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SLOVENIAN LABOUR MARKET THROUGH THE LENS OF WORKER FLOWS

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ABSTRACT

The main aim of this paper is to give a comprehensive view on worker flows between three labour market states and to analyse their cyclical patterns. The analyses are based on Labour Force Survey data from second quarter 2001 to the last quarter of 2011. The observed sample was partitioned into three sub-periods which coincide with the main changes in the unemployment rate dynamics: 1) 2001-2004, the period of stable macroeconomic conditions and stable unemployment; 2) 2005-2007, the period of economic boom and falling unemployment and 3) 2008-2011, the period of economic crisis and increasing unemployment. In addition to the aggregates, the paper also studies worker flows based on gender, age and education.

We find that gross worker flows between employment and inactivity are about three times larger than flows between employment and unemployment, or flows between unemployment and inactivity. Job-to-job flows, which according to several authors account for the most of labour turnover, are of approximately the same size as flows from unemployment to employment. Job-to-job flows are much more likely for employees with less stable types of employment. This could indicate that transitions to another employment are largely a matter of a need for a new job and to a lesser extent the result of match-specific problems. This could be a sign of relatively larger rigidity of stable types of employment. The disaggregated analysis shows a very high rate of activity for the population with the highest education, accompanied by high levels of employment and very low levels of unemployment. This population seems very resilient to business cycles, as the related flows of this population shows no correlation with flows on the aggregate level, with the exception of job-to-job flows. The disaggregated analysis also shows that the recent crisis had a stronger effect on men, the youngest, and the lowest educated.

POVZETEK

V tem prispevku so podrobneje analizirani tokovi delavcev na trgu dela med stanji zaposlenosti, brezposelnosti in neaktivnosti, obenem pa je analizirana tudi njihova povezanost s poslovnim ciklom. Analize temeljijo na podatkih Ankete o delovni sili v časovnem obdobju drugega četrtletja 2001 do zadnjega četrtletja 2011. Opazovano obdobje z vidika gibanja stopnje brezposelnosti lahko razdelimo v: 1) obdobje stabilnih makroekonomskih pogojev in stabilne stopnje brezposelnosti (2001–2004), 2) obdobje hitre gospodarske rasti in padajoče brezposelnosti (2005–2007) in 3) obdobje gospodarske krize in naraščajoče brezposelnosti (2008–2011). V prispevku so poleg agregatnih vrednosti tokov proučene tudi razlike v tokovih, ki jih povzročajo demografski dejavniki (spol, starost in izobrazba).

Ugotavljamo, da so na slovenskem trgu dela po obsegu največji tokovi med stanjem zaposlenosti in stanjem neaktivnosti, ki so približno trikrat večji od tokov med zaposlenostjo in brezposelnostjo oziroma med neaktivnostjo in brezposelnostjo. Po drugi strani so neposredni tokovi med različnimi zaposlitvami približno podobni tistim med zaposlenostjo in brezposelnostjo, čeprav empirična literatura s tega področja ugotavlja, da ti tokovi ustvarjajo največjo dinamiko na trgu dela. Za slovenski trg dela lahko ugotovimo, da so tokovi med različnimi zaposlitvami bolj verjetni za zaposlene z manj stabilnimi oblikami zaposlitve, iz česar lahko sledi, da so prehodi med različnimi zaposlitvami bolj posledica potrebe po (novi) zaposlitvi kot rezultat neujemanja med delodajalci in delojemalci. To bi lahko nakazovalo relativno večjo rigidnost stabilnih oblik zaposlenosti. Rezultati podrobnejše analize so pokazali na visoko stopnjo delovne aktivnosti in nizko stopnjo brezposelnosti visoko izobražene populacije. Za tokove visoko izobraženih delavcev je značilna tudi nekoreliranost z agregatnimi tokovi, iz česar lahko sklepamo, da je ta populacija manj odzivna na nihanja poslovnega cikla. Podrobnejša analiza je tudi pokazala, da je kriza imela večji učinek na populacijo moških, mladih in najnižje izobraženih.

1 Introduction

Labour market can be characterized by three different labour market states, employment, unemployment and inactivity. While the information on labour market states is important in describing labour market developments over time, they miss an important point of labour market dynamics. Changes in labour market states are significantly shaped by flows of workers into and out of these states, and knowing the magnitudes of these flows helps us to understand the main reasons behind the changes in labour market states. Understanding labour market as a dynamic system consisting of states and flows is not only important from the theoretical point of view but also for designing appropriate policies. This requires that policy makers have an appropriate assessment about which flows influence labour market states and to what extent. For example, unemployment can rise due to higher job loss rates, the declining ability of unemployed to find jobs, inflow from inactivity, or all of the above. The selection of appropriate measures in the labour market also depends on the structure of unemployed, such as age, education, etc.

The importance of worker flows is reflected in a rich history of empirical and theoretical research. Empirical research started to expand in the early 1970s by Kaitz (1970), Perry (1972) and Marston (1976), who were among the first that described how to estimate worker flows, and how these flows shape the evolution of unemployment. A new momentum for empirical research was given with the theoretical research on gross worker flows, and it is now widely accepted that the most useful way to think of these flows within the labour market context are search models developed by Diamond, Mortensen and Pissarides (Mortensen and Pissarides (1994), Pissarides (2000)).

The main findings in the search models literature can be summarized as follows. The partial equilibrium model of Blanchard and Pissarides (1992) is founded on three major parts, 1) a specification of labour demand in terms of gross flows of job destruction and creation, 2) a matching process between workers and firms, and 3) a wage determination process, where wages depend on the labour market prospects of employed workers and firms. In this model all flows arise through job creation and destruction, hiring occurs with constant-returns matching function, which implicitly assumes that (only) unemployed are engaged in job-search, and wages are determined so as to discourage shirking - efficiency wage approach. The key prediction of the model is that shocks to aggregate activity lead to countercyclical job destruction and procyclical job creation. After a negative shock to aggregate activity the number of workers moving from employment to unemployment (and inactivity) is expected to increase as jobs are destroyed, while the number of workers moving from unemployment to employment is expected to decrease as job creation falls.

The basic search model has been extended in several directions. The issue of labour force participation (labour-leisure choice), within the standard search model is discussed by Pissarides (2000), where it is assumed that individuals out of labour force enjoy leisure, while searching for a job is a costly activity. The model assumes that an individual will participate in the labour force if the marginal utility of leisure (or non-market activities) is less

than the reservation wage. It thus follows that participation is higher when wages are higher, labour market tightness (defined as vacancy to unemployment ratio) is greater, and the rates of interest and job loss are lower. It might be then expected that flows from inactivity to both other labour market states (employment and unemployment) should be procyclical as labour market tightness rises. Labour force participation in the context of a job-matching model was also considered by McKenna (1987). Issues regarding the supply of hours in dynamic models are discussed in several papers (for example Hall (1980) and Barro (1981)), following Lucas and Rapping (1969). These papers tend to emphasize short-run responses to temporary shocks, and how intertemporal substitution of leisure can explain output fluctuations.

Blanchard and Diamond (1990) present a model which considers several worker types with regard to their attachments to labour market. The so-called "primary" workers have high labour force attachment and brief spells of unemployment, while the "secondary" workers have much weaker labour force attachment and are more likely to spend longer time in both inactivity and unemployment. They assume that a secondary worker will drop out of the labour force more often, while a primary worker will tend to move from employment to unemployment. The model also implies that belonging to different type of worker may influence a worker's search behaviour and firm's perception of a worker: a firm will prefer hiring a primary worker over a secondary and firing a secondary worker first. In case of an adverse cyclical shock (which would lead to an increase of job destruction and an increase of a probability of productive jobs turning to unproductive, and at the same time a decrease of job creation and a decrease of a probability of unproductive job becoming productive) the model predicts the following effect on labour market flows. First, flows from inactivity to employment are pro-cyclical, which follows from the assumption that secondary workers are often inactive and that firms prefer primary workers over secondary ones implying that flows from inactivity to employment will be greater when unemployment is low. Second, flows from employment to unemployment are countercyclical, while the effect on flows from employment to inactivity is ambiguous. This is because increased layoffs cause the increase of flows from employment into both, unemployment and inactivity, though as the pool of employed secondary workers decreases, the number of secondary workers' quits falls. Third, flows from inactivity to employment are also procyclical, reflecting the hiring side, where decreases in job creation and quits lead to a decline in vacancies; with regard to the fact that firms prefer primary workers over secondary ones and that an adverse shock increases the pool of unemployed workers, flows from inactivity to employment decrease as well. Eventually, there are unclear predictions about the cyclicity of flows from unemployment to employment. In a case that a larger pool of unemployed offsets the effect of fewer vacancies, the number of hires from unemployment increases.

Amending the model with on-the-job search, Pissarides (1994) offers an additional explanation of a procyclical movement of job-to-job flows. He differentiates between good and bad jobs and assumes that while an unemployed job seeker is willing to accept both of them, an employed job seeker is only willing to accept the good one, and she is on-the-job search only when she has a bad job. The model also assumes that accumulation of job-specific human capital ensures that wage growth in the bad job offsets all the benefits of switching to a good job with zero tenure, which implies that on-the-job search should mainly occur at shorter job tenures. In case of increased aggregate activity time needed to accumulate job-specific human capital is expected to

increase as well, because there are more vacancies and expected search cost is lower. As workers in bad jobs succeed in finding better jobs, the number of workers in bad jobs decreases, regardless of their job tenure, while workers who are still in bad jobs have to search longer. This implies that the result of increased aggregate activity on the steady-state number of employed job-seekers is ambiguous. However, in the adjustment from one state to another, the number of employed job-seekers is expected to increase first, and then start to decrease. According to the model, job-to-job flows should be therefore, at least at the beginning of the cycle, procyclical.

To our knowledge, no comprehensive study on worker flows has yet been conducted on the Slovenian data. Our analysis shows that the largest gross worker flows are those between employment and inactivity, which are about three times larger than flows between employment and unemployment, or flows between unemployment and inactivity. Job-to-job flows, which according to several authors account for the most of labour turnover and are the largest among flows to employment, are of approximately the same size as flows from unemployment to employment. This could be a sign of relatively larger rigidity of stable types of employment in the Slovenian labour market, as flows between employment and inactivity are more likely for workers on others, more provisional or precarious contracts or undeclared work, mainly consisting of student work,¹ and workers who can more easily transit between employment and inactivity. Conversely, permanent and temporary employments are more protected and transition from employment to unemployment is much more difficult, which could be also the reason for smaller job-to-job flows.

Regarding the disaggregated analysis the results show a very high rate of activity of the highest educated population, which experience high levels of employment and very low levels of unemployment. The results show that this population is very resilient to business cycles, while evolution of its flows shows they are not correlated with flows on the aggregate level, with exception of job-to-job flows.

It is interesting that, even though the crisis affected unstable as well as stable types of employment, permanent employment is still on a downward trend, while less stable types of employment stopped falling. This could suggest that employers try to expand their horizon of employment flexibility in the context of highly protected permanent employment. Regarding the growth of permanent employment in the period of high GDP growth, this could be attributed to uncertain economic circumstances during the crisis. Disaggregated analysis shows that the recent crisis affected men, the youngest, and the lowest educated population more than other subpopulations. It is interesting to notice though that the highest educated population experienced relatively strong procyclical job-to-job flow, also among workers who are looking for a job.

The rest of the paper is structured as follows: section 2 briefly describes the data, in section 3 labour market stocks and flows between them are described on the aggregate level, in section 4 the emphasis is on stocks and flows on a disaggregated level, where disaggregation is based upon worker's demographic characteristic, in section 5 some of the characteristics of out-of-labour market states transitions are analysed, while section 6 presents a simple analysis of cyclicity of worker flows. Section 7 concludes.

¹ Student work is the most flexible form of work in Slovenia.

2 The data

The data are based on the Labour Force Survey (LFS) collected by the Statistical Office of the Republic of Slovenia (SORS). The available data ranges from 2001 Q2 to 2011 Q4. The LFS is based on the sample taken from the Central Population Register. It is a rotating panel carried out continuously throughout the whole year. Each household is surveyed five times, according to the rotation model 3-1-2: the households are surveyed in three consecutive quarters and, after a break of one quarter, in another two consecutive quarters. The SORS's census population weights are applied to correct for the non-response bias and to construct series interpretable for the population.

The series used in the analysis are seasonally adjusted. It should also be noted that series obtained from the LFS data show a rather pronounced high frequency movements. While many important characteristics about the labour market states and the flows between them can be described using visual inspection, we also estimated trends in the data in order to obtain clearer patterns.

When reading and interpreting results we should bear in mind that the definitions of employment, unemployment, and inactivity follow the EU Labour Force Survey definitions. Respondents are assigned to one of these groups on the basis of the most objective information possible obtained through the survey questionnaire, which principally relates to their actual activity within a particular reference week.

The concepts and the definitions used in the survey are based on those contained in the 'Recommendation of the 13th International Conference of Labour Statisticians', convened in 1982 by the International Labour Organisation (hereafter referred to as the 'ILO guidelines'). The economically active population comprises employed and unemployed persons. Employed persons are persons: 1) aged 15-64, 2) who during the reference week performed work, even for just one hour a week, for pay, profit or family gain, and 3) who were not at work but had a job or business from which they were temporarily absent because of, e.g., illness, holidays, industrial dispute or education and training. Unemployed persons are persons: 1) aged 15-64, 2) who were without work during the reference week, but currently available for work, and 3) who were either actively seeking work in the past four weeks or who had already found a job to start within the next three months. Inactive persons are those who are neither classified as employed nor as unemployed.

3 The dynamics of labour market aggregates

3.1 The flows between labour market states

Slovenian economy was characterised with a relatively high economic growth prior to the crisis, 4.4% on average in years 2001 to 2007. This was reflected in the labour market with increasing employment rate and decreasing unemployment and inactivity rate² (Figure 1). Nevertheless, the evolution of labour market states in this period was relatively heterogeneous. While unemployment rate was falling from 2001 to the middle of 2008, with a sharp

² Employment rate and inactivity rate are expressed as a share of working age population (15-64 years), while unemployment rate is expressed in usual terms, as a share of unemployed in labour force.

decrease during the period of high growth (2006-2007), employment rate decreased by about 2 percentage points from the end of 2002 to the end of 2003. This drop coincides with a slowdown of economic growth and was accompanied with a similar increase in the inactivity rate. Since 2003 employment rate rose sharply, stabilized during 2005-2006 period, and started to rise sharply again from the end of 2006 until the middle of 2008. At the same time the inactivity rate was following the employment rate in the opposite direction, although its decrease during the period of high growth was much more moderate than increase of employment rate.

The financial and economic crisis heavily affected the Slovenian economy and caused a severe drop of real GDP – of 7.8% in 2009. The labour market reacted with a lag and initially in a much milder form, but the employment rate was decreasing, and unemployment and inactivity rates were increasing even in 2012. Much of the gain in the employment rate from 2003 to the middle of 2008 was thus lost and the employment rate stood at approximately the same level at the end of 2011 as in the beginning of 2001 (around 64% of working age population). The unemployment rate has almost doubled since the lowest level in the middle of 2008 and stood at approximately 8.4% at the end of 2011. While turning points in employment and unemployment rate came at about the same time, inactivity rate only started to increase in the middle of 2010.

Flows that are shaping labour market states are shown in Figure 2. A first thing to note is that the largest flows, expressed as shares in working age population, are those between employment and inactivity (EI and IE), which are, with around 3% of working age population on average (on a quarterly basis), about three times larger than flows between employment and unemployment (EU and UE) or flows between unemployment and inactivity (UI and IU). This implies that a large portion of employment changes could be attributed to flows between employment and inactivity. During the years when employment rate was rising and unemployment rate was falling, both flows between employment and inactivity (EI and IE) were in general increasing, while flows between unemployment and inactivity (UI and IU) were in general decreasing. The flows between employment and unemployment (EU and UE) were both increasing during the period of moderate growth (2003-2005), while they started to decrease during the period of high growth (2005-2008). With the beginning of the crisis³ flows between unemployment and inactivity (UI and IU) started to increase and flows from inactivity to employment (IE) started to decrease in general. Conversely, flows from employment to inactivity (EI) and flows between employment and unemployment (EU and UE) do not show such a straightforward movement. It is clear that both flows between employment and unemployment increased in the crisis and stayed at high levels until the end of the observed sample (the end of 2011), but they strongly oscillated between 2010 and 2011. Similarly, the flow from employment to inactivity has been decreasing at the beginning of the crisis, but started to increase in the beginning of 2009, and decreased again in the beginning of 2011. What could be the reason for such patterns of these flows?

Consider first the flows between employment and inactivity and their increase during the period when employment rate was rising. One has to bear in mind that these flows are not only the interchanges between

³ The turning point of flow evolution in the beginning of the crisis is evident for flows between employment and unemployment (EU and UE), and unemployment and inactivity (UI and IU), while the turning point of flows between employment and inactivity (EI and IE) already happened in the beginning of 2007, when employment rate stopped growing.

those leaving the labour force (for example, because of retirement) and those entering the labour force (for example, because of the end of schooling), because these movements are determined by demographic characteristics and thus occur at very low frequency. The increase in these flows could therefore be linked to the growth of the number of employed that can frequently move between employment and inactivity. LFS data is partitioned so that we can distinguish between permanent employment, consisting of workers with open-ended work contracts, and other employment, which could be denoted as "unstable". Unstable employment can be further divided into (1) employment consisting of workers with temporary work contracts, (2) self-employed and family businesses, (3) their helping members, and (4) workers on others, more provisional (or precarious) contracts⁴ or undeclared work. Evolution of different types of employment in Figure 3 shows that temporary and other types of unstable employment were increasing before the crisis, while permanent employment was more or less stable until the end of 2006, when it increased quite sharply and reached the peak at the end of 2008. It is interesting to notice, though, that during the period of slowdown of GDP growth, which was followed by the decrease of employment rate in 2002-2003, the decrease of the pool of workers with less stable employment was the largest within self employed and family businesses and their helping members, while during the crisis this pool decreased the most within workers with temporary contracts. The upward swing of employment to inactivity flow (in the beginning of 2009) could therefore be a result of growing pool of self-employed which was stimulated by government subsidies and which attracted a lot of unemployed persons⁵. Similarly, the subsequent downward swing of flows from employment to inactivity at the end of 2010 followed the decreased pool of almost all less stable types of employment.

The flows between employment and unemployment (EU and UE) were both increasing during the period of moderate GDP growth (2003-2004) and decreasing during the period of high GDP growth (2005-2007). When the evolution of these flows is related to the evolution of job creation and job destruction rates, it can be noticed that during the period of moderate GDP growth job creation and job destruction rates were close to each other (Figure 4) and the unemployment rate was relatively stable. The evolution of flows between employment and unemployment during the 2001-2004 period reflects a slower job destruction and job creation dynamics in 2002-2003, which recovered together with the recovery of economic growth. At the same time the pool of unemployed was large enough to fill a great part of the needs of newly created jobs. It should not be overlooked however, that the period of moderate GDP growth was also the period of relatively high growth of employment of workers with temporary contracts, which are more prone to transit from employment to unemployment as the work contract expires. The decreasing trend of both flows between employment and unemployment during the period of high growth (2005-2007) could be related to the job creation rate strongly exceeding the job destruction rate and the shrinking pool of unemployed.

Both flows between unemployment and inactivity (UI and IU) were decreasing before the crisis and increasing during the crisis. The decreasing trend of unemployment to inactivity flows (UI) before the crisis could be

⁴ The most typical representative of this type of work is student work.

⁵ Employment Service of Slovenia started with a renewed program of including the unemployed and those who were about to become unemployed into the self-employment program in 2008, when the subsidy for self-employment was raised from 2,100 EUR to 4,500 EUR.

attributed to the acceleration in GDP growth. Another factor contributing to the decrease of UI flow was also the significant reduction of the pool of unemployed during the period of high growth. Roughly the same factors could be attributed to the decreasing trend of inactivity to unemployment flow (IU), which enabled for a larger transition from inactivity directly to employment instead of into unemployment.

The crisis resulted in sizeable job losses, generating a decrease in almost all types of employment, except self-employed and "contract" workers, and a limited ability to create new jobs. This caused a sharp increase of employment to unemployment flows (EU) and a sharp decrease of flows from unemployment to employment (UE). The growing pool of unemployed caused the upward swing of the UE flow (in the beginning of 2009), while fluctuation of both flows between employment and unemployment that followed after the turnover at the beginning of the crisis seems to be highly dependent upon the fluctuation of the pool of workers with temporary contracts.

The same reasons that caused a turning point in flows between employment and unemployment also hindered employability of inactive persons. A growing pool of unemployed brought about a higher competition for inactive population that was considering entry into labour force. In such conditions flows from inactivity to unemployment (IU) have been increasing since the beginning of the crisis. Flows from unemployment to inactivity (UI) on the other hand were stimulated by growing pool of unemployed and thus growing number of unemployed who could not find a new job (discouraged unemployed), while the announced labour market reform accelerated retirement from both employment and unemployment after 2010.

3.2 Job-to-job flows

Another informative part of labour market dynamics is the dynamics job-to-job flows. According to several authors job-to-job flows account for the most of labour turnover and are the largest among flows to employment (Pissarides and Wadsworth, 1994; Mumford Smith, 1999; Bell and Smith, 2002, Sutton, 2011). However their importance is dependent upon flexibility of labour market. As noted by Bell and Smith (2002), the extent to which both employees and employer are free to separate given match-specific problems will clearly impact on their welfare.

Job-to-job (EE) flows estimated from Slovenian LFS data (Figure 5, Figure 7) show that, regarding their size, they are on average very similar to flows from unemployment to employment (UE) and are thus about three times lower compared to flows from inactivity to employment (IE). The evolution of job-to-job flows from 2003 to 2009 shows a high correlation with the evolution of employment rate. After the slowdown of the GDP growth, job-to-job flows increased sharply, stabilized in 2005-2006 period and started to rise sharply again from the end of 2006 until the middle of 2007. Then, just before the recession, they started to decrease sharply, with a relatively moderate increase from the middle of 2009 until the end of 2010. Somewhat counter-intuitively, the share of employed persons looking for a new job has been on a downward trend since the beginning of 2004 (Figure 7). In the beginning of 2008 this decreasing trend heavily deepened, but reversed sharply in 2009. It is interesting to notice that the share of employed persons looking for a job has been on a downward trend even during the period of high growth, when the probability to make a job-to-job transition was rising, while it started to rise soon after the

beginning of the recession. This was in spite of in general lower probability to make a job-to-job transition. Nevertheless, the correlation between the share of employed persons looking for a new job and between the shares of each type of employment shown in Figure 3 is different. The correlation is positive for less stable types of employment (employment consisted of workers with temporary contracts ($r=0.480$), workers on others, more provisional or precarious contracts or undeclared work ($r=0.450$), helping members ($r=0.473$), and self-employed (0.310)). It is negative for permanent employment ($r=-0.330$). This suggests that search for a new job largely depends on the need for a new job, related to the choice between participating and not participating.

4 Disaggregated analysis of labour market states and flows

4.1 Disaggregated analysis of labour market states⁶

The aggregated analysis gives information about the state of labour market concerning an average worker. Disaggregated analysis of labour market states and flows can reveal if different types of workers enjoy equal status on the labour market regarding their characteristics, and if not, which workers carry more and which less burden of this asymmetry. To study the differences across subpopulations we divide the data by worker's characteristics and compare the evolution of different labour market states and flows between them with those of an average worker.

The analysis of labour market states with respect to age shows that the employment rate is the highest for the workers aged from 30 to 49. Younger and older population's employment rate is lower, mainly due to schooling and retirement, respectively. The inactivity rate is the reverse picture of the U-shaped employment rate. On the other hand it should be noticed that the unemployment rate is the highest within the youngest age groups and is decreasing with age up to the age of 30. For populations aged 30 to 59 the unemployment rate becomes approximately similar.

The correlation of the average (or aggregate) employment rate is the highest with the youngest and the oldest group's employment rate, while it is not statistically significant for middle aged populations (Table 1). It can be seen from figure 16 that the average employment growth was mainly driven by the employment growth of the youngest (15-24 years) and the oldest age groups (40 years or older), while the middle age group's employment rate was in general stable or even slightly decreasing in that period (with inactivity rate increasing). The employment rate growth of the oldest populations before the crisis is most likely related to the 2000 pension reform, which tightened the retirement conditions, while the employment growth of the youngest population can be mainly attributed to the growth of studying population combined with the vast growth of student work.

The correlation of an average (aggregate) unemployment rate with different age group's unemployment rates is strong and statistically significant for almost all age groups. The exception is the oldest group, where unemployment is more affected by institutional factors, in particular retirement conditions, and less by the overall labour market conditions. Lower but statistically significant correlation can be noticed for the youngest age group

⁶ Disaggregated labour market states are shown in Figure 8, and Figures 16 through 18.

(15-19 years), for which a strong downward trend of the unemployment rate was present throughout the pre-crisis in contrast to other age groups, where a clear downward trend was present only during the period of high GDP growth (2005-2007).

Regarding the gender, the average employment rate of men was about 10 percentage points higher than the employment rate of women before the crisis, while the difference decreased by about 2 p.p. during the 2008-2011 period. Both employment rates were increasing before the crisis and decreasing during the crisis. A more or less inverse picture can be seen for the inactivity rate, with the inactivity rate of women being higher than the inactivity rate of men. The difference between gender's inactivity rates was in general decreasing before the crisis, but it started to increase again in the beginning of 2009. While the difference between employment and inactivity rate between men and women can be to a large extent attributed to maternity issues on one hand and to less stringent retirement conditions on the other, the difference between gender's unemployment rates could also indicate some gender discrimination. The women's unemployment rate was higher than that of men through the whole time period before the crisis. Before the period of high GDP growth (2001-2004), the difference was around 1 percentage point and became even larger during the period of high GDP growth (around 2 p.p.). It is interesting to notice, though, that during the crisis the difference disappeared, while both unemployment rates started to increase. Thus, even though the crisis hit both genders, men were affected to a much greater extent. Finally, all correlation coefficients between average rates of employment, inactivity, and unemployment, and gender's rates (Table 1) are high, indicating that the evolution of different labour market states of men and women was close to an average evolution of all states.

Disaggregated analysis with respect to education shows that the employment rate increases considerably with higher education. While the average employment rate within the highest educated population was around 90%, the average employment rates were for around 20 and 33 percentage points lower for populations with medium and lowest education. The difference between the employment of the highest educated population and lower educated population decreased during the period of high GDP growth, but increased again during the crisis. The difference between the middle and the lowest educated population was more or less stable on average before the crisis, but rose significantly from the beginning of 2010. This indicates that the crisis affected the lowest educated population to a larger extent than the higher educated populations, which could show that sectors employing lowest educated population (mostly labour intensive sectors) suffered more during the crisis.

Patterns in inactivity and unemployment also point to a less favourable labour market conditions for the less educated part of the population. The decreasing trend noticed in the average (or aggregate) inactivity rate was present within the middle and the highest educated population before the crisis, while the inactivity rate of the lowest educated population was more or less stable until the beginning of 2010 (averaging around 38 %), when it

Table 1: Correlation coefficients of employment, unemployment and inactivity rates by age, gender and education with corresponding aggregate rates

			employment rate	unemployment rate	inactivity rate
Age – detailed classification	Age: 15 - 19	r	0.892	0.379	0.881
		p -value	0.000	0.013	0.000
	Age: 20 - 24	r	0.806	0.700	0.497
		p -value	0.000	0.000	0.001
	Age: 25 - 29	r	0.149	0.719	0.031
		p -value	0.346	0.000	0.845
	Age: 30 - 34	r	0.085	0.708	-0.148
		p -value	0.592	0.000	0.349
	Age: 35 - 39	r	0.113	0.726	-0.181
		p -value	0.478	0.000	0.252
	Age: 40 - 44	r	0.733	0.797	0.556
		p -value	0.000	0.000	0.000
	Age: 45 - 49	r	0.758	0.825	0.648
		p -value	0.000	0.000	0.000
	Age: 50 - 54	r	0.766	0.780	0.783
		p -value	0.000	0.000	0.000
	Age: 55 - 59	r	0.827	0.402	0.897
		p -value	0.000	0.008	0.000
Age: 60 - 64	r	0.642	0.139	0.787	
	p -value	0.000	0.381	0.000	
Gender	men	r	0.934	0.941	0.947
		p -value	0.000	0.000	0.000
	women	r	0.956	0.878	0.974
		p -value	0.000	0.000	0.000
Education	low	r	0.723	0.976	0.538
		p -value	0.000	0.000	0.000
	medium	r	0.912	0.869	0.920
		p -value	0.000	0.000	0.000
	high	r	0.718	0.384	0.796
		p -value	0.000	0.012	0.000
Age – broad classification	young (15-29)	r	0.922	0.942	0.891
		p -value	0.000	0.000	0.000
	middle (30-44)	r	0.469	0.933	0.159
		p -value	0.002	0.000	0.315
	old (45-64)	r	0.935	0.880	0.951
		p -value	0.000	0.000	0.000

started to increase sharply. Consequently, the difference between the inactivity rates of the lowest and higher educated population was increasing through the whole sample, while the difference in inactivity rates between the medium and the highest educated populations remained more or less constant. Similarly, the average unemployment rate within the lowest educated population was around 8%, which is more than 2 and 4.5 percentage points higher compared to unemployment rates within the middle and the highest educated

population, respectively. The difference between unemployment rates of the lowest educated population and higher educated population decreased before the crisis, but increased sharply during the crisis. A similar trend of the difference between unemployment rates is also evident between the middle and the highest educated population.

While the correlation of employment rates of all education groups is high with an aggregate employment rate, the strongest correlation can be seen for the employment rate of the middle educated population. The major difference in the evolution of employment rates of different education groups can be noticed during the period of high GDP growth (2005-2007), when the employment rate of the highest educated population did not grow, while it started to decrease about two quarters later (in 2009Q2) compared to the middle educated population. On the other hand, the employment rate of the lowest educated population experienced a much deeper fall during the crisis and it started to decrease rather earlier compared to the middle educated population (in 2007Q4). Larger differences in the evolution of labour market states between different education groups can be noticed in case of unemployment and inactivity rates. Looking at correlations it is apparent that the evolution of the unemployment rate of the two lower educated populations is close to the evolution of the aggregate unemployment rate, while the correlation coefficient of the aggregate unemployment rate with the highest educated population is low. The unemployment rate of the latter group has been in general increasing throughout the whole sample. This is consistent with the hypothesis that highly educated are more resilient to fluctuations of unemployment. Eventually, the correlation coefficient of the average inactivity rate is the weakest with the lowest educated population which is due to the absence of the decreasing trend in the inactivity rate before the crisis.

4.2 Disaggregated analysis of labour market flows⁷

To compare flows disaggregated by gender, age and education with the aggregate flows between labour market states we have to take into consideration their relative size and their evolution over time. While the size of flows can be mainly studied through visual inspection, we will again rely on the correlation analysis to qualify their dynamic patterns. Note that the flows between labour market states arise from rotating panel sampling available on smaller overlapping samples between two successive time periods, which could limit the reliability of flows disaggregated by age based on its detailed classification (10 age classes). For this reason we used broad age disaggregation (3 age classes) to study the characteristics of flows based on different age classes.

The correlation of aggregate flows with the same flows of different demographic classes (Table 2) shows a relatively high homogeneity in the evolution of disaggregated flows with the aggregate ones. This indicates that the sources for the evolution of different population classes flows are similar. The most obvious exception to this is the highest educated population, where the higher correlation with an average flow can only be noticed for job-to-job flows. Other flows of the highest educated population, except employment to unemployment (EU) and inactivity to unemployment (IU) flows, do not display any obvious trend, i.e. they are roughly constant through time. The highest educated population employment to unemployment (EU) flow was on a downward trend from

⁷ Disaggregated labour market flows are shown in Figures 9 through 15.

2003 to 2006, when it started to increase and the upward trend was in general present until the end of the observed sample. The inactivity to unemployment (IU) flow was relatively stable until 2005 when it turned to an upward trend until the beginning of 2008. At that time the IU flow started to decrease until the middle of 2009 when it started to increase again.

Table 2: Correlation coefficients of an average labour market state rates with age population's labour market state rates

*			EU	EI	UE	UI	IE	IU	EE
Gender	men	r	0.909	0.799	0.786	0.800	0.928	0.795	0.923
		<i>p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	women	r	0.760	0.861	0.744	0.817	0.930	0.823	0.823
		<i>p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Age – broad classification	young (15-29)	r	0.781	0.664	0.830	0.692	0.850	0.764	0.854
		<i>p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	middle (30-44)	r	0.831	0.408	0.717	0.602	0.538	0.656	0.848
		<i>p-value</i>	0.000	0.007	0.000	0.000	0.000	0.000	0.000
	old (45-64)	r	0.643	0.800	0.610	0.736	0.642	0.468	0.748
		<i>p-value</i>	0.000	0.000	0.000	0.000	0.000	0.002	0.000
Education	low	r	0.757	0.826	0.846	0.796	0.906	0.780	0.817
		<i>p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	medium	r	0.799	0.773	0.780	0.743	0.867	0.730	0.861
		<i>p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	high	r	0.366	0.347	0.273	0.423	0.136	-0.049	0.604
		<i>p-value</i>	0.017	0.024	0.080	0.005	0.391	0.758	0.000

Notes: *Flows from to: EU=employment to unemployment, EI=employment to inactivity, UE=unemployment to employment, UI=unemployment to inactivity, IE=inactivity to employment, IU=inactivity to unemployment, EE=employment to employment (job-to-job)

Looking at the relative sizes of disaggregated flows (Figures 9 through 15) it can be noticed that flows are the largest within the youngest population (15-29 years), while the flows of the oldest population (45-64 years) are generally below average. The middle aged population deviates downward from the average in flows between employment and inactivity in both directions (EI and IE), and in flows between unemployment and inactivity (UI and IU), although the later deviations are not extreme. The below average deviations between employment and inactivity (EI and IE) and unemployment and inactivity (UI and IU) are also apparent for the highest educated population, for which the below average size was also present for employment to unemployment flow (EU), but only until the beginning of 2006. Another characteristic of the highest educated population is also slightly above average unemployment to employment (UE) flow.

The relative size of job-to-job flows (Figure 15) shows that transitions between different jobs are the highest within the youngest population and the smallest within the oldest population. It is interesting to notice that while the highest educated population's job-to-job flow is above average for almost the whole time period, it is subject to much larger fluctuations compared to other population classes.

5 The probabilities of transiting between labour market states

The probabilities of transiting from different labour market states are studied with the use of a multinomial logistic regression. The multinomial logistic regression allows us to compare probabilities (relative risks) of transitions from a certain labour market state, given worker's characteristic, and to compare probabilities of different transitions from a certain labour market state. All regressions include as regressors the worker's demographic characteristics (gender, age and education) and the worker's characteristics related to the studied labour market state. The reference level of the dependent variable is always not transiting from a state, so all transitions are compared to a no-transition position.

5.1 Out of employment transitions

In case the current worker's state is employment one can consider three transition possibilities: 1) transition to another employment (job-to-job transition), 2) transition to unemployment and 3) transition to inactivity. The dependent variable was modelled conditional on the worker's demographic characteristics and the type of employment, the search for a new job indicator (if a worker is on the search for a new job) and the sector of activity.

Starting with a worker's demographic characteristics, the estimated regression coefficients (Table 3) show that females are in general more likely to transit from employment to unemployment and inactivity and are less likely to transit to another employment than males. While the transition to inactivity was still more likely for females compared to men during the crisis, differences in transition probabilities to unemployment and to another employment were no longer statistically significant between both genders. Probabilities of all transitions from employment in general diminish with age, with the exception of transition to inactivity where compared to the youngest, the oldest population is more likely to transit to inactivity, mainly due to retirement-related factors. This pattern holds in general for all time periods except for the period of high GDP growth, where the differences in transition probabilities to unemployment between age groups are not statistically significant. Higher education also reduces the transition probabilities to unemployment and inactivity, while job-to-job transitions are in general more likely for the highest educated population, although the pattern changes in different time periods. During the period of high GDP growth differences in transitions to another employment were not statistically significant between different education groups, while during the crisis higher educated populations were more likely to make a job-to-job transition compared to the lowest educated population.

Regarding the worker's sector of activity, the main differences between sectors appeared during the crisis when transition probabilities from employment to unemployment increased significantly for the manufacturing and construction sectors. It should be noticed though that these probabilities were already statistically significantly higher for construction sector in all time periods compared to other sectors. It is also interesting that during the crisis the transition probabilities to another employment increased significantly for all sectors except for non-market services, where these probabilities were already low compared to other sectors before the crisis. This

indicates an increase in reallocation of workers. Transition probabilities from employment to inactivity were also considerably lower for all sectors compared to agriculture, but differences decreased during the crisis.

An important factor influencing transitions from employment is the type of employment. In particular, compared to permanent employment all outflows from employment are higher for less stable employment types. The exception here is the case of self employed, who are less likely to make a job-to-job transition. Compared to permanently employed they are still more likely to transit from employment to inactivity, but similarly likely to transit to unemployment. From this perspective self-employment can be considered as stable as permanent employment. The main difference between temporary employed workers and workers on other work contracts, who are both quite likely to make out of employment transitions is in the transition probabilities to unemployment and inactivity. While temporary workers are more likely to transit to unemployment, workers on other work contracts are more likely to transit to inactivity.

Table 3: Estimated coefficients of multinomial logistic regression with dependent variable of different transitions from employment

* **	2001-2011			2001-2004			2005-2007			2008-2011		
	EE	EU	EI									
(Intercept)	-3.074	-3.391	-3.634	-2.880	-2.945	-3.561	-2.771	-4.114	-3.490	-3.733	-3.566	-4.033
¹ E:temp	1.193	1.870	1.137	1.100	1.777	1.331	1.191	2.068	1.126	1.312	1.895	0.820
E:self	-0.323	0.115	0.967	-0.406	0.155	1.122	-0.434	0.130	0.888	-0.123	0.053	0.810
E:help	1.071	1.264	2.069	0.782	1.179	2.116	0.930	1.456	1.857	1.612	1.252	2.260
E:contract	1.689	2.266	3.413	1.569	2.326	3.599	1.889	2.611	3.574	1.669	2.035	3.175
² Search job: no	-1.445	-1.974	0.151	-1.508	-2.026	0.195	-1.330	-1.957	0.060	-1.503	-1.870	0.277
³ S: manufact	0.056	0.140	-0.701	-0.207	-0.145	-0.826	0.047	0.218	-0.906	0.393	0.475	-0.352
S: construction	0.333	0.646	-0.715	0.211	0.386	-0.877	0.157	0.786	-0.943	0.738	0.891	-0.258
S: market serv.	0.271	0.182	-0.797	0.216	0.078	-0.839	0.027	0.311	-1.005	0.671	0.265	-0.475
S: nm serv.	-0.215	-0.090	-0.812	-0.253	-0.233	-0.930	-0.379	0.212	-1.004	0.032	-0.176	-0.515
⁴ G: females	-0.153	0.105	0.185	-0.155	0.170	0.275	-0.215	0.201	0.138	-0.078	-0.018	0.119
⁵ A: middle	-0.537	-0.242	-1.186	-0.591	-0.368	-1.277	-0.546	-0.137	-1.053	-0.429	-0.182	-1.207
A: old	-1.361	-0.399	0.092	-1.440	-0.576	-0.011	-1.266	-0.125	0.192	-1.339	-0.380	0.140
⁶ Ed: medium	0.038	-0.343	-0.265	0.062	-0.436	-0.186	-0.088	-0.206	-0.238	0.165	-0.280	-0.331
Ed: high	0.185	-0.762	-0.918	0.318	-1.079	-0.909	0.058	-0.679	-0.801	0.239	-0.482	-0.937

Notes: * Reference level of different transitions from employment=staying in the same employment. ** Different colours of estimated regression coefficients mark their statistical significance: red=significant at $p \leq 0.01$, blue=significant at $0.01 < p \leq 0.05$, green=significant at $0.05 < p \leq 0.1$, black=not statistically significant.

1 – employment type (temp=temporary employment, self=self employed, help=helping members, contract=employment on other contracts), reference level=permanent employment, 2 – searching for another job indicator, reference level=yes, 3 – sector of activity (manufact=manufacturing, market serv.=market services, nm serv.=non-market services), reference level=agriculture, 4 – gender, reference level=males, 5- age (middle=30-44, old=45-64), reference level=young (15-29), 6 – education, reference level=low

Another interesting finding following from estimated regression coefficients in Table 3 is that workers who search for a new job are not only more likely to find another job, but are also more likely to transit to unemployment. This indicates that searching for a new job might not only mean searching for a better job, but may also be related to the need to find a new job.

5.2 Out of unemployment transitions

The regression analysis focuses on two transition probabilities from unemployment, with reference level of staying in unemployment: 1) transition to employment and 2) transition to inactivity. In addition to worker's demographic characteristics, the multinomial logistic regression model also included unemployment duration (as an ordinal scale variable), and indicators of previous work experience, unemployment benefit or monetary compensation due to unemployment, and an indicator of registration at Employment Service.

The estimated regression coefficients (Table 4) show that transition probabilities from unemployment to employment decrease with age and increase with education while gender does not have a statistically significant influence on unemployment to employment transition, at least for the period from 2005 on. The inverse relationship can be found for the unemployment to inactivity transition, where transition probabilities to inactivity decrease with higher education, while transition probabilities to inactivity are significantly more likely for the oldest population only.

Table 4: Estimated coefficients of multinomial logistic regression with dependent variable of different transitions from unemployment

* ** ,	2001-2011		2001-2004		2005-2007		2008-2011	
	UE	UI	UE	UI	UE	UI	UE	UI
(Intercept)	0.128	0.073	0.092	-0.263	0.337	0.522	-0.054	0.081
¹ Unemployment duration: 6-12 months	-0.260	-0.098	-0.223	-0.063	-0.118	-0.153	-0.402	-0.067
Unemployment duration: 13-24 months	-0.463	-0.080	-0.421	0.046	-0.415	-0.237	-0.555	-0.096
Unemployment duration: >24 months	-0.683	0.169	-0.605	0.327	-0.603	-0.063	-0.955	0.104
² Working experience: yes	-0.012	-0.587	-0.026	-0.436	0.153	-0.702	0.004	-0.627
³ Unemployment benefit/support***: yes	-0.046	0.072	0.037	0.255	-0.015	0.023	-0.208	-0.173
⁴ Registered at Employment Service: yes	-0.532	-0.956	-0.492	-0.925	-0.633	-1.019	-0.539	-0.915
⁵ G: female	-0.077	0.096	-0.199	0.158	-0.076	-0.025	0.037	0.095
⁶ A: middle	-0.261	-0.014	-0.349	-0.083	-0.325	0.075	-0.113	-0.013
A: old	-0.502	0.841	-0.549	0.837	-0.712	0.797	-0.273	0.916
⁷ Ed: medium	0.173	-0.130	0.290	0.048	-0.029	-0.330	0.229	-0.187
Ed: high	0.509	-0.806	0.857	-0.480	0.286	-0.853	0.498	-1.003

Notes: * Reference level of different transitions from unemployment=staying in the unemployment. ** Different colours of estimated regression coefficients mark their statistical significance: red=significant at $p \leq 0.01$, blue=significant at $0.01 < p \leq 0.05$, green=significant at $0.05 < p \leq 0.1$, black=not statistically significant. ***Unemployment support= monetary compensation due to unemployment.

1 – unemployment duration reference level=less than 6 month, 2 – working experience indicator reference level=no, 3 – unemployment benefit or monetary support due to unemployment indicator reference level=no, 4 – registered at Employment Service indicator reference level=no, 4 – gender reference level=males, 5- age (middle=30-44, old=45-64), reference level=young (15-29), 6 – education reference level=low

As expected, longer unemployment duration decreases transition probabilities to employment, while the transition to inactivity is only more likely for those with the longest unemployment duration (more than 2 years). It is interesting that a registration at Employment Service decreases both transition probabilities from unemployment, while receiving unemployment benefits didn't have statistically significant effect on transitions from unemployment, except for the crisis period. Somehow counterintuitive is also the finding that working experience decreases the transition probability from unemployment to inactivity, while at the same time it does not affect the transition probability to employment.

5.3 Out-of-inactivity transitions

We estimate two transition probabilities out of inactivity, taking staying in inactivity as the reference point: 1) transitions to employment and 2) transitions to unemployment. Out-of-inactivity transitions are modelled conditional on worker's demographic characteristics and indicators of working experience and the will to work. Estimated regression coefficients in Table 5 show that transitions from inactivity are less likely for females compared to males and more likely for higher educated persons. Compared to the youngest population, the oldest population is less likely to transit from inactivity, while middle aged population is less likely to transit to employment and more likely to transit to unemployment during the crisis. Inactive persons who want to work are more likely to transit to employment and even more likely to transit to unemployment. All this is expected and consistent with previous findings. Somewhat surprisingly, working experience increases the probability of transition to unemployment and decreases the probability of transition to employment. The exception to this is the crisis period, when working experience also increased the probability of transition of inactive persons to employment.

Table 5: Estimated coefficients of multinomial logistic regression with dependent variable of different transitions from inactivity

* **	2001-2011		2001-2004		2005-2007		2008-2011	
	IE	IU	IE	IU	IE	IU	IE	IU
(Intercept)	-1.377	-1.858	-1.497	-1.912	-1.225	-1.906	-1.368	-1.750
¹ Working experience: yes	-0.223	0.790	-0.906	1.015	-0.477	0.897	0.220	0.559
² Want to work: no	-0.458	-1.609	-0.534	-1.512	-0.500	-1.696	-0.325	-1.658
³ G: female	-0.131	-0.239	-0.154	-0.239	-0.146	-0.257	-0.128	-0.232
⁴ A: middle	0.038	0.178	0.759	0.140	-0.003	-0.081	-0.402	0.237
A: old	-0.941	-1.576	-0.132	-1.731	-0.746	-1.698	-1.536	-1.445
⁵ Ed: medium	0.464	0.153	0.429	0.091	0.447	0.265	0.516	0.181
Ed: high	0.870	0.681	0.916	0.421	0.717	0.884	0.927	0.790

Notes: * Reference level of different transitions from unemployment=staying in the unemployment. ** Different colours of estimated regression coefficients mark their statistical significance: red=significant at $p < 0.01$, blue=significant at $0.01 < p < 0.05$, green=significant at $0.05 < p < 0.1$, black=not statistically significant.

1 – working experience indicator reference level=no, 2 – Inactives not searching for a job but would want to work indicator, reference level=yes, 3 – gender reference level=males, 4- age (middle=30-44, old=45-64), reference level=youth (15-29), 5 – education reference level=low

6 Cyclical properties of estimated worker flows

One way to define cyclicity of flows is to compute their correlations with the cyclical component of economic activity. To do a simple exercise on cyclicity of flows we used a bivariate correlation analysis between each of the seasonally adjusted flow series and seasonally adjusted unemployment rate. All series were detrended using the Hodrick – Prescott filter with $\lambda=1600$. Tables 6-9 show the results of this exercise for different time periods.

Looking at the whole sample, statistically significant correlations⁸ on the aggregate level appear in both flows from unemployment (to employment and inactivity), the flow from inactivity to unemployment and job-to-job flows. While flows from unemployment (to employment and inactivity) and flow from inactivity to unemployment appear

⁸ Correlations here are correlations between detrended unemployment rate and detrended flows.

to be countercyclical, job-to-job flows (which are statistically significant and in part represent the flows of workers not looking for a job) appear to be procyclical.

The strength of correlations in different subperiods indicates that the flow from employment to unemployment (EU) was fairly strongly countercyclical during the period of high growth and not statistically significant during the crisis, while the flow from inactivity to unemployment (IU) became strongly countercyclical only during the crisis. This could also suggest that the pool of unemployed was strongly affected by the continued flow from inactivity during the latest crisis. The results of the analysis are consistent with the procyclicality of job-to-job flows predicted in Pissarides (1994). Employment to unemployment flows are found to be countercyclical during the period of high GDP growth and at the beginning of the crisis period, while after that in contrast with unemployment they exhibit volatile movements, but at higher levels than before the crisis. Unemployment to employment flow, which should be procyclical following Blanchard and Diamond (1992), displays a countercyclical pattern, although it could be argued that the flow was procyclical at the beginning of the crisis. The reason for the countercyclical movement of UE flow during the period of high GDP growth could be related to the decrease of the pool of unemployed, and an increase in the pool of unemployed during the crisis.

The analysis on the whole available sample shows that the cyclicity of flows within different demographic subpopulations is in the case of unemployment outflows quite similar to average flows. Procyclicality of inactivity to employment flows, predicted by Pissarides (2000) and Blanchard and Diamond (1990) model, can be confirmed only for men, the youngest and the lowest educated population, while procyclicality of job-to-job flows seem to be statistically significant only for men and the middle aged population (30-45 years old). The flows from inactivity to employment became procyclical for the highest educated population during the period of high GDP growth, while the same population experienced a strongly procyclical job-to-job flow during the crisis - interestingly, this job-to-job flow appeared to be countercyclical for workers who are looking for a job. Also, job-to-job flows for the medium educated population became countercyclical during the crisis. These findings suggest that the highest educated population easily transitioned from inactivity to employment in the period of high GDP growth, which is probably related to transitions of graduates, while the job-to-job flow suggests that changing a job became much less common for the highly educated. Finally, the middle educated countercyclical job-to-job flow could be related to higher share of this population in temporary employment.

Table 6: Correlation coefficients between different worker flows and unemployment rate (2001-2011)

	All	Males	Females	18-30	30-45	45-65	Low	Medium	High
EU	-0.023	-0.004	0.208	-0.050	-0.097	0.117	0.091	-0.069	-0.186
EI	-0.095	-0.168	0.070	-0.266*	-0.144	0.048	-0.206	0.080	0.334**
UE	0.505***	0.331**	0.659***	0.441***	0.491***	0.548***	0.520***	0.527***	0.391**
UI	0.586***	0.599***	0.432***	0.604***	0.463***	0.308**	0.581***	0.329**	0.403***
IE	-0.215	-0.313**	-0.031	-0.284*	-0.166	0.010	-0.322**	-0.184	-0.319**
IU	0.333**	0.143	0.089	0.375**	-0.106	0.029	0.340**	0.193	0.047
EE	-0.277*	-0.379**	-0.107	-0.029	-0.350**	-0.135	-0.040	-0.154	-0.157
EE-searching	-0.092	-0.156	0.126	-0.033	-0.087	-0.295*	-0.063	-0.045	-0.105
EE-not searching	-0.299*	-0.352**	-0.238	0.006	-0.356**	-0.016	-0.032	-0.153	-0.101
Ein	-0.009	-0.138	0.212	-0.105	0.233	0.184	-0.106	0.041	-0.006
Eout	-0.097	-0.172	0.151	-0.246	-0.176	0.079	-0.143	0.043	0.129
Uin	0.209	0.087	0.204	0.258*	-0.153	0.090	0.279*	0.100	-0.140
Uout	0.725***	0.672***	0.760***	0.682***	0.634***	0.560***	0.788***	0.580***	0.569***
lin	0.154	0.180	0.238	0.042	0.207	0.169	0.099	0.185	0.476***
lout	-0.086	-0.234	0.010	-0.126	-0.243	0.018	-0.181	-0.070	-0.284*

Table 7: Correlation coefficients between different worker flows and unemployment rate (2001-2004)

	All	Males	Females	18-30	30-45	45-65	Low	Medium	High
EU	0.003	-0.162	0.418	-0.42	0.061	-0.080	-0.139	0.448*	0.253
EI	-0.386	-0.333	-0.035	-0.358	-0.327	0.163	-0.399	-0.068	0.114
UE	0.331	0.260	0.582**	0.421	-0.077	0.389	0.096	0.729***	0.413
UI	0.291	0.275	0.393	0.146	0.191	0.875***	0.403	0.262	0.545**
IE	0.127	0.055	-0.012	0.398	0.052	0.100	-0.168	0.252	-0.377
IU	-0.056	-0.199	-0.427	0.193	0.168	-0.157	0.077	-0.152	0.380
EE	-0.266	-0.113	-0.330	-0.363	0.108	-0.254	-0.141	0.465*	-0.615**
EE-searching	0.083	0.133	-0.012	-0.003	-0.491*	-0.178	0.102	0.515**	-0.491*
EE-not searching	-0.341	-0.189	-0.422	-0.485*	0.282	-0.140	-0.205	0.341	-0.233
Ein	0.204	0.158	0.112	0.461*	-0.010	0.212	-0.120	0.445*	0.013
Eout	-0.301	-0.352	0.08	-0.434	-0.169	0.144	-0.388	0.255	0.227
Uin	-0.098	-0.324	-0.060	-0.110	0.235	-0.218	-0.028	0.226	0.470*
Uout	0.546**	0.514**	0.604**	0.439	0.159	0.930***	0.570**	0.634**	0.636**
lin	-0.314	-0.213	0.064	-0.296	-0.081	0.447*	-0.261	0.075	0.398
lout	0.091	0.008	-0.110	0.375	0.167	0.078	-0.157	0.175	-0.173

Table 8: Correlation coefficients between different worker flows and unemployment rate (2005-2007)

	All	Males	Females	18-30	30-45	45-65	Low	Medium	High
EU	0.596**	0.456	0.598**	0.616**	0.147	0.504*	0.676**	0.346	-0.396
EI	-0.343	-0.313	0.250	-0.128	-0.442	-0.106	-0.298	0.083	0.549*
UE	0.798***	0.639**	0.799***	0.586**	0.704**	0.85***	0.763***	0.836***	0.456
UI	0.768***	0.729***	0.413	0.798***	0.635**	0.023	0.772***	0.484	0.411
IE	-0.357	-0.490	-0.027	-0.633**	-0.037	0.480	-0.311	-0.423	-0.327
IU	0.233	0.386	-0.318	0.284	-0.554*	-0.401	0.339	-0.137	-0.271
EE	-0.709***	-0.643**	-0.317	-0.297	-0.753***	-0.395	-0.357	-0.374	-0.359
EE-searching	-0.166	-0.059	0.042	-0.125	0.076	-0.656**	0.37	-0.233	0.094
EE-not searching	-0.789***	-0.671**	-0.390	-0.267	-0.710***	-0.249	-0.545*	-0.340	-0.406
Ein	-0.063	-0.332	0.305	-0.528*	0.589**	0.687**	-0.030	-0.188	-0.035
Eout	-0.053	-0.157	0.444	0.087	-0.215	0.208	0.071	0.266	0.069
Uin	0.435	0.470	0.021	0.485	-0.230	0.032	0.532*	0.087	-0.506*
Uout	0.841***	0.829***	0.866***	0.845***	0.804***	0.420	0.874***	0.758***	0.710***
lin	0.068	0.197	0.464	0.419	0.174	-0.082	0.151	0.181	0.652**
lout	-0.201	-0.278	-0.176	-0.469	-0.525*	0.218	-0.182	-0.460	-0.420

Table 9: Correlation coefficients between different worker flows and unemployment rate (2008-2011)

	All	Males	Females	18-30	30-45	45-65	Low	Medium	High
EU	-0.229	-0.256	0.047	-0.217	-0.232	0.011	-0.126	-0.330	-0.329
EI	0.083	0.039	0.050	-0.346	0.051	0.019	-0.117	0.098	0.287
UE	0.519**	0.251	0.572**	0.404	0.508*	0.528**	0.575**	0.363	0.403
UI	0.572**	0.625**	0.450*	0.566**	0.473*	0.213	0.552**	0.253	0.152
IE	-0.393	-0.489*	-0.081	-0.239	-0.401	-0.220	-0.577**	-0.248	-0.208
IU	0.598**	0.170	0.467*	0.598**	0.08	0.236	0.508*	0.500*	0.062
EE	-0.101	-0.218	-0.100	0.171	-0.217	0.022	0.190	-0.323	0.342
EE-searching	-0.112	-0.508*	0.134	0.008	-0.113	-0.220	-0.264	-0.164	0.242
EE-not searching	-0.088	-0.057	-0.296	0.253	-0.242	0.179	0.362	-0.297	0.259
Ein	-0.097	-0.317	0.207	-0.096	0.251	0.048	-0.190	-0.036	0.049
Eout	-0.065	-0.175	0.092	-0.399	-0.170	0.026	-0.198	-0.088	-0.028
Uin	0.125	-0.129	0.350	0.206	-0.144	0.156	0.174	0.062	-0.271
Uout	0.731***	0.590**	0.751***	0.664***	0.591**	0.497*	0.788***	0.525**	0.441*
lin	0.364	0.345	0.256	-0.003	0.303	0.114	0.321	0.187	0.326
lout	-0.123	-0.345	0.145	-0.038	-0.264	-0.106	-0.269	0.045	-0.182

7 Conclusion

The study presents several approaches to the analysis of gross worker flows based on Slovenian Labour Force Survey Data spanning the period from 2001 Q2 to 2011 Q4. The main aim of the analysis is to give a comprehensive view on the evolution of labour market states and flows between them. To our knowledge no such study has yet been done for Slovenia. Due to availability of data, a special emphasis can be given to the

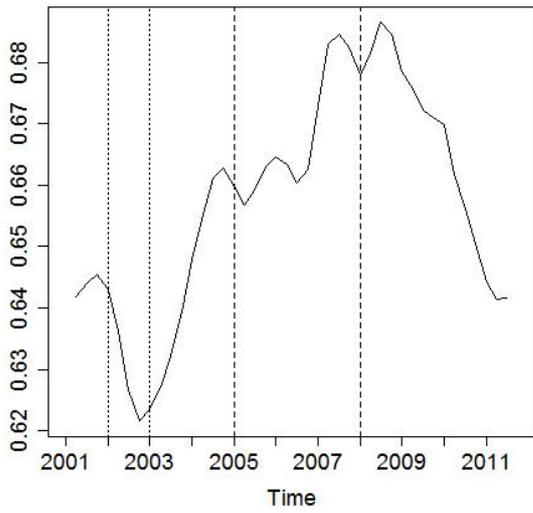
movements of flows during the recent crisis, which enables us to compare their patterns with the predictions of the related theoretical literature.

Some interesting patterns emerge, shedding light on many aspects of the Slovenian labour market dynamics. Consistently with the business cycle, the employment rate was increasing from 2003 to the beginning of the crisis, while at the same time unemployment rate was decreasing. While the trend of both labour market states was moderate until 2006, they display sharp movements during the period of high GDP growth, resulting in their historically highest/lowest levels. It is interesting to notice that until 2006 the growth of employment rate was mainly caused by the growth of less stable types of employment, especially employment consisting of workers with temporary work contracts and employment consisting of workers on others, more provisional or precarious contracts or undeclared work. The share of permanent employment grew sharply during the period of high GDP growth, along with moderate growth of less stable types of employment. The patterns of gross worker flows during the same time period indicate that flows between employment and unemployment were increasing before high GDP growth, when temporary employment was increasing, and decreasing when permanent employment started to increase. The decreasing flows from unemployment to employment are also the result of decreasing pool of unemployed during the period of high GDP growth. This suggests that flows between employment and unemployment are to a large extent linked to the type of employment. A similar conclusion can be drawn from the relative sizes of both flows in the period soon after the crisis, which were in general both larger than before the crisis, despite the continuous fall of employment rate.

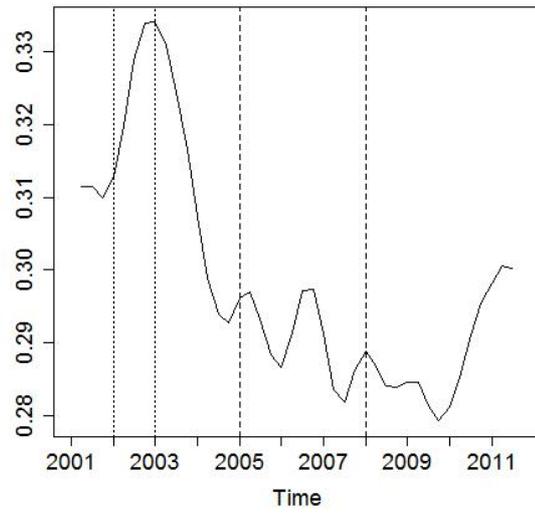
Job-to-job flows also exhibit some interesting features. According to several authors job-to-job flows account for an important part of labour turnover and are the largest among flows to employment. Job-to-job flows estimated from Slovenian LFS data are on average similar to flows between employment and unemployment and thus about three times smaller than flows between employment and inactivity. Results show that job-to-job flows are much more likely for employees with less stable types of employment. This could indicate that transitions to another employment are largely a matter of a need for a new job and to a lesser extent the result of match-specific issues. The analysis also revealed that the largest flows are those between employment and inactivity. The size of these flows is not only the result of interchanges between those leaving the labour force (for example because of retirement) and those entering the labour force (for example after schooling) but mainly expresses the movements of employees that can frequently move between employment and inactivity. This can be supported by the raw estimate of the size of the first entrance to and retirement from employment, which accounts for a little less than one percent of working age population, which is in turn equivalent to the size of the flows between employment and unemployment. By examining the employment to inactivity flows, it could be argued that flows between employment and inactivity are to a large extent the result of student work.

The obtained results point to the key problems of the Slovenian labour market: the segmentation between stable and less stable types of employment and the rigidity of the stable type of employment. The results indicate that movements between employment and unemployment as well as job-to-job flows are more likely for workers on temporary and other precarious contracts. The evolution of permanent employment suggests that less stable

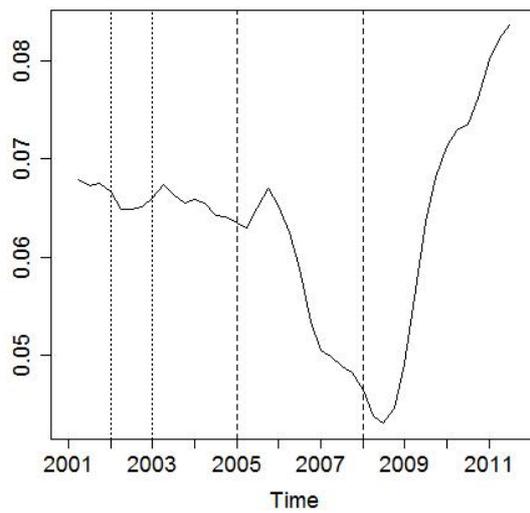
types of employment are an important source of employer's flexibility in times of uncertainty, which is what has been observed during the crisis.



(a) employment rate

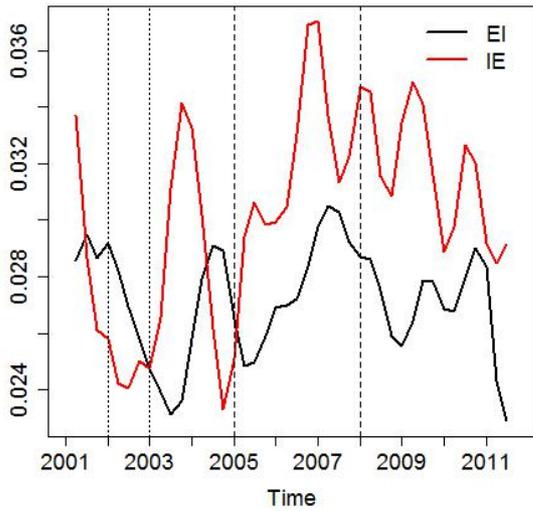


(b) inactivity rate

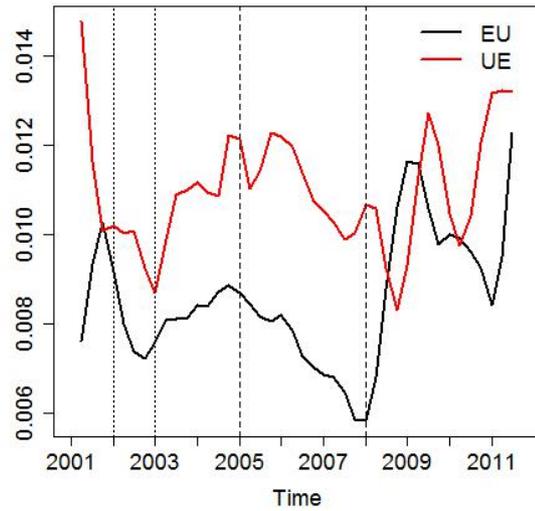


(c) unemployment rate

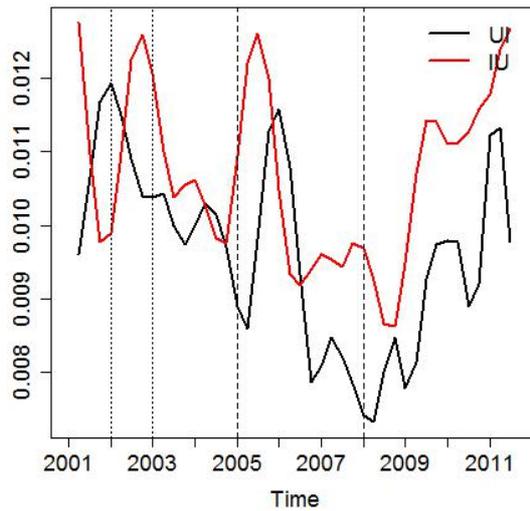
Figure 1: Three labour market states: (a) employment rate, as a share of working age population, (b) inactivity rate, as a share of working age population, and (c) unemployment rate, as a share of labour force.



(a) flows between employment and inactivity

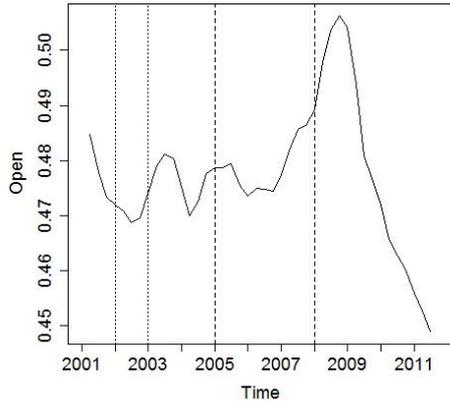


(b) flows between employment and unemployment

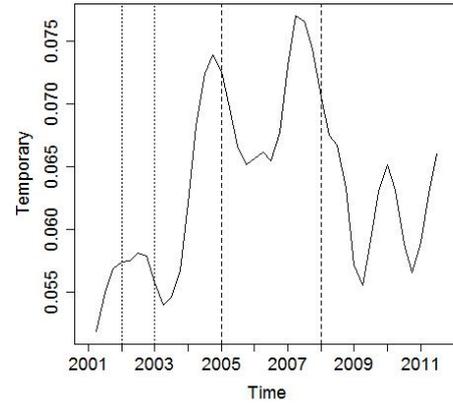


(c) flows between inactivity and unemployment

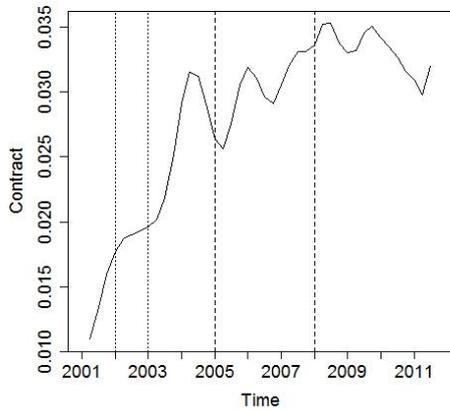
Figure 2: Flows between three labour market states expressed as shares of working age population: (a) flows between employment (E) and inactivity (I), denoted by EI and IE, (b) flows between employment (E) and unemployment (U), denoted by EU and UE, and (c) flows between unemployment (U) and inactivity (I), denoted by UI and IU.



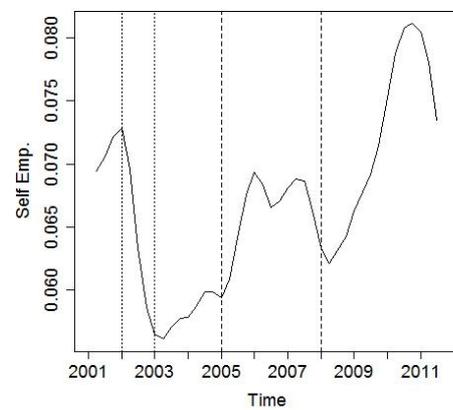
(a) employment rate for permanent employed



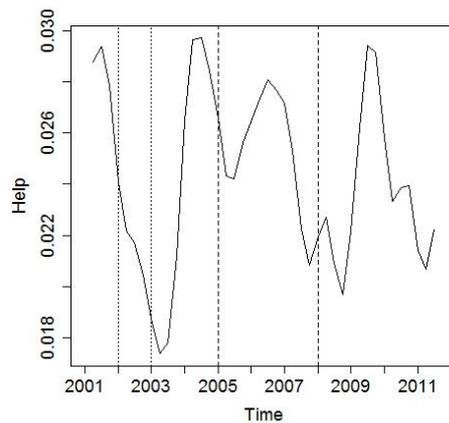
(b) employment rate for temporary employed



(c) employment rate for "contract" workers



(d) employment rate for self - employed



(e) employment rate helping members

Figure 3: Different types of employment that differentiate between more and less stable employment, (a) permanent employment - workers with open-ended work contracts, (b) workers with temporary work contracts, (c) workers on others, more provisional or precarious contracts or undeclared work, (d) self-employed and family businesses, and (e) their helping members.

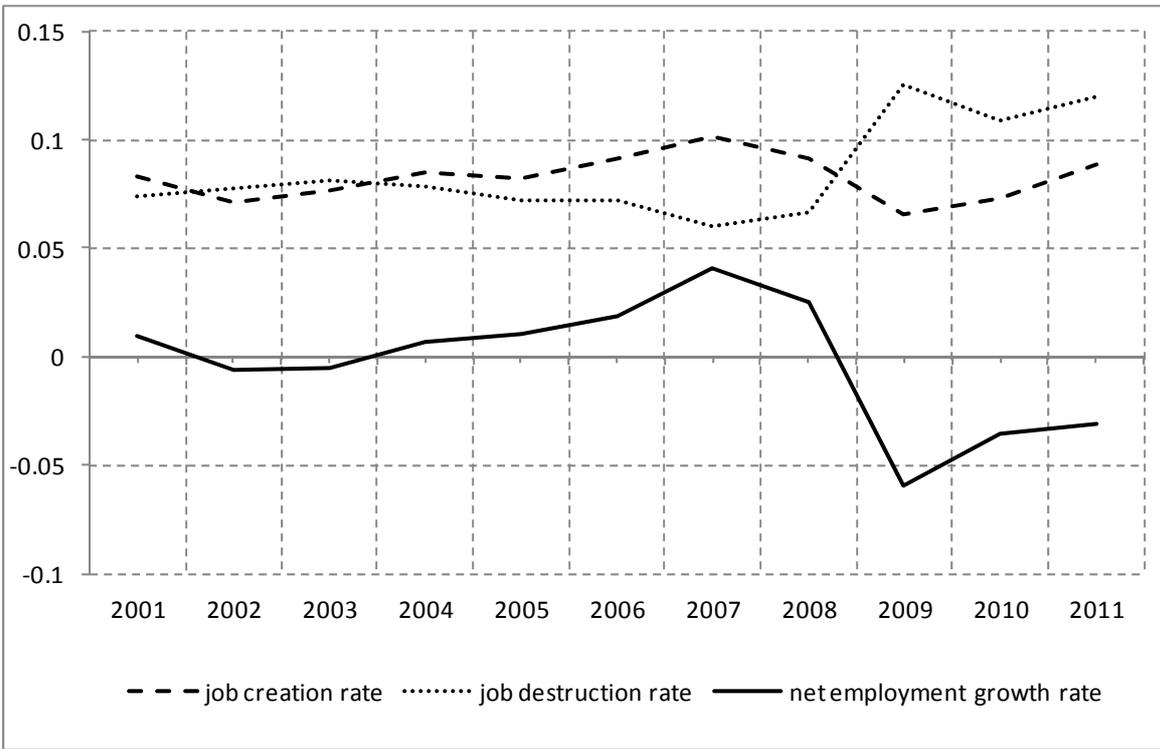


Figure 4: Job creation rate, job destruction rate and net employment growth

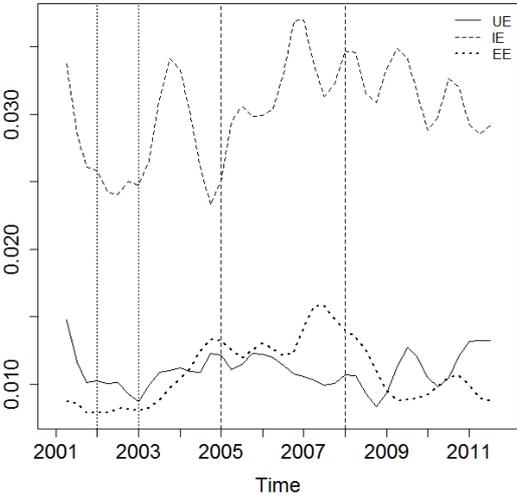
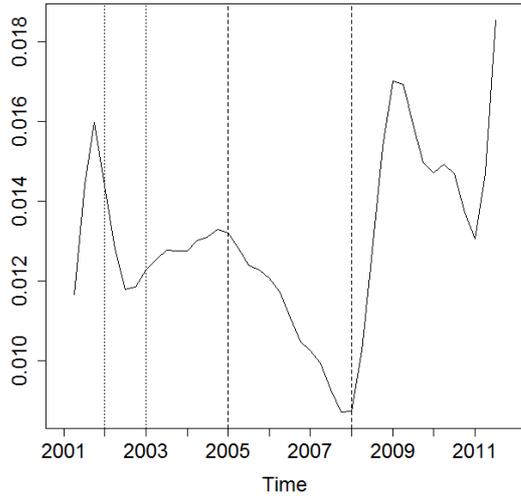
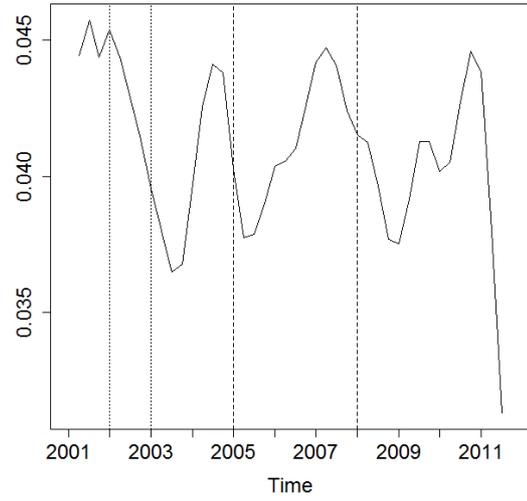


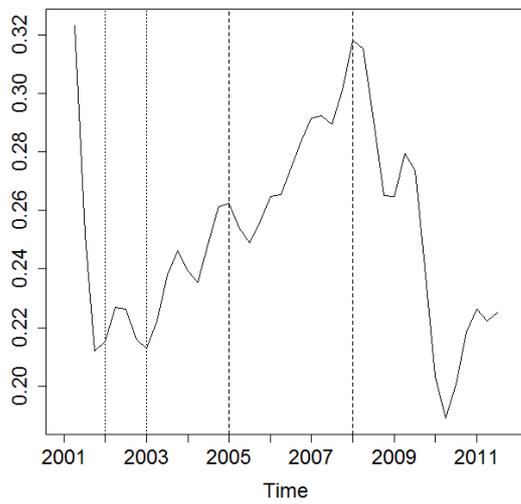
Figure 5: Flows from unemployment and inactivity to employment (UE and IE) and job-to-job flows (EE)



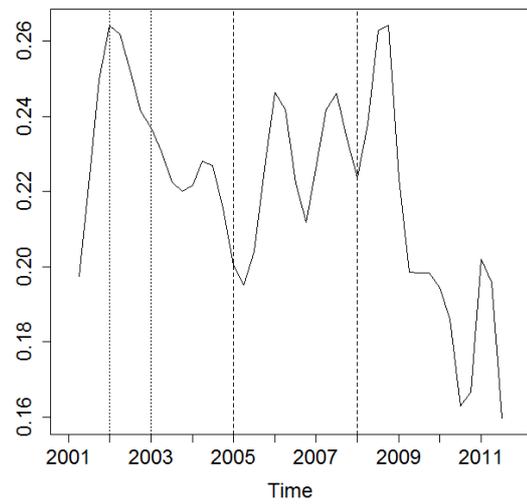
a) EU hazards



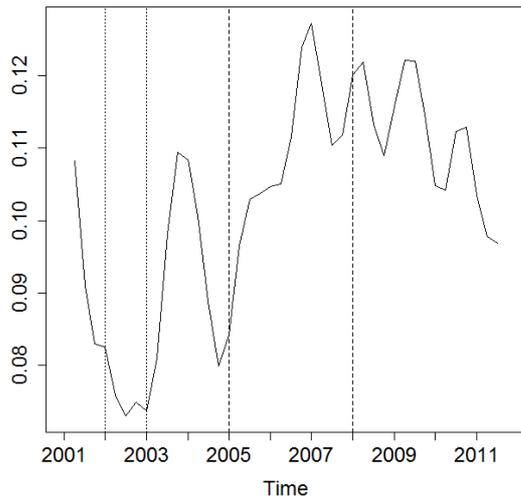
b) EI hazards



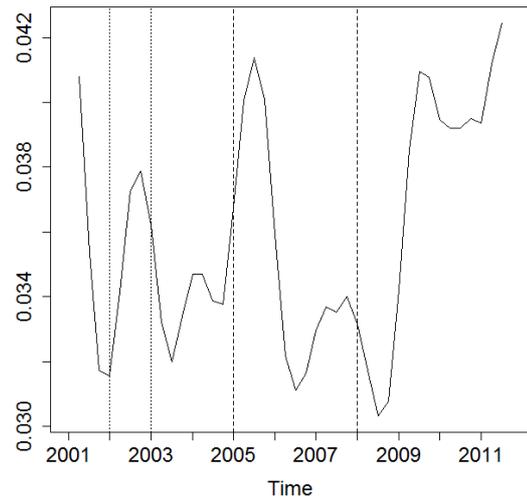
c) UE hazards



d) UI hazards

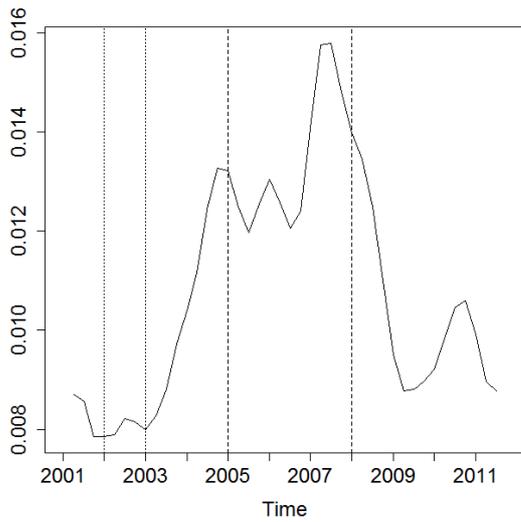


e) IE hazards

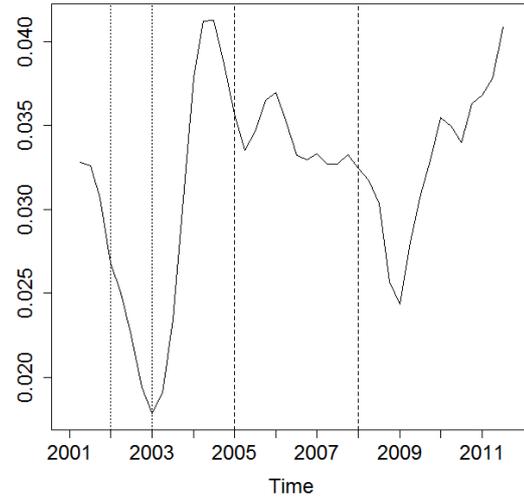


f) IU hazards

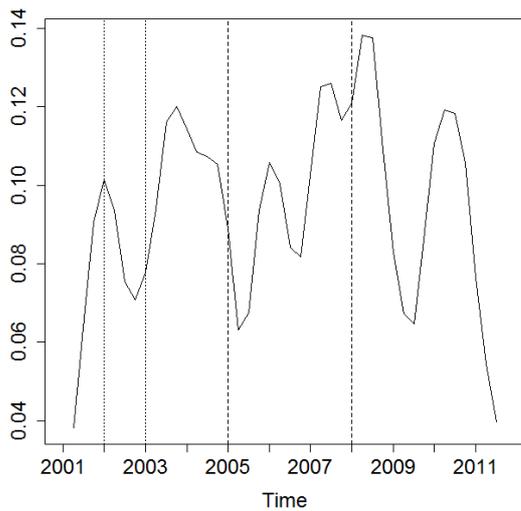
Figure 6: Hazard rates (or transition probabilities between labour market states) between three labour market states expressed as a share of working age population: a) hazard rates between employment (E) and unemployment (U), b) hazard rates between employment (E) and inactivity (I), c) hazard rates between unemployment (U) and employment (E), d) hazard rates between unemployment (U) and inactivity (I), e) hazard rates between inactivity (I) and employment (E), f) hazard rates between inactivity (I) and unemployment (U).



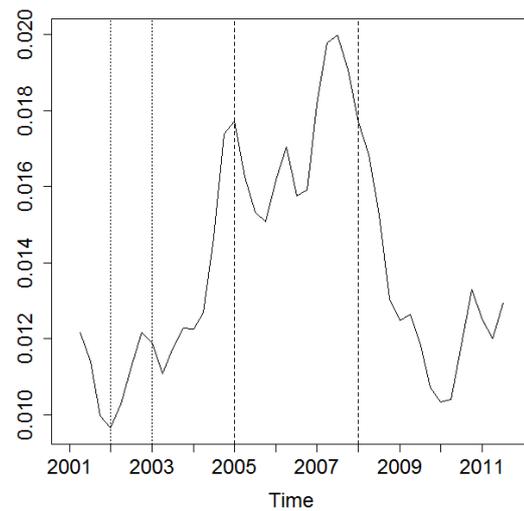
(a) Job-to-job flows (as a share of working age population)



(b) Share of employed persons looking for a job

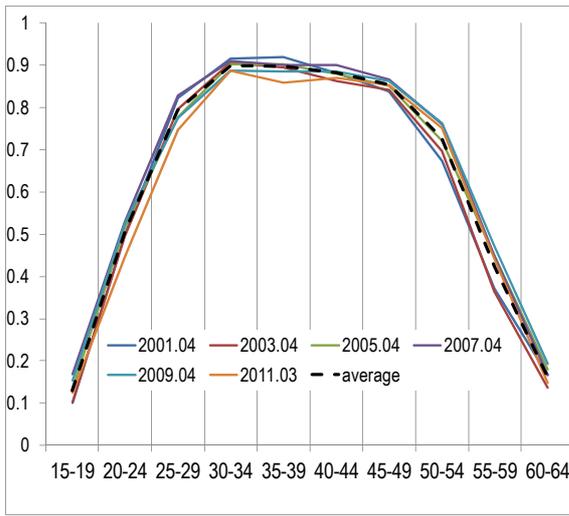


(c) Probability of a job-to-job transition (looking for a job)

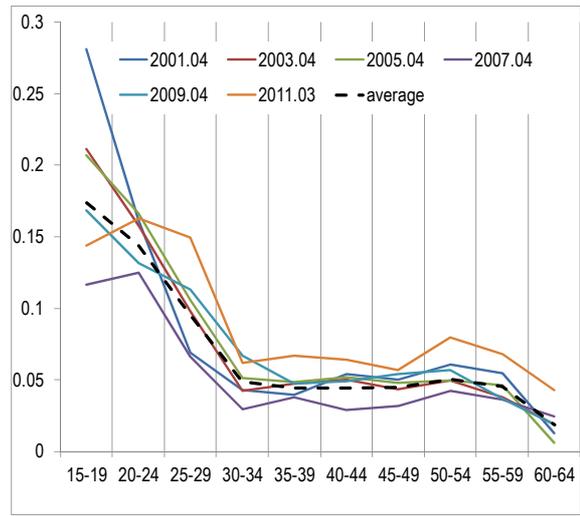


(d) Probability of a job-to-job transition (not looking for a job)

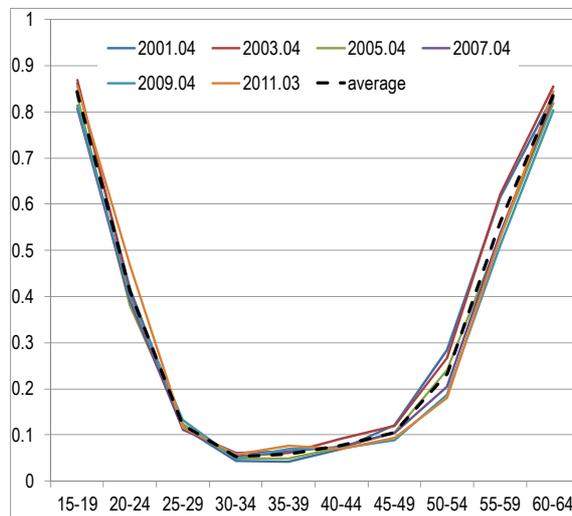
Figure 7: (a) Job-to job flows, (b) share of employed persons looking for a new job, (c) probability of making a job-to-job transition if not looking for a new job, and (d) probability of making a job-to-job transition if looking for a new job



(a) employment rate by detailed age group classification

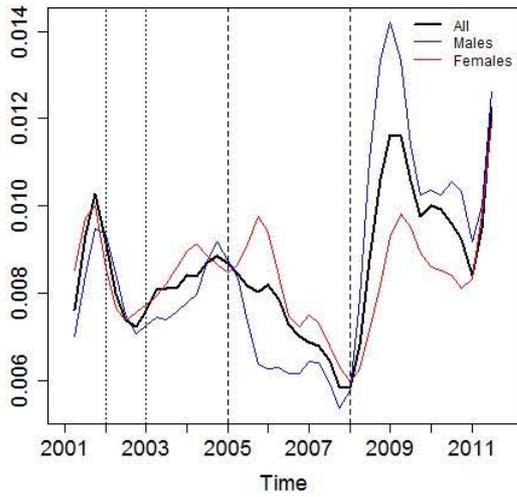


(b) unemployment rate by detailed age group classification

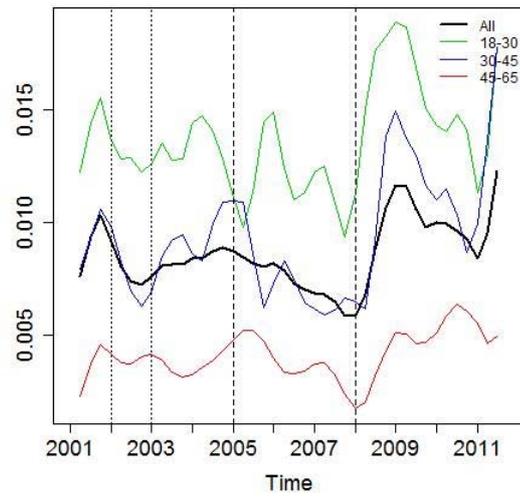


(c) inactivity rate by detailed age group classification

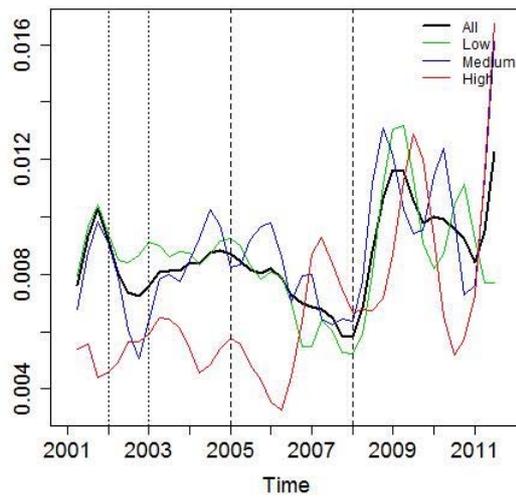
Figure 8: Market labour states by detailed age group classification at six different time points



a) employment to unemployment flows by gender

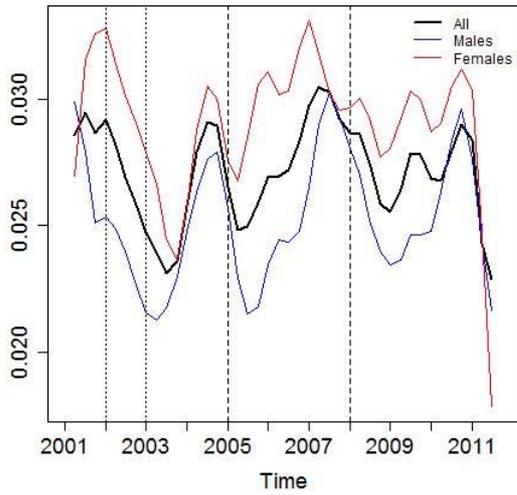


b) employment to unemployment flows by age

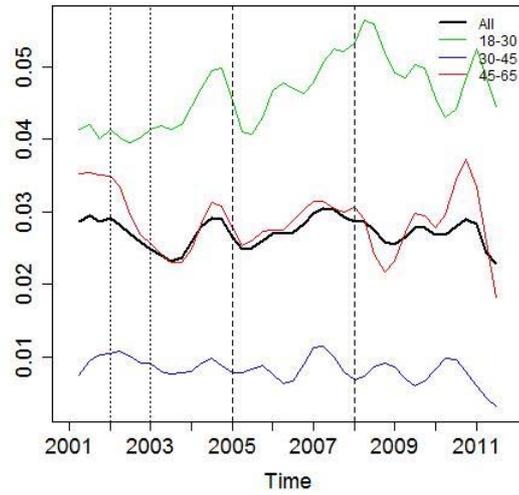


c) employment to unemployment flows by education

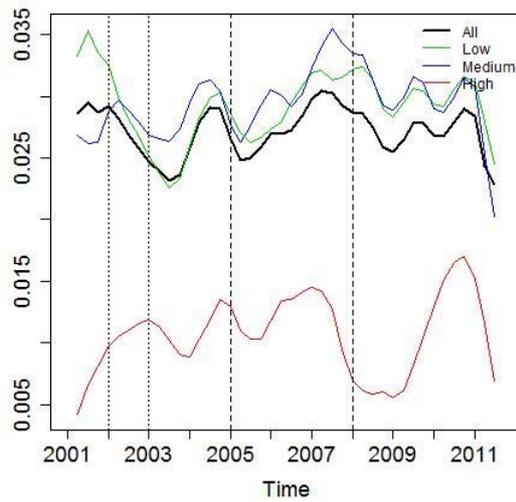
Figure 9: Employment to unemployment flows expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average employment to unemployment flow



a) employment to inactivity flows by gender

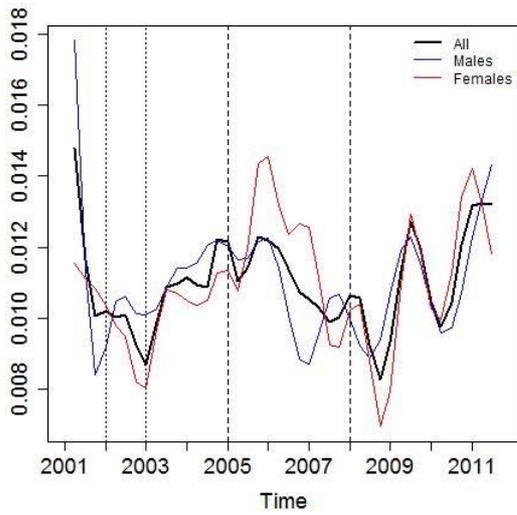


b) employment to inactivity flows by age

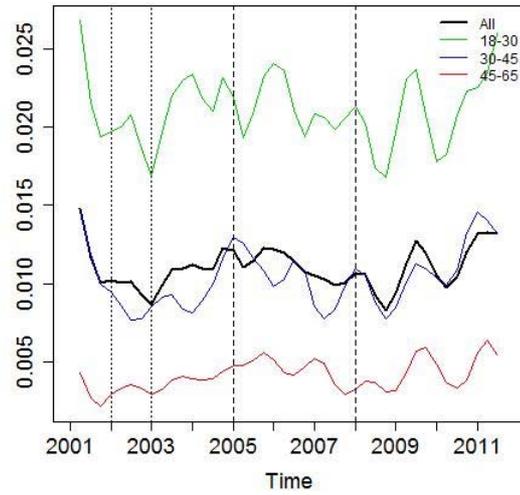


c) employment to inactivity flows by education

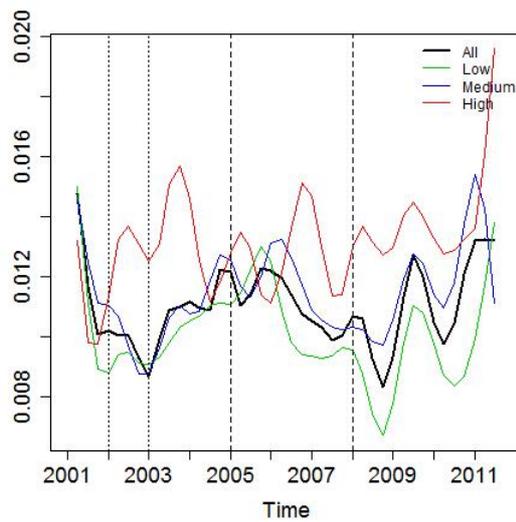
Figure 10: Employment to inactivity flows expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average employment to inactivity flow



a) unemployment to employment flows by gender

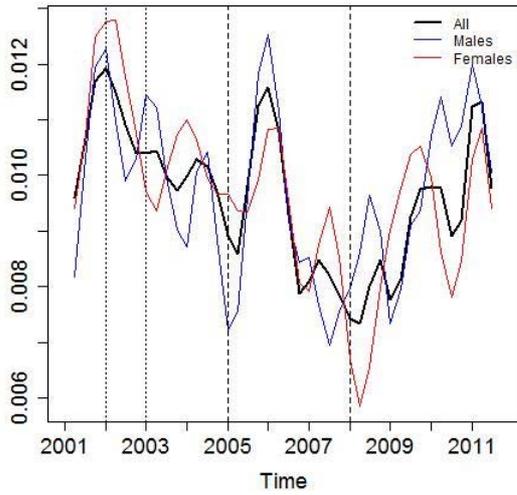


b) unemployment to employment flows by age

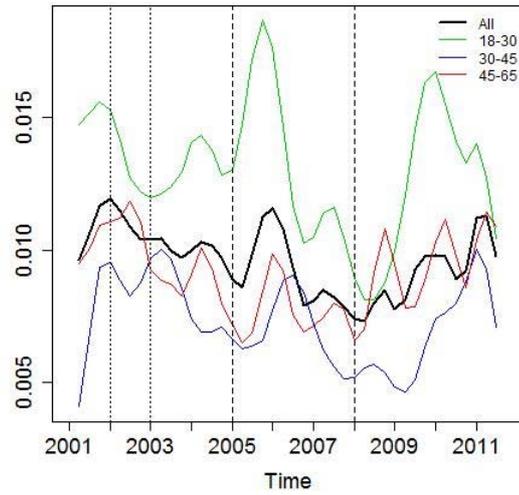


c) unemployment to employment flows by education

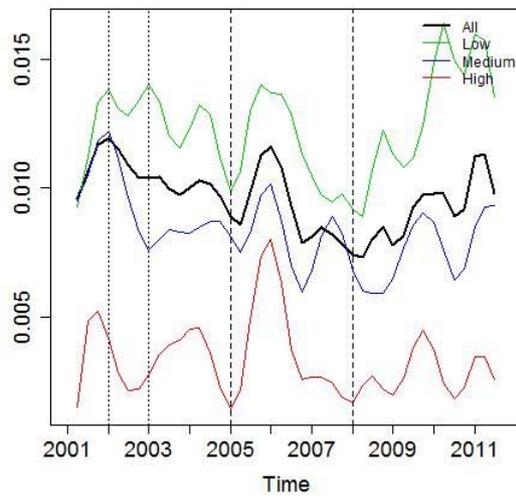
Figure 11: Unemployment to employment flows expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average unemployment to employment flow



a) unemployment to inactivity flows by gender

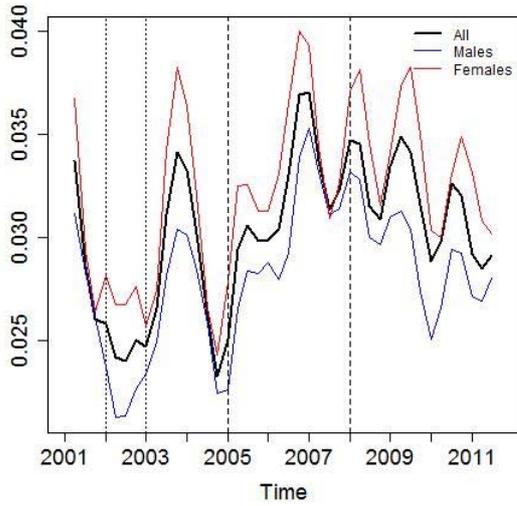


b) unemployment to inactivity flows by age

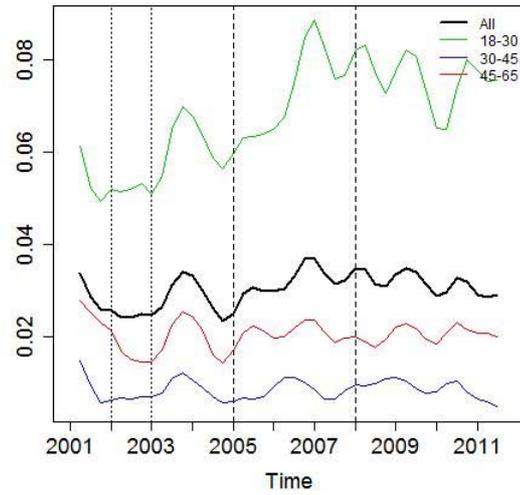


c) unemployment to inactivity flows by education

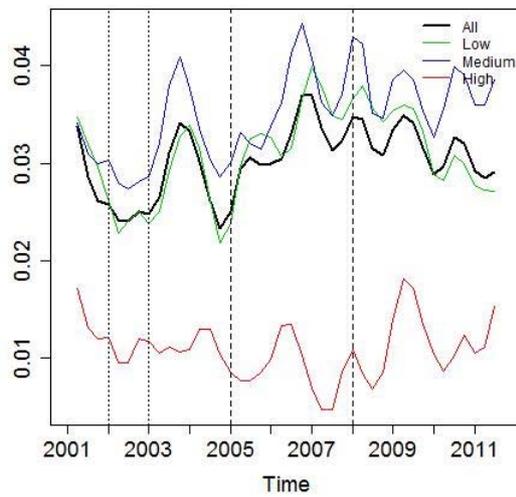
Figure 12: Unemployment to inactivity flows expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average unemployment to inactivity flow



a) inactivity to employment flows by gender

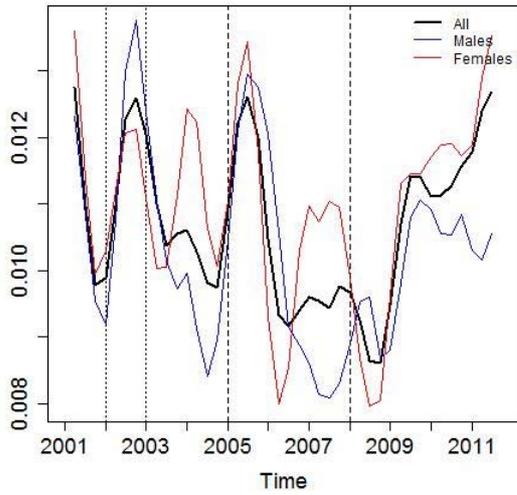


b) inactivity to employment flows by age

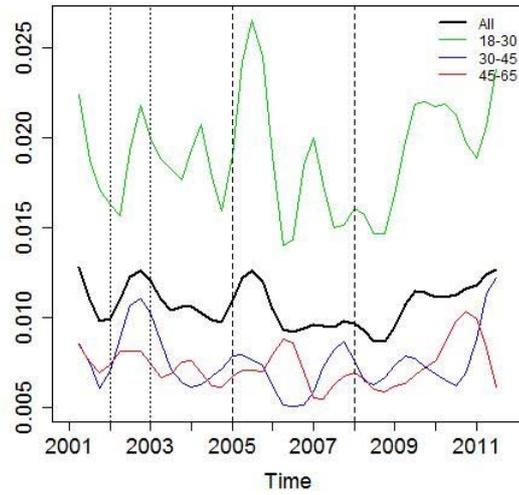


c) inactivity to employment flows by education

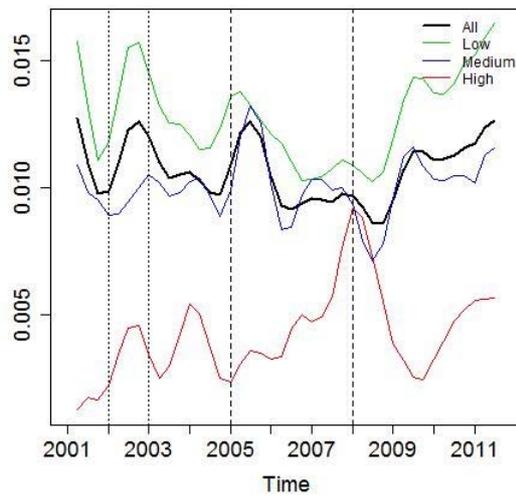
Figure 13: Inactivity to employment flows expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average inactivity to employment flow



a) inactivity to unemployment flows by gender

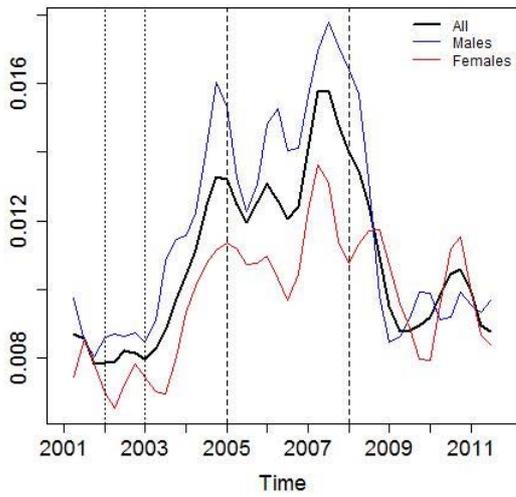


b) inactivity to unemployment flows by age

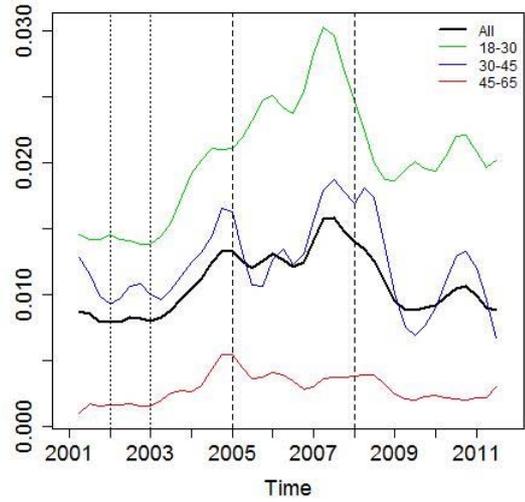


c) inactivity to unemployment flows by education

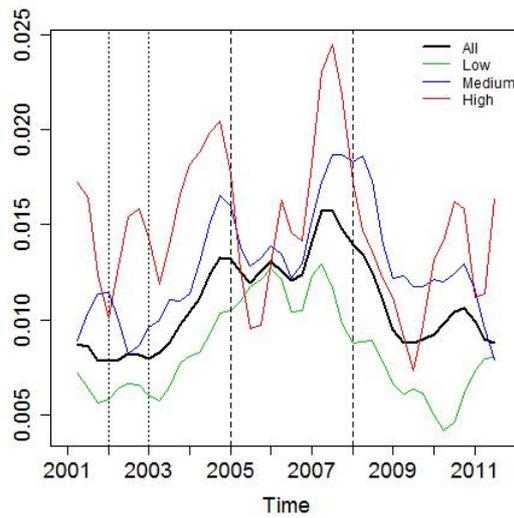
Figure 14: Inactivity to unemployment flows expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average inactivity to unemployment flow



a) job-to-job flows by gender

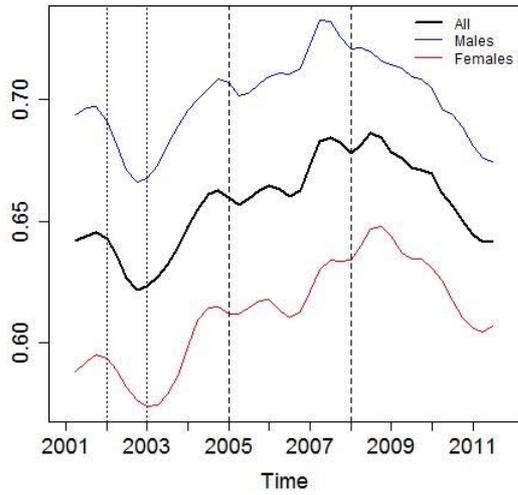


b) job-to-job flows by age

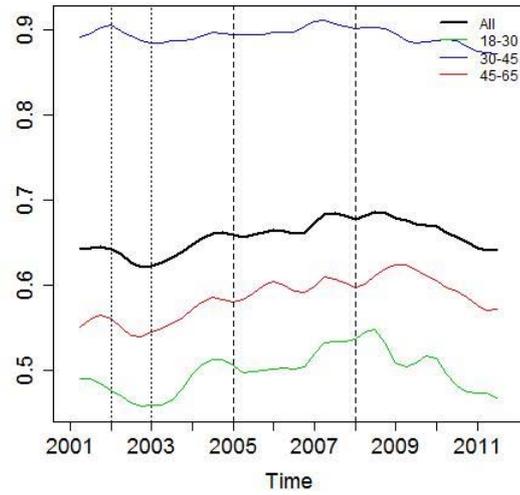


c) job-to-job flows by education

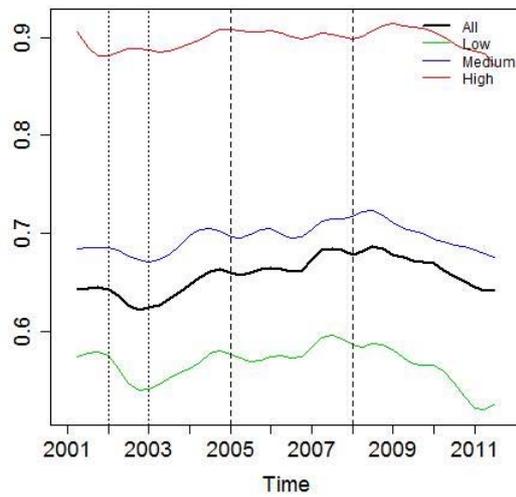
Figure 15: Job-to-job flows expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average job-to-job flow



a) employment rate by gender

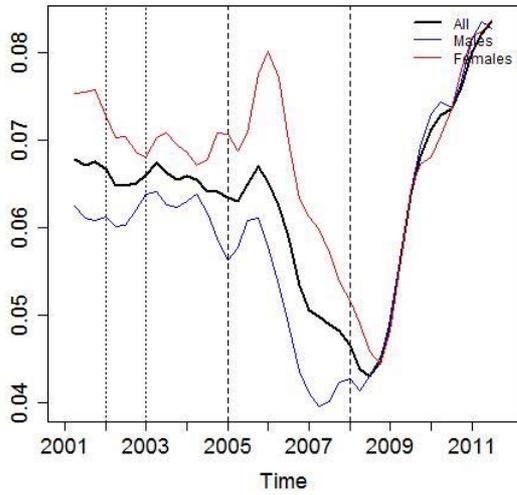


b) employment rate by age

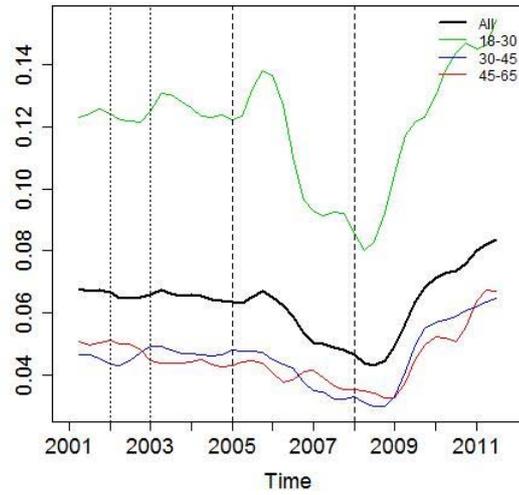


c) employment rate by education

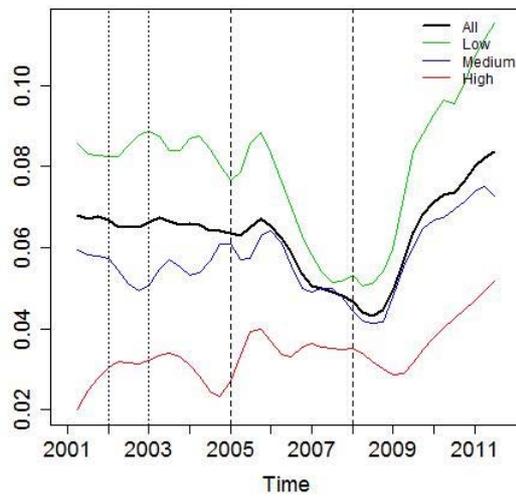
Figure 16: Employment rate expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average employment rate



a) unemployment rate by gender

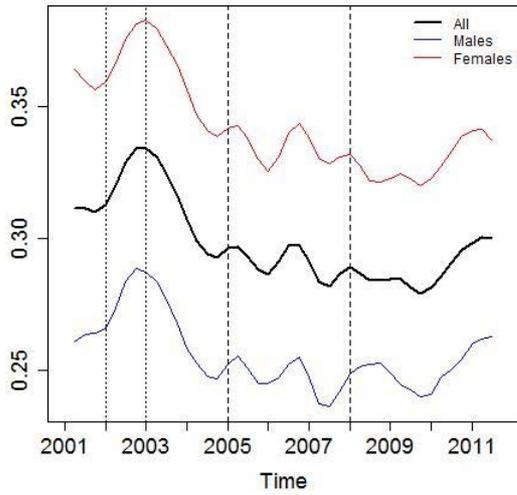


b) unemployment rate by age

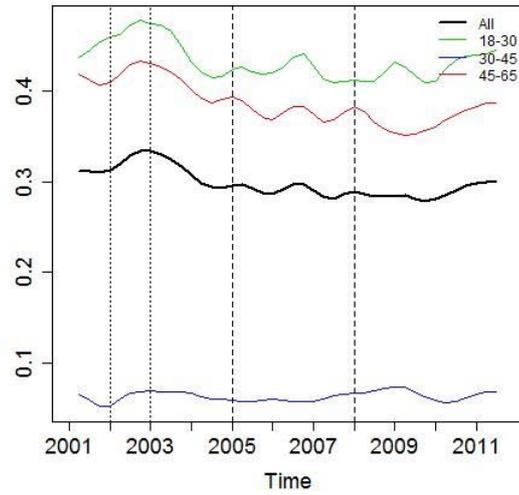


c) unemployment rate by education

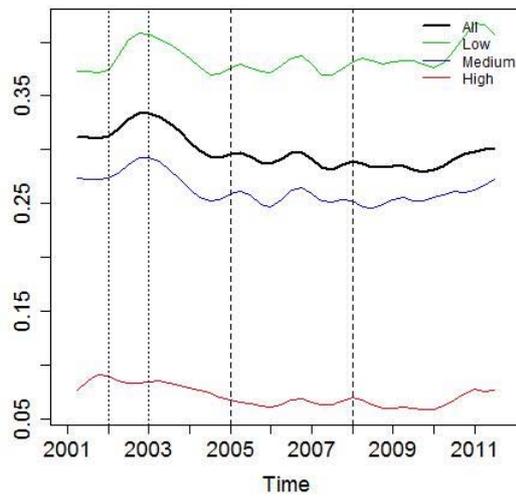
Figure 17: Unemployment rate expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average unemployment rate



a) inactivity rate by gender



b) inactivity rate by age



c) inactivity rate by education

Figure 18: Inactivity rate expressed as a share of working age population by a) gender, b) age and c) education; black solid line on figures a, b and c express an average inactivity rate

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