DISCUSSION PAPER

OĻEGS KRASNOPJOROVS

NATURAL AND CYCLICAL UNEMPLOYMENT IN LATVIA: NEW INSIGHTS FROM THE BEVERIDGE CURVE MODEL

2 · 2015

CONTENTS

ABBREVIATIONS

AMECO – Annual macro-economic database
CSB – Central Statistical Bureau of Latvia
EC – European Commission
EU – European Union
HP filter – Hodric–Prescott filter
ILO – International Labour Organization
IMF – International Monetary Fund
ISCO – International Standard Classification of Occupations
LFS – CSB Labour Force Survey
NAIRU – non-accelerating inflation rate of unemployment
NAWRU – non-accelerating wage rate of unemployment
NUTS – Nomenclature of Territorial Units for Statistics
SEA – State Employment Agency of Latvia
US – United States of America

SUMMARY

Whether current unemployment in Latvia is mostly structural or cyclical recently provoked an intense debate among policy makers and academic researchers. This paper follows the method proposed by Barlevy (2011) to estimate natural and cyclical components of unemployment from the Beveridge curve model. It finds that at the end of 2014 unemployment in Latvia was quite similar to its natural rate. Zero cyclical component of unemployment suggests that aggregate-demand-stimulating policies would not bring unemployment down without creating inflationary pressures and competitiveness loss and, therefore, are not a preferred option. Instead, raising matching efficiency between the unemployed and vacancies would decrease natural unemployment from its current high of about 11%. Moreover, it was found that the lowest matching efficiency between the unemployed and vacancies is present among workers (compared to managers and professionals) and typical for Latgale region. This might reflect significant structural problems rather than low business cycle synchronisation with the other occupational groups and regions.

Key words: unemployment, vacancies, Beveridge curve, cyclical unemployment, natural unemployment, structural unemployment

JEL codes: J63, J64, E24, E60

INTRODUCTION

Despite Latvia being the fastest growing economy of the EU during 2011–2013, unemployment still exceeds 10% and remains a major policy concern. Beyond straightforward social costs, unemployment rise may have enforced emigration spike of 2009–2012, further deteriorating already dim demographic prospects. The need to reduce unemployment is recognised as an important challenge by the whole political spectrum and many economic observers (see, for instance, Krugman (2012), Åslund (2012)).

Whether current unemployment in Latvia is mostly structural or cyclical recently provoked an intense debate among policy makers and academic researchers. On the one hand, the estimates of Latvijas Banka, the EC, the IMF (2014), Blanchard, Griffiths and Gruss (2013) as well as Ebeke and Everaert (2014) suggest that the cyclical component of unemployment is rather small or close to zero. On the other hand, Anosova et al. (2013) as well as Hazans (2013) claim that the cyclical component of unemployment is still positive and high. "Normal" unemployment rate above 10%, given a flexible labour market, certainly raises doubt and is not tolerated by society. The IMF (2014) points to high labour taxation as one of the possible causes for high structural unemployment in the Baltics.

Instead of being a pure academic debate, the nature of unemployment (mainly cyclical or structural) determines a preferable path of macroeconomic policy for subsequent years. In case of a positive, large and stable cyclical component of unemployment, aggregate demand stimulus would be the first policy option to bring unemployment down. Even in the case of a decreasing (but positive and large) cyclical component, temporary economic stimulus can speed up unemployment decrease towards its natural rate, without creating inflationary pressures and losing competitiveness. At the same time, if the cyclical component of unemployment is negative, zero or even marginally positive (but decreasing), economic stimulus may push inflation up without any long-lasting impact on unemployment. In the latter case, the only option to achieve a sustainable decline of unemployment is to implement measures combating high structural component (if one regards frictional unemployment as exogenous, high natural rate of unemployment implies high structural component, which should be addressed).

First attempts to estimate the natural rate of unemployment in Latvia goes back to Camarero et al. (2005), according to whom the natural rate varied between 10% and 14% during the decade before the EU accession.

The most widely used method of decomposing unemployment into natural and cyclical components in Latvia has been the Phillips curve model with a Kalman filter, first applied during the onset of the crisis by Latvijas Banka economists Meļihovs and Zasova (2007; 2009). The method defines the natural rate as a NAIRU, i.e. the unemployment rate at which inflation is stable. According to their estimates, NAIRU decreased from 14% in 1997 to below 8% in 2008. Similar results are reported by Zasova (2012), with NAIRU increasing above 9% by the end of 2010. Given that headline unemployment peaked at 19.5% in 2010, this result implies a large cyclical component of unemployment of about 10 percentage points.

The IMF (2014) and Ebeke and Everaert (2014) used a similar method to estimate the natural rate and derived a nearly flat NAIRU for 2002–2013. They admitted,

however, that NAIRU volatility depended on the assumption about the signal-to-noise ratio (variance of the error term in the transition equation of the NAIRU relative to the one of the error term in the Phillips curve equation) but claimed that NAIRU estimates were robust to reasonable modifications of this ratio.

The EC uses NAWRU, a slightly different concept of the natural rate, i.e. unemployment at which wages are stable. The EC regularly publishes NAWRU estimates within the AMECO database. NAWRU estimates for the most recent period are subject to large revisions: the current EC estimate (as of March 2015) reflects a NAWRU decrease from 17% in 1997 to 11% in 2005 and a subsequent rise to 12% in 2014; thus currently, the unemployment gap, i.e. the difference between headline and natural unemployment, is almost closed.

Anosova et al. (2013) constructed a Beveridge curve and found that both the unemployment increase during the crisis and its decrease afterwards were almost entirely cyclical. However, they do not provide any estimate of the natural rate or cyclical component of unemployment in absolute terms. Instead, they found that currently the cyclical component is higher than before the crisis and claimed that in 2013 a large share of unemployment in Latvia was still cyclical.

Hazans (2013) analytically concluded that the cyclical component of unemployment was currently high because, first, entrepreneurs were more concerned about insufficient demand rather than labour shortage, second, the vacancy rate was extremely low, and, third, vacancies were filled very fast. Later on, his arguments were opposed by Krasnopjorovs (2013).

To summarise, the Philips curve model with a Kalman filter results in currently almost non-existent cyclical unemployment in Latvia but its estimates are rather unstable subject to assumptions used. First, NAIRU volatility is assumed a priori by choosing the signal-to-noise ratio. Second, filtering makes the recent observations depend heavily on the future period data. Therefore, the Phillips curve model results should be verified with other techniques. Anosova et al. (2013) applied the Beveridge curve model to unemployment changes and found a still high cyclical component. This paper applies the Beveridge curve to decompose unemployment rate (rather than its changes) into natural and cyclical components.

The paper is organised as follows. Section 1 reviews methodology by extending the application by Barlevy (2011) for the US and discusses data that are available for Latvia. Section 2 discusses empirical results and performs a robustness check. Section 3 digs into the insights by looking at individual sectors, occupations and regions. Finally, the last section concludes.

1. METHODOLOGY

This Section, first, follows Barlevy (2011) by reviewing the Beveridge curve model and applying it to decomposing the unemployment level into natural and cyclical components, and, second, discusses the data that are available for Latvia.

1.1 The Beveridge curve model

The Beveridge curve reflects a negative relation between the unemployment rate and vacancy rate. The unemployment to vacancy ratio rises during recessions and falls during expansions, as shown in Chart 1 for Latvia. The movement along the Beveridge curve represents changes in the cyclical component of unemployment. In the meantime, a change in the natural rate of unemployment is reflected in Beveridge curve shifts. For instance, an upward shift of the Beveridge curve (more vacancies for given unemployment) represents a decrease of matching efficiency between the number of unemployed and vacancies and, thus, is associated with a rise of the natural unemployment rate. Chart 1 shows that there were some shifts of the Beveridge curve for Latvia's data, thus, the task is to quantify them in terms of the natural unemployment rate.

Chart 1
Beveridge curve for Latvia
(2002–2014)
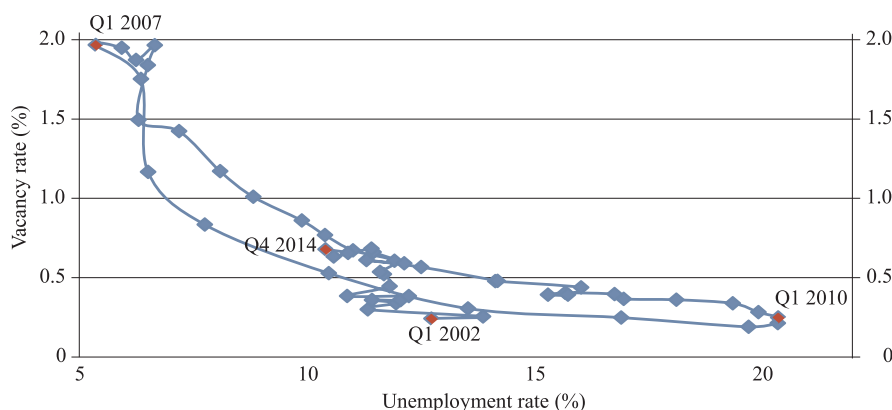
Source: author's calculations based on CSB and SEA data.

Petrongolo and Pissarides (2001) argue that labour market matching function *m*, which determines the total number of new hires *h*, can be reasonably approximated by the Cobb–Douglas function of unemployment *u*, vacancies *v* and matching efficiency *A*:

$$h = m(u,v) = A \cdot u^{\alpha} \cdot v^{1-\alpha} \qquad [1].$$

In constant unemployment rate equilibrium, the number of hires is equal to the number of separations, reflected by employment (*1 − u*) and separation rate *s*:

$$s(1-u) = h = A \cdot u^{\alpha} \cdot v^{1-\alpha} \qquad [2].$$

It is further assumed that the unemployment to vacancy ratio *u/v* is always close to conditional equilibrium, determined by the willingness of firms to hire (depends on the value of filled post to employer subject to the costs of posting and maintaining a

vacancy, and the probability of filling a vacancy). It is reflected by the moves along the Beveridge curve: rising unemployment and falling vacancies during recession and an opposite move during expansions. A determines firm's ability to hire employees, thus changes in A reflect Beveridge curve shifts.

The unemployment rate in conditional equilibrium is given by:

$$u = \frac{s}{s + A \cdot (v/u)^{1-\alpha}}$$ [3],

and, rearranging, the vacancy rate is given by:

$$v = \left[\frac{s}{A} \left(u^{-\alpha} - u^{1-\alpha} \right) \right]^{\frac{1}{1-\alpha}}$$ [4].

First, we solve equation [4] for constant A and α by minimising the squared deviation between the implied and headline vacancy rates. Since we are interested in the changes in A, not in its level, the separation rate s is a normalisation parameter which, following Barlevy (2011), is assumed to be constant (in this case, it is equal to 0.04).

Second, we assume a constant $α$ and calculate A for each period (i.e. At), so that the vacancy rate in equation [4] corresponds to the actual vacancy rate in the respective period.

Third, we express the natural value of vacancy to unemployment ratio $(v/u)*$ as a historical average of this ratio $(\bar{v}/\bar{u})$ adjusted by the value of At parameter in a specific period:

$$\left(\frac{v}{u} \right)_t^* = \frac{\bar{v}}{\bar{u}} \cdot \left(\frac{A}{A_t} \right)^{1-\alpha}$$ [5].

Fourth, we can calculate the natural rate of unemployment by putting the natural value of v/u in equation [3]:

$$u* = \frac{s}{s + A_t \cdot (v/u)*_t^{1-\alpha}}$$ [6].

Finally, the cyclical component of unemployment is a difference between the headline unemployment u_t and its natural rate:

$$\hat{u} = u_t - u_t *$$ [7].

This calculation has two important differences from Barlevy (2011). First, this paper finds constant A and $α$ in equation [4] by minimising the squared deviation between the implied and headline vacancy rates, while Barlevy (2011) estimates A and $α$ parameters more arbitrarily, "so that the average predicted vacancy rate over the period is equal to the actual average, and the difference in vacancy rates between the start and end dates is the same in the predicted series as in the actual series". Second,

the basic specification of this paper uses historical average vacancy and unemployment rates in order to get the natural value of *v/u*, while Barlevy (2011) uses a pre-crisis period (up to December 2007). During the last decade, Latvia experienced a sharp boom-bust cycle so that any specific period could hardly be chosen as a base period; instead, historical average may be a best guess for a period during which the difference between headline and natural unemployment was zero on average. However, as one of the robustness checks, this paper uses the pre-crisis period (1998–2007) as a base.

1.2 Data

Our base specification uses International Labour Organization's definition of unemployment rate (or job seekers rate) which is defined as the ratio of the unemployed to economically active population within the working age (15–74). Data come from the quarterly Labour Force Survey (LFS) conducted since 2002 by the CSB. This corresponds to the U3 unemployment definition in the US. As a robustness check, we consider two alternative unemployment definitions. The first alternative is to include discouraged workers both in the numerator and denominator of unemployment rate (U4 definition in the US), following Anosova et al. (2013). The second one is to use the registered unemployment rate (based on the number of people who obtained the official unemployed status with the SEA). It should be noted that the difference between U3 and U4 unemployment is the ratio of discouraged workers to economically active population that increased during the crisis but, nevertheless, was somewhat lower than during the pre-boom years (see Chart 2).

Chart 2
Alternative unemployment variables
(% of economically active population)

Registered unemployment
LFS unemployment rate (U3)
LFS unemployment rate + discouraged workers (U4)
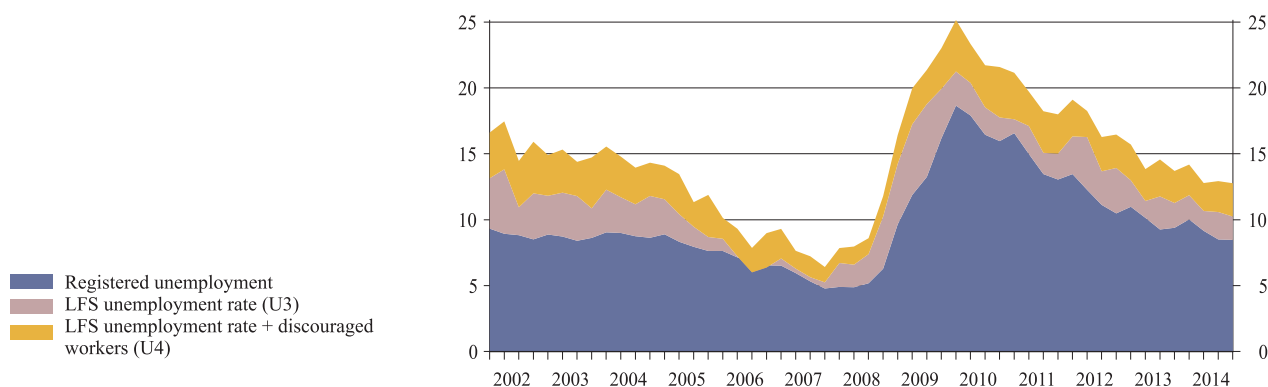
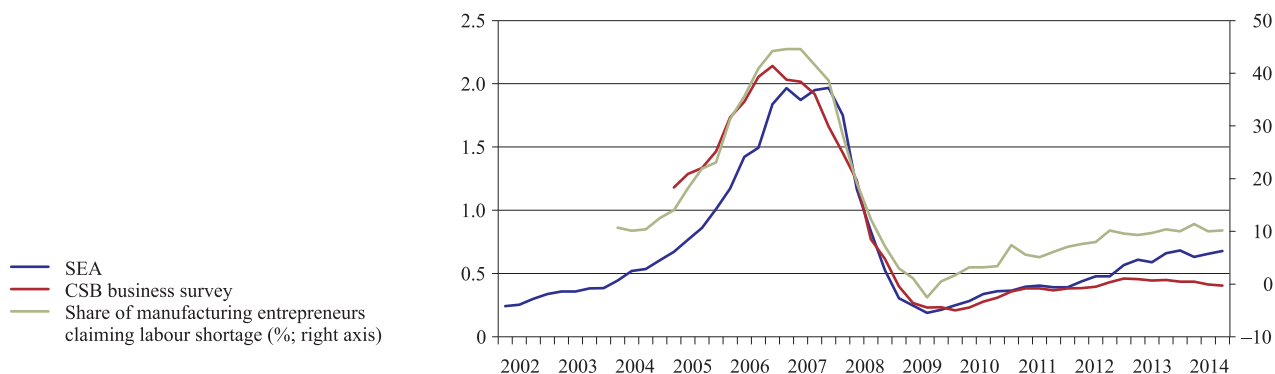Source: author's calculations based on CSB and SEA data.

The vacancy rate is defined as unfilled posts to total posts (both occupied and unfilled). Our base specification uses the SEA data on vacancies, which is the only vacancy data source available as early as from 2002, while the number of occupied posts was approximated by employment from the LFS. As a robustness check, we employ two alternative vacancy data sources. First, we use the CSB business survey data available as from 2005 (used in Anosova et al. (2013)). The second is the EC business tendency data, available as from 2004, on the share of manufacturing entrepreneurs claiming labour shortage as an important problem (used as the only proxy for vacancies by the IMF (2014) and Ebeke and Everaert (2014)). It is

important to note that the vacancy rate according to the CSB business survey considerably exceeds the respective indicator from the SEA data in 2005, while the opposite is true for 2013 and 2014 (see Chart 3). We will return to this issue when discussing the results of robustness check.

Chart 3
Alternative vacancy variables
(% of job places; seasonally adjusted)

SEA
CSB business survey
Share of manufacturing entrepreneurs
claiming labour shortage (%; right axis)

Source: author's calculations based on CSB, SEA and EC data.

The research period should be long enough in order to regard unemployment gap to be closed on average, but not include a period before major structural breaks in the labour market which could undermine α stability assumption. We regard 2002, the year when the quarterly LFS data became available, as a plausible starting point for our base specification. Barlevy (2011) shows that (in the US) α is fairly stable during several decades. Similarly, Anosova et al. (2013) who start from 2005, find no significant change in α for Latvia during the period considered. Nevertheless, as a robustness check, we consider alternative starting dates from 1998 to 2007.

2. EMPIRICAL RESULTS

First, empirical results of the base specification are presented, followed by a robustness check.

2.1 Base specification results

Solving equation [4] for constant A and α by minimising the squared deviation between implied and headline vacancy rates in the base specification gives elasticity of the hiring rate to unemployment α equal to 0.608. Being within the plausible range of 0.5–0.7 as argued by Petrongolo and Pissarides (2001), it could reflect that congestion effects among firms are bigger than the ones among workers. Moreover, it is similar to 0.61–0.67 found for Latvia by Anosova et al. (2013). Time-invariant matching efficiency A is estimated at 1.003, which gives time-invariant natural rate of 10.9%, i.e. close to the rate estimated by Blanchard et al. (2013) for the time-invariant Phillips curve, and to Ebeke and Everaert (2014) by applying the Kalman filter to assess the time-varying Phillips curve.

Then, holding α constant and calculating A for each period in order to equate the implied and headline vacancy rates gives A estimates shown in Chart 4. Matching efficiency decreased somewhat during the crisis but improved afterwards. Overall, matching efficiency in 2014 was similar to that in 2005. This is similar to the findings of Anosova et al. (2013) that matching efficiency is not worse than during

the pre-crisis years and that the crisis years did not lead to major deterioration in matching. The decrease of matching efficiency since the start of the crisis till mid-2010 could reflect unemployment hysteresis effects. However, larger scope and scale of active labour market policies contributed to a rise in matching efficiency during the subsequent years. A decrease of matching efficiency during 2002–2004 is less intuitive and may partly reflect hysteresis effects (high unemployment rate during the transition period) or rapid technology advances (i.e. computers and Internet), which increased the demand for skills not inherent for the unemployed.

Chart 4
Matching efficiency (*A*) estimate
(base specification; total economy)
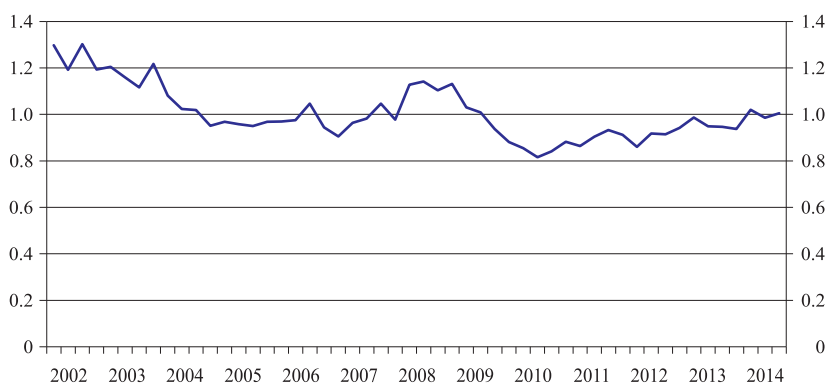
Source: author's calculations based on CSB and SEA data.

Next, we turn to quantifying the shifts of the Beveridge curve and the corresponding change of matching efficiency in terms of the natural rate of unemployment. The natural rate of unemployment estimate (HP-filtered with very low density ($\lambda = 10$) in order to subtract noise) together with the headline unemployment rate are shown in Chart 5 (unfiltered natural rate is shown in Chart A1). Note that natural unemployment rate profile mirrors *A* dynamics with the opposite direction. The cyclical component of unemployment (from HP-filtered natural rate) is shown in Chart 6.

Chart 5
Natural and headline unemployment rate
(% of economically active population; seasonally adjusted data; base specification)
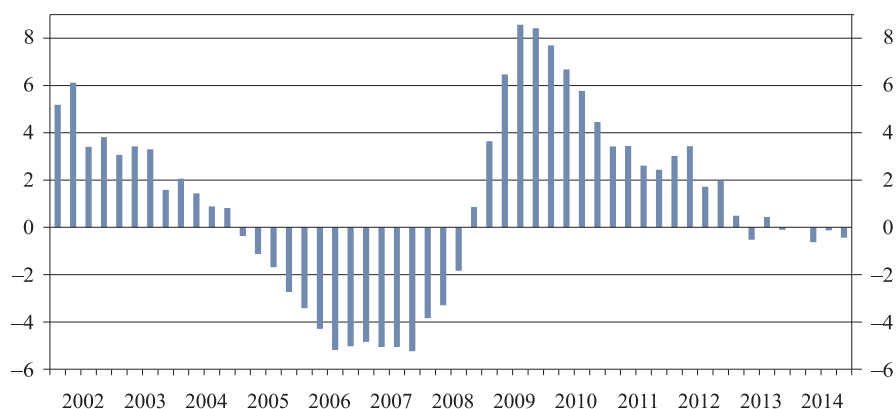

Headline unemployment
Natural rate of unemployment (hp-filtered, $\lambda = 10$)
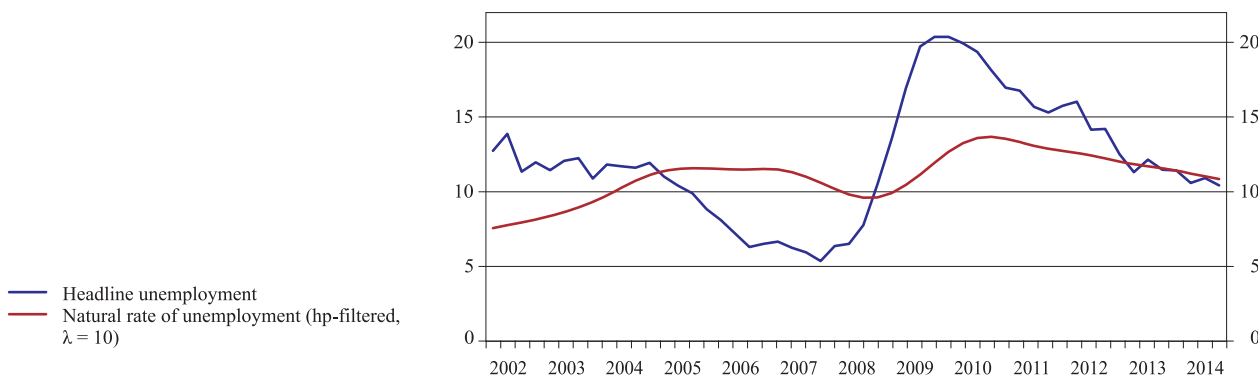
Source: author's calculations based on CSB and SEA data.

Chart 6
Cyclical component of unemployment
(% of economically active population; seasonally adjusted data; base specification)

Source: author's calculations based on CSB and SEA data.

There were two periods when the headline unemployment rate exceeded the natural rate of unemployment – 2002–2004 and 2009–2012. This corresponds to recessionary gaps (negative difference between headline and potential output), estimated by the EC (AMECO database) and the Ministry of Finance of the Republic of Latvia (2010). During 2005–2007, on the contrary, headline unemployment was lower than natural unemployment, leading to labour shortages and unsustainable wage growth far exceeding labour productivity increases. Similarly, the EC posts expansionary output gaps during this period. Finally, as from the beginning of 2013, headline unemployment is broadly similar to its natural rate and both are decreasing gradually. The point estimate of the cyclical component for the fourth quarter of 2014 is –0.42%, which should be regarded as near zero since the use of alternative data during robustness check may give slightly negative and positive cyclical components. This is similar to the results of the IMF (2014) and Ebeke and Everaert (2014) about Latvia facing a high rate of natural unemployment and contradictory to the results of Anosova et al. (2013) and Hazans (2013) pointing to still high cyclical component.

2.2 Robustness check

Given that the choice of a base period is somewhat arbitrary, we begin the robustness check with changing assumptions regarding the base period. Initially, we check whether alternative starting date matters. After that, we follow Barlevy (2011) by using the pre-crisis period rather than historical average as a base.

Eurostat publishes the unemployment rate also for the period 1998–2001, based on interpolated bi-annual LFS results. Similarly, the SEA publishes vacancy data from the beginning of the 1990s. This gives an opportunity to extend the research period. However, major structural changes may have been present in the post-transition labour market (possibly changing α or long-run s), which may justify shortening of the research period. Therefore, as a robustness check, we change the starting date of research period from 1998 to 2007. Moreover, we use the pre-crisis period (1998–2007) as a base for one additional robustness check.

The results show that the estimates of natural rate and cyclical component of unemployment as well as unemployment gap's turning points are robust to the

changes during the length of the research period (see Charts A1 and A2 and Table A1 in Appendix). The cyclical component is either slightly negative or slightly positive both for 2014 and its fourth quarter, reflecting a broadly closed unemployment gap. At the same time, natural rate estimates vary from 10% to 12% of economically active population.

The second robustness check was performed subject to alternative unemployment definitions. Chart A3 shows that the assessment of unemployment gap's turning points is robust, and, for instance, the natural rate exceeded headline unemployment from the first quarter of 2005 to the third quarter of 2008 irrespectively of the unemployment variable considered. The difference between the estimated cyclical components mainly comes from a different scale. When adjusting for the historical average unemployment rate, the cyclical component looks more similar (see Chart A4). From the fourth quarter of 2009 to the fourth quarter of 2011, a massive "Workplaces with Stipends" temporary public works programme was established, which raised the motivation of job seekers to obtain the official status of unemployed at the SEA. That is why the cyclical component of registered unemployment (as percentage of the historical average registered unemployment rate) was somewhat higher. The cyclical component is slightly negative both for 2014 and the end of 2014, irrespective of the unemployment definition (see Table A2).

The third robustness check was performed subject to alternative vacancy definitions. Vacancies from the CSB business survey give a considerably higher natural rate estimate at the beginning of the period and lower at its end (see Chart A5). The fact that the number of vacancies according to the business survey (which should represent the whole economy, except small agricultural enterprises) during the last two years was substantially lower than that in the SEA registers lacks economic reasoning. Instead, it is possible that the CSB business survey underestimates the number of vacancies and that this underestimation is larger than before at the end of the period. Under business surveys, data are collected for the last day of the quarter. If vacancies are seldom posted at the end of a quarter, underestimation of the average number of vacancies during a quarter under business survey would be stronger if the vacancy mean duration is lower. According to Hazans (2013), the vacancy mean duration decreased to only about 20 days in 2012, i.e. twice as low as in 2008. Therefore, business survey is likely to understate the number of vacancies more at the end of the period than at its beginning, which is reflected in the artificially big rise of matching efficiency, resulting in a large fall of the natural rate. Moreover, the Eurostat data reveal that in countries with similar data collection methodology to Latvia, the vacancy rate is somewhat lower than in countries with another base period (for instance, in the middle of the second month of the quarter). That is why Eurostat vacancy rate data may not be directly comparable across countries.

Meanwhile, if vacancies are approximated by the share of entrepreneurs claiming labour shortage as an important business obstacle (EC business tendency data), the cyclical component of unemployment is positive albeit small at the end of the period (see Chart A6 and Table A3). Again, a steep natural rate decrease during 2009 lacks economic intuition and should not be directly linked to the matching efficiency rise. Rather, it reflects almost zero share of entrepreneurs claiming labour shortage.

To sum up, the application of the Beveridge curve for decomposing the unemployment level into natural and cyclical components for Latvia confirms the most recent results of the Phillips curve with a Kalman filter (see the IMF (2014) and Ebeke and Everaert (2014)) of high natural rate and almost non-existent cyclical component at the end of the period. The results are robust to the changes of research period and unemployment rate definition, but are somewhat less robust to the change in vacancy rate definition. Therefore, extraordinary rises in the matching efficiency should not be directly linked to the fall of the natural rate, since the respective vacancy rate indicator may underestimate the true number of vacancies in the respective period (for instance, CSB business survey during 2013–2014 and business tendency survey in 2009).

3. INSIGHTS INTO OCCUPATIONS, SECTORS AND REGIONS

In comparison with the Phillips curve, one of the advantages of the Beveridge curve model is its potential to go beyond the aggregate natural rate estimate and examine changes of matching efficiency in particular sectors, occupations and regions. This might provide some insights as to in which sectors and occupations the aggregate Beveridge curve is shifting.

Analysis herein treats each sector, occupation and region as a separate labour market, whereas in reality there exists labour mobility between them. For instance, a fired construction worker can be hired by an agricultural firm. With this caveat in mind, however, labour mobility should not be considered as a major impediment for the results of this section. As pointed out by Braukša and Fadejeva (2013), two thirds of labour mobility in Latvia's regions is between the capital city and its suburbs (Riga and Pierīga), which will be treated as one region in this paper, while labour mobility across sectors and occupations even decreased during the crisis, possibly reflecting increased risk-aversion of the labour force. Moreover, any estimate of natural unemployment rate in particular country may face the same critique, as it disregards (is not adjusted for) labour mobility in the form of external migration, which was particularly substantial in Latvia's case.

According to the ISCO, the Beveridge curve may be split into three parts. The first occupational group consists of ISCO major groups 1–3: managers, professionals as well as technicians and associate professionals. The second group consists of ISCO major groups 4–5: clerical support workers as well as service and sales workers; the third group consists of ISCO major groups 6–9: skilled agricultural, forestry and fishery workers, craft and related trade workers, plant and machine operators and assemblers, elementary occupations. Unemployment data come from the LFS and are calculated as a ratio of unemployed with previous job experience in the respective occupation to the number of economically active (employed and unemployed) people belonging to the same occupation. Data on vacancies come from the CSB business survey, which is the only data source that divides vacancies by occupations.

While during the crisis unemployment grew and vacancies fell within each occupational group, some important differences are evident.

First, the boom-bust cycle was the most pronounced among workers. Workers had both the highest vacancy rate at the end of 2006 and the strongest vacancy rate rise during 2005–2006. During the crisis, the unemployment growth among workers was

particularly strong, reaching almost 25% in the third quarter of 2009, i.e. twice higher than among managers and professionals and three quarters ahead of the two other groups (see Chart 7).

Second, matching efficiency among workers is the lowest and is reflected in a rather high natural unemployment rate. Also, workers experienced the lowest rise of matching efficiency over the decade (see Chart 8).
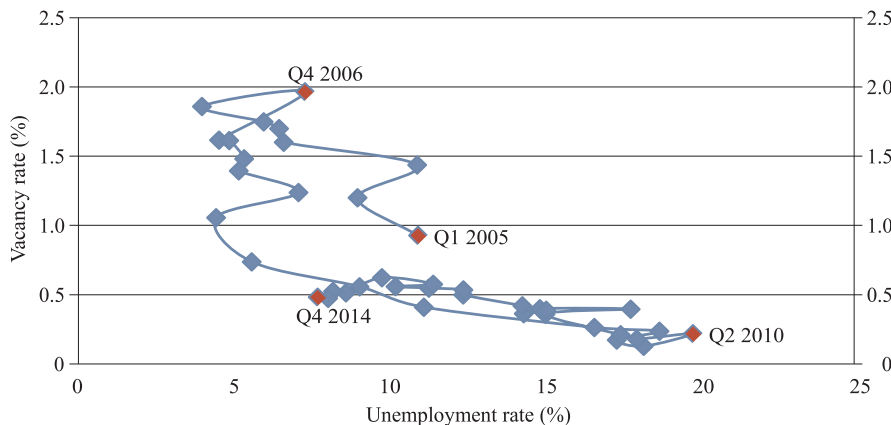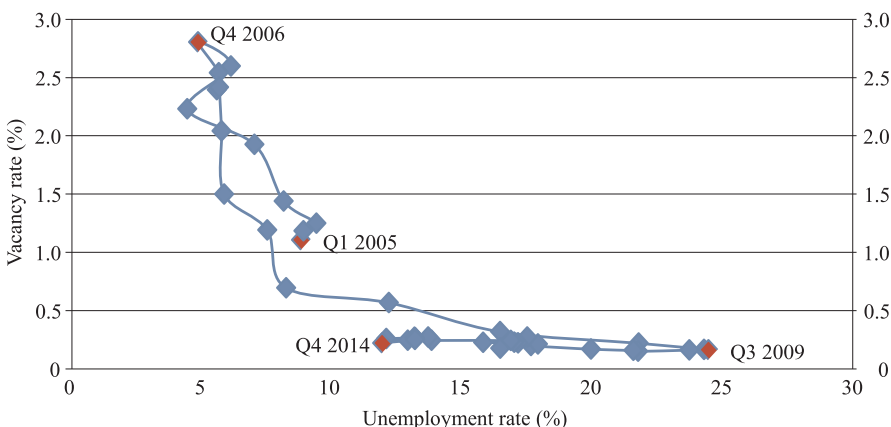
Chart 7
Beveridge curve by occupations

a) Managers and professionals
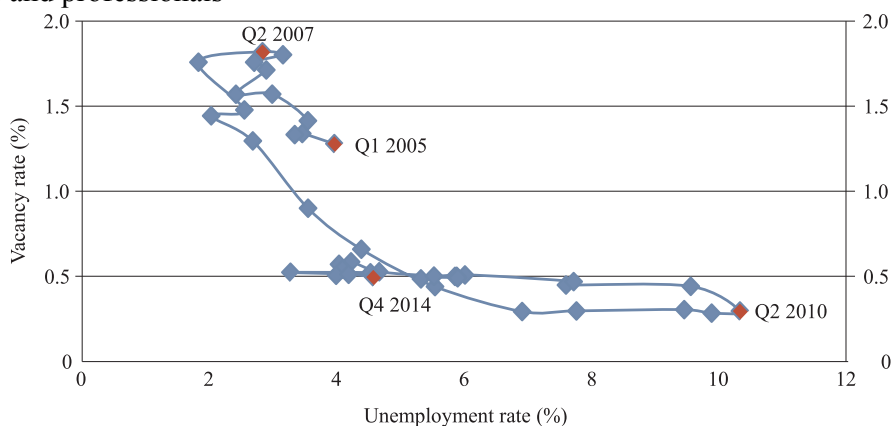
b) Clerks and service workers

c) Workers

Source: author's calculations based on CSB data.

Chart 8
Matching efficiency by occupations

Managers and professionals
Clerical support workers and service workers
Other workers
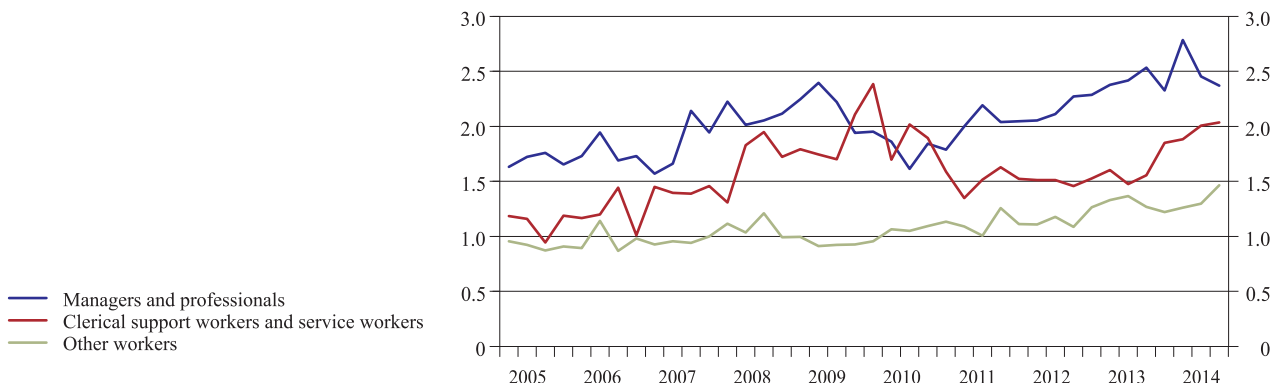
Source: author's calculations based on CSB data.

By sectors, the Beveridge curve may be split into three parts. The primary sector consists of agriculture and mining, the secondary sector consists of industry and construction, the tertiary sector comprises such services as trade, transport, hotels, education, etc. Unemployment data come from the LFS, and its level is calculated as a ratio of unemployed with previous job experience in the respective sector to the number of people employed in the same sector (available as from 2008). Data on vacancies again come from the CSB business survey, as it is the only data source that divides vacancies by sectors.

Some cross-sectional differences are worth mentioning.

First, the unemployment growth in the secondary sector was particularly fast during the crisis, exceeding 30% in the third quarter of 2009, i.e. twice as large and four quarters ahead of services (see Chart 9). It partly reflects the burst of real estate bubble with a significant impact on employment in construction and a steep slowdown in the manufacturing demand due to a decrease in external demand and deterioration in Latvia's competitiveness during the preceding expansion.
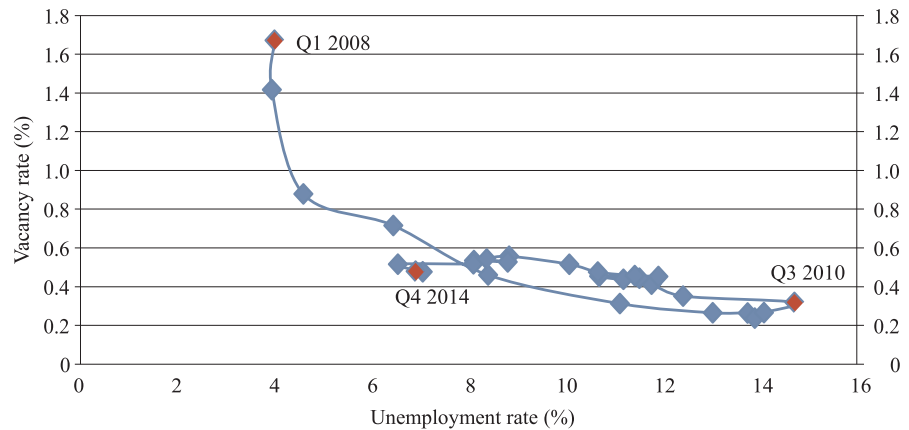
Chart 9
Beveridge curve by sectors

a) Primary sector
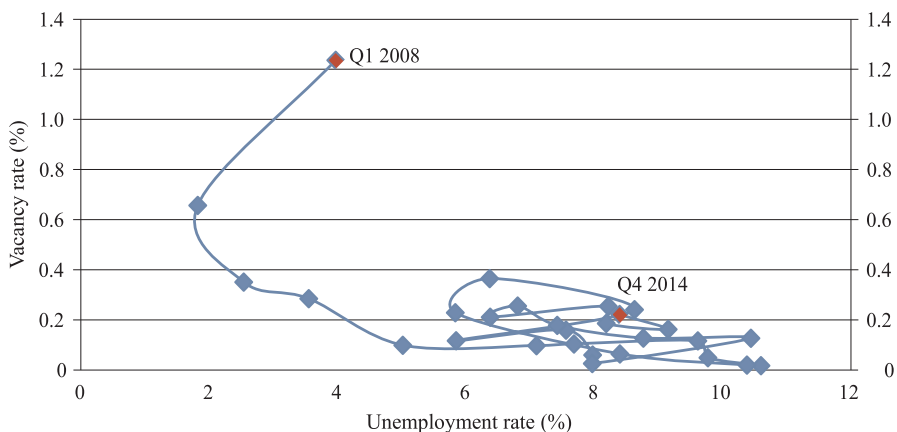
b) Secondary sector
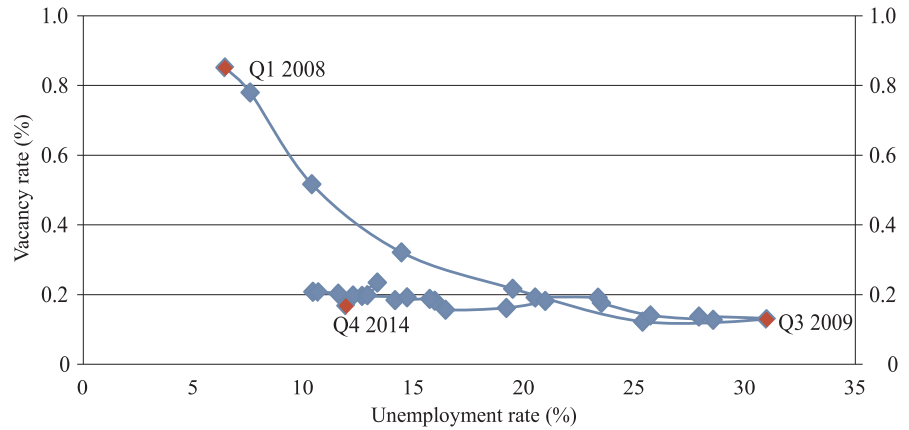
c) Tertiary sector

Source: author's calculations based on CSB data.

Second, matching efficiency in the secondary sector is more elastic to the economic cycle in comparison with the tertiary sector (primary sector was omitted here as a small sector showing large matching efficiency outliers in particular quarters). As from 2011, matching efficiency in the secondary and tertiary sectors was similar, while matching in the secondary sector was somewhat less efficient before the crisis and decreased more steeply in the crisis time (see Chart 10).

Chart 10
Matching efficiency by sectors

Secondary sector
Tertiary sector
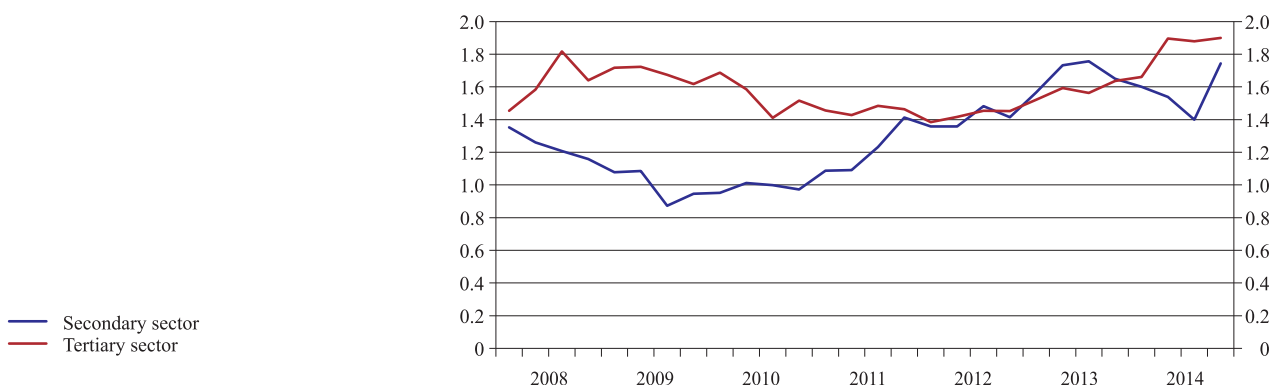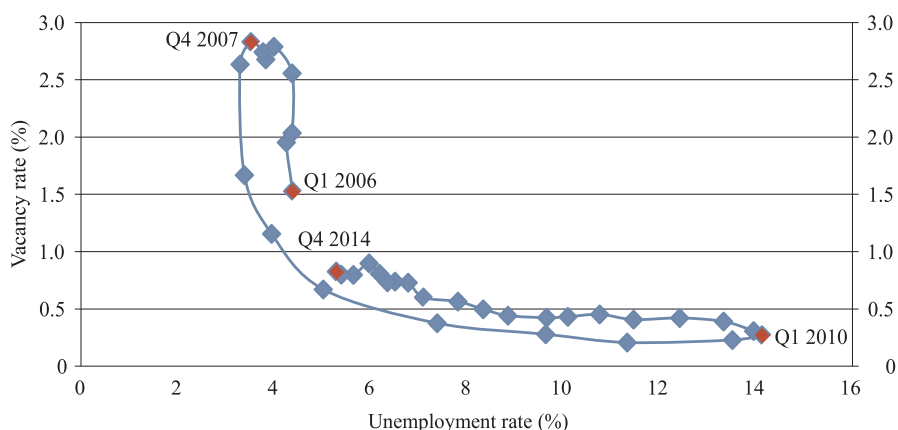
Source: author's calculations based on CSB data.

By regions (NUTS-3), the LFS unemployment data are available only annually, thus unemployment (and vacancy) data come from the SEA (available as from 2006).

By the end of 2014, Riga and Zemgale had almost returned to the unemployment rate experienced at the beginning of 2006, while the current vacancy rate is considerably lower. By contrast, Kurzeme currently faces a similar vacancy rate with significantly higher unemployment (see Chart 11). It reflects an increase and decrease of matching efficiency respectively. In terms of levels, Latgale consistently has the lowest matching efficiency (see Chart 12). The vacancy rate in Latgale is broadly on a par with other regions (except Riga) but the unemployment rate is twice higher. It could reflect either structural problems in the regional labour market or rather a cyclical slack. However, it could partly reflect also greater motivation of Latgale's (region with the lower average wages and incomes) job seekers to register for the unemployed status in order to receive social benefits or participate in temporary jobs programmes.
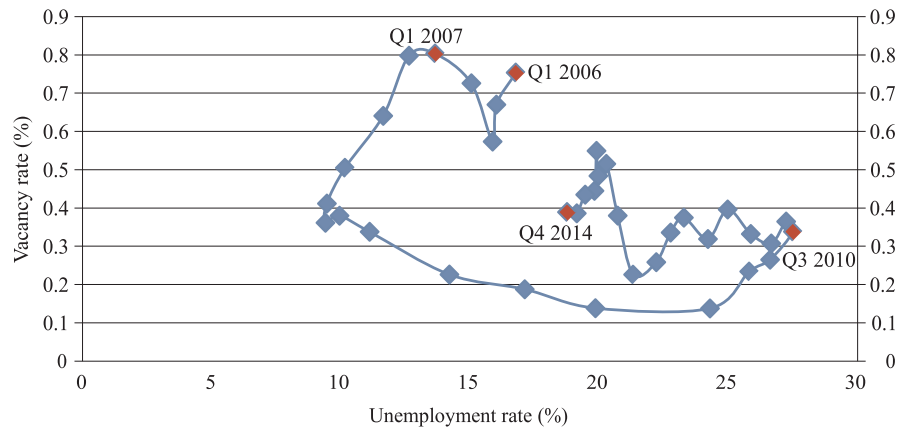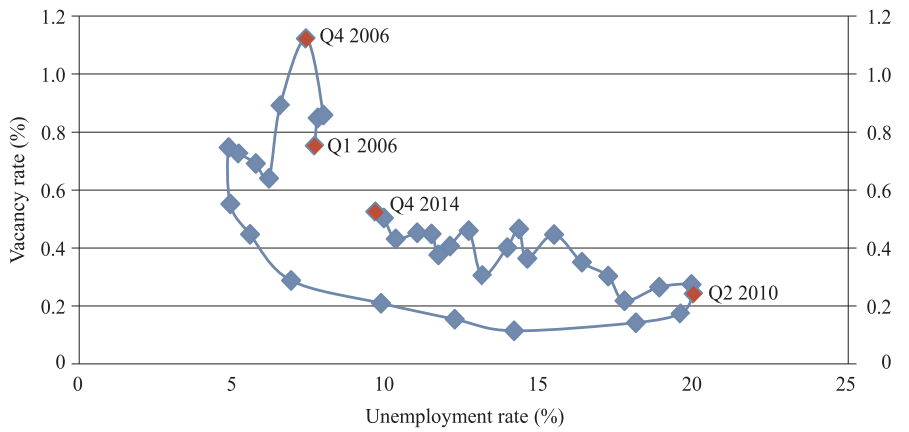
Chart 11
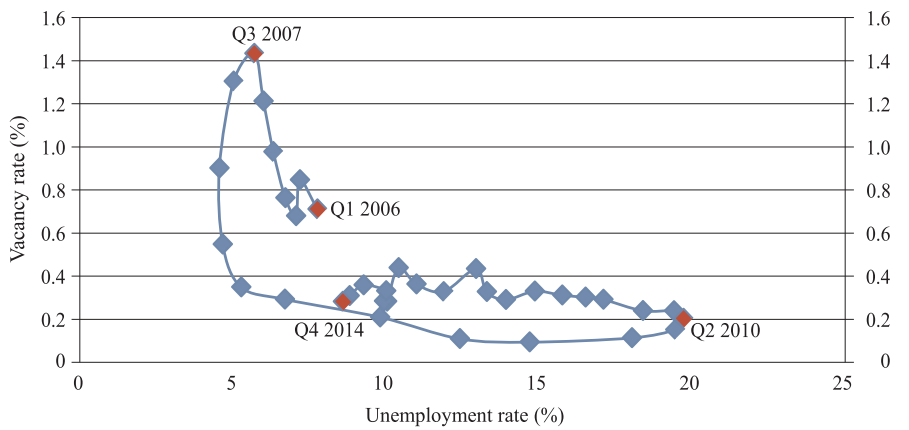**Beveridge curve by regions**
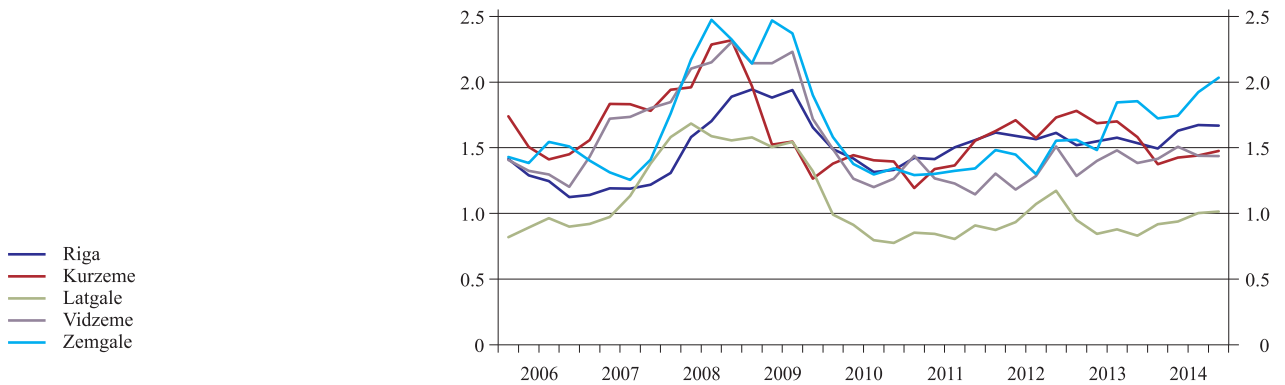
a) Riga

b) Kurzeme
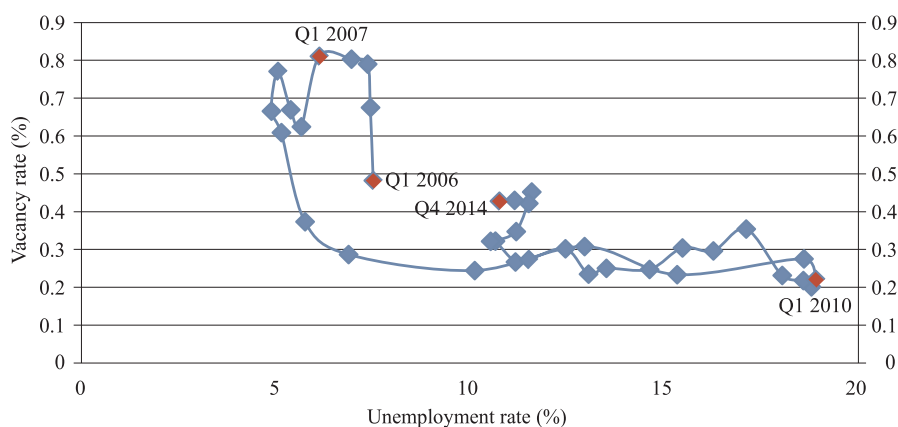
c) Latgale

d) Vidzeme

e) Zemgale

Source: author's calculations based on SEA data.

Chart 12
Matching efficiency by regions

Riga
Kurzeme
Latgale
Vidzeme
Zemgale

Source: author's calculations based on CSB data.

To sum up, the lowest matching efficiency between the number of unemployed and vacancies is present among workers (compared to managers and professionals, and also clerks and service workers) and in Latgale region. Particularly high unemployment in these groups might reflect a significant mismatch between labour supply and demand rather than low business cycle synchronisation with the other occupational groups and regions.

CONCLUSIONS

Whether current unemployment in Latvia is mostly structural or cyclical recently provoked an intense debate among policy makers and academic researchers. Well-acknowledged drawbacks of the conventional method (Phillips curve with a Kalman filter) necessitate verification of its results using other techniques.

This paper follows Barlevy (2011) in employing the Beveridge curve model to decompose the unemployment rate into natural and cyclical components. The results are similar to the most recent findings from the Phillips curve model (e.g. by Ebeke and and Everaert (2014)): the natural rate of unemployment in Latvia is rather high; currently the cyclical component is broadly zero. The results are robust to changes of research period and unemployment rate definition but are somewhat less robust to the change in the vacancy rate definition.

Almost zero cyclical component of unemployment suggests that aggregate demand stimulating policies would not bring unemployment down without creating inflationary pressures and competitiveness loss and, therefore, are not a preferred option. Instead, raising matching efficiency between the unemployed and vacancies, particularly by raising the scope, targeting and implementation quality of active labour market policy measures, would decrease natural unemployment from its current high of about 11%.

It was found that the lowest matching efficiency between unemployed and vacancies is present among workers (compared to managers and professionals, as well as to clerks and service workers) and in Latgale region. Particularly high unemployment in these groups might reflect a significant mismatch between labour supply and demand rather than low business cycle synchronisation with other occupational groups and regions.

APPENDIX

Table A1

Unemployment rate decomposition in 2014 and Q4 2014 subject to beginning of base period

(% of economically active population; seasonally adjusted data)

Starting date	Natural rate in 2014	Cyclical component in 2014	Natural rate in Q4 2014	Cyclical component in Q4 2014
1998	11.89	−1.06	11.56	−1.15
1999	11.75	−0.92	11.42	−1.01
2000	11.59	−0.76	11.27	−0.85
2001	11.38	−0.54	11.06	−0.64
2002	11.15	−0.31	10.84	−0.42
2003	10.86	−0.02	10.56	−0.14
2004	10.42	0.26	10.29	0.12
2005	10.53	0.42	10.14	0.28
2006	10.53	0.31	10.24	0.17
2007	11.23	−0.40	10.94	−0.52

Source: author's calculations based on CSB and SEA data.

Table A2

Cyclical component of unemployment rate in 2014 and Q4 2014 subject to alternative unemployment definitions

(% of economically active population; seasonally adjusted data)

	Cyclical component in 2014	Cyclical component in Q4 2014
Registered unemployment (SEA)	−0.18	−0.29
LFS unemployment (CSB; U3)	−0.31	−0.42
LFS unemployment + discouraged workers (CSB; U4)	−0.21	−0.37

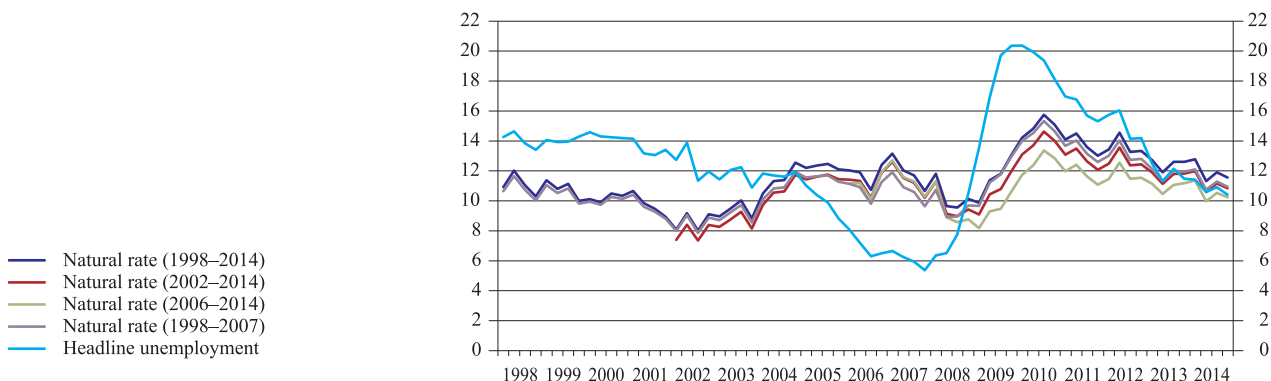Source: author's calculations based on CSB and SEA data.

Table A3

Cyclical component of unemployment rate in 2014 and Q4 2014 subject to alternative vacancy definitions

(% of economically active population; seasonally adjusted data)

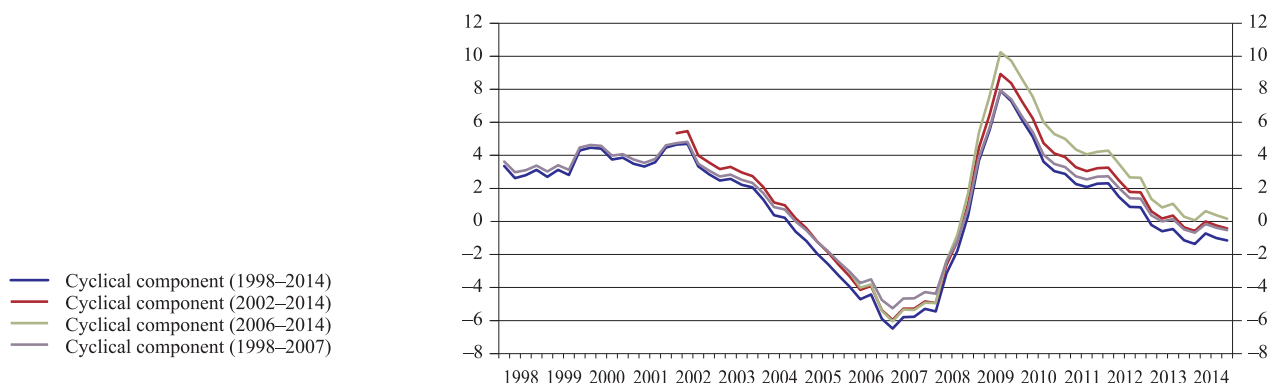|	Cyclical component in 2014	Cyclical component in Q4 2014
Vacancies (SEA)	−0.31	−0.42
Vacancies (CSB business survey)	3.39	3.51
Labour shortage in manufacturing (EC)	1.35	1.41

Source: author's calculations based on CSB, SEA and EC data.

Chart A1
Natural rate of unemployment subject to base period
(% of economically active population; seasonally adjusted data)

- Natural rate (1998–2014)
- Natural rate (2002–2014)
- Natural rate (2006–2014)
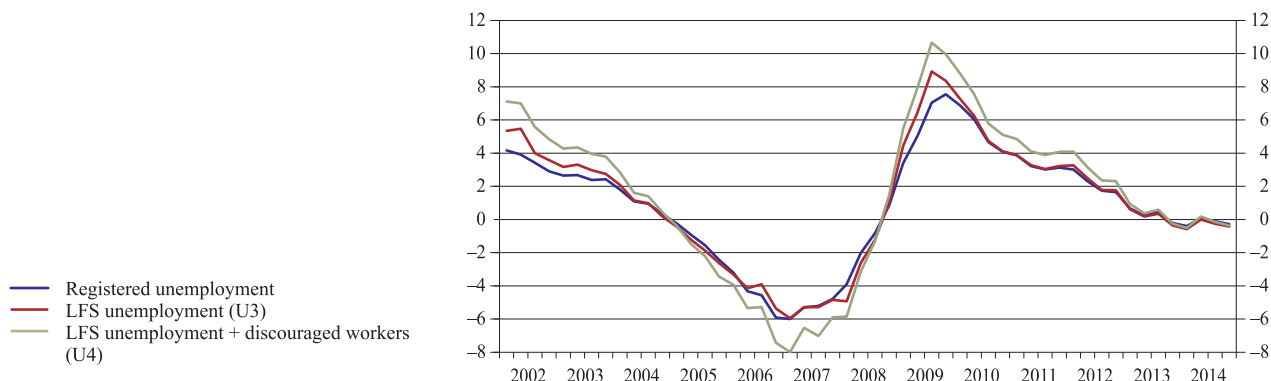- Natural rate (1998–2007)
- Headline unemployment

Source: author's calculations based on CSB and SEA data.

Chart A2
Cyclical component of unemployment subject to base period
(% of economically active population; seasonally adjusted data)

- Cyclical component (1998–2014)
- Cyclical component (2002–2014)
- Cyclical component (2006–2014)
- Cyclical component (1998–2007)

Source: author's calculations based on CSB and SEA data.

Chart A3
Cyclical component of unemployment subject to alternative unemployment definitions
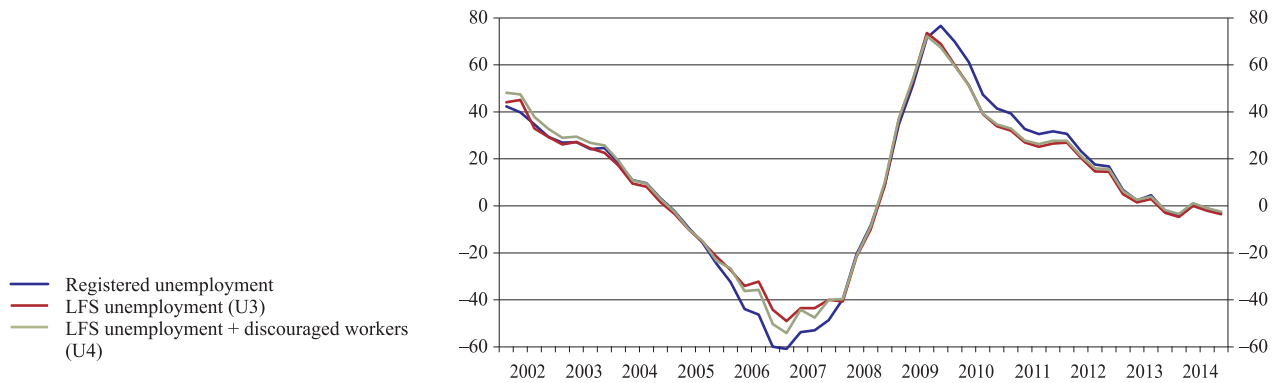(% of economically active population; seasonally adjusted data)

- Registered unemployment
- LFS unemployment (U3)
- LFS unemployment + discouraged workers (U4)

Source: author's calculations based on CSB and SEA data.

Chart A4
Cyclical component of unemployment subject to alternative unemployment definitions
(% of historical average unemployment; seasonally adjusted data)

Registered unemployment
LFS unemployment (U3)
LFS unemployment + discouraged workers
(U4)

Source: author's calculations based on CSB and SEA data.

Chart A5
Natural rate of unemployment subject to vacancy data source
(% of economically active population; seasonally adjusted data)

Natural rate (vacancies; SEA)
Natural rate (vacancies; CSB)
Natural rate (labour shortage; EC)
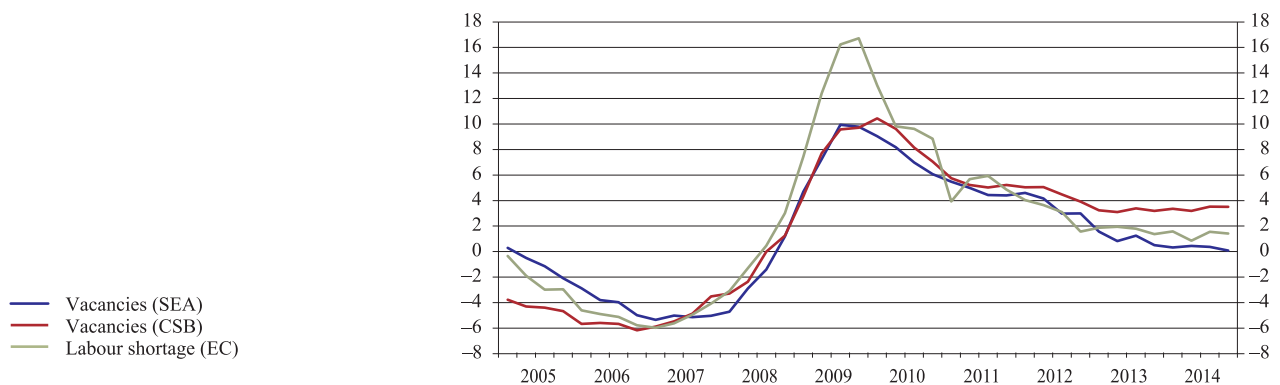Headline unemployment
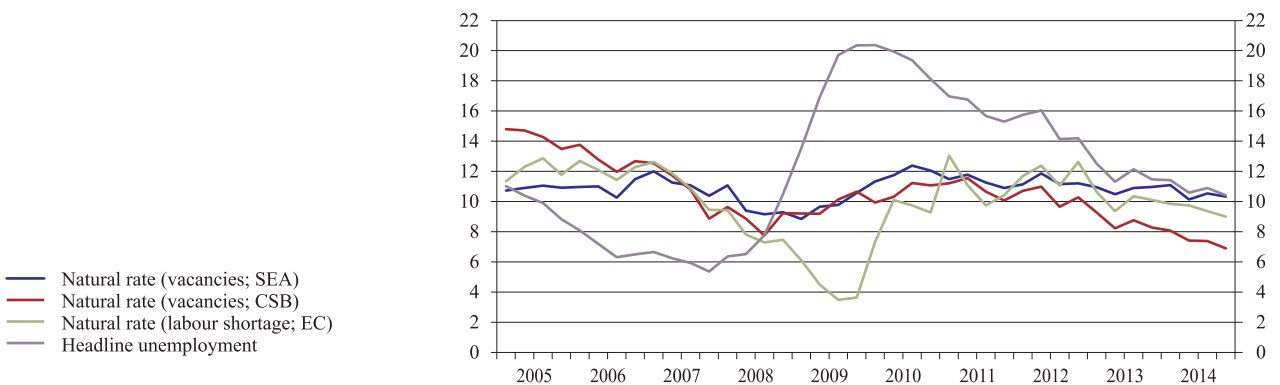
Source: author's calculations based on CSB, SEA and EC data.

Chart A6
Cyclical component of unemployment subject to vacancy data source
(% of economically active population; seasonally adjusted data)

Vacancies (SEA)
Vacancies (CSB)
Labour shortage (EC)

Source: author's calculations based on CSB, SEA and EC data.

23

BIBLIOGRAPHY

ANOSOVA, Daria, SONIN, Konstantin, VANAGS, Alf, ZASOVA, Anna (2013) – *Structural or Cyclical? Unemployment in Latvia Since the 2008–09 Financial Crisis*. Centre for Economic Policy Research Discussion Paper, No. 9525, June. 27 p. [cited 14 May 2015]. Available: *http://www.cepr.org/active/publications/discussion_papers/dp.php?dpno=9525*.

ÅSLUND, Anders (2012) – *Why Latvia Succeeded and Southern Europe Failed*. Presentation at the Bank of Latvia Conference (Riga, 2 November 2012) [cited 14 May 2015]. Available: *https://www.macroeconomics.lv/presentations-0*.

BARLEVY, Gadi (2011) – Evaluating the Role of Labor Market Mismatch in Rising Unemployment. *Economic Perspectives*, No. 3Q/2011, pp. 82–96.

BLANCHARD, Olivier, GRIFFITHS, Mark, GRUSS, Bertrand (2013) – Boom, Bust, Recovery: Forensics of the Latvia Crisis. *Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution*, vol. 47, issue 2 (Fall), pp. 325–388 [cited 14 May 2015]. Available: *http://www.brookings.edu/~/media/Projects/BPEA/Fall%202013/2013b_blanchard_latvia_crisis.pdf*.

BRAUKŠA, Ieva, FADEJEVA, Ludmila (2013) – *Internal Labour Market Mobility in 2005–2011: The Case of Latvia*. Latvijas Banka Working Paper, No. 2/2013. 44 p. [cited 14 May 2015]. Available: *https://www.macroeconomics.lv/sites/default/files/wp_2-2013-brauksa_fadejeva_labour_mobility_in_latvia.pdf*.

CAMARERO, Mariam, CARRION-I-SILVESTRE, Josep Lluís, TAMARIT, Cecilio (2005) – Unemployment Dynamics and NAIRU Estimates for Accession Countries: a Univariate Approach. *Journal of Comparative Economics*, vol. 33, issue 3, September, pp. 584–603.

EBEKE, Christian, EVERAERT, Greetje (2014) – *Unemployment and Structural Unemployment in the Baltics*. IMF Working Paper, No. 14/153, August. 25 p. [cited 14 May 2015]. Available: *http://www.imf.org/external/pubs/cat/longres.aspx?sk=41849*.

HAZANS, Mihails (2013) – *Structural or Cyclical? Unemployment in Latvia since 2008–09 Financial Crisis*. Joint Presentation by BICEPS, SSE Riga and Faculty of Economics and Management of the University of Latvia (1 March 2013, Riga) [cited 14 May 2015]. Available: *http://www.sseriga.edu/en/news-and-events/upcoming-events/event-archive/2013/presentation.html*.

IMF (2014) – *Baltic Cluster Report. IMF Country Report No. 14/117*, May. 91 p. [cited 14 May 2015]. Available: *http://www.imf.org/external/pubs/ft/scr/2014/cr14117.pdf*.

KRASNOPJOROVS, Oļegs (2013) – *Why I Disagree with Mihails Hazans*. Blog at macroeconomics.lv (3 May 2013) [cited 14 May 2015]. Available: *https://www.macroeconomics.lv/why-i-disagree-mihails-hazans*.

KRUGMAN, Paul (2012) – *Reinhart, Rogoff, and Latvia*. Blog at NY Times (21 October 2012) [cited 14 May 2015]. Available: *http://krugman.blogs.nytimes.com/2012/10/21/reinhart-rogoff-and-latvia/?_r=0*.

MEĻIHOVS, Aleksejs, ZASOVA, Anna (2007) – *Estimation of the Phillips Curve for Latvia*. Latvijas Banka Working Paper, No. 3/2007. 28 p. [cited 14 May 2015]. Available: *https://www.macroeconomics.lv/sites/default/files/estimation_phillips_curve.pdf*.

MEĻIHOVS, Aleksejs, ZASOVA, Anna (2009) – *The Assessment of Natural Rate of Unemployment and Capacity Utilisation in Latvia*. Latvijas Banka Working Paper, No. 2/2009. 24 p. [cited 14 May 2015]. Available: *https://www.macroeconomics.lv/assessment-natural-rate-unemployment-and-capacity-utilisation-latvia*.

Ministry of Finance of the Republic of Latvia (2010) – Convergence Programme of the Republic of Latvia 2009–2012. January. 52 p. [cited 14 May 2015]. Available: *http://ec.europa.eu/economy_finance/economic_governance/sgp/pdf/20_scps/2009-10/01_programme/lv_2010-01-29_cp_en.pdf*.

PETRONGOLO, Barbara, PISSARIDES, Christopher (2001) – Looking into the Black Box: A Survey of the Matching Function. *Journal of Economic Literature*, vol. 39, No. 2, June, pp. 390–431.

ZASOVA, Anna (2012) – *Latvijas darba tirgus funkcionēšanas ekonometriskais novērtējums*. Promocijas darbs. Rīga : Latvijas Universitāte. 241 lpp.