

INVESTIGATING DIFFERENCES BETWEEN THE CZECH AND SLOVAK LABOUR MARKET

Daniel Němec, Masaryk University, Faculty of Economics and Administration, Department of Economics

Abstract

This contribution reveals some structural properties and differences of the Czech and Slovak labour markets. A small search and matching model incorporated into standard DSGE model is estimated using Bayesian techniques. Two sources of rigidities were implemented: wage bargaining mechanism and "search and matching" process matching workers and firms. The results show that search and matching aspect provides satisfactory description of employment flows in both economies. Model estimates provide interesting evidence that wage bargaining process is determined mainly by the power of the firms. These results support the view of flexible wage environment in both economies. On the other hand, the firms are confronted by the increasing vacancy posting costs that limit vacancies creation. Relative low separation rate provides evidence of reduced mobility of the workers.

Keywords: search and matching model, DSGE model, wage bargaining, Bayesian estimation

JEL Classification: C51, E24, J60

AMS Classification: 91B40, 91B51

1 INTRODUCTION

Labour market and its structural properties are the key determinants of the business cycles fluctuations. The goal of my contribution is to reveal some interesting and important structural differences of the Czech and Slovak labour markets in the last twelve. For this purpose, I use a small search and matching model incorporated into standard macroeconomic dynamic stochastic general equilibrium model (DSGE). Search and matching model is an important tool to model labour market dynamics. This model is a log-linear version of the model originally developed by Lubik [8]. Using real macroeconomic data I am able to estimate some key labour market indicators: the wage bargaining power of unions, the match elasticity of unemployed and the efficiency of the matching process.

One of the main questions of this paper is how flexible are the Czech and Slovak Labour markets. There is not a unique measure of the labour market flexibility but one can focus on some key features which might be connected with a flexible labour market. In case of the Slovak labour market, Gertler [5] studies the relationship between the local unemployment rate and wage level (using a panel data approach). He has confirmed that wages in Slovakia are relatively flexible (that is an important part of labour market flexibility concept). But, this overall wage flexibility was only poorly influenced by the institutional arrangements of the Slovak labour market. The labour market in the Czech Republic was influenced (like the Slovak labour market) by the opening of markets which started in 1990. As Flek and Večerník [3] pointed out, the market reforms, trade and price liberalisation and the establishment of standard labour market institutions (aiming on improvement of labour mobility and flexibility) produced an inevitability of rising unemployment. Unlike other transition countries (including Slovakia) the rise of unemployment was delayed and unemployment rate hit 10-years peak in 2004. Flek and Večerník [3] argue that the labour market alone was not fully responsible for this poor performance. Some obstacles (to better macroeconomic performance and job creation) were linked with a relatively weak supply-side flexibility of the Czech economy as a whole. These authors conclude that the Czech labour market loses its flexibility due to high reservation wage and due to the obstacles connected with the necessary layoffs. This conclusion is confirmed by Gottvald [6]. On the other hand, he pointed out that the diminishing flexibility in 90s was accompanied by the high probability of changing job (without an episode of unemployment). He observed decreasing flows of workers among industries (i.e. low labour mobility). Other aspect of the Czech labour market are analysed by Mareš and Sirovátka [9] which emphasized the role of long-term unemployment (a problem faced by the Slovak labour market as well). Wage flexibility (on regional level) was discussed by Galuščák and Münich [4]. I am convinced that some of these issues may be confronted with the results of presented DSGE model.

2 MODEL AND DATA

As mentioned previously, I use the model developed by Lubik [8]. It is a simple search and matching model incorporated within a standard DSGE framework. The labour market is subject to friction because a time-consuming search process for workers and firms. The wages are determined by the outcome of a bargaining process which serves as a mechanism to

redistribute the costs of finding a partner. For estimation purposes, I did not use the non-linear form of the model mentioned in the previous section (of course, this form is important to understand the meaning of the key structural model parameters). Instead of that, I use a log-linear version of the model based on my own derivations. Log-linear version is not a part of the original contribution of Lubik [8] and may be found in Němec [10].

The model for the Czech and the Slovak economy is estimated using the quarterly data set covering a sample from 1999Q1 to 2010Q4. The observed variables are real output (GDP, in logs), hourly earnings (in logs), unemployment rate and rate of unfilled job vacancies. All data are seasonally adjusted. The original data are from databases of the OECD, the Czech Statistical Office (CZSO) and the Ministry of Labour, Social Affairs and Family of the Slovak Republic (SAFSR) and the Statistical Office of the Slovak Republic (SOSR).¹ Real output and hourly earnings are de-trended using Hodrick-Prescott filter (with the smoothing parameter $\lambda = 1600$ \$). The rate of unfilled job vacancies and unemployment rate was demeaned prior estimation. The variables used are expressed as corresponding gaps. It should be mentioned, that the unemployment gap and the gap of vacancies were computed as log differences (i.e. both series and their means were expressed in logarithms before differencing). This approach is consistent with the log-linear equations (see Němec [10]). The estimation results are thus different (in some ways) from the ones presented by Němec [10] who used simply the corresponding differences.

3 ESTIMATION RESULTS AND MODEL EVALUATION

Parameters are estimated using Bayesian techniques combined with Kalman filtering procedures. All computations have been performed using Dynare toolbox for Matlab (Adjemian et al. [1]). Table 1 reports the model parameters and the corresponding prior densities. The priors (and calibrations) are similar to those used by Lubik [8]. On the other hand, the standard deviations are rather uninformative.

¹ I used the following data sets: GDP at purchaser prices, constant prices 2000, s.a., CZSO, millions of CZK; GDP at purchaser prices, constant prices 2000, s.a., SOSR, millions of EUR; Index of hourly earnings (manufacturing), 2005=100, s.a., OECD; Registered unemployment rate, s.a., OECD; Unfilled job vacancies, level (transformed to ratio of unfilled vacancies to labour force), s.a., OECD and SAFSR.

Table 1: Parameters and prior densities

Description	Parameter	Density	Priors SVK		Priors CZE	
			Mean	Std. Dev.	Mean	Std. Dev.
Discount factor	β	-	0.99	-	0.99	-
Labour elasticity	α	-	0.67	-	0.67	-
Demand elasticity	ε	-	10	-	10	-
Relative risk aversion	σ	G	1.00	0.50	1.00	0.50
Match elasticity	ξ	G	0.70	0.10	0.70	0.10
Separation rate	ρ	G	0.10	0.05	0.10	0.05
Bargaining power of the workers	η	U	0.50	0.30	0.50	0.30
Unemployment benefits	b	B	0.20	0.15	0.20	0.15
Elasticity of vacancy creation cost	ψ	G	1.00	0.50	1.00	0.50
Scaling factor on vacancy creation cost	κ	G	0.10	0.05	0.10	0.05
AR coefficients of shocks	$\rho_{\chi,A,\mu,Y}$	B	0.80	0.20	0.80	0.20
Standard deviation of shocks	$\sigma_{\chi,A,\mu}$	IG	0.01	1	0.01	1.00
Standard deviation of shocks	σ_Y	IG	0.05	1	0.05	1.00

Chyba! Nenalezen zdroj odkazů. presents the posterior estimates of parameters and 90% highest posterior density intervals. It may be seen (in comparison with the Table 1) that most of the parameters are moved considerably from their prior means. The data seems to be strongly informative.

There are some remarkable results which should be emphasized. The first surprising estimate is the bargaining power of workers, η . The mean value of this parameter is almost 0 for both countries with a 90% coverage region that is shifted considerably away from the prior density. This implies that the firms can gain the most of their entire surplus. The firms are thus willing to create vacancies. This result is in accordance with the results of Lubik [8] or Yashiv [11] who aimed to model the U.S. labour market. Low bargaining power of the workers is typical for the flexible labour markets which bring the wage dynamics to the line with productivity growth. The second interesting result is the estimated separation rate, ρ . This parameter is considerably lower than the one estimated by Lubik [8]. Its value supports the view of less flexible Czech and Slovak labour market with limited ability to destroy old and new matches.

Low flexibility is meant to be associated with the restricted flows of the workers among industries.

Table 2: Parameters estimates

	SVK			CZE		
	Posterior mean	90% HPDI		Posterior mean	90% HPDI	
σ	0.2843	0.1319	0.4248	0.4517	0.2989	0.5648
ξ	0.8196	0.7645	0.8782	0.7758	0.7229	0.8316
ρ	0.0677	0.0185	0.1259	0.0705	0.0563	0.0843
η	0.0046	0.0000	0.0099	0.0022	0.0000	0.0050
b	0.1566	0.0001	0.2988	0.4557	0.4083	0.5052
ψ	2.2769	1.7870	2.7440	1.9257	1.8313	2.0563
κ	0.1245	0.0811	0.1759	0.0875	0.0524	0.1259
ρ_χ	0.2514	0.0616	0.4554	0.7347	0.6994	0.7641
ρ_A	0.9449	0.8785	1.0000	0.9851	0.9802	0.9914
ρ_μ	0.9563	0.9188	0.998	0.8222	0.7211	0.8804
ρ_Y	0.8079	0.6948	0.9267	0.9184	0.8632	0.9806
σ_χ	0.0170	0.0141	0.0199	0.0085	0.0071	0.0099
σ_A	0.5063	0.1300	0.8161	0.3181	0.2429	0.3981
σ_μ	0.0640	0.0531	0.0743	0.0666	0.0551	0.0767
σ_Y	0.0168	0.0142	0.0194	0.0097	0.0082	0.0112

The third remarkable estimate is the vacancy posting elasticity, ψ . The posterior means 2.3 for the Slovak labour market and 1.9 for the Czech labour market are shifted away from the prior mean. The vacancy creation is thus more costly because of increasing marginal posting costs (increasing in the level of vacancies or labour market tightness, $\theta = v_t / u_t$). Lubik [8] estimated this parameter at the mean value of 2.53. In this case, the high value of ψ may be interpreted as a balancing factor which “restrict” potentially excessive vacancy creation driven by the low bargaining power. In case of the analysed labour markets, this higher value provides further evidence of specifically less flexible labour markets. The estimate of parameter b corresponds to a remarkably high value of 0.46 for the Czech economy which might be in accordance with the real unemployment benefits paid within the Czech social

insurance system (40% of average wage). The lower value of 0.16 for the Slovak economy might support the view of lower reservation wage for this country. The posterior mean of the matching function parameter, ξ , is in accordance with the common values in literature (see Lubik [8] or Christoffel et al. [2]).

The trajectories² of selected smoothed variables and shock innovations show a relative sharp decline in the development of variable q (probability of filling a vacancy) at the end of the year 2006. This evidence is in favour of theories which stressed the role of an obvious lack of employees in the Czech economy. The similar results may be found for the Slovak economy as well. This tendency was reverted as a result of the last global economic slowdown starting at the end of 2008. This downturn of both economies influenced a fall of the matching rates (m) below their steady-state values. On the other hand, the starting recession has re-established the equilibrium on both labour markets (see the trajectories of employment rate and labour market tightness). The improvement of labour market institutions might be associated with the development of efficiency shock (μ). From this point view, some remarkable changes on the Czech and Slovak labour markets started at the end of 2004 and at the beginning of the 2006 respectively. Historical shock decomposition reveals the fact that the technology shock plays more important role in the Czech economy. A story about the properties and development of both labour markets is similar to the one discussed previously.

In order to see how the model fits the data, sample moments, autocorrelation coefficients and cross-correlations were computed. I computed these statistics from simulation of the estimated models with parameters set at their posterior means. All these statistics correspond to the four observed series (unemployment gap, u , gap of vacancies, v , gap of the wages, w , and output gap, Y). Both models are successful in matching all sample moments and autocorrelation coefficients (they are mostly within the appropriate 90% highest posterior density intervals). This ability is not used to be typical for such a small-scale model. Unlike the results of Němec [10], there is no exception regarding the fit of sample moments. The model using the data for unemployment gap and vacancies gap as log-differenced variables does not predict volatility in wages higher as observed. My results are in accordance with the authors arguing that the model with search and matching frictions in the labour market is able

² Due to the maximal allowed range of the contribution, all the figures (data, smoothed variables and shock, IRFs and shock decompositions) are a part of accompanying conference presentation and may be obtained upon a request.

to generate negative correlation between vacancies and unemployment (see Krause and Lubik [7]). Unfortunately, the values of cross-correlation coefficients are not sufficient for the correlations of wages and the rest of observable variables (especially in the case of the Czech model). The similar experience may be found in the results for U.S. labour market provided by Lubik [8]. Lubik pointed out that this may be due the presence of matching shock, which can act as a residual in employment and wage equations.

4 CONCLUSION

In my contribution, I investigated structural properties of the Czech and Slovak labour markets using a simple DSGE framework with labour market frictions. Two sources of rigidities were implemented: wage bargaining mechanism and "search and matching" process matching workers and firms. Estimated model provides satisfactory description of employment flows in both economies. Parameter estimates provide convincing evidence that wage bargaining process is determined mainly by the power of the firms. The structural properties of both markets do not differ too much from the properties of the U.S. labour market.

As for the labour markets flexibility, my results support the view of flexible wage environment in both economies. On the other hand, the firms are confronted by the increasing vacancy posting costs that limit vacancies creation. Moreover, the lower separation rate might provide us with the evidence of reduced mobility of the workers. Unfortunately, because of simple structure of the model presented in this paper, there are some drawbacks which should be mentioned and which are connected with some suggestions for further research: robustness check based on estimation using the information provided by a variety of filters or by direct linking of the observable data to the DSGE models, inclusion of price rigidities and monetary policy (monetary rule) which allows to analyse implications of wages and labour market shocks on inflation process and incorporating labour market rigidities into an open economy model because foreign demand should play a significant role in the development of both economies (the direct effects of labour market shocks will become more obvious).

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Author's address

Ing. Daniel Němec, PhD.

Masaryk University, Faculty of Economics and Administration, Department of Economics

Lipová 41a, 602 00 Brno

Czech Republic

email: nemecd@econ.muni.cz