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The German unemployment since the Hartz reforms: Permanent or transitory fall?

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HIGHLIGHTS

- The Hartz reforms attempted to make the German labor market more flexible.
- Unobserved components models distinguish permanent from transitory fluctuations.
- Our unobserved components models consist of unemployment rate and real GDP.
- The unemployment trend was reduced in the range of 1.1 and 2.6 percentage points.

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ABSTRACT

The Hartz reforms were designed to make the German labor market more flexible in order to reverse the increasing trend of unemployment. This paper employs unobserved components models in order to distinguish permanent from transitory movements in the German unemployment rate. Our results show that the permanent component of the German unemployment was reduced in the range of 1.1 and 2.6 percentage points after the Hartz reforms.

1. Introduction

After having peaked at 11.4% in 2005, the German unemployment rate recorded a sharp trend reversal and declined steadily until reaching 5.5% at the end of 2013. This labor market performance has received considerable attention, especially during the Great Recession where unemployment was slightly increased (Burda and Hunt, 2011). One popular reason among economists is to give credit to the wide-ranging Hartz reforms implemented during 2003–2005. The reforms aimed to reverse the increasing trend of unemployment, particularly by getting long-term unemployed back to work. The four laws Hartz I–IV consist of a set of measures such as lowering benefits during unemployment, restructuring the federal labor agency or reducing the social security contributions on labor. Krebs and Scheffel (2013) show that Hartz reforms led to a substantial reduction in the trend component of unemployment. This paper attempts to know how much of this fall can be attributed to the trend component.

Unobserved components models allow to distinguish permanent (trend) from transitory (cyclical) movements in macroeconomic fluctuations. Traditional unobserved components models, employed by Clark (1987, 1989) or Harvey (1989), set to zero correlation between shocks to the trend and the cycle. Nevertheless, Morley et al. (2003) (MNZ) show that the correlation could be identified and free estimated by specifying transitory component as an AR (2) process. Sinclair (2009) extends MNZ method to a multivariate analysis with real GDP and unemployment rate. This methodology suggests a substantial role for permanent movements unlike traditional models which imply a larger role for transitory movements. We estimate unobserved components models consisting of unemployment and real GDP following both Sinclair (2009) and a more conservative approach similar to Clark (1989). Moreover, Perron and Wada (2009) show that permanent movements become secondary in explaining overall fluctuations when allowing a structural break in the trend component. Therefore, our models

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include structural breaks in the trend component of unemployment and real GDP.

This paper assesses how much the reduction of the German unemployment rate can be attributed to a permanent component. To anticipate our findings, the permanent component of unemployment was reduced in the range of 1.1% and 2.6% points after the implementation of the Hartz reforms, even in the most conservative estimate. Furthermore, the Great Recession accounts for a permanent loss on the German real GDP. The rest of the paper proceeds as follows. Section 2 describes unobserved components models employed in our empirical analysis. Section 3 presents and discusses the results while Section 4 concludes.

2. Model and data

In order to distinguish trend component from cycle component, we resort to a bivariate unobserved components representation. Building on Clark (1989) and Sinclair (2009), the model consists of unemployment rate and real GDP. Unemployment rate u_t is disentangled into permanent τ_{ut} and transitory components c_{ut}:

$$u_t = \tau_{ut} + c_{ut}. \tag{1}$$

Berger (2011) argues that trend component of unemployment cannot be specified as a simple random walk for European countries. Following Berger, we represent the trend component of unemployment as a random walk with drift:

$$\tau_{ut} = \mu_{ut} + \tau_{ut-1} + \eta_{ut} \tag{2}$$

$$\mu_{ut} = \mu_{1u} + 1(t > T_u)d \tag{3}$$

where η_{ut} is the innovation of permanent component of unemployment. Berger finds for Euro area unemployment one break occurred in 1985Q1. Before the break, the drift term is estimated to be 0.125 implying an upward trend in unemployment over the first period. After the break, the drift is estimated to be close to zero. Thus, the permanent component of Euro area unemployment collapses to a simple random walk. In Eq. (3), drift equals μ_{1u} before the break date labeled by T_u and $\mu_{1u} + d\,(\mu_{2u})$ after. Based on univariate break tests,[1] we find one break in 1983Q2. Real GDP y_t is also the sum of permanent τ_{yt} and transitory components c_{yt}:

$$y_t = \tau_{yt} + c_{yt}. \tag{4}$$

Permanent component of real GDP is specified as a random walk with drift,[2] where μ_{yt} is the average growth rate of real GDP and η_{yt} represents the innovation as:

$$\tau_{yt} = \mu_{yt} + \tau_{yt-1} + \eta_{yt} \tag{5}$$

$$\mu_{yt} = \mu_{1y} + 1\left(t > T_y\right) d. \tag{6}$$

Following Perron and Wada (2009), Eq. (5) accounts for one structural break in the drift term. This specification aims to capture potential shift in the trend component of output. Average growth rate equals μ_{1y} before the break denoted T_y, $\mu_{1y} + d\,(\mu_{2y})$ after. Univariate break tests find a shift in 1991Q1 corresponding to the German reunification. Transitory component of unemployment and real GDP are modeled as an AR (2) process:

$$c_{ut} = \phi_{1u} c_{ut-1} + \phi_{2u} c_{ut-2} + \epsilon_{ut} \tag{7}$$

$$c_{yt} = \phi_{1y} c_{yt-1} + \phi_{2y} c_{yt-2} + \epsilon_{yt}. \tag{8}$$

The shocks $(\eta_{yt},\ \eta_{ut},\ \epsilon_{yt},\ \epsilon_{ut})$ are assumed to be normally distributed with mean zero. The variance–covariance matrix allows no restrictions on the correlations between any of the contemporaneous shocks. The variance–covariance matrix is:

$$\begin{pmatrix} \sigma^2_{\eta_y} & \sigma_{\eta_y\eta_u} & \sigma_{\eta_y\epsilon_y} & \sigma_{\eta_y\epsilon_u} \\ \sigma_{\eta_y\eta_u} & \sigma^2_{\eta_u} & \sigma_{\eta_u\epsilon_y} & \sigma_{\eta_u\epsilon_u} \\ \sigma_{\eta_y\epsilon_y} & \sigma_{\eta_u\epsilon_y} & \sigma^2_{\epsilon_y} & \sigma_{\epsilon_y\epsilon_u} \\ \sigma_{\eta_y\epsilon_u} & \sigma_{\eta_u\epsilon_u} & \sigma_{\epsilon_y\epsilon_u} & \sigma^2_{\epsilon_u} \end{pmatrix}.$$

We confront this correlated unobserved components model to a more conservative approach which impose restrictions on the variance–covariance matrix, similar to Clark (1989):

$$\begin{pmatrix} \sigma^2_{\eta_y} & 0 & 0 & 0 \\ 0 & \sigma^2_{\eta_u} & 0 & 0 \\ 0 & 0 & \sigma^2_{\epsilon_y} & \sigma_{\epsilon_y\epsilon_u} \\ 0 & 0 & \sigma_{\epsilon_u\epsilon_y} & \sigma^2_{\epsilon_u} \end{pmatrix}.$$

These restrictions assume that the off-diagonal elements of the matrix are set to zero. Okun (1962) shows that real GDP and unemployment are negatively related through their transitory movements. Thus, we only allow $\sigma_{\epsilon_y\epsilon_u}$ to be free estimated as transitory component of real GDP and unemployment are linked via Okun's law.

Eqs. (1)–(8) are cast into state-space form. The parameters of the model are estimated by using the Kalman Filter algorithm and maximum likelihood estimation.

Quarterly data are extracted from OECD.Stat and covering the period from 1970Q1 until 2013Q4. Unemployment corresponds with unemployment rate. Real GDP is defined in millions of dollars, volumes estimates, OECD reference year, annual levels and seasonally adjusted. Real GDP is expressed in logarithm and multiplied by 100.

3. Results

3.1. Parameters and components estimates

Table 1 reports the maximum likelihood estimates of our different specifications. The first column presents estimates of Model (1) which allows no restrictions on the variance–covariance matrix. Model (2) includes structural breaks[3] in the drift term of unemployment rate and real GDP. A likelihood ratio test with a *p-value* of 0.002 rejects the null hypothesis of no structural breaks. Finally, Model (3) is a restricted model with zero-covariances between permanent and transitory shocks including structural breaks.

Fig. 1 shows the estimated permanent component of unemployment rate based on Model (2). Movements in the unemployment rate appear to arise mainly from permanent shocks as the estimated permanent component is quite volatile. In particular, the standard deviation of the permanent innovation (0.566) is higher than the standard deviation of the first difference of the series (0.281) and slightly larger than the transitory innovation (0.547). The permanent and transitory innovations show negative correlation $\rho_{\eta_u\epsilon_u}$ with an estimate of −0.958. Allowing correlations between shocks to the trend and the cycle conduct to a significant part of permanent movements in the unemployment fluctuations.

The drift term μ_{1u} is found to be 0.158% for Model (2) and 0.165% for Model (3) on the pre-1983 sample. After the structural break, the drift term is estimated to be close to zero and not significant. We assume that this parameter is subject to one structural change rather than modeling the drift term as a random

[1] We use tests proposed by Bai and Perron (1998, 2003) and Andrews and Ploberger (1994).

[2] The Augmented Dickey–Fuller test with GLS detrending (ADF-GLS) cannot reject the null hypothesis of unit root for real GDP.

[3] Including structural breaks reduce the size of the permanent and transitory innovations for both unemployment rate and real GDP.