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**STRUCTURAL OR CYCLICAL?
UNEMPLOYMENT IN LATVIA SINCE
THE 2008-09 FINANCIAL CRISIS**

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Vanags and Anna Zasova

***INTERNATIONAL MACROECONOMICS,
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ABSTRACT

Structural or Cyclical? Unemployment in Latvia Since the 2008-09 Financial Crisis

In terms of output decline and increase in unemployment, the economic recession in Latvia that started during the 2008-09 financial crisis was one of the most severe in the world. Using both decomposition of the unemployment rate into structural and cyclical components and Mortensen and Pissarides' search and matching approach, we demonstrate that the changes in unemployment should be attributed primarily to cyclical, rather than structural factors; as of 2013, a large share of Latvian unemployment is still cyclical. Our results provide important implications for anti-crisis policy in Latvia and elsewhere in the world: the surge in unemployment was largely a consequence of Latvia's austerity policy.

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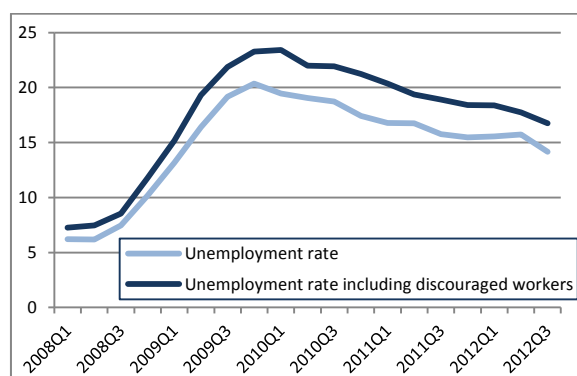
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1. Introduction

During the 2008-2009 recession Latvia experienced the largest and fastest increase in unemployment in the European Union. The unemployment rate rose by approximately 14 percentage points from a low of 6.2% in early 2008 to 20.4% at the end of 2009. Labour market recovery has not been equally rapid (see Figure 1) and the observed persistence in unemployment might be either a signal of the structural nature of the shocks that hit the economy during the recession, or a consequence of cyclical factors.

Figure 1: Unemployment rate (age group 15-74), seasonally adjusted, %¹



* Discouraged workers are those economically inactive who mentioned loss of hope to find a job as the main reason for not looking for a job.

Source: Central Statistical Bureau of Latvia, authors' calculations.

Normally, the answer to the question “cyclical or structural” has profound policy implications. Lazear and Spletzer (2012) observe that “If the phenomenon is structural, then central bank policy is limited in its effect. There is neither a theoretical nor empirical basis on which to believe that most structural deficiencies can be remedied by monetary policy.” The situation is different when the phenomenon is cyclical.

Latvia’s adjustment to the crisis took place under fixed exchange rate. A nominal exchange rate adjustment was never considered a suitable adjustment strategy by the Latvian

¹ Figure 1 uses data unadjusted for the results of the census carried out in Latvia in the first half of 2011 which showed that the population and the workforce was less than previously thought. This has implications for the calculation of all labour market statistics but the official statistics not yet been revised for years before 2011. Accordingly, for consistency over time, we use unadjusted data.

authorities², since joining the Eurozone in 2014 remained the government's primary target. During the crisis, GDP fell by 25% from peak to trough and today's unemployment remains high despite GDP has started to recover. Thus, assessment of the relative importance of cyclical as opposed to structural factors in explaining the dynamics of Latvian unemployment and assessment of the size of cyclical component in today's unemployment, provide policy implications, which are important not only for Latvia. Answer to this question allows for inferences as to whether the fixed exchange rate policy and constraints imposed by the Maastricht criteria are restricting economic recovery.

In this paper, we evaluate the extent to which the recent evolution of Latvian unemployment can be interpreted as structural. We employ three alternative direct approaches. We start by decomposing the changes in unemployment rate into structural and cyclical components using different sectors, occupations or demographic groups (following Lazear and Speltzer, 2012). Next, we directly estimate the labour market mismatch (Daly, Hobijn, Sahin, and Valletta, 2012). Finally, we employ the search and matching approach (Pissarides, 1984, Barlevy, 2011). The results of all three approaches point in the same direction: overwhelmingly, both the increase in unemployment and its recovery in Latvia are explained by cyclical factors.

Our findings contrast with most of the explanations provided by Latvian or European Union officials, and also the latest IMF findings, which favour predominantly the structural causes: thus a recent report from the IMF asserts that, based on an estimated NAIRU of 12.3%, "much of the unemployment is structural in nature [and] is rooted in skill mismatches in the labor market and extensive informal economy" (IMF 2013a) or that "the high level of unemployment in Latvia is largely structural (it's not about the cycle)" (Moore, 2013). The IMF estimates that NAIRU increased from about 10% to 13% in 2010-2011, which is "most likely due to "hysteresis" – a transformation of cyclical into structural unemployment as skills of the long-term unemployed depreciate" (IMF, 2013b). The European Commission's

² An alternative exchange rate option proposed by the international lenders was widening the exchange rate margins to +/-15% (allowed by ERM II), which, although possibly leading to a deeper decline in the short run, was estimated to result in a less protracted recession (IMF, 2009).

(2012) estimate for the NAWRU in 2012 is 14.6%, which is very close to the actual unemployment rate, and, according to their estimate, NAWRU was rising throughout the crisis and the recovery. The European Central Bank (2012), when discussing inflation prospects in Latvia, identifies the situation in the labour market as a potential source of risk, as “labour shortages in certain sectors have appeared, suggesting that unemployment is likely to be close to its natural rate”. Likewise, the Ministry of Finance of Latvia (2012) argues that in the medium term supply and demand mismatches will intensify, thus raising the risks of structural unemployment and, while not explicitly reporting their NAIU estimates, the reported estimate for the output gap in 2012 is just -0.2% of potential GDP, but for 2013, a positive output gap of 0.7% is forecast.

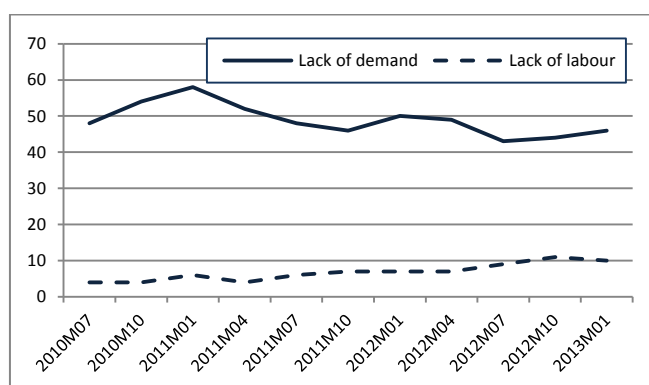
At the same time, our results are intrinsically consistent with recent findings by Hazans (2013), who uses micro level data on vacancies from administrative registers and from an Internet recruitment portal and argues that Latvian unemployment is mainly cyclical. Hazans demonstrates that (i) the number of vacancies remains very low across all major sectors and occupations and (ii) the available vacancies are filled very quickly. Moreover, he shows that the time taken to fill vacancies has declined since 2008 and this is true for all major occupations. Hazans argues that these findings are not consistent with the idea of notable labour market mismatches and that a large component of current Latvian unemployment is structural.

The above results that suggest that Latvian unemployment is mainly structural and/or that structural unemployment was rising during the crisis are largely based on time series methods for estimating the natural rate of unemployment in which its rate emerges indirectly and does not explicitly stem from the analysis of labour market mismatches, i.e., is not directly based on the definition of structural unemployment.

Lazear and Spletzer (2012) review the recent literature on the structural vs. cyclical debate and note that there are many potential approaches to defining structural unemployment but opt for a definition which corresponds to a situation where the composition of the economy has changed and “the skill requirements of the jobs that are available today do not match the skill set of the workers who are searching for jobs because they trained for an economic structure that has become obsolete”.

Direct examination of the Latvian labour market provides little evidence that this is currently the case in Latvia.³ Firstly, the overall level of vacancies is very low both historically and in comparison with other countries (see Hazans, 2013). Secondly, survey evidence from enterprises points to the overwhelming importance of lack of demand rather than lack of labour as a constraint on production (see Figure 2).

Figure 2: Factors limiting manufacturing production, % of surveyed enterprises)



Source: Central Statistical Bureau of Latvia

A similar picture can be observed in services and retail trade with less than 10% of enterprises reporting lack of labour as a constraint while between 40% and 60% of enterprises identify lack of demand as a constraint⁴.

Apart from structural changes in the economy, which cause a permanent change in the mix of demanded skills, the level of structural unemployment can be affected by changes in labour market institutions, which, as shown by a vast amount of theoretical and empirical literature (see e.g. Layard et al, 2005; Blanchard, 2005) can affect persistence of unemployment through their effect on the quality of matching or on wage rigidities.

³ In a blog post on the Central Bank of Latvia web-site, Krasnopjorovs (2012) argues that there is a structural mismatch in the Latvian labour market, which mainly takes form of skills mismatch and concludes that the “employment rate now is similar to that observed in “normal times” of 2002-2004”, [which] “suggests a rather small (if any) negative output gap and a large share of structural unemployment in total unemployment”.

⁴ In the construction sector there has been a sharper dynamics with the number of enterprises reporting lack of demand varying from about 75% in mid-2010 to less than 40% in mid-2012, while the number reporting lack of labour has varied between 10% and 20% with a clear seasonality in evidence.

Available evidence suggests that Latvian labour market institutions are generally characterized as being rather flexible, and thus are unlikely to be a cause of the sluggish labour market adjustment. One of the key challenges in analyzing the impact of labour market institutions is that institutions are difficult to quantify in a manner that would allow for cross-country comparisons and this is especially true for developing countries where data availability is often an issue. A notable recent contribution in this field is a paper by Lehmann and Muravyev (2012), who use a unique database on labour market outcomes and institutions in Eastern Europe and Central Asia. Their data suggests that labour market institutions in CEE (including Latvia and the other Baltics) are generally not characterized by major rigidities: thus, they document that the degree of protection ensured by employment protection legislation (EPL) and the tax wedge on labour in CEE roughly corresponds to the EU-15 average. Trade union density, and both duration and generosity of unemployment benefits is much below the EU average.

The indicators characterizing labour market institutional environment do not normally account for law enforcement effects. However, these effects are likely to be an important issue in developing countries, stemming from e.g. higher prevalence of informal sector or generally weak administrative capacity of regulatory bodies, which can significantly affect the potential impact of labour market institutions. Available studies show that while informal employment (i.e., workers without a contract) in Latvia tends not to be very widespread as compared to other EU countries (see Hazans, 2011), the prevalence of envelope wages in Latvia is one of the highest in the EU (see Williams, 2009), which is likely to limit the impact of the tax wedge on labour on the functioning of the labour market. There is also some evidence on Latvia and the other Baltics, suggesting that despite the strictness of EPL in these countries largely corresponds to the EU-15 average, law enforcement is likely to be weaker, which ensures higher flexibility (Eamets and Masso, 2004; Zasova, 2011)⁵.

⁵ What is important to stress is that Latvian EPL is clearly not characterized by major structural rigidities like e.g. in Spain. For example, see Bentolila et al (2012), who show that about 45% of the increase in Spanish unemployment in the latest recession is due to the Spanish labour market regulations being characterized by a

The changes to Latvian labour institutions during the recession, although possibly leading in the direction of less flexibility, were relatively minor and thus are not likely to have significantly contributed to the surge in unemployment. In 2009, the maximum duration of unemployment benefit was temporarily raised to 9 months for all unemployed⁶, however, those with a shorter length of service received only a small fixed amount (64 EUR) in the last several months, and in 2012, the maximum duration of the unemployment benefit was cut back to the pre-crisis level⁷. Moreover, an increase in the generosity of unemployment benefits during the crisis was partly compensated by more active labour market policies (ALMP). “As a response to a growing number of unemployed people, registering in the SEA, the available funding for ALMP measures in 2009 and 2010 was increased by 3 and 6 times respectively, comparing to 2008.”⁸ According to Nickell (1997), generous levels of unemployment benefits do not lead to higher unemployment, as long as they are accompanied by pressure out of unemployment (ALMP).

Changes to EPL during the recession were very minor to significantly restrict hiring and firing procedures⁹. There were several changes to labour taxation taking place during the recession: personal income tax rate¹⁰ was initially cut from 25% to 23% in 2009, then raised to 26% in 2010, and then cut back to 25% as of 2011. Social security contributions were raised by 2 percentage points in 2011. The reform that had the strongest impact on labour tax wedge, especially for low paid workers, was a reduction in non-taxable minimum implemented in 2009 (from about 130 EUR to 50 EUR), and, despite the non-taxable minimum was increased in 2011, it still remains much below the pre-crisis level.

large gap between the dismissal costs of workers with temporary and permanent contracts, as well as lax rules allowing for a widespread use of temporary contracts, the so called “two-tiered” labour market.

⁶ In 2008, the maximum duration of the benefit was 4-9 months, depending on the length of service.

⁷ As of 2013, the maximum duration of unemployment benefit was again raised to 9 months for all unemployed.

⁸ Ministry of Welfare of the Republic of Latvia, “Latvian Labour Market 2010-2011,” February 2011

⁹ This is indirectly illustrated by changes in the index characterizing hiring and firing procedures, which is compounded by the World Economic Forum for the Global Competitiveness Report. The index is based on survey of business executives, who are asked to characterize hiring and firing of workers on a scale ranging from 1 (impeded by regulations) to 7 (flexibly determined by employers). During the recession, the index increased from 3.6 (in 2007-2008) to 4.2 (in 2011-2012) (Schwab, 2012; Porter, Schwab, 2008).

¹⁰ Personal income tax in Latvia is flat, with some progressivity being ensured by non-taxable minimum, which is quite low, though.

However, a general inference is that labour market institutions in Latvia ensure a high degree of flexibility and it is unlikely that the changes that took place during the crisis can explain a significant part of the increase in unemployment during the recession.

In sum, both direct examination of factors that constrain production and evolution of labour market institutions do not provide clear evidence in support of the idea that structural unemployment have increased during the crisis and that today shortage of suitable labour is a significant factor limiting production. At the same time, explanations provided by Latvian and foreign officials strongly favour the idea that persistence of Latvian unemployment is a structural rather than cyclical phenomenon.

Which explanation is correct is important both for current policy purposes and for the interpretation of past policy. Thus, “if cyclical factors predominate, then policies that support a broader economic recovery should be effective in addressing long-term unemployment as well; if the causes are structural, then other policy tools will be needed.”¹¹ On the other hand, “higher structural unemployment alters the role of short-run stabilization policies, including monetary policy, by increasing the possibility that expansionary policies will trigger inflation at higher rates of unemployment than otherwise.”¹²

We see contribution of our paper being twofold. First, our results serve to demonstrate that direct analysis of the labour market structure, the degree of mismatch and the quality of matching lead to the conclusions which are at odds with results obtained with indirect time series methods. Without questioning the usefulness of time series approach to estimating the structural rate of unemployment in certain instances, we argue that the approach adopted in our paper provides a more direct evaluation of the degree of structural mismatches in the labour market and is more suitable when the assessment of the nature of unemployment is used for policy purposes. This finding can be useful for other post-

¹¹ Bernanke (2012), “Recent Developments in the Labor Market,” remarks to the National Association for Business Economics, March 26, 2012

¹² Daly, Hobijn, and Valletta (2011), “The Recent Evolution of the Natural Rate of Unemployment,” IZA Discussion Paper No. 5832, July 2011

transition countries, where the data series are short and characterized by large fluctuations, which makes disentangling trend and cycle problematic. Second, our results contribute to the ongoing policy debate about the success of austerity policy. Our findings allow concluding that not only did Latvia fall well below its long-term output trend during the recession, but is still operating below potential.

The rest of the paper is organized as follows. In Section 2 we describe the three approaches we use, Section 3 presents the results, while Section 4 concludes.

2. Methodology

The recession of 2007-09 led to high levels of unemployment in many countries and much research, especially in the US, has been devoted to uncovering the reasons for the high unemployment rates with a view to identifying the relative impact of structural and cyclical causes. Here we have adapted some of methodology underlying this research to the Latvian context.

The most direct approach is to decompose changes in the unemployment rate into structural and cyclical components according to different sectors or occupation groups. Denote the total unemployment rate in period t by UR_t . Assume that the workforce is divided between n sectors (or occupational groups) with the unemployment rate in each group i equal to UR_t^i . Then we can express UR_t as a weighted average of unemployment rates in sector or occupational groups: $UR_t = \sum_{i=1}^n UR_t^i * w_t^i$, where w_t^i is the share of group i in the workforce. Hence, when UR_t changes over time, its fluctuations can be decomposed into changes in the shares of the groups and changes in the unemployment rates of particular groups. So, the following formula applies:

$$(1) \quad \Delta UR_t = \sum_{i=1}^n \Delta UR_t^i * w_{t-1}^i + \sum_{i=1}^n UR_t^i * \Delta w_t^i.$$

Changes in w^i are naturally thought of as structural, while an aggregate demand shock is likely to increase UR^i across the board without affecting shares. Accordingly, the first component of expression (1) may be regarded cyclical, while the second is structural¹³.

Using the approach described above, Lazear and Spletzer (2012) conclude that the unemployment in the US during the recession of 2007-09 was more the result of cyclical factors during the current recession than was the case in previous recessions.

A second direct approach is to consider different structural factors and estimate their impact on unemployment. In a US context Daly, Hobijn, Sahin, and Valletta (2012) identify three main structural factors: decrease in match efficiency (mismatch), increased generosity of unemployment insurance, and uncertainty. Daly, Hobijn, and Valletta (2011) underline the importance of another potential factor – productivity growth. Other studies (see, for example, Dickens (2011)) also consider geographic mismatch. According to the literature, skill mismatch has contributed about 1 percentage point to the increase in the US unemployment rate, with the estimates varying from about 0.25 to 1.5 percentage points¹⁴. Other factors are found to be less important. Most studies find the effect of Emergency Unemployment Compensation equal to around 1 percentage point or less.¹⁵ The role of geographic mismatch and the house-lock mechanism is found to be quantitatively negligible.¹⁶

These results identify labour market mismatch as the most important structural reason for changes in unemployment rate during the US recession, followed by the changes unemployment benefits. A priori we regard changes in unemployment benefit as not an

¹³ Nevertheless interpretation must be made with care. For example, during the recession of 2008-09 workers in the Latvian construction sector were much more prone to unemployment than workers in other industries. In addition, some shifts in UR^i , for example those caused by institutional changes, may be considered structural.

¹⁴ See Barnichon, Elsby, Hobijn, and Sahin (2010); Estevao and Tsounta (2011); Daly, Hobijn, Sahin, and Valletta (2011); Sahin, Song, Topa, and Violante (2011).

¹⁵ See Aaronson, Mazumder, and Schechter (2010); Farber and Valletta (2011); Fujita (2010); Nakajima (2010); Rothstein (2011); Valletta and Kuang (2010); Valletta (2010).

¹⁶ Daly, Hobijn, Sahin, and Valletta (2012); Molloy, Smith, and Wozniak (2010); Sahin, Song, Topa, and Violante (2011); Valletta (2010)).

important factor in Latvia. Accordingly, here, we focus attention on labour market mismatch and how it might be observed in labour market data.

Following Lazear and Speltzer (2012) mismatch is defined as a situation where industries differ in their ratio of unemployed to vacancies. This may be explained as follows: when an aggregate demand shock occurs, business becomes less profitable and vacancies across all sectors are likely to fall and unemployment rates are likely to rise. By contrast, in case of a structural shift some sectors are hurt, while the others are not (they may even profit by this change). For example, when a new technology is introduced the firm which exploits it gains at the expense of its competitors. As a result, the unemployment rate in expanding sectors may decrease (and vacancies rise), while in others vacancies may fall and unemployment may increase. Thus, structural shifts can be expected to be accompanied by increases in dispersion of the number of unemployed per vacancy across sectors. However, as during a crisis procyclical sectors are usually hurt more, an increase in the dispersion in a recession may be temporary. Hence, by using this approach we provide an upper bound estimate for the extent to which the observed changes can be deemed to be structural. In our analysis we use the following formula for relative standard deviation of the ratio of unemployed per vacancy across sectors to measure the amount of labour market mismatch:

$$(2) \quad RSD = \frac{\sqrt{\frac{\sum_i (x_i - \bar{x})^2}{n-1}}}{\bar{x}}$$

Here x_i is the number of unemployed per vacancy in sector i (including discouraged workers) and \bar{x} is the unweighted average number of unemployed per vacancy across sectors¹⁷.

Finally, the search and matching approach developed by Pissarides (1985) and Mortensen and Pissarides (1994) is a standard approach to evaluating the efficiency of labour market matching. During a crisis creating a vacancy becomes less profitable therefore, firms begin to post fewer vacancies and fewer matches are produced. As a result, unemployment increases. This co-movement of vacancies and unemployment may be represented by a shift

¹⁷ This represents an alternative way of quantifying mismatch as compared with the mis-match index proposed by Lazear and Speltzer (2012)

of the Beveridge curve. Following Petrongolo and Pissarides (2001) and Barlevy (2011) we assume the following matching function:

$$(3) \quad m(u, v) = Au^\alpha v^{1-\alpha}.$$

Here m is the number of matches, u is the unemployment rate, v is the vacancy rate (the number of unfilled jobs divided by the sum of filled and unfilled jobs), A is the technology parameter describing productivity of the matching process, and α is elasticity of the number of matches with respect to the unemployment rate. The matching function describes the flow out of unemployment. If in addition to this we assume the flow into unemployment to be equal to $s(1 - u)$, where s is the separation rate into unemployment, in the steady state, where these flows are equal, we will get:

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

This equation can be estimated directly and following Barlevy (2011) changes in the parameter A can be interpreted in terms of changes the efficiency of labour market matching

3. Results

We employ each of the above approaches to empirically distinguish between structural and cyclical reasons for unemployment in Latvia for the period starting from the beginning of the 2008-2009 recession. First, we directly decompose the unemployment rate into structural and cyclical components. Second, we evaluate the labour market mismatch in Latvia. Finally, we utilize the search and matching approach and estimate the Beveridge curve.

3.1 Decomposition of unemployment rate into structural and cyclical components

The decomposition of unemployment into structural and cyclical components is based on the following intuitive reasoning: when structural change occurs, unemployment is a result of changes in the composition of the labour market, i.e. the skill requirements of the jobs available today no longer match the skills of the workers who are searching for jobs. On the other hand, when cyclical factors dominate, we would expect similar increases in unemployment across all sectors and locations. However, sectors may differ in how pro-

cyclical they are. Therefore, even cyclical factors may force unemployment in different sectors to change unevenly, thus, similar to what was mentioned above with respect to the unemployed to vacancy ratio, this approach to decomposing unemployment into structural and cyclical components provides an upper bound of the estimate for structural changes. Using a formalised version of this approach, we conclude that changes in Latvian unemployment during the recession and afterwards can be explained by changes in the unemployment rates in particular sectors and occupations, while the shares of the sectors and occupations in labour supply have been practically unchanged.

The sectors that were most severely hit by the crisis were construction (more than 40% fall in value added), trade (more than 30% fall) and industry (almost 20% fall). Employment in construction nearly halved during the crisis and, despite the relatively small size of the sector, constituted almost 1/4 of total job losses in 2009. Employment in trade and in industry declined by nearly 1/3, each accounting for about 20% of the rise in unemployment in 2009¹⁸.

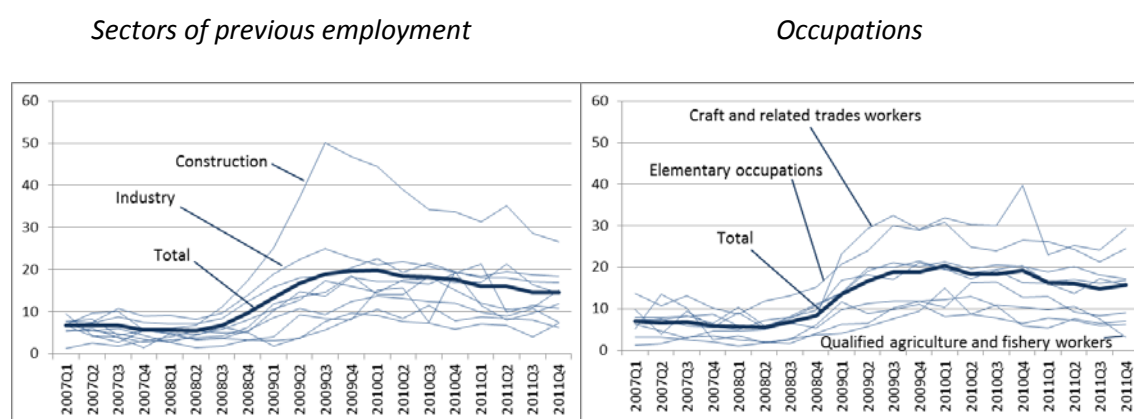
Following Lazear and Spletzer (2012) we decompose the changes in the unemployment rate into structural and cyclical components using equation (1). We are mainly interested in decomposition of unemployment dynamics by sectors and occupations. However, given that some of the most affected industries – construction in particular – are dominated by males and young workers, we also examine decomposition of unemployment by gender and age groups. Moreover, skill mismatches may take forms that cannot be captured by either sectors of previous employment or occupations, hence we also consider decomposition of unemployment dynamics by educational attainment.

In order to implement this analysis we use the most disaggregated categories of the sector of previous employment and occupations, that are obtainable from quarterly micro level LFS

¹⁸ For the analysis of employment dynamics, we use data from enterprise surveys, not Labour Force Surveys (LFS). One reason for this is that quarterly sectoral data from the LFS has quite strong quarter-on-quarter fluctuations, which are not readily interpretable. E.g., LFS data suggests that employment in industry in 2009q3 declined by 16.5% q-o-q and then increased by 7.2% in 2009q4 (corresponding change in employment based on enterprise survey data is -4.4% and -2.6%, respectively). The difference in dynamics of total employment from the two data sources is much smaller. Another reason is that there is a break in series in LFS statistics – data up to 2010 is not adjusted for the latest census results. The source of data on unemployment is the LFS.

data. This covers 10 sectors of production and 9 occupations. With respect to age decomposition, we use 10-year age groups up to the age of 54 and the age group 55-74; for educational decomposition, we use 4 categories – higher education, professional education, secondary education, and basic education or less. We use a broad definition of unemployment and include discouraged workers to account for the nominal reduction in unemployment which occurs just because people stop looking for a job. At the time of writing¹⁹ the data needed for decomposition is available only for years 2007-2011, thus our analysis does not cover 2012. Figure 3 shows unemployment rates by sectors of previous employment and by occupations (unemployment rates by gender, age groups and educational attainment are shown in the Appendix).

Figure 3: Unemployment rate by sectors of previous employment and occupation, discouraged workers included, seasonally adjusted %



* Includes only those unemployed who stopped working less than 8 years ago; for those who stopped working more than 8 years ago data on the previous sector of employment and occupation is not available

** Includes only those unemployed who indicated the sector of previous employment and occupation; for this reason total unemployment rate is slightly different for the two disaggregations.

Source: Central Statistical Bureau of Latvia, authors' calculations

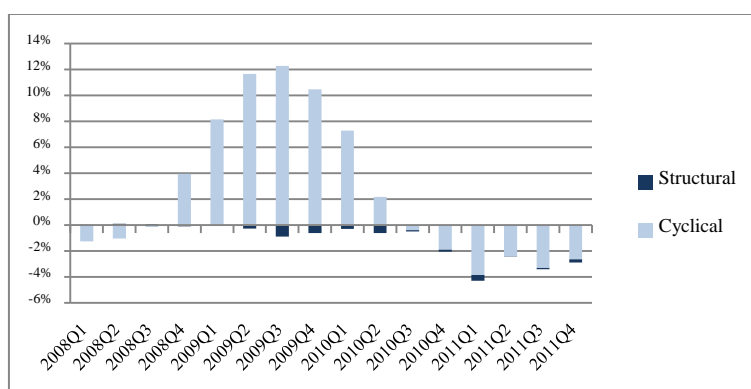
Workers previously employed in construction experienced by far the sharpest increase in unemployment rate. In 2009, it reached 50%, however, in subsequent quarters it also declined more strongly than the average unemployment rate – by the end of 2011, the unemployment rate in construction had almost halved. The unemployment rate among

¹⁹ Early 2013.

those previously employed in industry also increased more strongly than in other sectors at the outset of the recession (reaching almost 25% in end-2009) but has declined since then and by the end of 2011 was not much above the average. Other sectors demonstrate rather homogenous dynamics of unemployment rates – fast growth in 2008-2009 and a modest reduction afterwards. The results of the occupational decomposition suggest that the two groups that experienced the largest increase in unemployment rates were craft and related workers and workers in elementary occupations. No single group seems to have experienced a reduction in unemployment notably stronger than the others except “qualified agriculture and fishery workers”, which is a very small group with around 4% of the total labour supply. Other occupations demonstrate rather similar dynamics of unemployment rates – a strong increase at the outset of the recession and a moderate reduction afterwards.

Figures 4 and 5 show results of the decomposition of unemployment rate changes by sectors of production and by occupations, based on equation (1) (decomposition by gender, age and education is shown in Appendix).

Figure 4: Decomposition of year-on-year changes in unemployment rate by sectors of production, including discouraged workers, percentage points

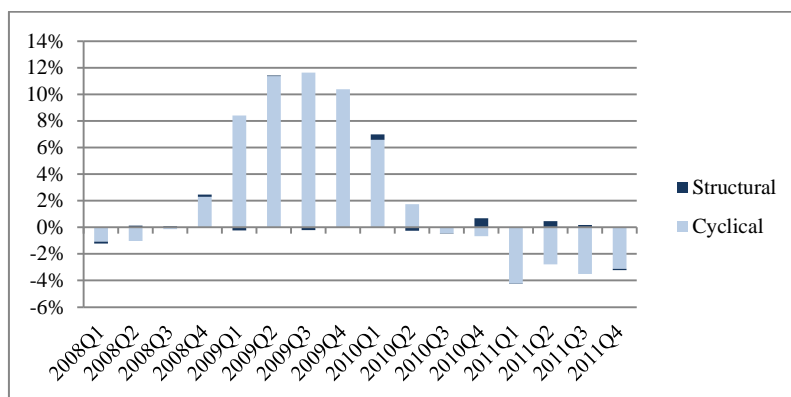


* Includes only those unemployed who stopped working less than 8 years ago, for those who stopped working more than 8 years ago data on the previous sector of employment is not available; includes only those who indicated the sector of previous employment.

Source: Central Statistical Bureau of Latvia, authors' calculations.

The sectoral decomposition suggests that the increase in unemployment in 2009-2010 can be fully attributed to cyclical factors – the structural component was small and even negative. The negative structural component is explained mainly by a reduction in the share of industry and construction in labour supply which were sectors characterised by relatively high rates of unemployment.

Figure 5: Decomposition of year-on-year changes in unemployment rate by occupations, including discouraged workers, percentage points



** Includes only those unemployed who stopped working less than 8 years ago, for those who stopped working more than 8 years ago data on the previous occupation is not available; includes only those who indicated previous occupation.*

Source: Central Statistical Bureau of Latvia, authors' calculations.

The occupational decomposition also suggests that changes in the rate of unemployment have been largely cyclical. The positive structural component in 2010Q1 can be explained by an increase in the share of civil servants, service workers, as well as shop and market sales workers. The positive structural component in 2010Q4 and 2011Q2 is a result of an increased share of craft and related trades workers, and elementary occupations.

The same conclusion can be drawn from decomposition of unemployment dynamics by demographic groups or educational attainment. A general observation is that the changes in demographic structure of the labour force, though minor, have contributed to a reduction in the unemployment rate, not the other way round. For example, the share of women, who are characterised by a lower unemployment rate, increased slightly, but the share of young workers, who are characterised by a much higher than the average unemployment rate, declined. The share of those with basic education or less declined (from about 15% to 12%), but the share of those with higher education – increased (from 23% to 28%). Hence, the structural component of the change in unemployment was mostly negative or non-existent.

In sum, the shares of both sectors and occupations in the economy have remained largely unchanged with unemployment changes explained by changes in the sectoral or occupational unemployment rates. Demographic and educational decompositions also

clearly suggest that both the increase and a consequent reduction in the unemployment rate were explained by cyclical factors and not by structural changes in the labour supply.

Clearly, we should take into account that the structural changes we consider usually occur over long horizons and thus a five year period might be too short for the structural change defined this way to manifest itself. Therefore, we consider two other approaches to distinguish between structural and cyclical reasons for unemployment.

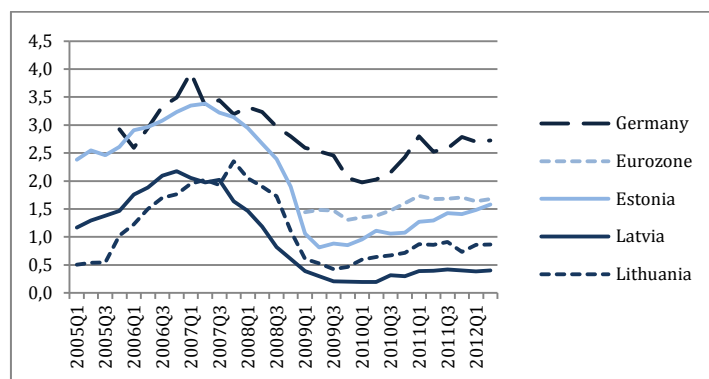
3.2 Evaluating mismatch

A second approach is to directly estimate labour market mismatch. Structural unemployment is usually defined as resulting from a mismatch between the labour demand and the skills and locations of those looking for jobs. “(M)ismatch is defined as a situation where industries differ in their ratio of unemployed to vacancies.”²⁰ Using this approach our estimates show no significant deterioration in the mismatch between available vacancies and the skills of workers.

The first general observation is that there has been a very strong reduction in the overall vacancy rate in Latvia since the beginning of the recession and the vacancy rate remains extremely low, despite GDP recovery. It is low also compared to other countries: the vacancy rate in Latvia (constant at 0.4 since the beginning of 2011) is currently among the lowest in the EU, it is much lower than in Estonia and also lower than in Lithuania (see Figure 6). And while the vacancy rate in Estonia was considerably above the Latvian rate also before the crisis, the vacancy rate in Lithuania was similar or even below that observed in Latvia before 2008.

²⁰ Lazear and Spletzer (2012), “The United States Labor Market: Status Quo or a New Normal?,” NBER Working Paper Series, No. 18386, September 2012

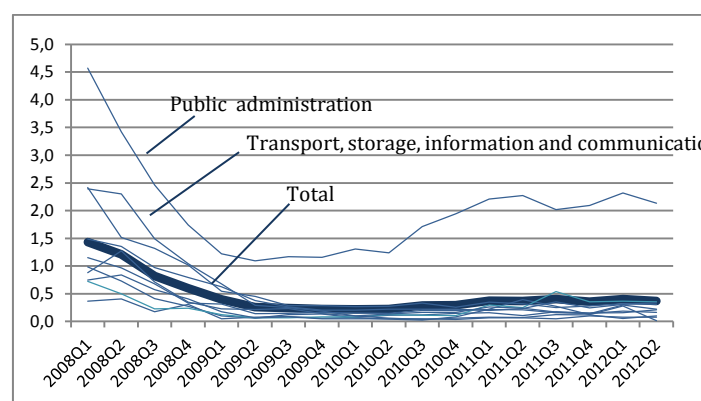
Figure 6: Vacancy rate in 2005-2012q2, total economy excluding agriculture and fishing, seasonally adjusted



Source: Eurostat, authors' calculations

Second, there are no observable differences in the dynamics of job vacancy rates across sectors, with the exception of public administration (see Figure 7). Vacancy rate in all other sectors remains very low, not exceeding 0.5 in any of the sectors, suggesting that there is a general lack of demand for labour.

Figure 7: Job vacancy rate by sectors in 2008-2012q2, seasonally adjusted²¹



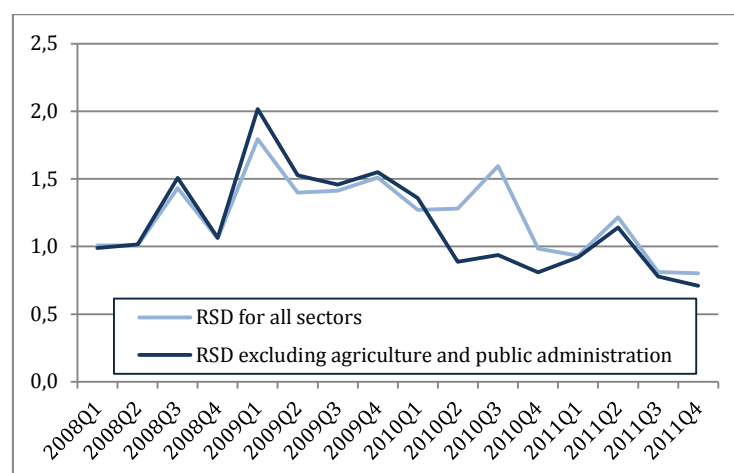
Source: Eurostat, authors' calculations

In what follows we assess changes in matching during the crisis, by calculating the relative standard deviation (RSD) of the number of unemployed per vacancy across sectors, according to Equation 2. Like in the previous section, we define unemployment as those

²¹ Vacancy rates by sectors are not analysed before 2008, because of break in the series. Before 2008, sectoral vacancy rates are available by NACE 1.1 classification, but starting from 2008 – by NACE 2 classification, hence the data is not comparable for all sectors.

looking for a job and discouraged workers. We calculate two series of RSD: first, we calculate RSD for all sectors, and second, we calculate RSD for all sectors except agriculture and public administration. We exclude agriculture because vacancies in this sector exhibit very strong and not readily interpretable quarter-on-quarter fluctuations²². Public administration is also potentially problematic: first, the vacancy rate in public administration was higher than in other sectors also before the crisis, which suggests that the sector is likely to be inherently different in terms of the number of vacancies (e.g., due to quality of data or due to higher turnover of employees); second, wages in the public sector are not market determined and hence an increase in public sector vacancies cannot be interpreted as a signal of intensification of labour market mismatches. Thus, the disproportionately strong increase in the vacancy rate in public administration since 2010 is likely to be a consequence of anti-crisis budget austerity measures, which included harsh wage cuts and is likely to have resulted in an inability of the public institutions to attract suitable workers.

Figure 8: Relative standard deviation of unemployed (including discouraged workers) per vacancy across sectors



Source: Central Statistical Bureau of Latvia, authors' calculations.

Figure 8 presents the results of the relative standard deviation estimation. To re-emphasize the point discussed in the methodology section, an increase in the dispersion of unemployed

²² It is also a very small sector accounting for about 2.5% of total employment.

per vacancy ratio is not necessarily a signal of structural mismatches, as some sectors are more pro-cyclical than others. Thus, growth in the dispersion is a necessary, but not sufficient condition for intensification in labour market mismatches and this approach provides an upper bound estimate of the structural change.

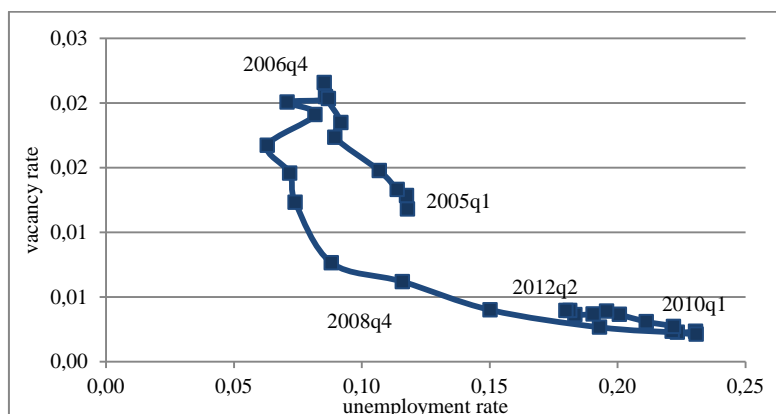
RSD increased in the beginning of the recession, which was mainly due to construction, where the number of unemployed per vacancy peaked at almost 2000 in end-2009 (vs. 130 unemployed per vacancy total in the economy), but by the end of 2011 the ratio declined to about 280 (vs. 51 in the economy). Another sector, which exhibited a very strong increase in the unemployed/vacancy ratio in the beginning of the recession was trade, accommodation and food (around 400 unemployed per vacancy in end-2009), but by the end of 2011 the ratio declined strongly and was close to the average in the economy. In sum, after an increase in the beginning of the recession, RSD has been declining indicating no increase in the degree of mismatch.

3.3 Estimating the Beveridge curve

The third method uses the search and matching approach as developed by Pissarides (2000) where the emergence of structural unemployment is signalled by deterioration in the efficiency of labour market matching. Again the conclusion is that except in the boom, when matching appears to have improved, Latvian unemployment cannot be explained by changes in the efficiency of matching.

We follow the Beveridge curve approach as proposed by Barlevy (2011) and estimate the change in the technology parameter A in Equation (4). Figure 9 plots the Beveridge curve for Latvia over 2005 – 2012Q2. We first observe that the curve appears to have shifted downwards in 2007, pointing to an improvement in matching (an increase in the productivity parameter) as the economy approached the peak of the boom. This is consistent with the idea that employers facing labour shortage became less “picky” in their hiring decisions. Starting from 2010, as the unemployment rate gradually declined there appears to have been a movement back along the Beveridge curve though perhaps with at most a minor outward shift.

Figure 9: Unemployment rate (including discouraged workers) vs. vacancy rate in 2005-2012q2, seasonally adjusted



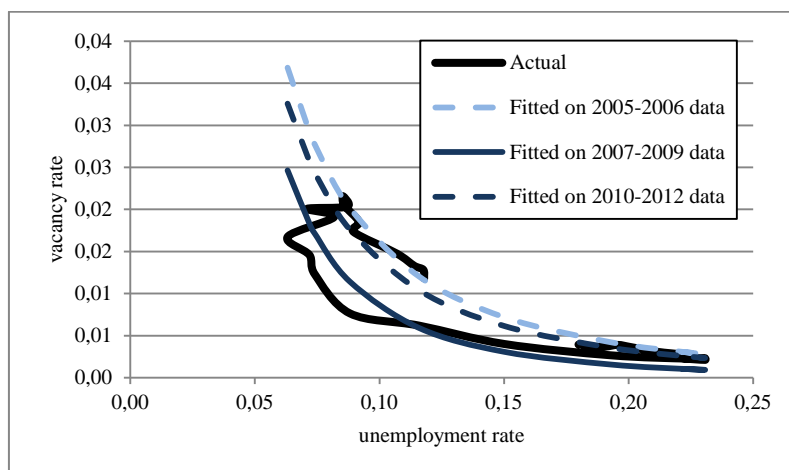
Source: Central Statistical Bureau of Latvia, authors' calculations

To estimate A , we divide the sample into 3 periods and fit the Beveridge curve for these three periods: 2005-2006 (beginning of the boom), 2007-2009 (the peak and the recession) and 2010-2012 (the period of gradual reduction in unemployment). Apart from data on unemployment and the vacancies, we need to know the separation rate s . Barlevy (2011) argues that the relevant separation rate is likely to be fairly stable over the cycle – he assumes a constant separation rate of 0.03 for US (one can think of this separation rate as the flow of people from employment to unemployment in “normal” times)²³. In the absence of concrete evidence to the contrary we also assume a separation rate of 0.03. However, the assumption about the exact value of s is not crucial for our analysis, since we are interested in the *change* in A and not the *level* of A .

Figure 10 shows the fitted Beveridge curves, as well as the seasonally adjusted data over the period ranging from 2005 up to the second quarter of 2012.

²³ The assumption of a constant separation rate in Barlevy (2011) refers to the flow from employment to unemployment excluding the spikes caused by recessions.

Figure 10: Fitted Beveridge curves and actual unemployment rate (including discouraged workers) vs. vacancy rate in 2005-2012q2, seasonally adjusted



Source: Central Statistical Bureau of Latvia, authors' calculations.

Our estimates of the parameters are presented in Table 1. The results show that A declined in 2010-2012, suggesting a slight deterioration in matching, yet A estimated on 2010-2012 data is slightly higher than A estimated on 2005-2006 data, the period which probably comes closest to the definition of “normal” times in our sample.

Table 1: Estimated parameters of the Beveridge curve

	2005-2006 data	2007-2009 data	2010-2012 data
A	0.55	0.61	0.57
α	0.61	0.67	0.62

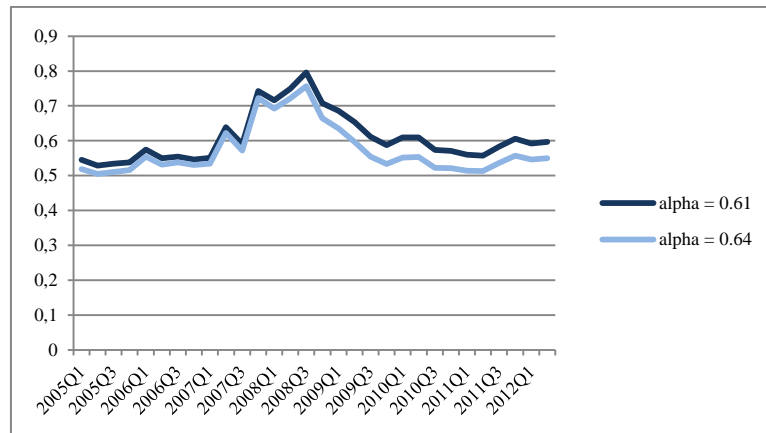
Source: authors' calculations

Using the estimated α and the formula for the steady-state vacancy rate, we are able to calculate implied changes in A over the whole period under consideration. To do this we employ two alternative estimates of α : (1) $\alpha = 0.61$, the estimate on 2005-2006 data, which can be viewed as α estimate for “normal” times and (2) $\alpha = 0.64$, average of α estimates for the three periods.

Figure 11 illustrates the results of the estimation which suggest that A declined from its peak in the beginning of 2008, suggesting that matching has deteriorated as compared to the boom years. However, A started growing in the end of 2011 and is currently above its level in 2005-2006. More importantly, our results suggest that there was no notable deterioration

in matching since mid-2009, i.e. neither the increase in unemployment in the recession nor the subsequent recovery have been accompanied by significant intensification of labour market mismatches.

Figure 11: Implied A estimate



Source: authors' calculations

To conclude: our estimates of the Latvian Beveridge curve imply that changes in matching efficiency have been practically absent (except at the start of the boom) and hence cannot account for the recent dynamics of Latvian unemployment.

4. Conclusion

Our analysis indicates no significant change in structural unemployment in Latvia during the 2008-2009 recession and afterwards. First, decomposition of the unemployment rate into structural and cyclical components illustrates the dominant role of the cyclical component. Second, direct estimation of mismatches also shows no evidence to support a structural explanation of the change in the Latvian unemployment rate. Finally, our estimates of the Beveridge curve during the period suggest that the efficiency of matching did not deteriorate during the recession and afterwards.

Our results differ from findings which are based on time series statistical methods (e.g., IMF (2013b), European Commission (2012)). According to the most recent IMF results²⁴, Latvian NAIU declined at the outset of the recession to about 10% in early 2010, then increased to about 13% by early 2011 and then remained broadly stable until 2012Q3 with perhaps a slight downward trend. This result can be contrasted with the European Commission's results (European Commission, 2012), which imply that the natural rate of unemployment was rising both throughout the recession and during the recovery, reaching 14.6% in 2012.

In terms of dynamics of the structural component of unemployment, our results are more akin to those found in the IMF paper, however our findings differ in a number of respects. First, by looking directly at the structure of the unemployed or by analyzing changes in the quality of matching we don't find evidence in support of an increase in the structural unemployment in 2010-early 2011, which suggests that the size of the negative output gap can be larger. Second, despite we are mostly looking at the *change* in the structural component of unemployment, our results allow for some inferences about the *level* of the structural component. Thus, we observe that unemployment rates across all major sectors and occupations remain high, which is not consistent with the idea that the unemployment rate is close to its natural rate. Also, our analysis shows that the vacancy rates remain extremely low in all sectors, pointing to a general lack of demand, which leaves little scope for supply-side explanations of the persistence in unemployment rate.

While our results differ from findings which are based on time series statistical methods, our findings are consistent with micro-level evidence from data on vacancies (Hazans, 2013). Notwithstanding a number of important advantages (e.g. international comparability of results and modest data requirements), time series methods that are traditionally used to estimate structural unemployment have a number of shortcomings. As argued by Bagger (2013), macro econometric models like the Phillips curve, while being useful for forecasting, are less suitable for policy recommendations, as both inflation and unemployment are

²⁴ The IMF estimate (IMF, 2013b) is based on quarterly data from 1996Q1 to 2012Q3 and is obtained by applying the production function approach, with the underlying natural rate of unemployment being approximated by a time-varying NAIU, and estimated using a Kalman filter and a Phillips curve relationship between core inflation and unemployment.

endogenously determined in an equilibrium and identification of the natural rate of unemployment relies on somewhat arbitrary choice of the model specification. He concludes that for policy purposes it is more appropriate to base the estimate of structural unemployment on fundamentals underlying the natural rate of unemployment, e.g., search and matching framework, where the structural and cyclical components of unemployment can be disentangled using micro level data on unemployment and vacancies, which provides “more robust and precise measurements of the nature of unemployment”.

The above mentioned limitations of the time series approach can be especially pronounced in post-transition economies, where data series are short and characterized by large fluctuations, which makes it even more difficult to disentangle the trend and the cycle. Hence, given that estimates of structural unemployment have very strong policy implications, we believe that the results obtained with time series methods should where possible be complemented or checked against other evidence.

Our results have implications for the assessment of Latvia’s adjustment to the crisis. After a 25% fall, Latvian GDP has now been growing for two consecutive years at rate exceeding 5% and Latvia is often presented as a poster child and a success story of austerity. Our results allow concluding that in the course of the crisis not only did Latvia fall well below its long-term output trend, but is still operating below potential. This has implications for the assessment of Latvia’s internal devaluation policy. To put it in Blanchard’s (2012) words: “Is it a success? The economic and social cost of adjustment has been substantial. Output further contracted by 16% in 2009, and is still 15% below its 2007 peak. Unemployment increased to more than 20% and still stands at 16% today, far higher than any reasonable estimate of the natural rate. Was there another, less costly, way of adjusting, through floating, and a slower fiscal consolidation? The truth is we shall never know”. Our results do not directly help to evaluate alternatives – still, they confirm that the chosen course was extremely costly.

References

- Aaronson, Daniel, Bhashkar Mazumder, and Shani Schechter (2010), "What is behind the rise in long-term unemployment?," *Federal Reserve Bank of Chicago Economic Perspectives* 2Q (2010), pp. 28-51
- Bagger, Jesper (2013), Discussion of IMF reports "Republic of Latvia: 2012 Article IV Consultation and Second Post-Program Monitoring Discussions" (Country Report No. 13/28) and "Republic of Latvia: Selected Issues" (Country Report No. 13/29), <http://www.sseriga.edu/en/news-and-events/upcoming-events/event-archive/2013/presentation.html>, March 2013
- Barlevy, Gadi (2011), "Evaluating the Role of Labor Market Mismatch in Rising Unemployment," *Journal of Economic Perspectives*, 35(3), July 28, 2011
- Barnichon, Régis, Michael Elsby, Bart Hobijn, and Aysegül Şahin (2010), "Which Industries are Shifting the Beveridge Curve?" *FRB SF Working Paper* 2010-32
- Bentolila, Samuel, Pierre Cahuc, Juan J. Dolado, and Thomas Le Barbanchon (2012), "Two-Tier Labour Markets in the Great Recession: France Versus Spain," *The Economic Journal*, Volume 122, Issue 562, pages 155–187
- Bernanke, Ben (2012), "Recent Developments in the Labor Market," remarks to the National Association for Business Economics, March 26, 2012
- Blanchard, Olivier (2012), "Lessons from Latvia," <http://blog-imfdirect.imf.org/2012/06/11/lessons-from-latvia/>, June 2012
- Blanchard, Olivier (2005), "European Unemployment: The Evolution of Facts and Ideas," NBER Working Papers 11750, National Bureau of Economic Research, Inc.
- Daly, Mary C., Bart Hobijn, Ayşegül Sahin, and Robert G. Valletta (2012), "A Search and Matching Approach to Labor Markets: Did the Natural Rate of Unemployment Rise?," *Journal of Economic Perspectives* 26(3), Summer 2012, pp. 3-26
- Daly, Mary C., Bart Hobijn, and Robert G. Valletta (2011), "The Recent Evolution of the Natural Rate of Unemployment," *IZA Discussion Paper* No. 5832, July 2011
- Dickens, William T. (2011), "Has the Recession Increased the NAIRU?" *unpublished paper*, Brookings Institution.
- Eamets, Raul and Jaan Masso (2004), "Labour Market Flexibility and Employment Protection Regulation in the Baltic States," IZA Discussion Papers 1147, Institute for the Study of Labor (IZA)
- Estevão, Marcello, and Evidiki Tsounta (2011), "Has the Great Recession raised U.S. Structural Unemployment?" *IMF Working Paper* 11(105)
- European Central Bank (2012), "Convergence report," <http://www.ecb.europa.eu/pub/pdf/conrep/cr201205en.pdf>, May 2012
- European Commission (2012), Autumn 2012 Forecast Exercise, Estimates of output gap and of potential output and their determinants, <https://circabc.europa.eu>, November 2012

Farber, Henry S., and Robert G. Valletta (2011), "Extended Unemployment Insurance and Unemployment Duration in The Great Recession: The U.S. Experience," *mimeo*, Federal Reserve Bank of San Francisco and Princeton University, June

Fujita, Shigeru (2010), "Effects of the UI Benefit Extensions: Evidence from the Monthly CPS," *Working Paper* No. 10-35, Federal Reserve Bank of Philadelphia, November

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, <http://www.sseriga.edu/en/news-and-events/upcoming-events/event-archive/2013/presentation.html>, March 2013

Hazans, Mihails (2011), "Informal Workers across Europe: Evidence from 30 Countries," IZA Discussion Papers 5871, Institute for the Study of Labor (IZA)

IMF (2013a), "Republic of Latvia. 2012 Article IV Consultation and Second Post-Program Monitoring Discussions," IMF Country Report No. 13/28, January 2013. Available at <http://www.imf.org/external/pubs/ft/scr/2013/cr1328.pdf>

IMF (2013b), "Republic of Latvia: Selected Issues," IMF Country Report No 13/29, January 2013. Available at <http://www.imf.org/external/pubs/ft/scr/2013/cr1329.pdf>

IMF (2012), "Republic of Latvia: First Post-Program Monitoring Discussions," <http://www.imf.org/external/np/sec/pn/2012/pn1276.htm> , July 2012

IMF (2009), *IMF Country Report* No. 09/3, International Monetary Fund, January 2009

Krasnopjorovs, Oļegs (2012), "What is missing in Krugman's structural unemployment story?" blog on Bank of Latvia website, <http://www.makroekonomika.lv/what-missing-krugmans-structural-unemployment-story> , June 2012.

Layard, Richard, Stephen Nickell, and Richard Jackman (2005), *Unemployment. Macroeconomic Performance and the Labour Market*// Oxford University Press Inc., 2nd Edition, New York

Lazear, Edward P., and James R. Spletzer (2012), "The United States Labor Market: Status Quo or a New Normal?," *NBER Working Paper Series*, No. 18386, September 2012

Lehmann, Hartmut, and Alexander Muravyev (2012), "Labour market institutions and labour market performance," *The Economics of Transition*, The European Bank for Reconstruction and Development, vol. 20(2), pages 235-269, 04.

Ministry of Finance of Latvia (2012), "Convergence programme of the Republic of Latvia 2012-2015". http://ec.europa.eu/europe2020/pdf/nd/cp2012_latvia_en.pdf , April 2012

Ministry of Welfare of the Republic of Latvia (2011), "Latvian Labour Market 2010-2011," February 2011

Molloy, Raven, Christopher L. Smith, and Abigail Wozniak (2010), "Internal Migration in the US: Updated Facts and Recent Trends," Federal Reserve Board of Governors, *mimeo*

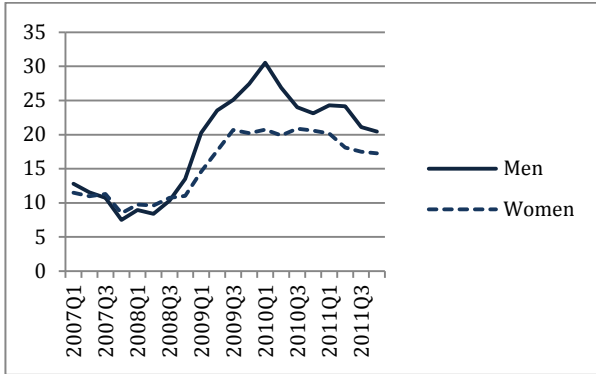
Mortensen, Dale T., and Christopher A. Pissarides (1994), "Job creation and job destruction in the theory of unemployment," *Review of Economic Studies*, Vol. 61, No. 3, July, pp. 397-415

- Moore, David (2013), "Latvia's Economic Potential: Recovery and Reforms," IMF direct, The International Monetary Fund's global economy forum, <http://blog-imfdirect.imf.org/2013/01/28/latvias-economic-potential-recovery-and-reforms/>, February 2013
- Nakajima, Makoto (2011), "A quantitative Analysis of Unemployment Benefit Extensions," Federal Reserve Bank of Philadelphia, *mimeo*
- Nickell, Stephen (1997), "Unemployment and Labor Market Rigidities: Europe versus North America," *Journal of Economic Perspectives*, Vol.11, No.3, pp. 55-74
- Petrongolo, Barbara, and Christopher A. Pissarides (2001), "Looking into the Black Box: A Survey of the Matching Function," *Journal of Economic Literature*, 39(2), June 2001, pp. 390–431
- Pissarides, Christopher A. (2000), "Equilibrium Unemployment Theory" (Second Ed.). Cambridge, MA: MIT Press
- Pissarides, Christopher A. (1985), "Short-run equilibrium dynamics of unemployment vacancies, and real wages," *American Economic Review*, Vol. 75, No. 4, September, pp. 676–690
- Porter, Michael E., and Klaus Schwab (2008), "The Global Competitiveness Report 2008-2009," World Economic Forum
- Rothstein, Jesse (2011), "Unemployment Insurance and Job Search in the Great Recession," *Brookings Papers on Economic Activity*, Fall 2011, forthcoming.
- Sahin, Aysegül, Joseph Song, Giorgio Topa, and Gianluca Violante (2011), "Measuring Mismatch in the U.S. Labor Market," Federal Reserve Bank of New York and New York University, *mimeo*
- Schwab, Klaus (2012), "The Global Competitiveness Report 2012-2013," World Economic Forum
- Valletta, Robert G. (2010), "House Lock and Structural Unemployment," Federal Reserve Bank of San Francisco, *mimeo*
- Valletta, Robert G., and Katherine Kuang (2010), "Extended Unemployment and UI Benefits," *FRB SF Economic Letter* 2010-12
- Williams, Colin C. (2009), "Formal and Informal Employment in Europe: Beyond Dualistic Representations," *European Urban and Regional Studies* 16(2): 147–159
- Zasova, Anna (2011), "Labour market institutions: an obstacle or support to Latvian labour market recovery?," *Baltic Journal of Economics*, Baltic International Centre for Economic Policy Studies, vol. 11(1), pages 5-24, July.

Appendix: Decomposition of unemployment rate into structural and cyclical components by gender, age and educational attainment

Figure A1: Unemployment rates and decomposition of unemployment rate into structural and cyclical components by gender, including discouraged workers

Unemployment rates by gender



Decomposition

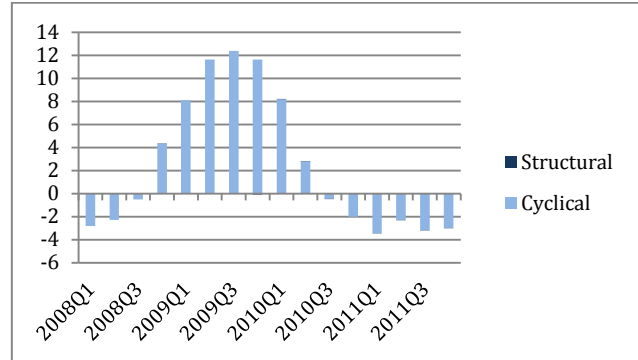
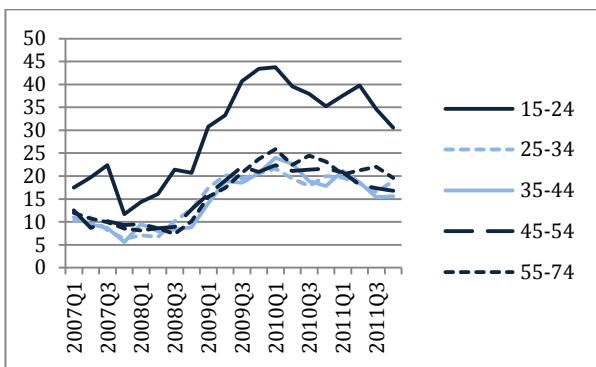


Figure A2: Unemployment rates and decomposition of unemployment rate into structural and cyclical components by age, including discouraged workers

Unemployment rates by age groups



Decomposition

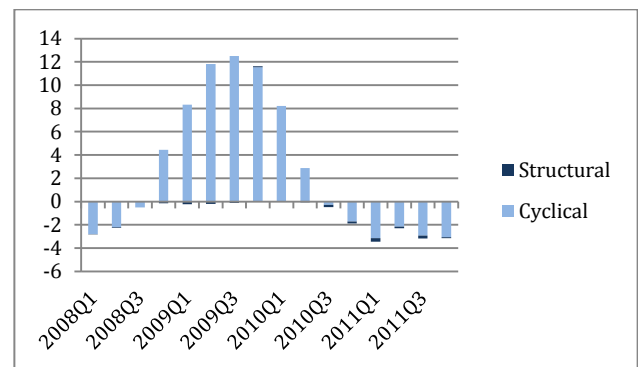
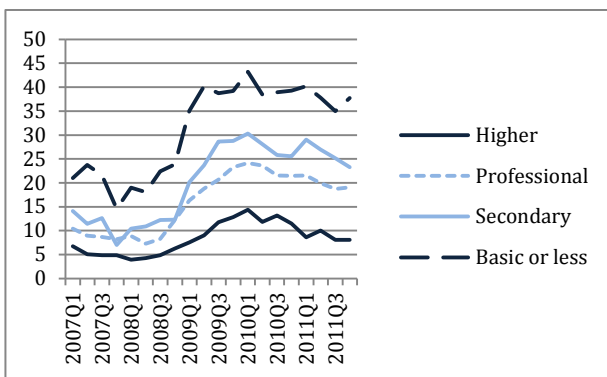


Figure A3: Unemployment rates and decomposition of unemployment rate into structural and cyclical components by educational attainment, including discouraged workers

Unemployment rates by educational attainment



Decomposition

