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Outcomes: Evidence from Latvia**

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Internal Devaluation and Labor Market Outcomes: Evidence from Latvia*

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Abstract

This paper analyzes the policy response and labor market adjustment of Latvia, which faced the most severe recession in Europe and globally. Latvia's adjustment and recovery from the 2008 economic crisis represents "a rare case study", which "has been an object of intense attention" (Blanchard et al., 2013) as country's authorities, despite many experts' recommendations, decided to maintain its currency peg and adjust through fiscal austerity and internal devaluation implementing major structural reforms. Three years later Latvia returned to a positive growth path and in 2014 joined the Euro zone. The main question in the literature is whether this adjustment represents a success story and can provide a lesson for other countries in the Euro area. We provide details on the adjustment in the Latvian labor market employing individual level data over the years 2002 to 2012. We show that with flexible labor markets, weak unions and relatively low employment protection, adjustment takes place predominantly at the extensive margin since it is driven by flows from permanent wage employment to unemployment. Underemployment constitutes another important adjustment channel, while the evidence for informal employment is more mixed. Wage regressions suggest that job mobility is not associated with increased labor productivity during and immediately after the crisis. We also identify groups particularly affected by the crisis and provide suggestions for the right mix of policy interventions.

JEL Classification: J6, J21, P16.

Keywords: Unemployment, labor market flows, Latvia, crisis.

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1. Introduction

The 2008 economic crisis has brought about many challenges for economies and labor markets. A profound deterioration of the main economic indicators gave testimony of the deepest recession over the last decades in many countries, urging the governments to undertake significant policy measures. Almost a decade after the beginning of the crisis, it is instructive to analyze the political economy and labor market adjustment to such large economic shocks with some countries returning to a positive growth path with improved labor market indicators, while other countries still experiencing economic difficulties. In this paper, we analyze the policy response and labor market adjustment in Latvia, a country that has faced the most severe shock not only in Europe, but in the world and also experienced the largest fiscal adjustment.

Latvia is a small open economy that joined the European Union (EU) in 2004 and that has a population of around two million people. However, in the words of Blanchard et al. (2013), Latvia's adjustment and recovery from the 2008 economic crisis represents "a rare case study", which "has been an object of intense attention" (p. 325). After a period of transition to a market economy and structural reforms, the country enjoyed solid economic growth since the beginning of the 2000s. At the outset of the crisis it faced a decline in GDP of 25%, and if the drop would have reached 30% as was predicted by the IMF it would have made Latvia's loss more than that of the US Great Depression in 1929-1933 (Weisbrot and Ray, 2010). The unemployment rate in Latvia increased the most in EU, from 6% in 2007 to close to 20% in 2009 and 2010, making it the highest unemployment rate among the new EU members and one of the highest in the whole EU. It also faced significant emigration. Other two Baltic countries, Estonia and Lithuania, experienced similar trends.

Given this remarkable deterioration of economic conditions and the Latvian pegged exchange rate regime, devaluation seemed an obvious rescue scenario and was advised by many

international experts.¹ However, despite this advice, the Latvian government decided to maintain its currency peg and to adjust through internal devaluation and front-loaded fiscal consolidation. External devaluation was seen as inconsistent with the aim to join the Eurozone, and internal devaluation was also supported by the European Union. In all three Baltic countries, the policy response of radical reforms and fiscal adjustment was rapid, early and concentrated in the first half of 2009, with Latvia undertaking 60% of its needed adjustment within this year (Åslund, 2012). Large cuts in public expenditures were undertaken together with major structural reforms mainly in three sectors, namely public administration, health care and education (ibid). By the end of 2009, unit labor costs declined by almost 25% and remained stable thereafter, while productivity increased, with both labor shedding and a large increase in unemployment. The decline in the share of low productivity workers and firms' ability to reduce some X-inefficiency were potentially behind this increase and set the stage for potential future growth (Blanchard et al., 2013). The fact that the productivity increase was not matched by the increase in wages suggests a crucial role played by increased unemployment, weak unions and limited employment protection (ibid). Emigration also played a role.

The crisis and the adjustment was not without political costs. According to the Eurobarometer data, trust in the Latvian central government decreased enormously from 19% (17%) of the respondents in the autumn of 2007 (2008) to less than 7% in the beginning of 2009. In February 2009 the government fell, and the new government had to implement the fiscal consolidation measures included in the revised budget for 2009 (Blanchard et al., 2013). In June 2009, the new government announced the new consolidation measures that included a further reduction in its wage bill (resulting in a decrease in public sector wages by more than 20%), cuts to pensions (that were later proclaimed unconstitutional) and reductions in personal income tax

¹ Advocates of devaluation included Paul Krugman, Kenneth Rogoff and Nouriel Roubini. Interesting discussions were held in the form of blogs by Paul Krugman and Latvia's then prime-minister Valdis Dombrovskis. Also see, for example, Åslund and Dombrovskis (2011) and Weisbrot and Ray (2010). For the comprehensive macroeconomic analysis of the Latvian crisis, recovery and lessons for other countries see Blanchard et al. (2013).

allowances (ibid). However, despite the drastic consolidation measures and in contrast to many European governments that lost to their opposition, the Latvian experience is exceptional, since it had the same prime minister from March 2009 to December 2013 (ibid), and the government responsible for budget cuts returned to office in 2011. In the spring of 2009 while preparing amendments for the 2009 budget, the government involved social partners and trade unions into the dialog (Åslund, 2012). Trust in national government was still low in autumn of 2009 (9%), but increased substantially thereafter, reaching 20% in the end of 2010, 15% in spring 2011 and 21% in the autumn of 2013 (Eurobarometer).

The recovery was also remarkable. The strong negative trend in GDP growth was soon overturned, with GDP growing at positive rates from the third quarter of 2010 onwards. Since 2010 Latvia is one of the best performers in the EU with regards to GDP growth. Regarding unemployment, it has been declining steadily since 2010 (while still increasing in Southern European countries). Finally, Latvia adopted the Euro in 2014. On the other hand, however, the crisis hit certain groups of the population more than others, and emigration was also significant as many chose to “vote with their feet”.

How did the labor market adjust to this strong variation in economic activity? Which groups were particularly affected during the downturn? These are the questions we analyze in this study, exploring also whether the dramatic cycle left longer lasting traces in the Latvian labor market.²To analyze labor market adjustment during the Great Recession we employ the data from the EU SILC and Latvian Labor Force Survey over the period 2002 to 2012, and first investigate the trends in traditional labor market states, followed by the analysis of contingent employment, informal employment, underemployment and low work intensity households. Then we estimate transitions between labor market states and their determinants. We complement this analysis by estimating

² Fallon and Lucas (2002) document the impact of the financial crises of the 1990s on labor markets in Argentina, Mexico, Turkey and several Asian countries. Their evidence shows that in all these countries even when GDP returns to robust positive growth after the initial impact of the crisis, the negative effects in the labor market are longer lasting, with higher unemployment of heads of household, higher child labor and less long run human capital formation.

transitions between four classes of aggregated occupations, to investigate the role of upward and downward mobility in the Latvian labor market over the Great Recession. Finally, in order to see whether mobility lead to more productivity, wage regressions are estimated.³

Our main results indicate a strong increase in unemployment and underemployment and a rise in the incidence of low work intensity households and workless households. Thus, labor market adjustment takes place predominantly at the extensive margin since it is driven by flows from permanent wage employment to unemployment. It is important to note that out-migration played also a very important role. Without the option to emigrate the unemployment rate would have been even higher (Hazans, 2013). We also show that both young and older, non-Latvians and above all less skilled individuals were especially hard hit by the economic crisis. Estimated transitions between four occupational groups demonstrate that downward mobility was very limited even during the Great Recession. Finally, estimating wage regressions we find that in the reported period job mobility was not associated with increased labor productivity.

The rest of the paper is structured as follows. Section 2 presents economic and labor market conditions in Latvia during and after the Great Recession. Section 3 discusses the data sources and the definitions used, while section 4 presents the analysis of labor market trends. Section 5 looks at transition probabilities between labor market states and their determinants as well as at transitions between aggregated occupational groups. Wage regressions in connection with occupational mobility are analyzed in Section 6. The final section provides conclusions and implications for the right mix of policy measures.

2. The economic crisis and the labor market in Latvia

³ Fadajeva and Krasnopjorovs (2015) provide complementary firm level evidence on labor market adjustment during 2008 to 2013 in Latvia.

Since the beginning of this century Latvia has enjoyed solid economic growth and declining unemployment as a result of structural reforms undertaken in the country during its transition from a centrally planned to a market economy in the 1990s. Combined with relatively high emigration after the accession to the EU in 2004, which has contributed to, but was not the only factor behind declining unemployment, labor shortages emerged in 2005-2007 (Hazans and Philips, 2010; Rutkowski, 2007). The boom originated primarily from a rise in domestic demand and a housing boom, while the first signs of overheating came in 2006 with wages and prices, especially housing prices increasing rapidly (Blanchard et al., 2013). Most of Latvia's banks were owned by Scandinavian banks and the interest rates were low while credit and mortgages were widespread. This "unhealthy boom" in combination with the world financial crisis caused a huge decrease in GDP which declined by 25% over just eight quarters with decline in domestic demand being 43% of GDP (Blanchard et al., 2013). Internal devaluation and fiscal consolidation policies in 2009 included cuts in public expenditures, wages and pensions, reductions in personal income tax allowances, resulting in a decline in unit labor costs and a substantial increase in unemployment. Declining unit labor costs and employment, withdrawal of low-productivity workers and increase in firms' efficiency potentially led to an increase in productivity and improved firms' competitiveness (ibid).

There are several potential reasons why the Latvian government preferred internal devaluation. As is discussed in Blanchard et al. (2013), external devaluation seemed inconsistent with the goal to adopt the Euro. In addition, since a large proportion of loans was denominated in Euros, external devaluation would have imposed large costs leading to loan defaults and spillover effects in other Central and Eastern European countries (Kattel and Raudla, 2013). Fiscal consolidation also acted as signaling device to restore confidence of foreign investors (ibid). Finally, national currencies had strong national-symbolic values and devaluing the national currency was associated with devaluing self-identity and sovereignty (ibid).

As is comprehensively discussed in Åslund (2012), the Latvian government used the crisis as an opportunity to implement structural reforms, targeting in particular three sectors: public administration, health care and education. Public wages were cut by 26% in one year, and 29% of civil servants were dismissed. While these measures were appreciated by voters as people wanted less bureaucracy, wage cuts in the private sector were smaller and unpopular, with average wages in Latvia declining by 11% by the end of 2009. To increase efficiency, the government decided to close 35 out of 59 hospitals by 2013, closed more than 100 schools in 2010, increasing the pupils to teachers ratio to the average European level, and higher education institutions were also targeted for reforms in order to increase their quality. Another policy response included further liberalization of the labor market removing reductions to flexible work arrangements and establishing employment support programs and increasing spending on labor market policies with EU funds (Åslund, 2012; Kattel and Raudla, 2013). Pension reforms were undertaken including controversial pension cuts, that were later proclaimed unconstitutional (Åslund, 2012; Blanchard et al., 2013; Kattel and Raudla, 2013). As a result of austerity and structural reforms and in contrast to Southern EU countries, Latvia has experienced the largest improvement in its current account, which changed from a deficit of 13% of GDP in 2008 to a surplus of 9.4% in 2009 (Åslund, 2012). GDP growth returned to positive from late 2010, exports increased and unemployment declined. Also the youth unemployment rate after having reached more than 26% in 2010 has been declining thereafter, in contrast to the trends in Southern EU countries and several new member states. However, both the unemployment rate and the youth unemployment rate remained significantly higher than their pre-crisis levels.

In contrast to Southern EU countries, the public reaction to the fiscal consolidation measures was rather modest with only some protests. As is argued in Kattel and Raudla (2013), this was due to a number of social and cultural factors, including a culture of patience, the previous experience with fiscal contractions during the transition period in the 1990s and the hope that short-term pain

would result in long-term gain. An underdeveloped civil society and weak trade unions are further explanations for the very contained protests that occurred.

Another important part of the adjustment process involved emigration. The post-accession period for Latvia was characterized by relatively high out-migration, which increased even more during the crisis.⁴ In general, migration provides an important adjustment mechanism in a single currency zone.⁵ Hazans (2013) shows that net emigration from Latvia has increased remarkably during the crisis, particularly to the UK, the most important destination country, while it became negative for Ireland that was also hit severely by the crisis. Since 2009 emigration has increased for all groups of the workforce; the increase was, however, particularly strong for highly educated workers. Hazans and Philips (2010), Hazans (2013), Elsner (2013a,b) demonstrate that emigration from the Baltic countries contributed to a decline in unemployment as well as wage growth before the crisis particularly for groups affected by it (young, male and lower skilled workers). It also improved bargaining power of lower skilled employees and contributed to skill shortages in certain sectors, as well as improved the labor market position of ethnic minorities (Hazans and Philips, 2010).

Figure 1 plots migration inflows to the UK, measured by the National Insurance Numbers (NINos) allocated to adult overseas nationals entering the UK. It indicates that emigration to the UK has increased substantially from Latvia and Lithuania, countries hit particularly hard by the crisis, with emigration levels even surpassing the post-accession levels. Is there a relation between labor market conditions at home and migration? A simple theoretical model suggests that migration depends on the relative wages between home and host countries weighted by the probability to find

⁴ A detailed analysis of Latvian emigration and its impacts is available in Hazans (2013,2016), while Zaiceva and Zimmermann (2016) analyze return migration during the crisis in the new EU member states.

⁵ Several recent studies confirm that migration reacts to the deterioration of relative economic conditions. For example, Bertoli et al. (2013) find evidence of “migration diversion” into Germany during the crisis, while Elsner and Zimmermann (2016) show that migration from the new EU member states to Germany has increased substantially despite migration restrictions that Germany applied to these countries until 2011, and was similar to an increase in migration from Southern EU countries.

employment. Figure 2 presents simple correlations between unemployment and emigration to the UK for all new EU members and only for Latvia, suggesting a strong positive relation. Indeed, the share of unemployed among all Latvian migrants (i.e. whose last registered labor market status before leaving was unemployment) increased from 10% in 2005 to 48% in 2011 (Hazans, 2013). Overall, the available literature suggests that emigration from Latvia has contributed to a decrease of unemployment and without the option to emigrate unemployment would have been even higher (ibid).⁶

3. Data, definitions and the sample

To investigate trends in the labor market and to estimate transitions between labor market states during and after the recession we employ both the longitudinal EU SILC data for Latvia as well as a panel dataset constructed by us from various waves of the Latvian Labor Force Survey over 2002-2012. In the EU SILC data labor market status refers to self-defined current economic status and is generated as follows. For permanent (EP) and temporary (ET) employees and self-employed and family workers (ESF) the variable “employment status” was used. Self-employed and family workers are further disaggregated into professional (ESFP) and non-professional (ESFNP), where professional refers to occupation groups 1-3 in ISCO-88. For unemployment (U) and inactivity (N) the information on self-defined “current economic status” was used. Labor force status is set to missing if both employment status and current economic status are missing.⁷

Regarding the Latvian Labor Force Survey (LFS), it has several advantages relative to the EU SILC. First, labor market status, i.e., employment, unemployment or inactivity, is not self-

⁶ In the analysis that follows, unfortunately due to data limitations, we are not able to include emigration. Indeed, emigration potentially could constitute an additional labor market state in transition matrices. Nevertheless, we attempt to proxy potential emigration by looking at panel attrition. At any rate, as long as out-migration is an additional safety valve regarding large labor market shocks, which is clearly the case in Latvia, our analysis essentially shows lower bounds of labor market flows and labor market adjustment. In addition, when out-migration is not systematically correlated with the estimated labor market transitions, the presented adjustment trends over the Great Recession and in its aftermath remain credible. Indeed, as we show below, attrition hardly affects the estimated transitions.

⁷ Note that in some cases the results have to be interpreted with caution due to the very small number of observations.

reported but constructed from the information available in the data using the conventional ILO definitions.⁸ It also contains information on ethnicity⁹. In addition, we construct a regional variable for the labor market in the capital region (Riga and Pieriga) and in the rest of the country.

Using the LFS data, the panel was constructed as follows. Only individuals who appear in two consecutive years and have no missing values in the current and lagged labor market status are retained in the sample. In addition, we only keep transitions between two different interviews in two consecutive years with at least 52 weeks of distance (92% are exactly at 52 weeks of distance, the remaining 8% between 53 and 65 weeks). With this criterion we discard only 1.4% of individuals.¹⁰¹¹

In the final sample we keep individuals between 15 and 64 years old, who are not in the armed forces. Table A1 in the Appendix provides descriptive statistics and proportions of certain demographic groups in our sample with the LFS data as well as the EU SILC data. The shares are comparable across the two datasets, apart for the Latvian/non-Latvian variable with the proportion of non-Latvians being larger in the LFS dataset. These two categories, however, are not directly comparable due to the fact that using the LFS data enables us to define Latvian and non-Latvian *ethnicity*, while the EU SILC variable refers to *the country of birth*.

⁸ There exists also information on self-reported past labor market status given by the reference person for all members of the household. This information could in principle be used to construct transitions. However, because of potentially large measurement error and recall bias we do not use this information.

⁹ To define ethnicity we have used a variable “Ethnicity” available in the LFS, that distinguishes between Latvian and non-Latvian ethnicity, where the latter group includes the following ethnicities: Russian, Belarusian, Ukrainian, Polish, Lithuanian, Jewish, Roma, Estonian and German. We didn’t use the citizenship variable, since the choice of citizenship particularly in the case of Latvia is endogenous due to institutional and historical reasons and the number of non-citizens is large.

¹⁰ Note that sometimes for the same individual there are two possible transitions across two consecutive years: that is, the transition between the first and third interview, and the transition between the second and fourth interview. Both transitions occur with 52 weeks /one year of distance or slightly more. In these cases we use all transitions but implement some reweighting: for instance, to an individual with two possible transitions in the same year (e.g., 2007/2008) we assign weights equal to 0.5 to each of the two transitions. If only one transition is available we assign a weight equal to one.

¹¹ We also drop observations with inconsistencies in the sequence number (e.g., the sequence number changes across waves or individuals with the same sequence number change gender or age category). The number of such cases, however, is small accounting roughly for 2 % of all observations.

4. Trends in the labor market during and after the recession

a) Standard labor market outcomes

To begin the analysis of labor market adjustment to the shock, we present descriptive evidence on standard labor market aggregates: the labor force participation rate, the employment rate, the unemployment rate without and with discouraged workers, as well as self-employment. We follow Brown et al. (2006) in defining discouraged workers as individuals “not working, available but not searching for the following reasons: they believe that there are no available jobs, they do not know how to search, they believe they do not have suitable skills or are too old to find a job, they sought a job before but did not find one” (Brown et al., p. 449).

Figure 3 presents these aggregates, with all rates normalized by the working age population. The figure shows a quite steady labor force participation rate between 2002 and 2012, hovering around 70%, while the employment rate reaches a peak in 2008 at 67%, but then falls to 59% in 2009 and does not recover to pre-crisis levels by 2012. The two unemployment rates show a secular decline from 2002 until the crisis years and then rise quite dramatically in 2009 and reach a peak in the year 2010. After this peak year the unemployment rates come slowly down but remain substantially higher than before the crisis. Finally, the self-employment numbers do not show any major trends over the available years. Thus, the fall in the employment during the crisis is essentially absorbed by a strong rise in unemployment.

To understand which groups in the population were particularly affected, we slice the labor market aggregates by gender, age, ethnicity and educational attainment (see table A2 in the Appendix). Labor force participation is relatively uniform across gender and ethnicity. Possibly as a legacy of the planned economy participation rates of women are only slightly lower than those of men throughout the observed period. There are, however, discernible differences by age and

educational attainment. The core group of workers (those in the age interval 25-54) have very high participation rates, being roughly 50 and 35 percentage points larger than the participation rates of young and older workers respectively. Equally striking is the far lower participation rate of less educated Latvian workers. Inspection of the employment rates makes clear that the crisis has its full impact in the labor market in 2009. For all categories employment rates fall substantially from 2008 and 2009. It is noteworthy that more men lose their jobs than women as do younger and older workers relative to the core group of workers. Non-Latvians who have the same employment rate as Latvians in 2008 lose jobs disproportionately during the crisis. What is also very striking is that while Latvians recover somewhat as far as employment is concerned, Non-Latvians do not since their employment rate in 2012 is as low as in 2009, the worst year of the crisis. The same scenario seems to play out if we distinguish by educational attainment. Interestingly, workers with intermediate educational attainment seem to be particularly hard hit by the crisis years, since these workers do not recover any of the lost ground as do less educated workers and workers with tertiary education.

Since labor force participation is quite stable over the entire period for all categories, unemployment mirrors the trends of the employment rates. Male workers who throughout the years under analysis have a higher unemployment rate than women experience a tripling of the unemployment rate from 2008 to 2009 while for women the unemployment rate doubles between the two years. Men, however, seem to come out of the crisis marginally better since their unemployment rate declines from 21% in 2009 to 17% in 2012. Female unemployment in contrast does not go down after the crisis but actually rises by 1% point from 2009 to 2012. Similar patterns can be observed for age and ethnicity, since older workers' and Non-Latvians' unemployment rates do not decline between 2009 and 2012. The youth unemployment rate rises dramatically by 20 percentage points during the crisis and remains high. The general picture is that the unemployment rates of all groups of workers remain much higher than before the crisis started. The fact that the

Latvian labor market did not recover completely to its pre-crisis level by 2012 in spite of high GDP growth can also be inferred from the long-term unemployment rate. The incidence of long-term unemployment (in unemployment overall) shows a strong upward trend after 2009. For the whole sample the incidence rises from less than 30% in 2009 to more than 50% in 2012. The unemployed thus have increasing difficulties in the post-crisis years to exit unemployment. This is especially true for older workers and Non-Latvians.

Finally, males, older workers, Latvians and less educated workers engage more in self-employment throughout the entire period. However, self-employment is clearly not the channel through which the Latvian labor market adjusts to the shocks related to the crisis. There is a slight increase for all categories in the crisis year of 2009 but this increase seems to reflect more a statistical artefact than a real increase. The way the self-employment rate is measured (i.e. the ratio of self-employment to total employment) implies that when employment falls in the crisis the self-employment rate can rise even when there are no additional inflows into self-employment. Nevertheless, self-employment falls proportionately less than total employment during the crisis.

Which groups of the population were particularly affected by the crisis? Table 1 presents the determinants of unemployment using probit regressions. The marginal effects confirm that males and younger workers have a higher incidence of unemployment as do non-Latvians and workers with low educational attainment. The relative effects become more accentuated in the post-crisis years as far as ethnicity, education and age are concerned. For example, in the boom year of 2007 Non-Latvians have a 2 percentage points higher likelihood to be unemployed than their Latvian counterparts, while in 2011 this difference rises to roughly 7 percentage points. Workers with lower educational attainment in 2007 experience an unemployment rate that is 5 percentage points higher than the unemployment rate of workers with tertiary education; this gap rises to more than 15 percentage points in 2011. For younger workers this unemployment difference triples between 2007

and 2011. Hence, younger workers, non-Latvians and less educated workers seem to bear the brunt of the adjustment that occurs in the aftermath of the crisis in the Latvian labor market.

b) Underemployment and contingent employment

To extend our analysis, Figure 4 presents three measures of underemployment: the fractions of involuntary temporary workers, of involuntary part-time workers and of the underemployed broadly defined. Involuntary temporary workers are individuals in temporary jobs who could not find permanent jobs, while involuntary part-time¹² workers would like to work full-time but could not find full-time jobs. Finally, underemployed workers are employed persons who work less than 40 hours per week¹³ but would like to work this amount of hours and are available to do so within two weeks. The percentages of involuntary temporary and part-time workers are more than halved in the pre-crisis boom period, but then rise sharply after 2008 and remain larger than when the crisis set in. The same trend occurs with the percentage of underemployed workers, which falls from roughly 10% in 2002 to below 4% in 2007 and 2008, but rises to a post-crisis peak of 8% in 2010. We find similar trends with Eurostat data for the three Baltic States, however, it is worth noting that during the crisis both unemployment and underemployment rates were the highest in Latvia among the Baltic states and higher than the EU average.

On the other hand, underemployment shares are substantial relative to the unemployment for all types of workers. In the crisis year of 2009 these shares are between 6% and 9% of all employed. Underemployment thus strikes us another important channel through which the Latvian labor market absorbs the shocks caused by the crisis. Similar to the trends in labor market

¹² Part-time workers are identified using a question in the LFS whether an individual works full-time or part-time in his/her main job.

¹³ The 40 hours threshold was chosen since the mean weekly hours worked in Latvia are around 40.

aggregates presented above, we can conclude that also with respect to underemployment the labor market does not bounce back to a performance seen in the pre-crisis years.

Turning to the analysis of temporary employment suggests that it does not seem to be an adjustment mechanism when we look at all employees. As panel a of table 2 shows, for the most part the fraction of employees with a temporary contract is very small throughout the period and rises only marginally from 2008 to 2009. Only young and less educated workers have substantial shares of temporary workers, but these shares increase only marginally after the crisis. On the other hand, when considering either new entrants into the labor market or workers who separated from their previous job, both of whom we proxy with employees having tenure of less than one year, we get some interesting results (panel b of table 2). First, the fraction of employees having temporary contracts is large and reaches about one fifth for the whole sample in 2009. Second, for all but highly educated workers this fraction rises by about 7% points from 2008 to 2009. Third, the numbers of temporary contracts do not return to the low levels of 2008 in the post-crisis years. Fourth, older workers and the less educated have disproportionately large shares of temporary contracts throughout the analyzed period. So, while more than 95 percent of older workers have permanent jobs, those with new employment relationships are hard hit by the crisis since in 2012 roughly a quarter of these older workers can only find temporary employment. To find a new job during and after the crisis is particularly hard for less educated workers since in 2009 and 2012 more than a third of this group only found temporary jobs.¹⁴

¹⁴ The analysis of hours worked and part-time work(not reported but available upon request) suggests only a slight reduction in the actual hours worked (1.5) between 2007 and 2009 (in contrast to, for example, Estonia where hours declined by 3.5 between 2007 and 2009 (OECD 2010, chapter 1). The variation in the average actual hours worked across the various types of workers is also very small. Mirroring the reduction in working hours there is a small increase in the incidence of part-time employment in the post-crisis years, but the share of part-time jobs is still smaller than in 2002. Women, young and older individuals and those with the lowest educational attainment have the highest incidence of part-time jobs.

Overall, the adjustment via underemployment has been important in Latvia, and also substantial in international perspective as in 2009 Latvia had the highest underemployment rate in the Baltic States, topping Estonia and Latvia by a wide margin.¹⁵

c) Informal employment

Defining informal employment is not an easy task.¹⁶ The Latvian LFS contains information on the lack of a written contract for employees that can be used to proxy informal employment. However, this information is only available for the years 2011 and 2012. Employing this definition suggests a quite low incidence of informality for salaried employees in Latvia, around 2.4% and 1.3%, respectively. In contrast, using the EU SILC data available over 2007-2011 would allow establishing whether informality is pro-cyclical or counter-cyclical. Employing this dataset, we construct two definitions of informal employment that are based on the approach of Koettl and Weber (2012) and of Hazans (2011). Definition 1 includes all employees as informal for whom their employers do not pay social security contributions. Non-professional employers or self-employed who employ five or fewer workers (including zero workers) are defined as informal self-employed. Also, unpaid family workers are also defined as informal. Definition 2 adds the informal self-employed and unpaid family workers to informal employees.¹⁷

¹⁵ In addition, we have performed the analysis of household polarization and low work intensity households (those with the number of months worked relative to the number of months that they could have potentially work being below certain threshold, i.e. below 0.2) (available upon request). The number of low work intensity households increases in the year 2009 and thereafter, leading to an overall increase by roughly 64% between 2007 and 2011. Thus, the reduction of employment opportunities for households triggered by the crisis is substantial. In addition, there was an increase in workless households during the crisis (consistent with OECD 2014, Chapter 1) and that the incidence of such households in 2012 is still higher than at the beginning of the 2000s. The share of mixed households is also substantial.

¹⁶ See, for example, Lehmann and Zaiceva (2015) for different definition of informal employment in Russia and the references therein.

¹⁷ One form of “partial informality” are “envelope payments”, i.e., when part of the wage is paid under the table to partially evade the payment of social security contributions. Unfortunately, there are no direct questions regarding envelope payments in the Latvian LFS or SILC questionnaires. Lehmann and Zaiceva (2015) show that in the Russian labor market this incidence reaches roughly 20% of all salaried employment in 2011. Williams (2009) and European Commission (2013) use a special survey of the EU Barometer on envelope payments in 2007 and 2012 and establish

As Table 3 demonstrates, the incidence of informal employment among dependent workers seems to be pro-cyclical in the Latvian labor market since it is lowest in the crisis years of 2008 and 2009. Thus, informal employment does not seem to have the buffer function immediately during the crisis that one would observe if the labor market were segmented and workers would use informal employment as a waiting stage. In Latvia overall employment and informal employment both decline during the downturn and informal employment grows strongly when the economy picks up. It is noteworthy that in 2011 the incidence of informal employment is higher than in 2007 for all groups of the population, and is particularly high for the low skilled and the youngest.

The relative importance of the factors determining informal employment does not change much across the years 2007 and 2011 as the probit regression estimates in Table 4 demonstrate. Males have a higher incidence of informal employment than their female counterparts being 2% points more likely to engage in informal employment relation *ceteris paribus*. This result is in line with the stylized fact that in transition countries males engage more in informal employment than females (Lehmann, 2015). Individuals with higher education attainment are less likely to be informal. In general, it is mostly low skilled individuals both with respect to education and occupation who have a higher likelihood to be informal. As far as sectors are concerned there are some changes over the period but informal employment is concentrated in agriculture, construction, hotels and restaurants, real estate and renting activities.

5. Transitions between labor market states and their determinants

In this section we complement the descriptive analysis of labor market trends during the recession presented above with the estimates of transition probabilities and their determinants. We employ

that these payments are substantial in the Baltic States and in particular in Latvia. Their findings suggest that in 2007, i.e., before the crisis, the incidence was 17% in Latvia, while it was 11% in Lithuania and 8% in Estonia. By 2012 this form of wage payments has fallen by 6% points in Latvia and in Lithuania and by 3% points in Estonia. Williams (2009) finds that envelope payments are especially prevalent in small firms and in the sectors construction, personal services, retail and hotels and restaurants.

data from both the Latvian LFS and the EU SILC and compare the results. The analysis is performed from the year 2007, i.e. the year before the recession, till the last available year, i.e. 2011 or 2012, respectively. We begin by focusing on three standard labor market states, namely employment, unemployment and inactivity. In the subsequent subsection we extend our analysis to six labor market states.

a) Transitions between employment, unemployment and inactivity

Our analytical approach follows Clark and Summers (1979) and Bellmann et al. (1995) in assuming that transitions between labor market states are governed by a Markov process. Having the states of employment (E), unemployment (U) and inactivity (N), we have nine potential transitions, which can be represented by the following matrix P_k :

$$P_k = \begin{bmatrix} EE_k & EU_k & EN_k \\ UE_k & UU_k & UN_k \\ NE_k & NU_k & NN_k \end{bmatrix} \quad (1),$$

where UE_k , for example, represents the probability of individual k being employed in period t conditional on being unemployed in period t-1. The gross probability of transition from state i to state j can be written as:

$$P_{ij} = \frac{F_{ij}}{S_i}, \quad i, j = e, u, n \quad (2),$$

where F_{ij} is the number of persons flowing from state i in period t-1 to state j in period t and S_i is the number of persons in the origin stock in period t. Finally, under Markovian assumptions

duration of state occupancy is exponentially distributed and given by the reciprocal of the outflow rate:

$$\frac{1}{\sum_j P_{ij}}, \quad j \neq i. \quad (3)$$

Table 5 shows the estimated annual transitions based on equation 2 and employing the EU SILC data. This table suggests a substantive difference between these transitions for the period 2008 to 2009 and the other years. The former period is precisely the time interval when the crisis has a major impact on the Latvian labor market. Comparing the employment-unemployment (*EU*) columns of the last year before the crisis and of the period 2008–2009 we see a tripling of the flows from employment to unemployment. We can assume that this dramatic increase is mainly due to labor shedding and not due to voluntary quits.

Disaggregating by gender gives the striking result that it is males who are much more affected by the increase in labor shedding since women's transition rate from employment to unemployment is much lower in the crisis period. Slicing the data by age and educational attainment results in large jumps in the transition rates for young workers and workers with only primary education. However, all age and educational groups experience substantial increases in the flows from employment to unemployment and the relative rankings in the transitions do not change after the onset of the crisis. Males, young workers and workers with primary education have the highest transition rates from employment into unemployment throughout the analysed period. In the years 2009–2010 and 2010–2011 the outflows from employment to unemployment are somewhat attenuated relative to the crisis period, but they do not return to the levels of the period 2007 – 2008 as far as the total sample and the sub-groups are concerned. Consequently, we can moot that there is more labor shedding for all the reported years after the crisis than for the period before the crisis.

Columns 4–6 in Table 5 show what happens to the unemployed. Applying equation 3, one important statistics is the average duration of unemployment which is given by the reciprocal of the sum of the transition probabilities UE and UN. In the pre-crisis period this expected duration is $(1/0.551) = 1.8$ years while in the periods following the crisis it is 2.2, 2.1 and 1.96 years respectively. It is also worth noting that in the period 2010–2011 outflow rates into employment are at least as high as before the crisis. The slightly longer average duration of unemployment come about because of a fall into the outflow rates into inactivity relative to the pre-crisis years. However, a slightly deteriorating outflow rate in combination with a large inflow rate into unemployment in the aftermath of the crisis implies the build-up of the stock of long-term unemployed.

Inspection of the outflow rates into employment (UE) enables us to determine which groups have particularly large difficulties in leaving unemployment for new jobs. Workers with primary education have a substantially worse experience than their better educated counterparts. In addition, older workers (55–64 years of age) have relative difficulties to find employment, while their transition rates into inactivity are particularly large. What is also very striking is the far higher female outflow rate into employment relative to the male rate. So, in the crisis period 2008 to 2009 male workers have a far worse labor market experience than their female counterparts. As women also have a higher outflow rate into inactivity in this period the average duration of unemployment for men (2.72 years) is roughly one year longer than the average duration for women (1.75 years).

On the basis of the estimated transition matrices we can conclude that the main adjustment of the Latvian labor market to the negative shock occurred between 2008 and 2010. In the last period (2010–2011) we see substantial improvements, namely lower outflow rates from employment into unemployment for the whole sample as well as for all sub-categories but one relative to the period 2008–2010. The same pattern holds for the UE flows: in the period 2010–2011, the outflow rates from unemployment into employment are substantially larger than in the previous two periods.

Estimates of the transition probability employing the Latvian LFS suggest patterns across the years that are quite similar to the ones estimated with the EU SILC panel data (not reported but available upon request). There is little labor shedding and substantial flows from unemployment into employment in the pre-crisis period 2007 to 2008. During the crisis years (2008 to 2009) outflows from employment to unemployment more than double to roughly 10 percent while hirings from unemployment are approximately halved. Outflows from employment into unemployment fall back to roughly pre-crisis levels as of 2010. Hires from the stock of the unemployed, on the other hand, although increased relative to the crisis period, do not recover completely to the pre-crisis level. Again, this is related to the build-up of long-term unemployment over the crisis. As shown by Layard et al. (1991) with a larger incidence of long-term unemployment overall outflows from unemployment into employment will be reduced since the long-term unemployed have usually great difficulties to leave unemployment for jobs. Overall, this analysis suggests that unemployment clearly absorbs most of the shock brought on by the crisis.

The determinants of the transitions from the respective origin state to the respective destination states are estimated with a multinomial logit (MNL) model. Marginal effects of a variable on the transition probabilities into a specific state are presented, that show the impact of a single variable on the transition probability of interest, holding all other factors constant. We also report the effect of a variable on the “transition probability” of remaining in the origin state. For example, table 6 shows employment as the origin state and the marginal effects of a set of variables on the transition probabilities from E to E (E-E), from E to U (E-U) and from E to N (E-N). By construction the marginal effects add up to zero.

With employment as the origin state in table 6, where we control for sectors and occupations,¹⁸ men have a slightly higher likelihood to flow into unemployment and a slightly lower probability to leave the labor force, amounting to roughly half a percentage point in both

¹⁸ To this aim, we use Latvian Labor Force data.

cases, than their female counterparts. Workers residing in the metropolitan Riga region have lower probabilities of a similar magnitude to enter unemployment and flow into inactivity. Relative to the marginal effects of the other demographic factors shown, the gender and regional effects are, however, quite small. Age certainly plays a bigger role than gender and region in the estimates since the core age group has roughly a 1.5 percentage points lower probability to flow into unemployment and into inactivity than workers in the youngest group. The probabilities of older workers are -3.4 and 2.2 percentage points respectively when considering transitions into unemployment or into inactivity. Latvian workers also have a somewhat better labor market experience than non-Latvians since their proclivity to enter unemployment is about 1 percentage point lower than that of non-Latvians. Finally workers with upper secondary and in particular with tertiary education have a substantially lower likelihood to enter unemployment and to leave the labor force than less educated workers. The marginal effects on sectors are especially large. In particular, workers in construction have a probability of leaving for unemployment that is nearly 7 percentage points higher than the probability for workers in agriculture and fishery. Other sectors where workers disproportionately lose jobs are real estate, trade, accommodation and food services and mining and manufacturing. As far as occupations are concerned service workers, craft workers and workers in elementary occupations have a relatively high likelihood to flow into unemployment. Overall, it is workers with lower skills who are particularly affected by job loss.

The MNL estimates of transitions from unemployment show some interesting patterns (table 7). Male workers have a higher likelihood to remain unemployed only because they are less likely to enter inactivity than female workers, while flows into employment do not show any statistically significant difference. In contrast, unemployed workers residing in Riga and surroundings have a probability of entering employment that is roughly 4 percentage points higher than that of unemployed workers residing elsewhere. Age is also an important determinant of flows out of unemployment. The core age group has a substantially higher chance to find employment than other age groups and a much lower likelihood to flow from unemployment to inactivity. Older workers,

on the other hand, have lower flows into employment and larger flows into inactivity than the rest of the workforce. Ethnicity is an important determinant of transitions out of unemployment since Latvian workers leave unemployment at a significantly higher rate than non-Latvians because of a much higher transition rate to employment. These results that ethnic minorities have a worse performance than the majority in terms of employment are in line with previous findings for Latvia (Hazans 2010, 2011, 2013). Finally, as expected, better educated workers have higher accession rates to jobs and lower transition rates into inactivity.

Finally, marginal effects of the determinants of transitions out of inactivity are reported in table 8. Male workers have a higher proclivity to enter the labor force, and this through entry into both employment and unemployment. While residence has no impact on flows out of inactivity, age and educational attainment are very important determinants of these flows. Workers in the core age group have higher flows into both employment and unemployment while older workers remain disproportionately inactive because of much lower flows into employment. Workers with upper secondary and tertiary education have much higher transition rates into employment than their less educated counterparts. Finally ethnicity also plays a role since Latvians access jobs at a rate that is 2 percentage points higher than the job accession rate of non-Latvians. The effect is, however, minor since both education and age exhibit substantially larger marginal effects than ethnicity.

One issue that can confound this analysis is attrition, out-migration being one of the potential reasons for it. Selective out-migration and attrition might bias our results if the flow of persons who drop out of the survey is correlated systematically with the transitions between labor market states. Respondents are interviewed at most four times in two consecutive years, for example, in the 1st quarter 2007, 2nd quarter 2007, 1st quarter 2008 and 2nd quarter 2008. As this interview structure shows, the distance between the first and third interview is one year. Since we estimate annual transition probabilities we can define future attriters as respondents who appear in the first three interviews but are not present in the fourth interview. To tackle the issue of attrition

and potential emigration, we perform separate regressions with the same covariates where the transitions are restricted to the flows between interview 1 and 3 and in which we add an attrition dummy for those who have no fourth interview. The coefficient estimates of the attrition dummy are reported in the last row in tables 6 to 8.

The important result regarding the coefficient estimates on the attrition dummy in Table 6 is that flows from employment into unemployment are slightly over-estimated when we concentrate on the sample of non-attriters. However, this effect is quite small as a comparison of the marginal effects of the other covariates and the coefficient on the attrition dummy shows. Table 7, on the other hand, shows that attrition, as modeled by us, does not bias the flows from unemployment into employment, while concentrating on non-attriters does over-estimate exiting the labor force from the state of unemployment by roughly 5 percentage points. Finally, flows from inactivity into employment (unemployment) are slightly under-estimated (over-estimated) when we ignore attrition (see Table 8). Moreover, adding the attrition dummy to the set of covariates does not change the coefficient estimates on the other covariates in any discernible way. This exercise leads us to conclude that attrition does not seem to strongly affect the transitions from employment and unemployment and that the large flows between labor market states that we find during the Great Recession are certainly not driven by attrition.

b) Six labor market states: transitions and determinants

To provide a more comprehensive picture, in this sub-section we disaggregate employment into four mutually exclusive states: permanent wage employment, temporary wage employment and professional and non-professional self-employment. To this aim we again use the EU SILC data over 2007-2011. The four employment states are defined using the variable employment status in the data set, while unemployment and inactivity are derived from the self-defined current economic status. Professional self-employment refers to self-employed workers who are legislators, senior

officials, managers, professionals and associated professionals (i.e., occupation categories 1 – 3 of ISCO-88). Non-professional self-employment includes also family workers. Following La Porta and Shleifer (2008) we could take non-professional self-employment as a proxy for informal employment. While in developing countries this might be a relatively precise proxy, it is not entirely clear whether this would hold in the Latvian context.¹⁹We, therefore, consider here non-professional self-employment having in mind that there might be some overlap with informal self-employment.

Before we discuss estimated transitions between six labor market states we have estimated the multinomial logit regressions of the probability of finding oneself in one of these states (not reported but available upon request). We find that older workers have a slightly lower probability to be in temporary wage employment and in unemployment and a slightly higher probability to be self-employed. These effects of age are, however, very small relative to the effects of the other covariates on labor market states. Male workers have a higher likelihood to be in all four employment states and a substantially higher (lower) likelihood to be unemployed (inactive). Educational attainment is a particularly strong predictor with workers with upper secondary education having a significantly higher (lower) probability to be in permanent wage employment and in professional self-employment (unemployment and inactivity) than those with lower education. These relative probabilities have the same signs when we compare workers with tertiary education and workers with less than upper secondary education; the relative magnitudes are, however, augmented substantially. It is also striking that the likelihood to be in temporary wage employment is not affected by educational attainment. As expected, workers with tertiary education have a substantially lower likelihood to be in non-professional self-employment. The marginal effects related to the year dummies are also quite illuminating. They suggest that over the crisis most of the adjustment takes place via the states permanent wage employment and unemployment,

¹⁹ For example, Lehmann and Pignatti (2007) find the overlap of non-professional self-employment and informal self-employment in Ukraine to be rather small.

while temporary wage employment, non-professional self-employment and inactivity are characterized by very minor adjustments, and professional self-employment seems to be not affected by the crisis. Permanent wage employment reaches a trough in 2010 and unemployment a peak in 2009. In addition, non-professional self-employment moves in the same direction as permanent wage employment, hence they are not substitutes for workers in the Latvian labor market. Finally, only in 2010 do we see a slight increase in the incidence of inactivity. Thus, workers in Latvia do not leave the labor force in larger numbers during the crisis.

The estimated transition probabilities between the six states are reported in Table 9. Inspection of the estimated transition probabilities produces some important insights. In all periods the states permanent wage employment, professional and non-professional self-employment as well as inactivity are relatively “stable” since their diagonal entries are always higher than 50%. In other words, only a minority of workers, who are originally in one of these states, flow out of them. In contrast, temporary wage employment is always very volatile since between 2007 and 2011 more than 70% of workers who are originally in this state exit it for other destinations. In other words, more than two thirds of all workers who at the beginning of the year are in temporary wage employment find themselves in another state at the end of the year.

The state unemployment has to be thought of differently, since a high percentage in the diagonal entry implies stagnancy and is thus decisively an indication of a poor performance of the labor market. The period with the best performance is the pre-crisis year 2007–2008 when more than half of the unemployed flow out of this state within a year. It is, however, noteworthy that a quarter of the unemployed leave the labor force. The year with the worst performance is 2008–2009 when only 45% leave the unemployment state. Thus, again the crisis period of 2008–2009 marks a large increase of the inflows into unemployment. Both for workers in permanent wage employment and in non-professional self-employment the inflow rates into unemployment triple, while around a

quarter of workers originally in temporary wage employment flow every year into unemployment throughout the entire period.

There are some interesting patterns regarding the flows between employment states. The flows from permanent wage employment to the other three employment states are tiny throughout the period. On the other hand, workers originally in temporary wage employment have very large flows into permanent wage employment and small flows into the two types of self-employment. The large transition probabilities into permanent employment are, of course, not surprising since a big chunk of temporary employment is involuntary (see Section 4) and workers seem to queue in this state to enter permanent jobs. Flows from temporary wage employment to both types of self-employment are small, pointing possibly at the unsuitability of workers who find themselves in temporary wage employment to become self-employed. However, we also see large transition rates from both types of self-employment to permanent wage employment, hinting at self-employment as a potentially unwanted state by a non-negligible number of workers.

Outflow rates out of the labor force are only large for temporary wage workers and for non-professional self-employment but do not play an important role for the other states. Thus, the only relevant adjustment for the large majority of workers who are in permanent wage employment is at the extensive margin, that is, through flows into unemployment. The converse flows, those from unemployment into permanent wage employment hardly vary over the period. By 2010–2011, inflows into permanent wage employment are as large as before the crisis apart from the state of inactivity. In general, we can say that flows between labor market states roughly return to pre-crisis levels at the end of the observed period.

Which factors drive the transitions between the six labor market states? To answer this question we performed multinomial logit regressions capturing the probabilities to transit from the respective origin state to the respective destination states as above (not reported to save space, but available upon request). We find that older workers are slightly less likely to flow from permanent employment into temporary employment and into unemployment and are slightly more likely to

flow into inactivity. Gender and educational attainment are factors that are more important in determining flows with males having a higher probability to transit both to temporary employment, to professional and non-professional self-employment as well as to unemployment and are less likely to flow into activity than females. More education leads to larger flows into professional self-employment and to lower flows into the other four states. The marginal effects on the time dummies confirm the notion that the main adjustment of the Latvian labor market during the crisis is via unemployment since only the marginal effects on the time dummies for the flows from permanent employment to unemployment are throughout the period positive and large.

Regarding transitions from temporary wage employment and professional self-employment²⁰ older workers in temporary employment are less likely to leave for inactivity and to flow from professional self-employment to permanent employment. Male workers in temporary jobs have a far lower probability to move into inactivity than females. Tertiary education, on the other hand, lowers substantially the transitions from professional self-employment to permanent wage employment and to inactivity. Regarding non-professional self-employment as the origin state, older workers are less likely to flow into temporary employment and unemployment while they have a higher propensity to leave the labor force. The other important result is related to the time dummies that drive the flows into unemployment. They are statistically significant and positive for all periods suggesting that the adjustment takes place at the extensive margin over the crisis, with the effect being larger for non-professional self-employment in the years 2009-2011.

Regarding flows from unemployment, apart from age and gender we find little difference in other determinants. Older workers have a slightly lower (higher) proclivity to flow into permanent wage employment (into inactivity). Male workers are more likely to flow to non-professional self-employment and less likely to enter inactivity than females. Finally, taking inactivity as the origin state, older workers are less likely to flow into permanent and temporary wage employment and into unemployment, and more likely to enter non-professional self-employment. Male workers are less

²⁰ Note that some estimates in these states are imprecisely estimated due to the small number of observations.

likely to flow into permanent employment, while workers with secondary and tertiary education have much larger transitions into this state than workers with lesser education. We also see a clear cyclical pattern of the flows between inactivity and permanent employment and unemployment as flows into permanent employment are substantially reduced and flows into unemployment boosted during the crisis years. However, while the decrease in the flows into permanent employment remains roughly constant over the entire period, the increase in the flows into unemployment is halved between 2008 and 2011.

c) Transitions between four aggregated occupational groups

Interesting transitions can also occur between sectors of the economy and occupations as the labor market adjust to the shock. In this subsection we focus on the link between occupational change and upward and downward mobility during the economic recession. To this aim, we employ the EU SILC data and aggregate occupations into four hierarchical groups in order to get economically meaningful results. Occupational group 1 is comprised of legislators, senior officials, managers, professionals and associated professionals. The second group combines clerks, service workers, shop and sales workers. Occupational group 3 refers to skilled agricultural and fishery workers, craft and related trades workers; finally, the last group consists of plant and machine operators and assemblers, and elementary occupations. While this classification is admittedly somewhat arbitrary, it allows us to relatively easily establish occupational upward or downward mobility when estimating movements between the four occupational groups. Movements from a higher number to a lower number represent upward mobility in our case, while movements to a higher number downward mobility.

Table 10 shows the annual transitions between these occupational groups. Inspection of the table leads us to infer that mobility between these groups is very limited since the lowest percentage of workers remaining in a given occupational group is around 87 percent. Unsurprisingly the movements between the two polar occupational groups (1 and 4) are miniscule apart from the

period 2010-2011. There are also very few transitions between groups 2 and 3 in both the upward and downward direction, implying few movements between the lower skills end of white collar occupations and the higher skills end of blue collar occupations.

The off-diagonal elements below the diagonal represent upward occupational mobility while the off-diagonal elements above the diagonal show downward occupational mobility. In the period before the crisis hit the Latvian labor market (2007-2008) we see a lot more upward than downward mobility. Normalized across four occupational groups, 5.2 percent of workers experience upward mobility against 3.3 percent²¹ who find themselves in a lower occupational group at the end of the period relative to its beginning. In the crisis year 2008-2009 we get very limited occupational mobility, upward as well as downward, amounting to roughly 2.5 and 2.2 percent respectively. In 2009-2010 there is actually more downward than upward mobility in the data (2.3 percent upward versus 4.8 percent downward mobility). This is reversed in the last available period of 2010-2011 since we find 5.7 percent of workers moving up and 3.3 percent moving down. The main upshot of these results is that occupational mobility as defined by us is limited in the Latvian labor market during the crisis.

Overall, the results of the transition analysis suggest that unemployment constitutes the main adjustment channel in the Latvian labor market throughout the recession, where young and older workers, ethnic minorities and, above all, individuals with low educational attainment are affected most. In contrast, mobility across broad occupational groups does not seem to play a significant role.

6. Wages and occupational mobility during and after the crisis

This section investigates whether labor mobility across labor market states, occupations and sectors can lead to a more efficient structure of job matches in the economy, resulting in higher productivity and thus higher wages. We start out with a very simple exercise, performing wage

²¹ The sum of the off-diagonal entries in the first panel of the table is 20.8 below the diagonal and 13.2 above the diagonal; having four occupational groups in the panel we normalize these numbers dividing by 4.

regressions and including a dummy for those workers who changed jobs from one year to the next. Using the annual EU SILC longitudinal data over the period 2007–2011 we estimate pooled OLS and fixed effects wage regressions with standard covariates. In some specifications we also include the aggregated occupational groups.

Column 1 of Table 11 reports the results of an OLS regression of the log of real monthly wages on a quadratic in age, gender, educational attainment and year dummies. When we aggregate occupations into four large groups endogeneity issues are attenuated; nevertheless we exclude occupational groups in column 1 to see how robust our estimates are. Consistent with earlier studies for Latvia, wages are rising in age at a decreasing rate, and there is a quite large gender wage gap as well as large returns to education. These results hold when we include occupational groups in column 2, with the gender gap actually increasing to roughly 40 percent. Adding a dummy for annual job-to-job moves again does not change the coefficient estimates (column 3). The crucial result here is that the mobility dummy is negative and large, implying that those who change jobs experience a wage penalty on average. Table 12 supplements this analysis by presenting the year-by-year coefficients on the job change dummy. As can be seen from this table, the wage penalty for those who change jobs is the lowest in 2010 and the highest in the following year.

These OLS results are biased if unobservable characteristics influence significantly both wages and covariates and are omitted from the regressions. The fixed effects results in column 4 of Table 11 account for unobserved time-invariant workers' characteristics and show no wage penalty caused by a job change. Hence a wage penalty seems to arise because of adverse selection. In other words, according to these results workers who change jobs have on average worse unobserved characteristics than those who are able to retain their jobs. On the basis of these results worker mobility does not seem to lead to a more productive job structure in the Latvian economy during the crisis.

To probe somewhat deeper into the issue of job change and wages we create three mutually exclusive dummy variables: a variable for upward mobility, that is for movements from a higher

numbered occupational group to a lower numbered occupational group, a variable for downward mobility, which describes the opposite movement and a variable when a job change entails no movements between occupational groups. We then interact these mobility dummies with the job change dummy in our wage regressions. Table 13 shows the coefficients on these interaction terms. In column 2 we do not control for occupational group while in column 3 occupational group is an additional control variable. By introducing the interaction term and controlling for occupational group we eliminate some of the bias due to unobserved characteristics like motivation or ability. When we do not control for occupational group the coefficients of the interaction terms show small differences across the three mobility groups that are not statistically significant. Once we control for occupational group we get statistically significant differences as far as upward and downward mobility is concerned. Those workers who are upwardly mobile do not experience a wage penalty when they change jobs, while those who move down in the occupational ladder are confronted with a 24% wage penalty. In the light of the standard errors the difference between the zero and the 24% penalty is statistically significant, while the difference in the penalties of those who move down and those who stay in the same occupational group albeit numerically large is not statistically significant.

Why do we not observe a wage premium for those who are occupationally upwardly mobile? Having no information on where these workers come from and in which firms they land their new jobs we can only speculate. A negative impact of the business cycle may definitely play a role. Selective out-migration may be another reason when those with a particularly high likelihood of improved productivity move out. Third, and maybe most importantly, as long as within firms there exists an upward sloping wage profile with respect to tenure (for example, because of a seniority pay system or because of the accumulation of firm specific human capital), workers will lose their positions in the previous firms' wage structure when they change jobs. Starting a new job, they will have lost firm specific human capital and all the tenure accumulated with the previous employer (see Lehmann and Wadsworth 2000 on this). Only in the case of strong upward

occupational mobility, which is the case when workers move from a higher to a lower numbered occupational group, will workers in their new job not face a lower wage than in their previous employment. Interpreting the absence of a wage penalty for workers who show strong upward occupational mobility in this way allows us to infer that part of the observed labor reallocation may result in improved productivity in the Latvian labor market during the crisis. However, as we have noted in the discussion of the transitions between occupational groups, for most years we have more upward than downward mobility and the vast majority of job changers remain in the same occupational group throughout the period. Hence according to this evidence overall job reallocation does not seem to lead to an increase in labor productivity and higher wages during and shortly after the crisis.

7. Conclusions and policy implications

In this paper we analyze a policy response and labor market adjustment to a large macroeconomic shock in Latvia, a country that faced the largest recession and fiscal adjustment in Europe and a subsequent remarkable recovery. To cope with the crisis internal devaluation was chosen by the Latvian government, and several important reforms were undertaken, including in the labor market. Here we first investigate trends in a number of labor market aggregates, and then estimate transition probabilities between different states and their determinants. Our main findings are as follows.

Even though the macroeconomic crisis has been overcome (Blanchard et al., 2013) and strong GDP growth has resumed since the third quarter of 2010, the performance of the Latvian labor market has not bounced back to its pre-crisis level. All analyzed labor market aggregates show a worse performance in 2012, i.e., 3 years after the crisis than in the years 2007-2008, when the labor market had not yet been affected by the crisis. Once labor is shed in the aftermath of the crisis all types of workers who enter unemployment have great difficulties to flow out of this state into

employment. As a result of major labor shedding with the onset of the crisis, flows from employment to unemployment shoot up dramatically for the whole sample but also for all demographic categories in 2008-2009. Outflow rates, on the other hand, fall only slightly in the years after 2008 and thus the duration of unemployment increases during the crisis. Thus, even though unemployment declined after 2010, the sharp rise in the incidence of long-term unemployment provides evidence of the prolonged poor performance. We also find that less educated workers, men, young and non-Latvians recover less from the crisis than the other groups. Further analysis suggests that permanent wage employment, professional and non-professional self-employment are relatively stable states, while temporary wage employment is very volatile. The evidence also shows that the only substantial flows out of permanent wage employment are into unemployment confirming that labor market adjustment to the crisis occurs at the extensive margin, while multinomial logit regressions demonstrate that gender and above all educational attainment drive the transitions.

In general, the labor market responded to the large macroeconomic shock by a dramatic rise in unemployment, a substantial increase in underemployment and a small reduction in the average hours worked, thus adjusting above all at the extensive margin. Complementary to this, there was also a strong rise of the incidence of low work intensity households, while the share of both workless households (in which none of the working age adults is in employment) and mixed households (where at least one member of the household does not work) was also significant. There is little adjustment via self-employment and informal employment, as the latter declined at the beginning of the crisis and increased thereafter, hence does not provide a buffer function. Our results also suggest low occupational mobility, and if anything, that upward mobility is slightly larger than downward mobility in most of the years. Wage regressions indicate that job mobility does not lead to an increase in labor productivity in the Latvian labor market during and

immediately after the crisis, hinting at the fact that during the Great Recession many workers probably change jobs involuntarily.

Finally, the role of migration is also important. Migration may relieve the labor market of excess labor and thus serve as an additional important adjustment mechanism during the crisis. Indeed, out-migration increased substantially after the onset of the crisis and there was a significant positive correlation between unemployment and emigration to the UK. Although the data at our disposal does not allow us to directly evaluate the effect of out-migration, the estimated panel attrition probabilities suggest that our analysis is not biased by selected attrition. Nevertheless, further research is needed with out-migration included as one of the states, as well as the analysis of the impact of emigration and return migration on labor markets, demographic trends and political economy consequences.

Can the Latvian adjustment provide a lesson for other countries? In many aspects Latvia's experience was unique, including previous recession during transition from plan to market, modest reaction to the fiscal consolidation measures due to both cultural traits and underdeveloped civil society and weak trade unions (Kattel and Raudla, 2013). With weak institutions and limited employment protection it was possible to achieve relatively quickly large cuts in public expenditures and use the crisis as an opportunity for structural reforms. Also, the determination to join the Euro zone provided very strong incentives. Mirroring the indicators of macroeconomic performance, the trust in government after the strong dip in 2009 increased again thereafter.

Our work provides important insights for policy makers in countries affected by severe recessions. First, with weak trade unions and limited employment protection the labor market adjusts mainly at the extensive margin, facing large inflows into unemployment and a sustained build-up of long-term unemployment. Contingent employment and self-employment do not appear as important buffers in the recession. If there is state dependence this built-up stock of long-term unemployed is hard to reduce even if the economy picks up again (see, e.g., Layard et al., 1991). In

addition, our analysis identifies the main problem groups mostly affected by the crisis, which include young, men and above all less skilled individuals. A combination of active labor market policies such as training and job search measures, of job support schemes and of social policies might attenuate the bad situation of these individuals by boosting outflows from unemployment through the former and by maintaining a certain level of income through the latter policies, a path that Latvian policy makers indeed followed. In a more longer-term perspective, facilitation of job creation by small and medium enterprises, investment in higher education and in modern vocational education may prove to be the most effective policy measures, together with migration and return migration policies.

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Table 1. Determinants of unemployment. Probit, marginal effects

	2002	2007	2008	2009	2011
Male	0.010*	0.004	0.004	0.053***	0.023***
	(0.006)	(0.003)	(0.004)	(0.005)	(0.006)
55-64	-0.067***	-0.045***	-0.055***	-0.135***	-0.116***
	(0.007)	(0.003)	(0.004)	(0.005)	(0.006)
25-54	-0.071***	-0.040***	-0.049***	-0.139***	-0.128***
	(0.010)	(0.006)	(0.006)	(0.009)	(0.011)
Latvian	-0.053***	-0.020***	-0.033***	-0.051***	-0.071***
	(0.006)	(0.004)	(0.004)	(0.006)	(0.006)
Upper sec. ed.	-0.055***	-0.039***	-0.057***	-0.081***	-0.081***
	(0.009)	(0.005)	(0.005)	(0.008)	(0.008)
Tertiary ed.	-0.102***	-0.049***	-0.069***	-0.147***	-0.153***
	(0.006)	(0.003)	(0.004)	(0.006)	(0.006)
Log likelihood	-3908.451	-3782.27	-4650.88	-8154.78	-6679.09
Observations	11099	17713	18472	19235	16429

Notes: sample consists of individuals of 15-64 years of age. All covariates are dummy variables, for which the marginal effects are given for a change of the covariate from 0 to 1. * p<0.05, ** p<0.01, *** p<0.001. Reference categories: female, 15-25, non-Latvian, below upper secondary education.

Table 2. Workers with temporary contracts, in percent of employees

a. *All*

	2002	2007	2008	2009	2012
all	12.9	4.0	3.2	3.9	4.5
male	15.8	5.4	4.3	5.2	5.3
female	10.0	2.5	2.2	2.8	3.8
15-24	23.5	9.9	7.0	8.8	9.8
25-54	11.5	3.2	2.8	3.6	4.2
55-64	11.7	3.2	2.8	2.7	3.3
Latvian	12.0	4.2	3.3	3.9	4.3
Non-Latvian	14.2	3.6	3.1	3.7	4.9
Tertiary ed.	6.8	1.0	1.1	1.2	2.0
Upper sec. ed.	13.1	3.7	2.8	3.8	4.7
below sec. ed.	20.8	9.6	9.1	10.4	11.2

b. *Workers with tenure less than one year*

	2002	2007	2008	2009	2012
all	33.0	16.0	14.5	21.5	20.4
male	38.2	19.0	17.7	24.6	21.2
female	26.9	12.4	11.0	18.1	19.5
15-24	34.8	16.5	13.9	21.5	16.8
25-54	31.3	15.0	13.8	21.4	20.7
55-64	46.1	21.6	20.7	22.6	26.6
Latvian	32.2	17.1	14.6	21.9	19.6
Non-Latvian	34.2	13.9	14.2	20.9	22.1
Tertiary ed.	18.9	5.8	5.6	7.6	11.0
Upper sec. ed.	32.6	14.7	12.6	20.9	20.2
below sec. ed.	46.6	24.8	26.4	36.6	34.2

Source: Latvian LFS.

Table 3. Incidence of informal employment

	2007	2008	2009	2010	2011
Definition 1 (in percent of all employees)					
All	7.9	6.9	6.5	8.0	9.7
Males	10.7	9.8	9.0	11.2	12.6
Females	5.4	4.4	4.3	5.3	7.3
16-24	13.3	10.9	10.0	12.8	17.5
25-54	7.5	6.7	6.7	8.1	9.3
55-64	5.2	4.5	3.6	5.0	8.7
Latvian	7.5	6.9	6.2	7.4	9.7
Non-Latvian	9.9	6.8	8.2	11.2	10.2
Below secondary	16.5	16.2	13.3	14.9	20.7
Upper secondary	7.5	6.0	6.3	8.3	10.3
Tertiary .ed.	2.9	2.7	3.0	4.3	4.0
Definition 2 (in percent of all employed)					
All	10.6	9.3	9.6	10.2	11.1
Males	14.4	13.2	12.8	13.7	14.3
Females	7.5	6.0	6.9	7.2	8.5
16-24	13.5	11.2	10.6	13.5	18.8
25-54	10.6	9.7	10.0	10.4	10.6
55-64	8.5	6.8	6.8	7.1	8.8
Latvian	10.7	9.5	9.7	10.2	11.6
Non-Latvian	10.3	8.1	9.5	10.2	8.9
Below secondary	16.5	15.7	16.2	15.2	17.4
Upper secondary	11.1	9.4	9.9	10.9	12.2
Tertiary .ed.	3.4	3.5	4.1	5.1	5.0

Source: EU SILC

Table 4. Determinants of informality. Probit, marginal effects

	2007	2011
Male	0.020** (0.008)	0.023*** (0.008)
Age	-0.003 (0.002)	-0.002 (0.002)
Age squared	0.000 (0.000)	0.000 (0.000)
Latvian	-0.007 (0.009)	0.001 (0.008)
Secondary edu.	-0.033*** (0.010)	-0.015* (0.009)
Tertiary edu.	-0.039*** (0.010)	-0.021* (0.011)
Professionals	0.021 (0.029)	0.066* (0.034)
Technicians and associated professionals	0.028 (0.027)	0.069* (0.037)
Clerks	0.014 (0.031)	0.046 (0.039)
Service, shop and market sales workers	0.053 (0.033)	0.073* (0.039)
Skilled agricultural and fishery workers	0.098 (0.061)	0.379*** (0.097)
Craft and related trades workers	0.032 (0.027)	0.148*** (0.051)
Plant and machine operators and assemblers	0.037 (0.030)	0.064 (0.039)
Elementary occupations	0.109** (0.042)	0.244*** (0.061)
Mining, manufacturing, electricity, gas & water supply	-0.042*** (0.008)	-0.043*** (0.008)
Construction	-0.003 (0.013)	-0.003 (0.015)
Wholesale and retail trade & repairs	-0.034*** (0.009)	-0.032*** (0.010)
Hotels and restaurants	-0.022 (0.013)	-0.029** (0.012)
Transport, storage & communication	-0.035*** (0.008)	-0.018 (0.012)
Financial intermediation	-0.045*** (0.009)	-0.039*** (0.011)
Real estate, renting & business activities	-0.023** (0.011)	0.005 (0.016)
Public administration & defence, comp. social security	-0.059*** (0.005)	-0.028*** (0.010)
Education	-0.058*** (0.006)	-0.045*** (0.008)
Health and social work	-0.043*** (0.008)	-0.027** (0.011)
Other services	-0.012 (0.013)	-0.013 (0.015)
Log-likelihood	-934.975	-1083.302
Observations	4021	4901

Source: EU SILC. Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. We use definition 1 of informal employment. Apart from age all covariates are dummy variables, for which the marginal effects are given for a change of the covariate from 0 to 1. Reference categories: Female, Non-Latvian, below secondary education, legislators senior officials and managers, agriculture, hunting, forestry and fishing.

Table 5. Annual labor market transitions: three states – 2007 to 2011, EU SILC

	EE	EU	EN	UE	UU	UN	NE	NU	NN
2007 to 2008									
Total	0.879	0.053	0.068	0.308	0.449	0.243	0.162	0.029	0.809
Males	0.862	0.074	0.064	0.328	0.484	0.188	0.137	0.038	0.825
Females	0.897	0.032	0.071	0.279	0.395	0.326	0.178	0.023	0.799
Age 16-24	0.754	0.076	0.169	0.455	0.273	0.273	0.139	0.025	0.836
Age 25-54	0.904	0.056	0.041	0.292	0.514	0.194	0.297	0.074	0.628
Age 55-64	0.833	0.022	0.144	0.300	0.350	0.350	0.080	0.000	0.920
Primary	0.781	0.086	0.132	0.344	0.344	0.313	0.087	0.017	0.896
Upper sec.	0.889	0.051	0.060	0.296	0.463	0.241	0.185	0.032	0.784
Tertiary	0.949	0.014	0.037	0.400	0.400	0.200	0.308	0.000	0.692
2008 to 2009									
Total	0.809	0.137	0.054	0.298	0.551	0.151	0.144	0.123	0.733
Males	0.773	0.178	0.049	0.249	0.633	0.118	0.117	0.120	0.763
Females	0.843	0.099	0.058	0.371	0.431	0.198	0.159	0.125	0.716
Age 16-24	0.686	0.227	0.087	0.308	0.462	0.231	0.103	0.139	0.757
Age 25-54	0.842	0.134	0.024	0.308	0.579	0.113	0.237	0.190	0.573
Age 55-64	0.719	0.103	0.178	0.282	0.410	0.308	0.090	0.031	0.879
Primary	0.643	0.254	0.104	0.237	0.588	0.175	0.081	0.099	0.820
Upper sec.	0.815	0.137	0.048	0.320	0.541	0.140	0.156	0.133	0.711
Tertiary	0.893	0.069	0.038	0.345	0.517	0.138	0.298	0.114	0.588
2009 to 2010									
Total	0.825	0.094	0.081	0.289	0.523	0.188	0.106	0.079	0.814
Males	0.835	0.110	0.055	0.301	0.557	0.142	0.092	0.079	0.829
Females	0.816	0.082	0.102	0.271	0.472	0.257	0.116	0.080	0.804
Age 16-24	0.716	0.164	0.121	0.239	0.441	0.319	0.118	0.092	0.790
Age 25-54	0.861	0.092	0.047	0.336	0.572	0.092	0.187	0.145	0.668
Age 55-64	0.702	0.057	0.242	0.147	0.382	0.471	0.037	0.014	0.950
Primary	0.687	0.180	0.133	0.249	0.538	0.213	0.060	0.072	0.867
Upper sec.	0.827	0.099	0.075	0.287	0.551	0.162	0.109	0.072	0.819
Tertiary	0.876	0.051	0.072	0.378	0.396	0.225	0.242	0.068	0.689
2010 to 2011									
Total	0.883	0.083	0.034	0.359	0.492	0.149	0.106	0.081	0.813
Males	0.878	0.099	0.022	0.355	0.534	0.111	0.092	0.093	0.815
Females	0.887	0.069	0.045	0.364	0.439	0.197	0.116	0.073	0.811
Age 16-24	0.792	0.137	0.071	0.336	0.504	0.160	0.101	0.074	0.825
Age 25-54	0.894	0.085	0.021	0.394	0.490	0.116	0.185	0.160	0.655
Age 55-64	0.852	0.063	0.086	0.221	0.497	0.282	0.046	0.035	0.919
Primary	0.776	0.173	0.051	0.286	0.559	0.155	0.051	0.054	0.896
Upper sec.	0.878	0.088	0.034	0.352	0.490	0.158	0.114	0.084	0.803
Tertiary	0.929	0.042	0.029	0.510	0.392	0.098	0.206	0.085	0.709

Source: EU SILC longitudinal data set.

Table 6. Determinants of transitions from employment: MNL regressions, marginal effects

	E – E	E - U	E - N
<i>Demographics</i>			
Male	0.0003 (0.003)	0.0052* (0.003)	-0.0055** (0.002)
Riga	0.0092*** (0.003)	-0.0052* (0.002)	-0.0040* (0.002)
25-54	0.0319*** (0.005)	-0.0151*** (0.004)	-0.0167*** (0.004)
55-64	0.0117* (0.006)	-0.0342*** (0.005)	0.0225*** (0.004)
Latvian	0.0139*** (0.003)	-0.0113*** (0.002)	-0.0026 (0.002)
Upper secondary	0.0315*** (0.004)	-0.0162*** (0.003)	-0.0152*** (0.002)
Tertiary	0.0583*** (0.006)	-0.0353*** (0.005)	-0.0230*** (0.004)
<i>Sectors</i>			
Mining and manuf.	-0.0318*** (0.006)	0.0260*** (0.004)	0.0058 (0.004)
Construction	-0.0730*** (0.008)	0.0685*** (0.007)	0.0045 (0.005)
Trade	-0.0315*** (0.007)	0.0310*** (0.005)	0.0004 (0.004)
Accom.&food service	-0.0338*** (0.011)	0.0259*** (0.008)	0.0078 (0.007)
Transportation	-0.0013 (0.006)	0.0127** (0.005)	-0.0114** (0.004)
Finance&insurance	-0.0242 (0.015)	0.0078 (0.0105)	0.0164 (0.012)
Real estate	-0.0634*** (0.009)	0.0437*** (0.007)	0.0197*** (0.006)
Public adm.&defence	-0.0133* (0.007)	0.0023 (0.005)	0.0109* (0.006)
Education	-0.0037 (0.007)	-0.0001 (0.004)	0.0037 (0.005)
Health&social work	0.0099 (0.007)	-0.0070 (0.004)	-0.0028 (0.005)
Arts&otherservices	-0.0181** (0.008)	0.0198*** (0.006)	-0.0017 (0.005)
<i>Occupations</i>			
Professionals	-0.0108* (0.006)	0.0062 (0.005)	0.0046 (0.004)
Technicians	-0.0208*** (0.006)	0.0165*** (0.005)	0.0043 (0.004)
Clerks	-0.0275*** (0.008)	0.0073 (0.006)	0.0201*** (0.005)
Service workers	-0.0417*** (0.006)	0.0204*** (0.005)	0.0212*** (0.004)
Skilled agr.fish.workers	-0.0079 (0.009)	0.0071 (0.008)	0.0008 (0.005)
Craft workers	-0.0343*** (0.006)	0.0197*** (0.004)	0.0145*** (0.004)
Operators&assemblers	-0.0221*** (0.006)	0.0119** (0.005)	0.0101** (0.004)
Elem. occupations	-0.0567*** (0.006)	0.0351*** (0.005)	0.0215*** (0.004)
future attriters [§]	0.0164***	-0.0158***	-0.0006

(0.006) (0.004) (0.003)

Source: Latvian Labor Force Survey, years 2007 – 2012. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level. § The coefficients on dummies of future attriters are taken from separate regressions.

Table 7. Determinants of transitions from unemployment: MNL regressions, marginal effects

	U – E	U - U	U - N
<i>Demographics</i>			
Male	0.0241 (0.015)	0.0729*** (0.015)	-0.0971*** (0.012)
Riga	0.0420*** (0.015)	-0.0224 (0.016)	-0.0196 (0.013)
25-54	0.0361* (0.020)	0.0747*** (0.021)	-0.1109*** (0.015)
55-64	-0.0593** (0.028)	-0.01361 (0.028)	0.0729*** (0.019)
Latvian	0.0737*** (0.014)	-0.0691*** (0.015)	-0.0046 (0.012)
Upper secondary	0.1052*** (0.019)	-0.0267 (0.019)	-0.0785*** (0.014)
Tertiary	0.1614*** (0.027)	-0.0950*** (0.029)	-0.0663*** (0.023)
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future attriters [§]	-0.0096 (0.025)	-0.0376 (0.026)	0.0472** (0.020)

Source: Latvian Labor Force Survey, years 2007 – 2012. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level. § The coefficients on dummies of future attriters are taken from separate regressions.

Table 8. Determinants of transitions from inactivity: MNL regressions, marginal effects

	N – E	N - U	N - N
<i>Demographics</i>			
Male	0.0224*** (0.005)	0.0226*** (0.004)	-0.0451** (0.006)
Riga	-0.0094 (0.006)	-0.00003 (0.005)	0.0095 (0.007)
25-54	0.0842*** (0.006)	0.0401*** (0.005)	-0.1243*** (0.007)
55-64	-0.0338*** (0.007)	-0.0793*** (0.007)	0.1132*** (0.009)
Latvian	0.0217*** (0.005)	-0.0195*** (0.004)	-0.0021 (0.006)
Upper secondary	0.0928*** (0.006)	0.0605*** (0.005)	-0.1534*** (0.007)
Tertiary	0.1780*** (0.009)	0.0846*** (0.008)	-0.2627*** (0.011)
<hr/>			
future attriters [§]	0.0342*** (0.008)	-0.0450*** (0.008)	0.0107 (0.011)

Source: Latvian Labor Force Survey, years 2007 – 2012. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level. § The coefficients on dummies of future attriters are taken from separate regressions.

Table 9. Labor market transition probabilities – six states

	EP	ET	ESFP	ESFNP	U	N
2007 to 2008						
EP	85.25	1.64	2.28	0.82	4.19	5.83
ET	42.03	14.49	0.00	1.45	26.09	15.94
ESFP	19.57	2.17	65.22	2.17	4.35	6.52
ESFNP	15.48	3.57	0.00	67.86	3.57	9.52
U	20.56	7.48	0.00	2.80	44.86	24.30
N	14.02	1.89	0.19	0.57	3.03	80.30
2008 to 2009						
EP	78.66	0.99	0.86	0.73	14.05	4.71
ET	36.15	13.85	3.85	3.85	26.15	16.15
ESFP	23.42	0.90	64.86	0.90	7.21	2.70
ESFNP	9.93	1.99	2.65	68.87	11.92	4.64
U	19.86	2.84	0.71	5.67	55.67	15.25
N	8.90	2.20	0.62	2.56	12.95	72.78
2009 to 2010						
EP	80.80	1.88	1.17	0.74	8.56	6.85
ET	33.33	24.24	1.01	3.03	24.24	14.14
ESFP	23.81	0.00	56.46	4.76	5.44	9.52
ESFNP	10.60	2.76	0.00	59.45	11.52	15.67
U	18.17	7.97	0.39	2.04	52.58	18.85
N	8.21	2.07	0.27	0.67	8.41	80.39
2010 to 2011						
EP	85.47	2.87	0.94	0.49	7.01	3.23
ET	41.89	27.93	0.90	1.80	22.52	4.95
ESFP	25.00	0.00	65.79	1.32	3.95	3.95
ESFNP	14.56	3.40	0.00	62.62	11.65	7.77
U	22.07	9.92	1.28	1.97	49.70	15.06
N	6.67	1.80	0.33	1.26	7.71	82.23

Notes: Sample includes individuals between 16-64 years old. The labor force status is generated as follows. For permanent (EP) and temporary (ET) employees and self-employed and family workers (ESF) the variable employment status was used. Self-employed and family workers are further disaggregated into professional (ESFP) and non-professional (ESFNP), where professional refers to occupations 1-3. For unemployed (U) and inactive (N) the information on self-defined current economic status was used. Labor force status is set to missing if both employment status and current economic status are missing. The results have to be interpreted with caution due to the very small number of observations in some categories.

Table 10. Annual transitions between occupational groups (in percent)

2007 to 2008				
	1	2	3	4
1	95.39	3.29	0.44	0.88
2	7.82	88.27	1.68	2.23
3	3.33	0.95	90.95	4.76
4	2.36	1.35	5.05	91.25
2008 to 2009				
1	97.32	1.44	0.31	0.93
2	3.13	95.18	0.24	1.45
3	1.57	1.84	92.13	4.46
4	0.80	1.81	1.01	96.38
2009 to 2010				
1	94.35	4.14	0.68	0.83
2	2.19	93.60	0.73	3.47
3	2.29	0.92	87.41	9.38
4	0.31	1.56	2.03	96.09
2010 to 2011				
1	95.50	3.12	0.58	0.80
2	9.36	87.36	0.16	3.12
3	1.69	0.42	92.41	5.49
4	6.49	2.25	2.78	88.48

Source: EU SILC.

Notes: Occupational group1 refers to legislators, senior officials, managers, professionals and associated professionals; Occupational group2 refers to clerks , service workers, shop and sales workers ; Occupational group3 refers to skilled agricultural and fishery workers, craft and related trades workers; Occupational group4 refers to plant and machine operators and assemblers, elementary occupations.

Table 11. Log real wage regressions with annual job-to-job movements

	OLS (1)	OLS (2)	OLS (3)	FE (4)
Age	0.024*** (0.003)	0.020*** (0.003)	0.019*** (0.003)	0.066*** (0.017)
Age squared	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)
Male	0.287*** (0.010)	0.342*** (0.011)	0.344*** (0.011)	
Secondary edu.	0.250*** (0.014)	0.151*** (0.016)	0.149*** (0.016)	-0.026 (0.046)
Tertiary edu.	0.835*** (0.016)	0.516*** (0.020)	0.513*** (0.020)	-0.049 (0.059)
Job change			-0.151*** (0.018)	-0.007 (0.021)
2008	0.157*** (0.020)	0.165*** (0.020)	0.167*** (0.019)	0.121*** (0.013)
2009	0.257*** (0.018)	0.285*** (0.019)	0.282*** (0.019)	0.229*** (0.010)
2010	0.126*** (0.018)	0.153*** (0.018)	0.153*** (0.018)	0.091*** (0.008)
2011	0.012 (0.019)	0.047* (0.019)	0.048* (0.019)	
Oc_group2		-0.339*** (0.013)	-0.334*** (0.013)	-0.028 (0.029)
Oc_group3		-0.344*** (0.017)	-0.340*** (0.017)	0.007 (0.049)
Oc_group4		-0.423*** (0.016)	-0.415*** (0.017)	-0.057 (0.036)
Constant	0.545*** (0.056)	0.957*** (0.060)	0.992*** (0.060)	0.109*** (0.396)
R-squared	0.20	0.25	0.26	
Observations	19332	16294	16294	16294

Notes: Robust standard errors in parentheses. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level. Sample includes individuals 16-64 years old not in the armed forces over 2007-2011. Job change equals 1 if a person changes job since last year. Oc_group1 (reference category) refers to legislators, senior officials, managers, professionals and associated professionals; Oc_group2 refers to clerks, service workers, shop and sales workers; Oc_group3 refers to skilled agricultural and fishery workers, craft and related trades workers; Oc_group4 refers to plant and machine operators and assemblers, elementary occupations.

Table 12. Year-by-year coefficients on job change

	2007	2008	2009	2010	2011
Job change	-0.126**	-0.100**	-0.182***	-0.097***	-0.251***
	(0.058)	(0.040)	(0.043)	(0.036)	(0.038)

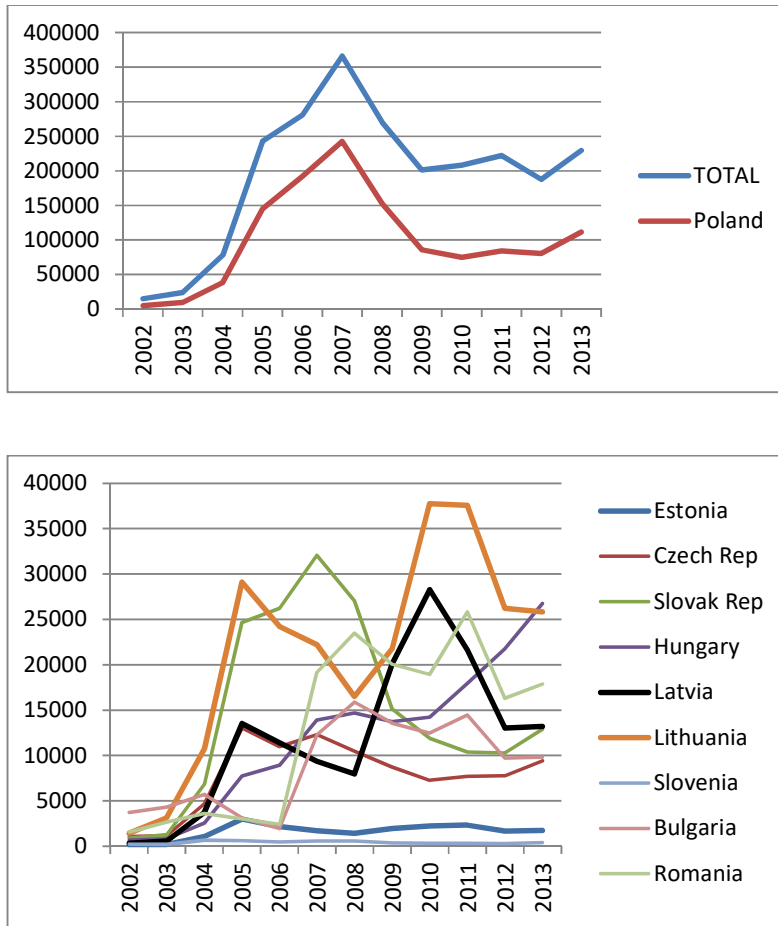
Notes: Coefficients from pooled OLS regressions are reported. Robust standard errors in parentheses. ** significant at the 5 percent level, *** significant at the 1 percent level. Sample includes individuals 16-64 years old not in the armed forces. All regressions include the same variables as in Table 11. Dependent variable: log of real wages.

Table 13. Coefficients of interaction terms of job change and occupational mobility

Job change,	-0.188***	-0.027
Upward mobility	(0.072)	(0.070)
Job change,	-0.205***	-0.276***
Downward mobility	(0.072)	(0.072)
Job change,	-0.197***	-0.132*
No mobility	(0.073)	(0.071)
Occupations included	No	Yes
R-squared	0.21	0.28
Observations	15303	12777

Notes: Coefficients from pooled OLS regressions are reported. Robust standard errors in parentheses. * significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level. Sample includes individuals 16-64 years old not in the armed forces over 2007-2010. All regressions include the same variables as in Table 11. Dependent variable: log of real wages.

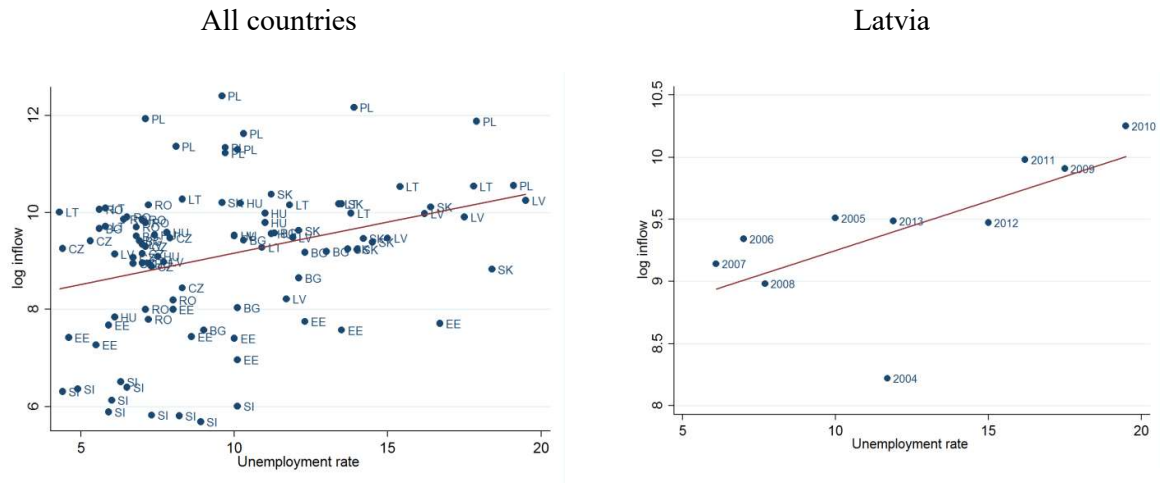
Figure 1. Emigration to the UK from the new member states



Source: UK Department for Work and Pensions.

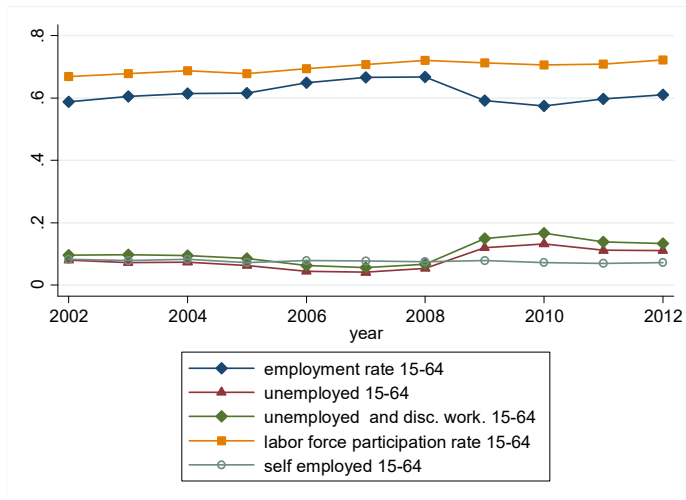
Notes: the figure reports National Insurance number allocations to adult overseas nationals entering the UK.

Figure 2. Emigration from the new member states to the UK and unemployment



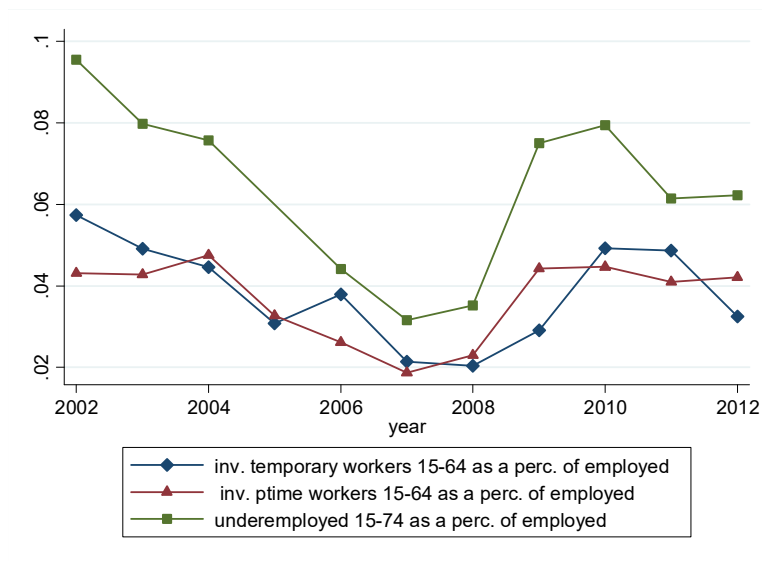
Source: own calculations based on data from Eurostat and UK Department for Work and Pensions

Figure 3. Labor market aggregates in Latvia



Source: Latvian LFS.

Figure 4: Aggregates of underemployment



Source: Latvian LFS.

APPENDIX A1.

Table A1: Descriptive Statistics

a. Latvian LFS

	2002	2007	2008	2009	2011
Male	46.6	46.8	47.1	47.5	47.1
Female	53.4	53.2	52.9	52.5	52.9
15-24	23.1	22.1	22.1	21.3	18.6
25-54	59.6	59.6	59.1	59.6	59.9
55-64	17.3	18.2	18.8	19.1	21.5
Latvian	58.7	64.4	64.7	63.9	66.2
Non-Latvian	41.3	35.6	35.3	36.1	33.8
Below sec. ed.	27.1	26.3	25.1	23.9	19.3
Upper sec. ed.	57.6	57.3	56.7	57.4	58.7
Tertiary ed.	15.3	16.3	18.2	18.6	22.0

Source: Latvian LFS.

b. EU SILC

	2005	2006	2007	2008	2009	2010	2011
Male	46.5	45.7	45.8	45.9	46.6	46.8	46.6
Female	53.5	54.3	54.2	54.1	53.4	53.2	53.4
15-24	20.8	21.2	20.9	21.1	20.2	19.8	17.3
25-54	61.1	59.4	59.4	59.7	60.7	61.1	61.1
55-64	18.0	19.4	19.8	19.2	19.1	19.1	21.5
Latvian	81.9	83.3	85.3	85.9	85.3	85.0	84.2
Non-Latvian	18.1	16.7	14.7	14.1	14.7	15.0	15.8
Below sec. ed.	24.0	21.9	24.6	25.3	24.1	23.0	21.6
Upper sec. ed.	59.3	59.5	57.8	55.4	53.9	54.5	54.7
Tertiary ed.	16.5	18.4	17.5	19.1	20.4	21.3	22.4

Table A2. Labour market aggregates by gender, age, ethnicity and educational attainment*a. Labour force participation rate, in percent of the working-age population*

	2002	2007	2008	2009	2012
all	66.9	70.8	72.1	71.2	72.2
male	71.7	75.0	75.4	73.2	74.8
female	62.7	67.0	69.3	69.4	69.9
15-24	35.9	37.2	37.3	36.8	36.4
25-54	85.2	86.7	88.3	87.5	87.8
54-64	45.0	59.4	62.4	58.9	59.7
Latvian	67.9	70.0	71.3	70.7	72.1
Non-Latvian	65.5	72.2	73.7	72.1	72.4
below sec. ed.	39.1	41.3	40.9	39.7	41.6
Upper sec. ed.	74.9	78.4	79.8	78.2	75.4
Tertiary ed.	85.8	91.3	91.5	90.1	90.6

b. Employment rate, in percent of the working-age population

	2002	2007	2008	2009	2012
all	58.8	66.6	66.8	59.2	61.1
male	62.2	70.1	69.0	57.8	62.0
female	55.9	63.6	64.8	60.5	60.2
15-24	28.5	32.9	31.8	24.0	25.1
25-54	75.9	82.0	82.2	74.0	75.2
55-64	40.7	57.3	59.4	52.2	52.8
Latvian	61.1	66.4	66.8	60.0	62.9
Non-Latvian	55.6	67.1	66.7	57.8	57.4
below sec. ed.	31.5	36.8	34.7	27.8	30.3
Upper sec. ed.	65.7	74.1	74.1	64.4	62.3
Tertiary ed.	81.3	88.6	88.2	83.4	84.9

c. Unemployment rate, in percent of the labour force

	2002	2007	2008	2009	2012
all	12.0	5.8	7.4	16.9	15.4
male	13.2	6.5	8.4	21.1	17.1
female	10.9	5.1	6.5	12.9	13.8
15-24	20.6	11.6	14.6	34.8	30.9
25-54	11.0	5.4	6.9	15.4	14.4
55-64	09.6	3.5	4.8	11.3	11.6
Latvian	09.9	5.1	6.3	15.2	12.7
Non-Latvian	15.1	7.0	9.5	19.8	20.7
below sec. ed.	19.5	10.9	15.2	30.1	27.1
Upper sec. ed.	12.2	5.5	7.1	17.7	17.4
Tertiary ed.	05.3	2.9	3.6	7.4	6.2

Table A2, continued*d. Long-term unemployment rate: one year or more searching for a job, in percent of the labour force*

	2002	2007	2008	2009	2012
all	5.6	1.9	2.2	5.0	8.3
male	6.6	2.3	2.5	6.4	9.5
female	4.6	1.5	1.8	3.6	7.2
15-24	6.5	1.6	2.2	7.6	10.1
25-54	5.5	2.1	2.2	4.7	8.3
55-64	5.6	1.4	2.2	4.7	7.7
Latvian	4.1	1.5	1.7	4.1	6.2
Non-Latvian	7.8	2.7	3.0	6.6	12.5
below sec. ed.	11.0	3.6	4.3	11.0	14.7
Upper sec. ed.	5.4	1.9	2.1	5.0	9.5
Tertiary ed.	2.0	0.9	0.9	1.6	3.1

e. Self- employed, in percent of the employed

	2002	2007	2008	2009	2012
all	14.2	11.6	11.3	13.3	11.8
male	16.1	13.7	14.2	16.5	14.5
female	12.3	9.5	8.5	10.6	9.3
15-24	8.1	6.3	5.3	6.5	4.0
25-54	13.5	11.8	11.7	13.1	11.9
55-64	24.1	14.3	13.0	17.7	14.3
Latvian	16.2	12.7	12.4	14.3	13.2
Non-Latvian	11.0	9.6	9.1	11.6	8.6
below sec. ed.	25.6	15.4	13.7	18.1	15.0
Upper sec. ed.	13.3	11.9	12.0	14.0	12.3
Tertiary ed.	9.1	8.0	8.0	9.8	9.8

Source: Latvian LFS.



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