposed in Section 2: the last decade may have actually dated several negative shocks to both the unemployment rate and the welfare participation rate, the latter being consistent with the idea of a restrictive federal welfare policy.

Figure 4 here
Figure 5 here

Further, a brief review of the effects of previous federal welfare policies may help to better understand the experience of the last decade. For instance, the rise in the welfare participation rate in the late 1960s may 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, by providing administrative assistance. At the same time, the politics of the 'Great Society' encouraged States to accept more applications. The latter also happened in force of some Supreme Court decisions imposing States to eliminate (being at adds with the Social Security Act) several restrictions to eligibility, such as residency requirements or the so-called 'man-in-the-house rule'. In addition, in 1967, the Congress decreased the benefit reduction rate from 1 to 0.66 and this choice may have affected the welfare participation rate positively since the lower benefit reduction rate ended eligibility being restricted to families with income below of the guarantee level.

An additional example on the possible link between share of population on public assistance and welfare policy intervention is related to the approval of the Omnibus Budget Reconciliation Act (OBRA) in 1981. The OBRA moved the benefit reduction rate from 0.66 to 1. In addition, the act introduced a federal income-limit for eligibility and included the eventual stepparent's income in calculation of total family income. It seems likely that the sum of all these changes caused the recipients to decrease from 11.1 millions in 1981 to 10.4 millions in 1982, the highest decline since AFDC birth.

An increase in the welfare participation rate was also registered in the early 1990s. This increase can be - at least partly - related to the 1988 Family Support Act (FSA). This act made mandatory the participation in the AFDC-UP program for every State receiving matching grants. The FSA had transitory rules for those States not yet offering AFDC-UP, with the transition period expiring on October 1990. Indeed, the number of States offering AFDC-UP jumped from 28 in 1990 to 52 in 1991. Further, the FSA made mandatory the State medical assistance for AFDC families, rising propensity of poor to apply for benefits.

To conclude, 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 due to the decline in the unemployment rate, as the majority view suggests (Bell, 2001). On the contrary, the fall in the welfare participation rate since its 1994 peak can be mainly attributed to the restrictive welfare reforms occurred, under the assumption that the literature is right in considering two main explanations for this fall.

Regarding our second VAR stylized fact (Section5), it is consistent with findings of several welfare-to-work studies (Section 2). Our result supports the idea that a federal political choice to contract (expand) the welfare participation rate may 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, mainly due to a political choice, has affected the reduction of the unemployment rate in the 1990s.

8. 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, i.e. jobs paying a very low hourly wage. 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. Indeed, 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 (see also Eatwell, 1995).

The economic expansion since 1993 has increased both non-peripheral and peripheral job opportunities. The decrease in the number of caseloads, mainly due to a federal political choice, has likely increased the number of people willing to accept peripheral jobs. The combination of this two events may have increased the level of disguised unemployment. The increase 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, mainly due to the welfare reforms, may have inflated the fall in the unemployment rate in the 1990s, by increasing employment proportionally more than labor force. Our second stylized fact supports this conclusion. In addition, Boushey and Rosnick (2003) have shown that most welfare leavers have found jobs in low-wage industries of retail commerce and services, and that six of the top nine industries hiring former welfare recipients - food service, temporary help, home health care, nursing and residential care, local government teaching, and child care - have grown faster than total employment between 1996 and 2000.

The finding that B is not a strong predictor of U (p-value 0.08) is consistent with the fact that, theoretically, a change in the number of people on welfare rolls, that affects X, may or may not affect D. For instance, a reduction in the number of people on welfare rolls, increasing X from X(0) to X(1), does not increase D if Y(0) is not higher than X(0). In other words, it is consistent with the Keynesian view that maximum potential total employment depends, ultimately, on the aggregate demand.

9. Conclusions

The Council of Economic Advisers (1997) started a large research effort about the relationship between the US unemployment rate and the welfare participation rate, with special regard to the 1990s. We have examined this relationship in a structural VAR model over the period of 1960-2000. In our findings, 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. These results are robust to State and year heterogeneity over the period of 1990-1998. A first implication is that - contrarily to the majority view - the decline of the welfare participation rate in the last decade should be mainly 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.

Appendix

The low dimension of the VAR negatively affects generality of our study. Indeed we believe that our empirical model is far from being exhaustive. A higher number of variables might lead to different empirical results (or might not). This, however, will not affect our main point: that is, the importance of modeling somehow the dynamic interaction between the unemployment rate and the welfare participation rate. Indeed, our article has the additional aim to question the validity of the single-equation approach in the literature. Future research to improve our VAR specification is needed and welcome.

Each time-series used in Model 1, namely U and B, has 41 annual observations. Since Model 1 has required estimation of 10 parameters, the number of observations might be a source of distortion. However, results of Model 1 are not rejected using a panel of 51×9 observations (Model 2).

Another criticism may be related to the use of the national time-series themselves, independently of the number of observations. Since the AFDC-TANF is a State level program, the use of national time-series data may mask important heterogeneity at State level. Nevertheless, a time-series approach have at least two advantages. First, it allows to recover actual structural shocks to the national welfare participation rate, which are of some interest since suitable to be interpreted as federal welfare-policy shocks. Second, it easily allows to keep into account data on the share of population on welfare rolls in the period of 1960-1975, disregarded since the first CEA (1997) report. Moreover, although very simple, Model 1 provides a reasonable fit of actual data regarding the AFDC-TANF participation rate (Figure 1).

Another note is related to our identification method. As well-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 mainly due to the lack of a formal U-B theory, supporting a more complex identification method. Indeed, this paper has also the aim of 'letting data speak' in order to derive stylized facts that may be modeled by other researchers. As stressed in Section 4, 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.

References

Arellano M. (2003) *Panel Data Econometrics* (Oxford, Oxford University Press).

Arellano M., Bond S. (1991) Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations, *Review of Economic Studies*, 58, pp. 277-297.

Bartik T., Eberts R. (1999) Examining the Effect of Industry Trends and Structure on Welfare Caseloads', in: Danziger S.H. (ed.) *Economic Conditions and Welfare Reform* (Kalamazoo MI, Upjohn Institute Press).

Bell S.H. (2001) Why Are Welfare Caseloads Falling?, *Assessing the New Federalism: Discussion Papers*, No. 01-02, Washington DC, Urban Institute, March.

Blank R. (2001) What Causes Public Assistance Caseloads to Grow?, *Journal of Human Resources*, 36(1), pp. 85-118.

_____. (2002) Evaluating welfare reform in the United States, *NBER Working Papers*, No. 8983, Cambridge MA, National Bureau of Economic Research, June.

Blank R., Card D., Robins P.K. (2000) Financial Incentives for Increasing Work and Income Among Low-Income Families in: Blank R., Card D. (eds.), *Finding Jobs: Work and Welfare Reform* (New York NY, Russell Sage Foundation).

Blundell R.W., Bond S.R. (1998) Initial Conditions and Moment Restrictions in Dynamic Panel Data Models, *Journal of Econometrics*, 87, pp. 115-143.

_____. (2000) GMM Estimation with Persistent Panel Data: An Application to Production Functions, *Econometric Reviews*, 19, pp. 321-340.

Boushey H., Rosnick D. (2003) Jobs Held by Former Welfare Recipients Hit Hard by Economic Downturn, Briefing Paper, Center for Economic and Policy Research, Washington DC, September.

Christiano L.J., Eichenbaum M., Evans C.L. (1996) The Effects of Monetary Policy Shocks: Evidence from the Flow of Funds, *Review of Economics and Statistics* , 78(1), pp. 16-34.

Council of Economic Advisers. (1997) Explaining the Decline in Welfare Receipt, 1993-1996, Executive Office of the President, Washington DC, May.

_____. (1999) The Effects of Welfare Policy and Economic Expansion on Welfare Caseloads: an Update, Executive Office of the President, Washington DC, August.

Eatwell J. (1995) Disguised Unemployment: the G7 Experience, *UNCTAD Discussion Papers*, No. 106, Geneva, United Nation Conference on Trade and Development.

Edelman P. (1997) The Worst Thing Bill Clinton Has Done, *The Atlantic Monthly*, 279(3), pp. 43-58.

Elliot G., Rothenberg T., Stock J.H. (1996) Efficient Tests for an Autoregressive Unit Root, *Econometrica*, 64, pp. 813-836.

Ellwood D.T. (2000) The Impact of the Earned Income Tax Credit and Social Policy Reforms on Work, Marriage, and Living Arrangements, *National Tax Journal*, 53(4), pp. 1063-1105.

Enders W. (1995) *Applied Econometric Time Series* (New York NY, John Wiley & Sons).

Figlio D.N., Ziliak J.P. (1999) Welfare Reform, the Business Cycle, and the Decline in AFDC Caseloads, in: Danziger S.H. (ed.), *Economic Conditions and Welfare Reform* (Kalamazoo MI, Upjohn Institute Press).

Grogger J. (2000) Time Limits and Welfare Use, *NBER Working Papers*, No. 7709, Cambridge MA, National Bureau of Economic Research, May.

_____. (2001) The Effects of Time Limits and Other Policy Changes on Welfare Use, Work, and Income among Female-Headed Families, *NBER Working Papers*, No. 8153, Cambridge MA, National Bureau of Economic Research, March.

Kaushal N., Keastner R. (2001) From Welfare to Work: Has Welfare Reform Worked?, *Journal of Policy Analysis and Management* , 20(4), pp. 699-719.

Klerman J., Haider S. (2004) A Stock-Flow Analysis of the Welfare Caseload: Insights from California Economic Conditions, *Journal of Human Resources* , forthcoming.

Kwiatkowski D., Phillips P.C.B., Schmidt P., Shin Y. (1992) Testing the Null Hypothesis of Stationarity Against the Alternative of a Unit Root: How Sure Are We That Economic Time Series Have a Unit Root?, *Journal of Econometrics*, 54, pp. 159-178.

Levine P.B., Whitmore D.M. (1998) The Impact of Welfare Reform on the AFDC Caseload, *National Tax Association Proceedings 1997* , Washington DC, National Tax Association.

Martinson K. (2000) *The National Evaluation of Welfare-to-Work Strategies: The Experience of Welfare Recipients Who Find Jobs* (Washington DC, US Department of Health and Human Services).

Meyer B.D., Rosenbaum D.T. (2000) Making Single Mothers Work: Recent Tax and Welfare Policy and its Effects, *National Tax Journal* , 53(4), pp. 1027-61.

Moffitt R. (1999) The effect of Pre-PRWORA Waivers on AFDC Caseloads and Female Earnings, Income, and Labor Force Behavior in: Danziger S. (ed.) *Economic Conditions and Welfare Reform* (Kalamazoo MI, Upjohn Institute Press).

_____. (2002) The Temporary Assistance to Needy Families Program, *NBER Working Papers*, No. 8749, Cambridge MA, National Bureau of Economic Research, February.

O'Neill J.E., Hill M.A. (2001) Gaining Ground? Measuring the Impact of Welfare Reform on Welfare and Work, *Civic Report*, No. 17, New York, Center for Civic Innovation, July.

Pesaran M.H., Shin Y. (1998) Generalized Impulse Response Analysis in Linear Multivariate Models, *Economic Letters*, 58, pp. 17-29.

Robinson J. (1980) *Collected Economic Papers* Volume 4 (Oxford, Basil Blackwell).

Roodman D.M. (2004a) Xtabond2: Stata Module to Extend Xtabond Dynamic Panel Data Estimator, Boston MA, Boston College Department of Economics, July, <http:// econpapers.hhs.se/software/bocbocode/s435901.htm>

_____. (2004b) The Anarchy of Numbers: Aid, Development and Cross-Country Empirics, *CGD Working Papers*, No. 32, Washington DC, Center for Global Development.

Schoeni R.F., Blank R. (2000) What Has Welfare Reform Accomplished? Impacts on Welfare Participation, Employment, Income Poverty and Family Structure, *NBER Working Papers*, No. 7627, Cambridge MA, National Bureau of Economic Research, March.

US Department of Health and Human Services. (1998) Aid to Families with Dependent Children: The Baseline, Technical Report, June, <http://aspe.hhs.gov/hsp/afdc/baseline/2caseload.pdf>.

_____. (2003) Indicators of Welfare Dependence, Annual Report to Congress, March, <http://aspe.hhs.gov/hsp/indicators03/> .

Wallace G., Blank R. (1999) What Goes Up Must Come Down? Explaining Recent Changes in Public Assistance Caseloads, in: Danziger S. (ed.) *Economic Conditions and Welfare Reform* (Kalamazoo MI, Upjohn Institute Press).

Windmeijer F. (2000) A Finite Sample Correction for Variance of Linear Two-Step GMM Estimators, *IFS Working Papers*, No. 19, London, Institute for Fiscal Studies.

Ziliak J., Figlio D.N., Davis E.E., Connolly L.S. (1997) Accounting for the Decline in AFDC Caseloads: Welfare Reform or Economic Growth? , *IRP Discussion Papers*, No. 1151-97, Madison, Institute for Research on Poverty.

Ziliak J., Figlio D.N., Davis E.E., Connolly L.S. (2000) Accounting for the Decline in AFDC Caseloads: Welfare Reform or Economic Growth?, *Journal of Human Resources*, 35(3), pp. 570-586.

Table 1

Unit Root & Stationarity Tests

	ERS	KPSS
Null hypothesis	Unit root	Stationarity
Test statistic for U	–2.42	0.19
Test statistic for B	–1.84	0.33
Critical value at 1%	–2.62	0.73
Critical value at 5%	–1.94	0.46
Critical value at 10%	–1.61	0.34

Notes
Sample period of 1960-2000.
ERS = Elliot, Rothenberg and Stock (1996).
KPSS = Kwiatkowski, Phillips, Schmidt and Shin (1992).
ERS tests assume intercept and one lagged difference.
KPSS tests assume intercept only.

Table 2

VAR Estimates

	Model 1		Model 2	
	1960-2000 OLS		1990-1998 GMM2 SYS	
Column index	(a)	(b)	(c)	(d)
Dependent variable	U	B	U	B
Instruments option	No	No	t–2	t–3
State and year effects	No	No	Yes	Yes
Intercept	0.84	0.34 **	No	No
B(–1)	0.47	1.71 *	0.32 **	1.75 *
B(–2)	–0.16	–0.77 *	–0.25	–0.82 **
U(–1)	0.94 *	0.05	0.64 *	–0.21
U(–2)	–0.30 ***	–0.06 ***	0.08	0.23 ***

Notes
All columns:
Significant at 1% level *. Significant at 5% level **. Significant at 10% level ***.
Columns (a)-(b):
Autocorrelogram analysis shows that residuals are not auto-correlated. White's test does not reject to null of homoschedasticity in residuals. Jerque-Bera test rejects the null of normality for residuals of column (a). Multicollinearity might affect B's estimates in column (a) due to high linear correlation (r = 0.95; p-value = 0.00). If either B(–1) or B(–2) is removed from the regression model, the estimated effect of B on U is significant at 5% and approximately equal to the sum of B's coefficients in column (a), and residual test outcomes are the same as for column (a).
Columns (c)-(d):
Windmeijer (2000) corrected standard errors are computed.

Selected p-values	(c)	(d)
Hansen test of over identifying restrictions	0.43	0.50
Arellano-Bond test for AR(1) in first differences	0.00	0.03
Arellano-Bond test for AR(2) in first differences	0.86	0.11
Hansen difference test with respect to GMM2 DIFF	0.42	1.00

Table 3

Granger Causality Tests

	Model 1 1960-2000		Model 2 1990-1998	
Null hypothesis	F-stat.	P-value	F-stat	P-value
U does not Granger cause B	1.63	0.20	2.16	0.12
B does not Granger cause U	2.59	0.08	2.59	0.08

Table 4

AR(1) Estimates

	FE	OLS	GMM2 DIFF	GMM2 SYS
Unemployment rate	0.50	0.89	0.84	0.80
Welfare participation rate	0.85	1.00	0.63	1.15

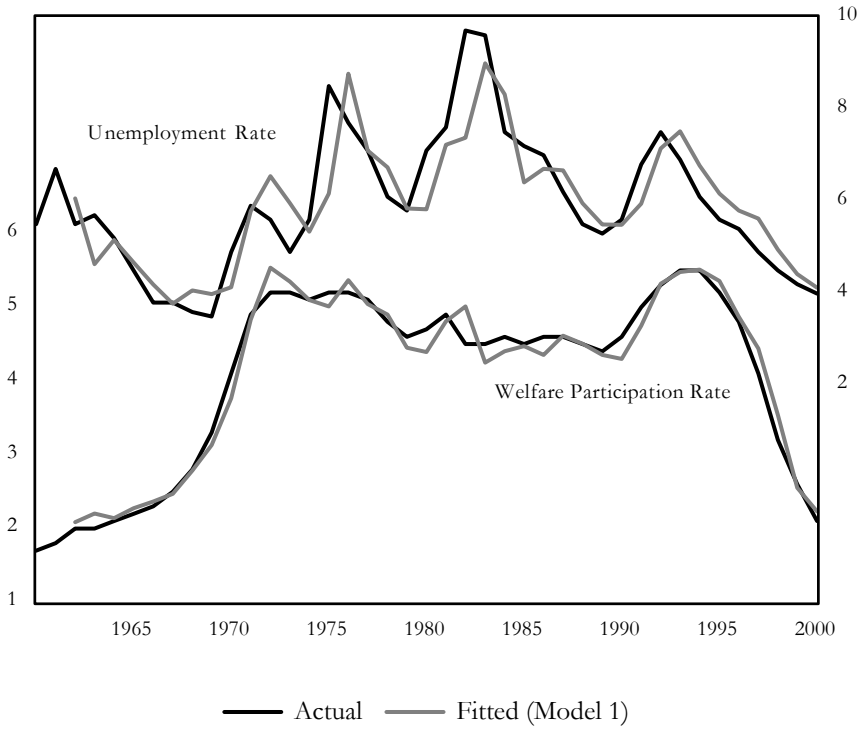
Notes
Sample period is of 1990-1998. Year effects are included in all models. OLS does not include State effects. All reported coefficients are significant at 1% level. GMM estimation uses Windmeijer (2000) corrected standard errors.

Unemployment rate p-values	GMM2 DIFF	GMM2 SYS
Hansen test of over identifying restrictions	0.07	0.15
Arellano-Bond test for AR(1) in first differences	0.00	0.00
Arellano-Bond test for AR(2) in first differences	0.53	0.52

Welfare participation rate p-values	GMM2 DIFF	GMM2 SYS
Hansen test of over identifying restrictions	0.24	0.28
Arellano-Bond test for AR(1) in first differences	0.32	0.04
Arellano-Bond test for AR(2) in first differences	0.13	0.01

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

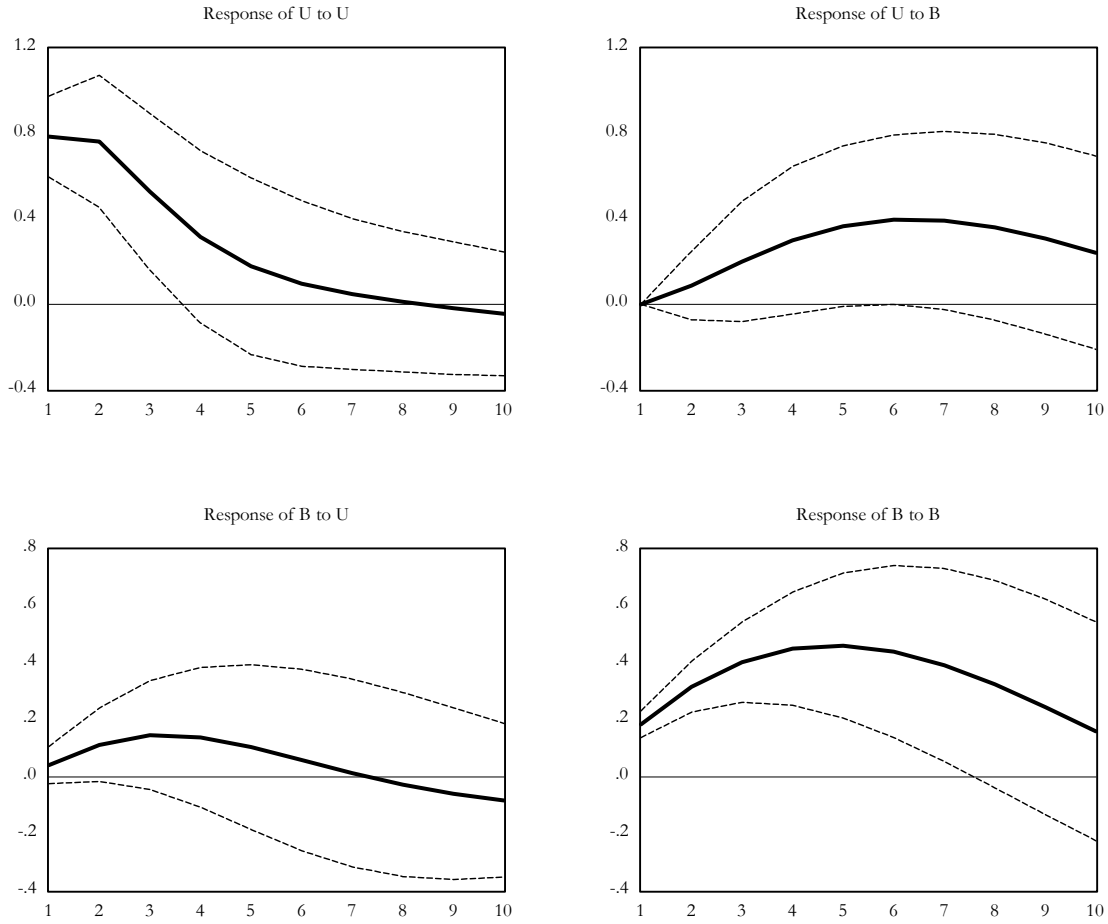


Figure 3

Accumulated Impulse-Response Functions

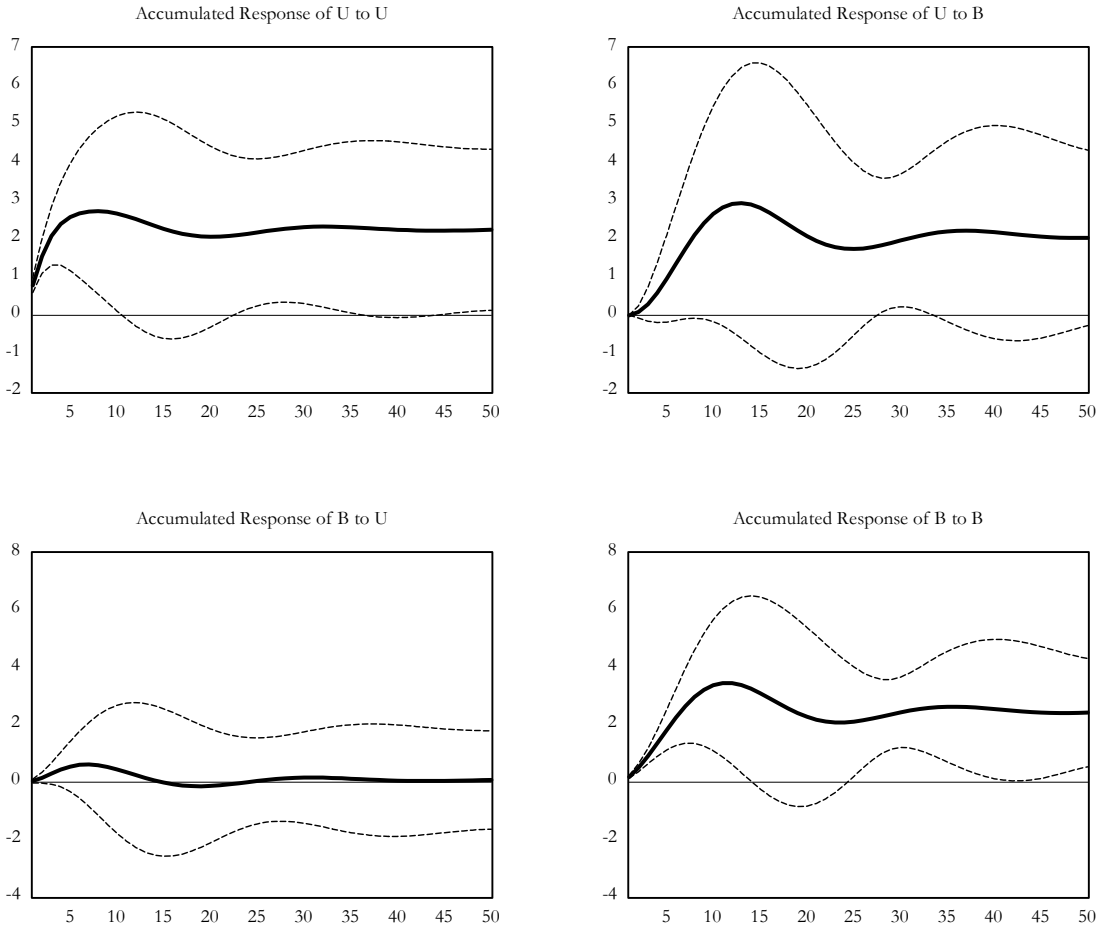


Figure 4

Structural Shocks to the Welfare Participation Rate

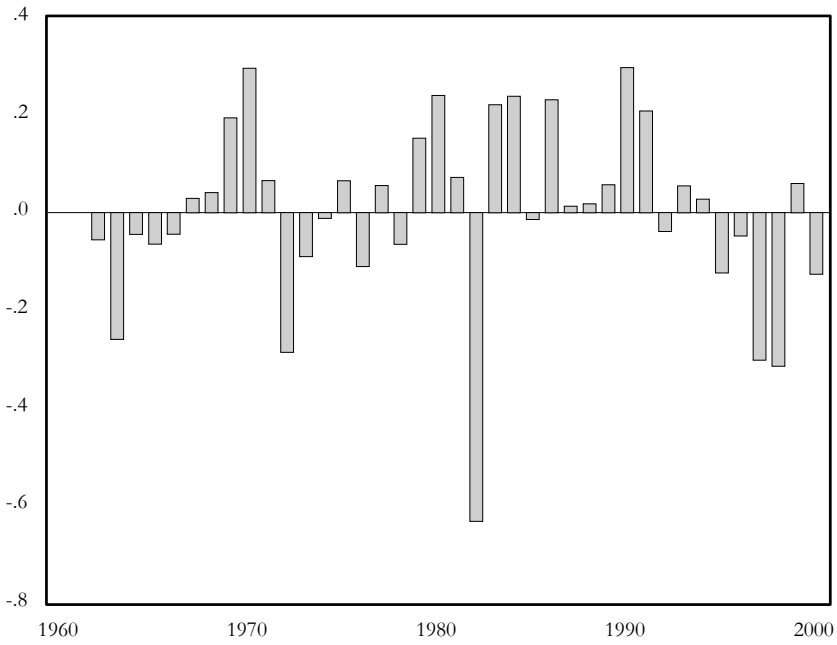
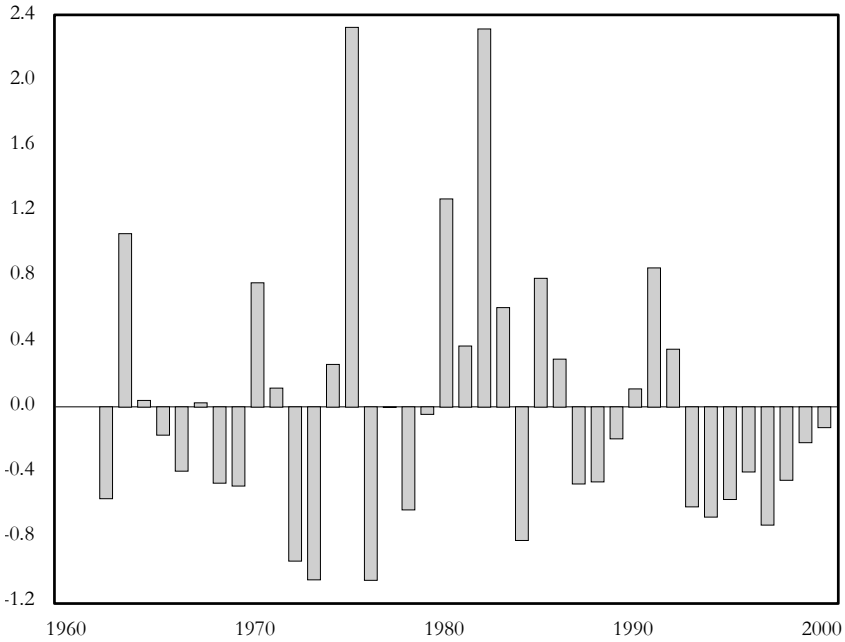


Figure 5

Structural Shocks to the Unemployment Rate



Notes

[1] These studies have also discussed the influence of the welfare reforms on the share of population on public assistance.

[2] These studies has also discussed the influence of political changes, other than welfare reforms, on employment and labor force.

[3] That is, we assume $\phi_2 = \delta_1 = \delta_2 = 0$ in equation (7) and $\eta_2 = \theta_1 = \theta_2 = 0$ in equation (8). Year dummies are found jointly significant in both equations.

[4] If the instrument matrix is singular, two-step estimates may be no longer more efficient than one-step. It is worth stressing that all the results in this article are not sensitive to use of 'collapsed' instruments.