ECONOMETRIC MODELLING OF UNEMPLOYMENT IN SERBIA DURING PERIOD 2008-2013

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Abstract: The purpose of the paper is to econometrically exploit the characteristics of unemployment in Serbia upon the start of the 2008 economic crisis. The methodological framework is based on the cointegrated vector autoregressive model that consists of the following macroeconomic variables: unemployment rate, prices, nominal wages and nominal exchange rate. These variables are unit-root processes and their relationship is examined within the multivariate cointegrated time series set-up. Following the deductive modelling approach, we reached the specification that explains unemployment rate by real wages. The results show the negative consequences of the economic crisis to the labour market, with an extremely high increase in the unemployment rate. Strong negative impact of real wages on unemployment rate is additionally confirmed by its dynamic effects throughout the impulse response function.

Keywords: Cointegrated vector autoregressive model, Impulse response function, Real wages, Unemployment rate.

MSC: 97K80, 91G99.

1. INTRODUCTION

Unemployment has always been considered as substantially important economic and political issue that society has to deal with. What is the cause of high unemployment

rate? The reasons are numerous, but some of them could be highlighted as the most important, such as economic crisis that hits the whole economy and transition period (restructuring the economy from state and socio-owned to the market based).

The transition period in Serbia has been followed by extremely high unemployment rate. In order to make a continuous progress and development, it is necessary to reduce the unemployment and to increase the employment. Continuously high unemployment rate in Serbia has made labour market the one of the most popular topics among economists, politicians, academics, so as in media and everyday life.

There are a number of papers concerning long transition period in Serbia, world recession that had great effects on the Serbian economy, privatization, and also impact of those processes on the labour market. However, little work has been done on econometric modelling of unemployment rate and other macroeconomic variables especially over the last few years.

The purpose of this paper is to present econometric results of estimating long-run relationship that explains unemployment rate in Serbia from 2008 on. The paper is structured as follows. Section 2 provides key characteristics of the labour market in Serbia in the period 2008-2013 and underlines the differences between unemployment trends in Serbia and other European countries. Section 3 contains the empirical results. They are derived starting from the four-variable system (prices, nominal wages, nominal exchange rate and unemployment rate) that finally reduces to the system between unemployment rate and real wages. Cointegrated vector autoregressive model is used as a methodological framework. Strong negative impact of real wages to unemployment rate has been detected by several cointegration approaches as well as by the impulse response function. Existing empirical results for other countries, both developed and developing, are presented in Section 4. Concluding remarks are summarized in Section 5.

2. LABOUR MARKET IN SERBIA

Trends at the labour market in Serbia are worse than in EU countries. Although the most developed European countries experienced an increase in their unemployment rates in the period of a huge recession, Serbia is one of the leaders in Europe. Activity rate and employment rate are less than in other countries, and consequently the unemployment rate is one of the highest in Europe. Table 1 gives information about the dynamic of indicators of the labour market in Serbia for the period 2008-2013. Both absolute and relative data are provided. The participation and employment rates are constantly decreasing, whilst the unemployment rate is increasing. There is some changes in labour market trends in 2013, since there is a decrease in unemployment rate for 1.4 pp and an increase in employment rate of 2 pp.

Table 1: Main indicators of labour market in Serbia in period 2008-2013, (aged 15+), annual data

Indicators/Years	2008	2009	2010	2011	2012	2013
Number of persons employed	2,821,724	2,616,437	2,396,244	2,253,209	2,157,618	2,227,432
Number of persons unemployed	445,383	502,982	568,723	671,143	736,802	708,688
Number of active persons	3,267,107	3,119,419	2,964,966	2,924,352	2,894,421	2,936,120
Unemployment rate	13.6	16.1	19.2	23.0	25.5	24.1
Employment rate	44.4	41.2	37.9	35.8	34.3	36.3
Participation rate	51.5	49.1	46.9	46.4	46.1	47.9

Source: Statistical Office of Republic of Serbia, LFS, 2008-2013
Note: Data in 2012 and 2013 are from April survey.

Figures 1 and 2 are presented in order to observe trends in unemployment rates in years after the economic crisis (2008-2013) for both developed countries (US, Japan, EU18 and EU28), and the developing (Balkan) countries.
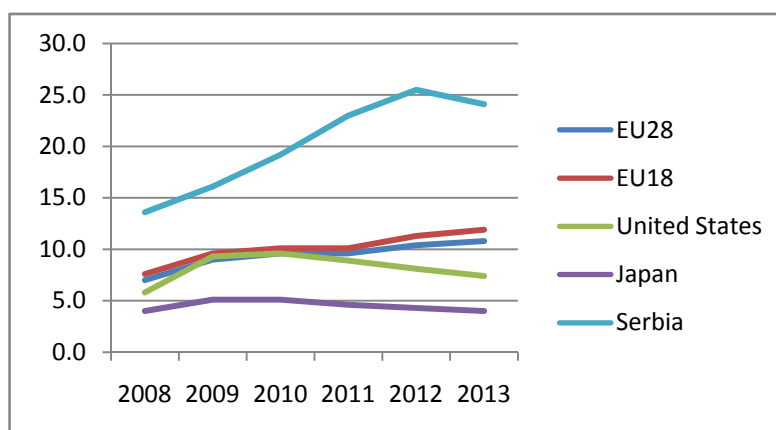

Figure 1: The unemployment rate (in % for period 2008-2013) for EU28, EU18, US, Japan and Serbia
Source: Euro Stat and Statistical Office of Republic of Serbia
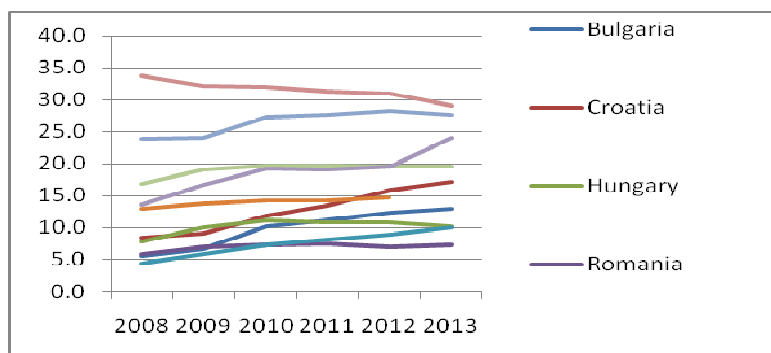Note: Data for Serbia in 2012 and 2013 are from April survey

Figure 2: The unemployment rate (in % for period 2008-2013) in Former Yugoslav
Republics and countries in Balkan region
Source: Euro Stat, ILO and National Statistical Offices
Note: There are no data for Albania in 2013.

It can be seen that Serbia has substantially high unemployment rate. In Figure 1,
Serbia is compared with the EU average, the US and Japan. Traditionally Japan, as a
highly developed country, has a low unemployment rate even in crisis periods (4-5%). In
2008 the United States had an unemployment rate of 5.8%, but in the period of recession
it peaked at 9.6%. Unemployment rate in US was decreasing after 2010. Compared with
EU, Japan and US (developed countries) Serbia has much higher rate of unemployment.

Mediterranean countries experienced a financial collapse and debtor crisis with
extremely high government debt and budget deficit. The debtor crisis had a great
negative influence on the labour market. Greece has the highest rate of unemployment in
the EU28, it is even higher than in Serbia, peaking to 27.5% in 2013. The top five
countries with the highest unemployment rate in the EU28 in 2013 are Greece, Spain,
Croatia, Portugal, Cyprus with unemployment rates of 27.5, 26.1, 17.2, 16.4 and 15.9,
respectively.

The most interesting observation is to inspect where Serbia stands in
comparison with its neighbours (Figure 2). During period 2008-2013 FYR of Macedonia
and Bosnia and Herzegovina had higher rates of unemployment than Serbia, between
29% and 34% and between 23% and 28%, respectively. The rate of unemployment in
Montenegro was higher than in Serbia in the period 2008-2010, but from 2011 it was vice
versa. Generally speaking, Serbia has similar labour market characteristics to other
Balkan countries, especially Former Yugoslav Republics.

This was a short overview of trends in the unemployment rates in the 28
countries of the European Union, Japan, United States, Serbia and other Balkan
countries. The rate of unemployment has an upward trend in all of those countries, with
the highest rate of around 34% in FYR of Macedonia and the lowest in Norway, between
2.5% and 3.6%.

It is not possible to distinguish clearly what the influence of the advanced stage
of restructuring and privatisation is and how much the economic crisis has contributed to
the reduction in employment and large increase in unemployment. The impact of the
2008 economic crisis in Serbia was mild in terms of output contraction (3% of GDP), but
very severe in terms of job losses [2]. As in all socialistic countries, privatisation left

many workers jobless because they where technically redundant (private employers are not supposed to buy "social peace"). The expansion of the private sector proved insufficient to absorb the labour shedding caused by economic restructuring and privatisation [2]. A large number of redundancies due to privatization, refugees and internally displaced persons exerted a strong pressure on the labour market. Those categories generated a large labour supply relative to the weak labour demand [4]. Many of them couldn't cope with the newest technology at the market. They were not prepared for new market conditions. At the time when a huge economic crisis hit the world, the transition period wasn't over in Serbia. It continued in a crisis period, too. That is the reason why it is difficult to find the marginal effects.

Two relevant indicators of a labour market are long-term and youth unemployment. Long-term unemployment is defined as that which lasts one year and over. Two measures of long-term unemployment are used: (1) the long-term unemployment rate defined as a ratio of the number of persons unemployed in the long term to that of the active population, and (2) the ratio of number of persons unemployed in the long term to the number of persons unemployed. In Serbia more than two thirds of unemployed persons have been actively looking for a job for at least one year. Youth unemployment is defined as the number of persons unemployed aged between 15 and 24 as a percentage of the active population of the same age [13]. Bosnia and Herzegovina has the highest youth unemployment rate in Europe of 57.5% in 2012. Greece, Spain, Macedonia, Serbia, Croatia, Montenegro are the countries with the extremely high overall unemployment rate, and consequently high youth unemployment rate. Youth unemployment rate in Serbia is reaching 45.9% in 2012 (ILO database). According to data provided by the Labour and Social Policy Ministry, the number of welfare recipients in Serbia has climbed by one third since the beginning of the economic crisis, and estimates suggest that 1,300 new applicants are added to the list every month.

When talking about the registered unemployment rate, we should not ignore the fact that there is a large influence by the informal sector in undeveloped and developing countries, and that data of the registered rate of unemployment possibly overestimates the real situation, and vice a versa, conversely the registered rate of employment is often underestimated. It is always difficult to collect data related to the informal sector, especially in surveys where people often do not answer questions truthfully. The Labour Force Survey (LFS) in Serbia is published twice a year, in April and October, while data comparable with EU standards have been available since 2008. Until 2008, LFS did not contain specific questions to unambiguously classify employment into two mutually exclusive categories – formal and informal employment [2]. LFS is conducted quarterly from 2014. The Serbian Statistical Office definition of informal employment covers following categories of workers: (a) workers employed in registered firm but with no written contract AND with no social contributions paid; (b) people employed in a private unregistered firm; (c) unpaid family workers. According to these estimates, employment in the informal economy in Serbia appears significant. Nearly 23 percent of total employment (aged 15 and over) was in the informal sector in October 2008, and this percentage decreased to 17 percent in April 2012. It is interesting to note that informal employment decreased more than formal employment over the period of economic crisis [12].

3. ECONOMETRIC RESULTS

Empirical results of modelling unemployment rate are summarized in two subsections. First, cointegration analysis is presented and estimated vector equilibrium correction model (VECM) is discussed. Second, dynamic responses of unemployment rate to unexpected structural shocks are reported in form of the impulse response function. Results are obtained using WinRats8.2 and Eviews8 software.

3.1. Cointegration in system framework

We started with the four variable vector autoregressive (VAR) model with linear trend (*t*) included as a part of the cointegration space. The variables considered are: the unemployment rate (*un*), nominal wages (*w*), the consumer price index (*cpi*) and the nominal exchange rate (*ex*). Monthly observations in logs are used covering period: January, 2008 – December, 2013. Data on prices, wages and exchange rate are available from National Bank of Serbia and Statistical Office of Republic of Serbia. Monthly data on unemployment rate are constructed by us, such that the Chow-Lin disaggregation method [6] was applied on semi-annual data from LFS while taking into account monthly dynamics of unemployment rate officially reported by the Serbian Employment Office. Seasonally adjusted data are modelled.

Since all variables are unit-root processes, their correlation is analyzed within the cointegrated VAR (CVAR) framework [11]. The application of the Johansen trace test [9] shows that cointegration exists. The result doesn't change with the variation of the VAR order. The problem that arises in models with these variables is normalization. By default, the exchange rate should be normalized, indicating that model is more useful in explaining exchange rate than the unemployment rate. Even if we do not use the default normalization, and normalize the unemployment rate that we are actually modelling, the results are difficult to interpret. Estimated coefficients are either unrealistically high or with an opposite sign [1].

The model we focused on is the system that consists of unemployment rate, prices and wages. The inference of prices and wages is measured by real wages (*rw*) calculated as *w-cpi*. There is no cointegration between nominal wages and the consumer price index, since real wages are also unit-root processes.

The main features of the CVAR model are summarized as follows: a) Number of lags is 7, b) System variables are unemployment rate and real wages, c) Deterministic components are unrestricted constant and trend restricted to be a part of cointegration space d) Trend in cointegration space is piecewise, with the break occurred in 2012:6. It is captured by dummy variable D introduced as follows: D = {t, for period: June 2012-December 2013; 0, otherwise} and e) Three impulse dummy variables are included. They are defined as: S1={1, for January 2009; 0, otherwise}, S2= {1, for January and June 2011; 0, otherwise} and S3={1, for August 2013; 0, otherwise},

The presence of one cointegrated vector and one common stochastic trend is detected by the Johansen trace test [9], as presented in Table 2. The Johansen procedure modified to accommodate the piecewise trend is followed [10].

Table 2: Testing for cointegration

Hypotheses	Eigenvalue	Trace	$C_{95\%}(p-r)$	p-value
H_0:r=0 and p-r=2, H_1: r>0	0.389	36.338	33.680	0.030
H_0:r=1 and p-r=1, H_1: r>1	0.064	4.281	16.670	0.738

Note: Number of cointegrated vectors is denoted by r, while p stands for the dimension of VAR system. $C_{95\%}(p-r)$ denotes critical values taken from Dennis (2006).

Only cointegrating vector is estimated as follows:

$$un_t = -0.466rw_t + 0.014t - 0.021D \tag{1}$$

It is depicted in Figure 3 while variables are shown in Figure 4. Evidently, estimated cointegration vector neutralized individual stochastic trends of variables.

There is permanent change in slope of linear trend being a part of cointegration space: it switches from positive to negative value after June 2012. This shift takes account of change in the deterministic trend of unemployment rate that was not captured by real wages. The data stamping of the break was based on several Bai-Perron tests [3]. To illustrate the necessity of including change in the deterministic trend function, we depicted residuals from the regression estimated by the ordinary least squares (OLS) between unemployment rate and real wages. As seen from Figure 5, residuals exhibit trending behaviour with the slope changing sign in June, 2012.
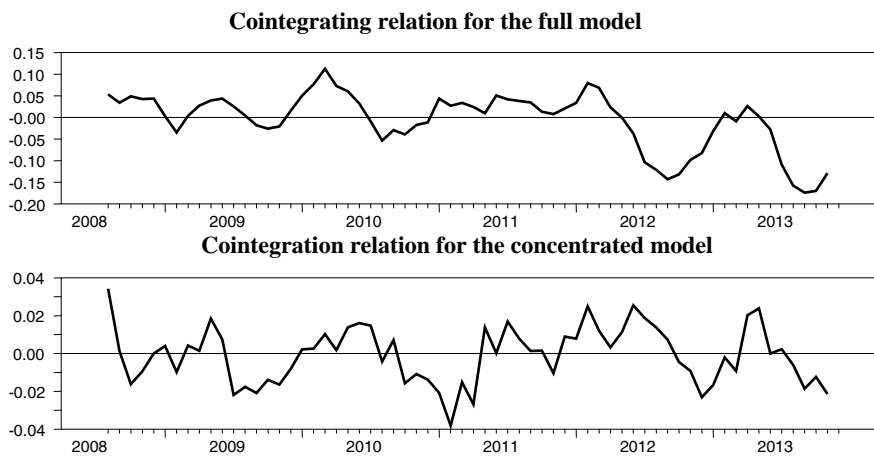
Cointegrating relation for the full model

Cointegration relation for the concentrated model

Figure 3: Estimated cointegration vector

Note: In both models cointegration relation is corrected for constant. In addition, concentrated model stands for the long-run relation corrected for the short-run dynamics and dummy variables. Cf. [11].
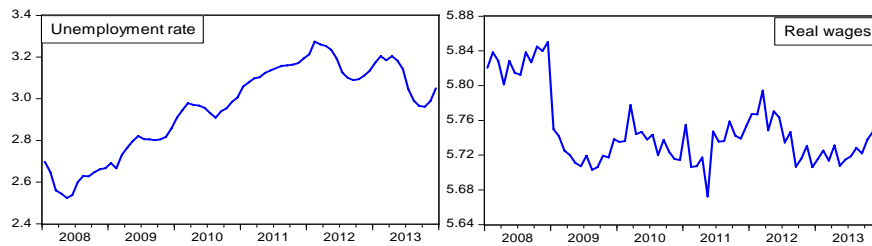
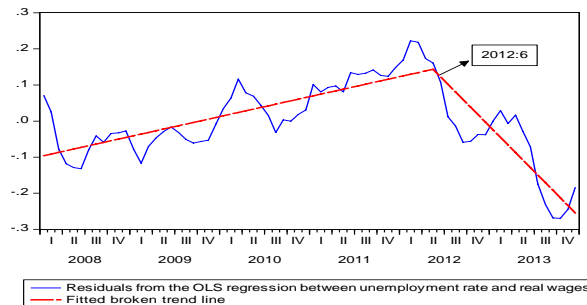**Figure 4**: Variables considered (in logs, seasonally adjusted)

Figure 5: Change of the deterministic trend in relation between unemployment rate and real wages

The presence of one cointegration relation is confirmed by the values of the corresponding roots derived under the restriction that one cointegration vector exists. Only one out of fourteen values, associated with VAR of order seven with two variables, is exactly 1, suggesting that system has a common stochastic trend (Table 3 and Figure 6).

Table 3: Roots of the companion matrix, in modulus

Root 1	Root 2	Root 3	Root 4	Root 5	Root 6	Root 7
1.00	0.98	0.98	0.82	0.82	0.79	0.79
Root 8	Root 9	Root 10	Root 11	Root 12	Root 13	Root 14
0.75	0.75	0.71	0.71	0.70	0.68	0.55

CVAR model provides additional analysis on testing for stationarity, exclusion from the cointegration space and for the weak exogeneity. Results reported in Table 4 show that both variables are unit-root processes while real wages appear to be weakly exogenous variable. The result of a unit-root presence in unemployment rate suggests that hysteresis effect is detected. Given that real wages are weakly exogenous variable in respect to cointegration parameters, accumulated unexpected shocks in real wages are identified as a main source of non-stationarity in this bi-variate system. Therefore, extremely high persistence of unemployment rate is found to be due to negative consequences of economic crises represented by stochastic trend in real wages.
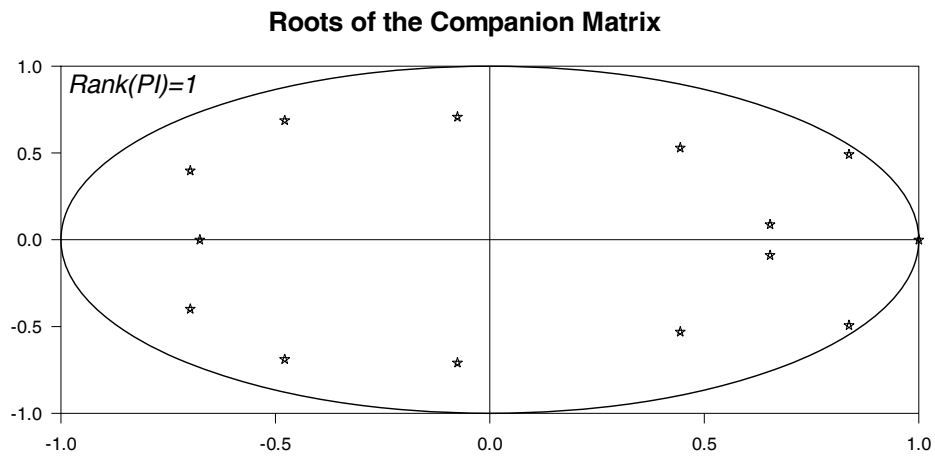
Roots of the Companion Matrix

Figure 6: Roots of the companion matrix

Table 4: Testing stationarity and weak exogeneity of unemployment rate and real wages
Testing stationarity (testing a unit cointegrating vector)

Test-statistic $\chi^2(1)$	*un*	*rw*
5% critical value 3.84	12.88	22.36
Testing for weak exogeneity (testing a zero row in adjustment vector)		
Test-statistic $\chi^2(1)$	*un*	*rw*
5% critical value 3.84	26.43	**0.14**

Note: Null hypothesis is respectively that each variable itself is stationary (testing for stationarity) and that each variable is weakly exogenous with respect to cointegration parameters (testing for weak exogeneity). Insignificant values at 5% are in bold.

Estimated VECM stemming from CVAR specification reads as follows:

$$
\begin{bmatrix} \hat{\Delta un}_t \\ \hat{\Delta rw}_t \end{bmatrix} = \begin{bmatrix} -0.664 \\ (-6.23) \\ 0.044 \\ (0.40) \end{bmatrix} \begin{bmatrix} 1 & 0.466 & -0.014 & 0.021 \\ & (3.91) & (44.12) & (21.71) \end{bmatrix} \begin{bmatrix} un_{t-1} \\ rw_{t-1} \\ t-1 \\ D_{t-1} \end{bmatrix} +
$$

$$
\begin{bmatrix} 0.572 & 0.269 \\ (5.57) & (2.94) \\ 0.077 & -0.27 \\ (0.72) & (-2.82) \end{bmatrix} \begin{bmatrix} \Delta un_{t-1} \\ \Delta rw_{t-1} \end{bmatrix} + \begin{bmatrix} 0.546 & 0.062 \\ (4.96) & (0.67) \\ -0.076 & 0.131 \\ (-0.66) & (1.35) \end{bmatrix} \begin{bmatrix} \Delta un_{t-2} \\ \Delta rw_{t-2} \end{bmatrix} +
$$

$$
\begin{bmatrix} 0.296 & -0.01 \\ (3.00) & (-0.09) \\ -0.024 & 0.305 \\ (-0.24) & (3.20) \end{bmatrix} \begin{bmatrix} \Delta un_{t-3} \\ \Delta rw_{t-3} \end{bmatrix} + \begin{bmatrix} 0.020 & 0.261 \\ (0.23) & (2.85) \\ -0.159 & -0.016 \\ (-1.72) & (-0.17) \end{bmatrix} \begin{bmatrix} \Delta un_{t-5} \\ \Delta rw_{t-5} \end{bmatrix} +
$$

$$
\begin{bmatrix} -0.001 & 0.277 \\ (-0.01) & (3.25) \\ 0.112 & -0.020 \\ (1.20) & (-0.22) \end{bmatrix} \begin{bmatrix} \Delta un_{t-6} \\ \Delta rw_{t-6} \end{bmatrix} +
$$

$$
\begin{bmatrix} 3.507 \\ (6.26) \\ -0.23 \\ (-0.40) \end{bmatrix} + \begin{bmatrix} -0.041 \\ (-6.41) \\ 0.001 \\ (0.19) \end{bmatrix} \Delta D + \begin{bmatrix} 0.017 & 0.001 & -0.049 \\ (1.10) & (0.09) & (-3.03) \\ -0.106 & 0.058 & 0.004 \\ (-6.74) & (5.16) & (0.25) \end{bmatrix} \begin{bmatrix} S_1 \\ S_2 \\ S_3 \end{bmatrix}.
$$

(2)

Note: t-ratios are in parentheses and Δ is the first difference operator. Estimates on lag 4 are not reported because each of them was insignificant.

Model performs statistically well as confirmed by several multivariate and univariate tests that are presented in Tables 5 and 6.

Table 5: Univariate test statistics

Equation for	Mean	Standard deviation	Skewness	Kurtosis	Maximum	Minimum
Δun_t	0.000	0.014	0.328	3.145	0.040	-0.027
Δrw_t	0.000	0.014	-0.454	3.419	0.037	-0.036
	ARCH(7)		Normality		R-squared	
Δun_t	5.758 (0.57)		1.560 (0.46)		0.780	
Δrw_t	7.652 (0.36)		2.813 (0.25)		0.657	

Note: p-values are in parentheses.

Table 6: Multivariate test statistics

Test for	Value	p-value
Autocorrelation of order 1	8.02	0.09
Autocorrelation of order 2	4.55	0.34
Normality	4.05	0.40
ARCH (1)	13.53	0.14

Note: Autocorrelation is tested by the multivariate version of the LM test. Normality is assessed by multivariate version of the Doornik-Hansen test [11].

Results imply that in the long run, 1% change in real wages is associated with 0.47% change of opposite direction in unemployment rate. Thus, fall in real wages induces in the long-run an upward trend of unemployment rate and vice versa. According to the estimate of the adjustment coefficient in the equation for the first difference of unemployment rate (-0.66), its dynamics is adjusted each month by approximately two-thirds towards the long-run relation with real wages. Short run dynamics of unemployment rate mostly depends on its own lagged values. Thus, system mainly explains long-run impact of real wages. The presence of linear trend in cointegration vector captures the effects of economic and institutional variables that are not explicitly modelled by our system. Their influence has changed since June 2012 as confirmed by significant break in the linear trend function.

The relationship between unemployment rate and real wages was reconsidered within the progressive LSE modelling approach [14]. Basically, it relies on the unrestricted form of VECM that enables direct estimation of cointegration parameters. Results reached are almost the same as the one reported above [1].

3.2. Dynamic effects of shocks

Having found the significant long-run influence of real wages on unemployment rate, it is of interest to assess how the impact of real wages shocks on unemployment rate evolves throughout time. These dynamic effects can be computed via the impulse response function and the forecast error variance decomposition calculated based on VECM form. Cholesky decomposition of the covariance matrix is employed using the ordering suggested by the weak exogeneity test results, i.e. there is one way exogeneity running from real wages to unemployment rate. The dynamic behaviour of responses of both variables to shock of one standard deviation in each variable is observed by the accumulated impulse response function depicted in Figure 7.

The effects of the shock in unemployment rate appear to be negligible. On the other hand, shock of one standard deviation in real wages has a long-lasting negative effect on the unemployment rate dynamics and a persistent positive impact on real wages. This finding supports cointegration results that accumulated impulses in real wages represent common stochastic trend in the system with unemployment. Significant upward trend of unemployment rate has a stochastic (unit-root) nature due to effects of shocks that have reduced the level of real wages over the last few years.

Finally, the cumulated dynamic pass-through effect of real wages to unemployment rate is calculated from the corresponding vector moving average representation that is equivalent to estimated cointegrated VECM in (2). Long-run reaction of unemployment to accumulated unexpected random shocks in real wages is estimated to be negative and significant: -0.58 (with t-ratio -2.95). This estimate is close to the value of -0.47 from cointegration relation (1). On the other hand, unemployment has no significant permanent influence on real wages.
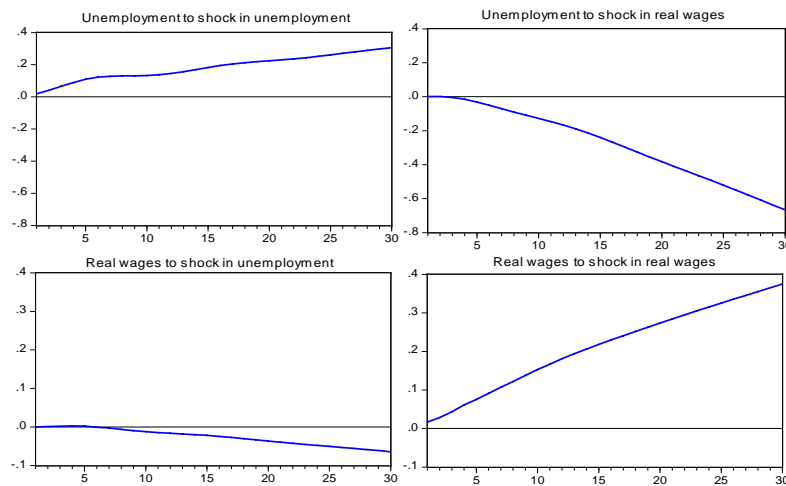

Figure 7: Accumulated Response to Cholesky One Standard Deviation Innovations

The results of the forecast error variance decomposition calculation are reported in Table 7 for different time horizons. It is indicated that variability of unemployment rate is in large portion explained by shocks in real wages when horizon longer than a year is considered. The contribution of real wages is estimated to be 24% for 6 month period, but 53% and 83% for 12 and 36 months respectively. On the other hand, variability of real wages is almost all due to its own shocks.

In order to check robustness of the results, the same computations are performed but with different ordering of variables. This has not changed significantly the dynamic responses of both variables.

Table 7: Forecast error variance decomposition of unemployment rate and real wages (%)

Months	Unemployment rate		Real wages	
	Shock in unemployment rate	Shock in real wages	Shock in unemployment rate	Shock in real wages
6	76	24	1	99
9	57	43	2	98
12	47	53	2	98
24	24	76	3	97
30	20	80	4	96
36	17	83	4	96

Note: rows sum to 100% for each variable.

4. RESULTS FOR OTHER COUNTRIES

The relationship between unemployment rate and real wages has been investigated for many countries around the world. It has been noticed that wages are lower in the areas with higher unemployment. To determine the position of Serbia in comparison with other countries, we will present some empirical findings for EU countries and ex-socialistic countries in the transition periods. Blanchflower (2001) found that in period 1990-1997, the estimation of east European wage curves produces a local unemployment elasticity of between -0.1 and -0.3. The paper studies the labour markets of 23 transition countries from eastern and central Europe – Albania, Armenia, Belarus, Bulgaria, Croatia, Czech Republic, East Germany, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Ukraine and Yugoslavia.

De Galdeano and Turunen (2005) estimated the elasticity of real wages with respect to local unemployment for the Euro area as a region, as well as for some Euro area and EU countries in 1994-2001. In the Euro area, the estimated elasticity coefficient was between -0.158 and -0.110 in the period 1994-2001. Among Euro area countries French wages show most and German wages least flexibility.

Serbia has much lower estimated coefficient (around -0.47) comparing with both developed and the developing countries. We may conclude that unemployment in Serbia is more responsive with respect to real wages than in other European countries. It is probably a consequence of enormous structural problems that have been cumulated during extremely long transition period and negative trends caused by economic crises.

5. CONCLUSION

Paper contains empirical evidence of modelling unemployment rate in Serbia over the period 2008-2013. Cointegrated vector autoregressive model was employed. Main results are summarized as follows.

First, long-run cointegration relationship has been detected between unemployment rate and real wages. It is estimated that 1% rise in real wages reduces unemployment rate in the long-run by 0.47%. Within this set-up, it is found that real wages are weakly exogenous variable such that dynamics of unemployment is equilibrium corrected each month by approximately 67%.

Second, dynamic responses of unemployment rate to innovations in real wages are estimated to be substantial as the impulse response function showed. This reaction becomes stronger over time. Forecast error variance decomposition confirms dominant role of real wages in explaining variability of unemployment.

Third, high persistence of unemployment rate in Serbia over period considered is found to be due to accumulated unexpected shocks in real wages, which is a common stochastic trend in bi-variate system. Long-run impact of these shocks is estimated to be close to the value of calculated cointegration parameter.

Fourth, autonomous linear trend of unemployment rate in cointegration relation is characterized by a break that occurred in mid 2012, such that positive slope has become negative after June 2012. It remains to be seen whether this downward trend will turn into a key feature of unemployment rate or it represents just a transitory movement.

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