

Effect of Labour Code Reform on Unemployment Duration in the Course of Crisis: Evidence from Slovakia¹

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Abstract

This paper investigates the pattern of exiting unemployment in Slovakia during the period 2005 – 2009 using an alternative concept of unemployment represented by the self-perceived labour market status as measured by the EU-SILC dataset. In particular, we examine the effects on unemployment duration of the changes in labour regulations as captured by a major Labour Code reform in 2007. Applying standard statistical techniques to several inflow samples we find that after the new Labour Code came into effect in September 2007 the unemployed have, ceteris paribus, lower probability of exiting unemployment by almost 40%.

Keywords: *unemployment duration, Labour Code Reform, Slovakia*

JEL Classification: J08, J64

Introduction

The transition from the command to the market economy brought about double-digit unemployment rates in most post-communist European states during the early 1990s. Despite a relative success in stabilizing and lowering the unemployment during the boom years of early 2000s, the recent economic crisis has brought the unemployment problem back to the spotlight. In this paper we analyse individual unemployment duration in Slovakia in order to shed light on the

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common factors as well as eventual differences that determine exits from unemployment during the pre- and post-crisis period. We also examine the potential impact of a major labour legislation reform on exits from unemployment.

By investigating the unemployment duration this study attempts to answer the following questions: What are the chances to exit unemployment for people with different individual characteristics? What is the difference in the unemployment duration among people who became unemployed at different stages of the economic cycle? Thirdly, what was the Labour Code reform's impact on the unemployment duration?

Answering these questions is important for several reasons. Firstly, the economic crisis that hit Europe is without a precedent for the post-communist EU members. Investigating the exits from unemployment under such circumstances is completely new and could inform us a lot about the labour market processes in the crisis. Secondly, the Labour Code reform is always a subject to a heated public discourse with many stakeholders, policy-makers and economists taking part in it. However, the effects of the Labour Code changes on unemployment duration have never been scrutinised in a scientific way in Central Eastern Europe. This paper could shed light on the relevant issues and improve the understanding of the relationship between the Labour Code tightening and unemployment. In addition to the academic debate, answers to these questions may provide valuable leads for designing employment policies and labour market policies aimed at activating the unemployed people and getting them into jobs.

This paper studies unemployment duration using the survival analysis and Prentice-Gloeckler (1978) regression model, allowing for time-dependent variables. The method allows us to follow individuals and their unemployment spells over time and to assess their chances for exiting unemployment given their individual characteristics as well as contextual variables capturing external conditions, such as labour market tightness or labour market regulations. We use the European Union Statistics on Income and Living Conditions (EU-SILC). The data include information on unemployment of the individual as well as household characteristics. The contextual data were added from other sources. The period under study includes years from 2005 to 2009.

The structure of the paper is as follows. Firstly, we shortly discuss the development of the Slovak economy and the unemployment to capture the economic context of the period under investigation. After the literature review we introduce in detail the methods and data used in this paper. Subsequent section analyses the results and compares several models we employ. Before concluding we discuss the consequences our findings possibly have on the policy-making process.

1. Theoretical Background

1.1. Unemployment Duration

This subsection reviews the most relevant literature on the unemployment duration. Firstly we review studies according to the key determinants of the unemployment duration. Subsequently we focus on the unemployment duration research closely related to Slovakia.

Most studies (D'Agostino and Mealli, 2000; Tansel and Tasci, 2005; Nivorozhkin, 2006; Kupets, 2006;) find a negative association between the age of the unemployed person and his/her probability of exiting unemployment (meaning that *ceteris paribus*, older people have a lower chance of finding a job when unemployed). However, for some countries there seems to be evidence that young people are, along with the old ones, one of the categories for which the chances of finding a job are low (D'Agostino and Mealli, 2000 for Italy, UK and Spain, and Borsic and Kavkler, 2009 for Macedonia and Romania).

The effect of education on the unemployment duration seems to vary from country to country (and for the various data sources), from positive effect through no effect to negative effect. Tansel and Tasci (2005), Nivorozhkin (2006), Kupets (2006) found a positive relationship between the level of education and probability of exiting unemployment in Turkey, Sweden and Ukraine. These findings are consistent with those of D'Agostino and Mealli (2000) for the UK, Belgium and Ireland, as well as with the results of Borsic and Kavkler (2009) for Romania, Austria and Croatia and those of Ollikainen (2003) for Finland. However, an earlier study on Finland (Kettunen, 1997) shows that the positive relationship is only present for educational attainments shorter than 13 – 14 years, while for higher levels of education the relationship turns into a negative one. This disadvantaged labour market position of those holding the highest educational degrees seems to be characteristic for the recession periods, as documented by Van Ours and Ridder (1995) for the case of the Netherlands during the 1980-ties, as well as by numerous studies of the ex-communist regions and states (Stetsenko, 2003 on Kiev, Ukraine; Löfmark, 2008 on Taganrog, Russia; Borsic and Kavkler, 2009 on Slovenia and Macedonia). A possible explanation could be that people with higher education have also higher reservation wages. In this case the unemployed with lower education would be pushed towards accepting a job offer sooner than the people with higher reservation wage that can afford to wait for a more suitable position.

Gender represents a prominent factor in the unemployment duration studies. Mostly, men are found to have better chances of leaving unemployment (D'Agostino and Mealli, 2000; Tansel and Tasci, 2005; Borsic and Kavkler,

2009). In the studies where the relationship between gender and exit rate from unemployment was found insignificant, or even positive for women, the explanation suggests that the economy expands in the sectors that are dominated by female labour force (Borsic and Kavkler 2009 for the case of Romania).

Estimating the effect of different levels of unemployment benefits on the motivation to exit unemployment (as captured, for example, by the replacement rate of labour income by the unemployment benefit) is very relevant for policy formulation. For example, Kupets (2006) finds that the level of unemployment benefit did not have a significant effect on the time a person needs until finding a new job, while the presence of other source of income (e.g. subsistence farming, pension) seems to prolong the unemployment spell.

Another influential factor that have been taken into account by various researches include the marital status. Kupets (2006) finds that single people are less likely to exit unemployment in Ukraine. Similarly, the role of labour market training was examined by some authors. D'Agostino and Mealli (2000) found that having a training experience before becoming unemployed reduced the probability of long term unemployment in Belgium, Ireland and France.

The studies of unemployment duration in Slovakia are relatively rare and not so recent. Lubyova and van Ours (1997; 1999) focused on the effect of the unemployment benefits system on unemployment and its duration in Slovakia. Using the Labour Force Survey data they concluded that despite the potential for disincentive effects, the Slovak benefit system did not influence the "job finding behaviour" of the unemployed Slovaks in the late 1990s (1999, p. 679). Additionally, Lubyova and van Ours (1999) found that young, male and highly educated persons from areas with low unemployment rates have higher chances of exiting unemployment. In their earlier study Lubyova and van Ours (1997) examined the effect of the change in the unemployment benefit system. They found that shortening the entitlement period led to earlier exits from unemployment. On the other hand, lengthening the entitlement period for specific age groups caused the unemployed to have longer unemployment spells.

Van Dijk (2006) investigated the influence of selected active labour market policies on the unemployment duration in one Slovak district (Nové Zámky). Van Dijk shows that participation in labour market training or school-leavers' practice shortens the unemployment duration substantially. As far as individual characteristics are concerned, persons with no previous unemployment spell, with higher education and of prime age were found to have higher chances of exiting unemployment. On the other hand, older individuals, people with health conditions and those who experienced long-term unemployment tended to have longer unemployment duration.

1.2. The Effects of Labour Legislation (Labour Code Reform)

In addition to the individual characteristics and the economic environment, the regulatory environment can potentially exert a significant impact on the unemployment duration. This is mainly because the labour market environment and its perceptions by both the employers and job seekers are determined by labour market regulations. In particular, the latter influence the key labour market parameters, including the ease of hiring and firing and the cost of labour, which in turn influence the behaviour of employers and job seekers. The period under our investigation encompassed an important change in labour regulations implemented by the Labour Code reform. The reform was enacted in 2007 by the new social-democratic government that took office after eight years term of a centre-right coalition. The Labour Code reform was among the most discussed legislative changes and one of the “key political tasks” of the new government (Cziria, 2007). Employers were strongly opposing the changes claiming that it will cause more rigid employment and subsequently lower investment, higher unemployment and fewer new hirings.

The new Labour Code that came into effect on 1 September 2007 in general strengthened the position of employees. The main changes could be grouped into three broad categories (Cziria, 2007). Firstly, different aspects of the employment contract arrangements were changed. Most importantly, renewal of a fixed-term contract was limited to once a year and the simultaneous entitlement for both redundancy payment and wage during the redundancy notice period was introduced (previously a worker was entitled only to one of these). The second group of changes regard working time arrangements. Among the most important changes were the following: standard working time was shortened to 48 hours a week, the ‘stand-by’ time of employees was included into time that should be paid, and part-time contract termination conditions were made stricter. The third group of legislative changes concerned employee representatives and were basically meant to strengthen the rights of trade unions or work councils at workplace. In general, the changes weakened the manoeuvring space of employers by making the firing lengthier and more costly, and by increasing the cost of labour.

The purpose of this work is not to assess the impact of the individual measures on the unemployment duration. Not only would it be beyond the scope of this article, there is also lack of proper data to conduct such a study. However, we argue that the Labour code changes as a package had the potential to change the behaviour of firms for two reasons. Firstly, the new Labour Code rendered the labour market more rigid in the traditional terms of flexibility of hiring and firing and the unions’ strength. Secondly, the new legal provisions brought additional costs in terms of time and money (e.g. longer redundancy period

in combination with the redundancy payment). Altogether, such change of the Labour Code, widely discussed in the public, had a potential to affect the employers' behaviour in hiring. It is reasonable to assume that these changes were reflected in the employers' hiring practices, in particular that they became more careful in their hiring behaviour and less likely to take on regular employees, which could have decreased the exit rate from unemployment into jobs. Therefore we decided to test the impact of the whole Labour Code reform as a package on the unemployment duration.

1.3. Hypotheses

This study focuses on identifying the factors that impact unemployment duration in Slovakia between 2005 and 2009. Based on the previous research we have reasons to suppose that gender, age, level of education, additional sources of income, unemployment benefits or living in a couple are relevant factors in determining the length of unemployment spells. The expected relationships could be translated into the following hypotheses. Firstly, we expect male, more educated, younger workers with no additional income to have higher chances to exit unemployment. Secondly, we argue that individual's unemployment duration will be also dependent on the labour market tightness at the time of becoming unemployed. In other words, the better the labour market performs, the sooner a person finds a job after losing the previous one. Thirdly, we expect that the probability of getting employed will be lower after the above-mentioned Labour Code reform took place, controlling for other factors.

2. Data and Methodology

This study uses the European Union Study on Income and Living Conditions (EU-SILC). At the time of conducting this research, data were available for years 2006 – 2010.² This data timeframe is appropriate for our research design, since it entails a few years' period before the Labour Code reform, the year of the reform itself, and a few years' time after the reform was implemented.

The EU-SILC is a data panel that allows for following the activity status of the respondents over time (e.g. falling into and leaving unemployment). The information on the activity status is provided on monthly basis and thus enables us to treat the unemployment duration as a continuous variable. A major difference

² The analysis is done on 2005 – 2010 waves of EU-SILC. Since the unemployment (main activity) status information is given for the previous year, the last year for which there are available data is 2009.

with regard to other studies of unemployment duration in Slovakia is the use of the self-defined status of unemployment, which is an alternative to the objectively determined unemployment status as measured by the Labour Force Survey. The latter definition of unemployment is often perceived as too restrictive, as it counts anyone who worked for at least one hour during the previous week as employed. While this condition is generally accepted for the purposes of international comparisons, it is too strict from the individual point of view. The EU-SILC data allow us to investigate the unemployment status as perceived by the unemployed themselves, thus providing a better proxy for the individual behaviour at the labour market. Another advantage of the EU-SILC data is the possibility to monitor the changes in the unemployment duration on monthly basis (as opposed to the quarterly basis used by the LFS), which makes the measurement more accurate and realistic. Finally, from the policy perspective the monthly measurement as well as the subjective perceptions of unemployment status is more relevant than the LFS-derived states, as the former are more directly linked to the unemployment registry and participation in labour market programmes. Furthermore, the above mentioned qualities of the EU-SILC data make them compatible with the administrative data on unemployed and vacancies. Administrative data are relevant for policy analysis and they are available on monthly basis. Therefore, the combination of data used in our paper provides a convenient and relevant framework for further assessment of labour market policies effectiveness.

Additionally, use of the EU-SILC data is not completely new in the research of unemployment and its duration. Rather contrary, the volume of literature making use of SILC data has grown recently Garrouste, Kozovska and Perez (2010); Mussida and Fabrizi (2014); Flek, Hala and Mysikova (2015), etc.

However, the advice derived from our analysis should not be taken as definite and our study cannot serve as a basis for exhaustive policy advice, since the analysis could not account for all potential factors. Therefore, before we proceed with the analysis, we believe the limitations that stem mainly from the character of the data should be discussed at this point. The biggest limitations stem from the quality of the data. Many missing values prevented us from including factors such as previous contract type or occupation in the analysis. Due to the regional disparities in Slovakia, the lack of information on the respondent's region is also a considerable limit. Rotational design of the survey caused that the maximum hypothetical duration is 36 months. The rotational design might be also behind the relatively high number of the right-censored observations. This, in turn, rendered the inclusion of competing risks impossible. Last but not the least, there is a considerable amount of unemployment spells that are both left-censored and right-censored (23%, see Appendix 3 for more details). This means that a person

was already unemployed at the start of the observation period and was still unemployed at the end of the observation period (or dropped out). We inspected the distribution of the individual variables and compared the two respective groups (see Appendix 4 for a detailed table). They are very similar in all the personal characteristics and thus we have reason to believe that we do not create a strong bias in excluding the unemployment spells that are both left- and right-censored.

Since the activity status is traced retrospectively, accounting for the calendar year before the interview, our data include persons who fell unemployed between 2005 and 2009. The data allow us to create several inflow samples in order to make the researched groups more homogeneous in terms of external influences. Regarding the control variables the EU-SILC provides information on basic individual characteristics such as gender, age, education, health status, partner's economic status, and unemployment benefit. The values of the independent variables are measured at the beginning of the unemployment spell. Regarding the household-level variables, we include the household equivalised income and child-related allowances. The first one is a proxy of the reservation wage and should capture to what extent is an unemployed person dependent on finding a job to provide for basic utilities. The children allowance was included to control for the presence of children in the household. Both of the variables are included in the analysis since they relate to the respondents' motivation to accept or not accept a job as soon as possible, regardless the characteristics of the job. We admit there are more covariates that would increase the explanatory power of our model. Particularly useful would be the degree of urbanization, which would account for the spatial pattern of unemployment. However, due to the lack of information in the dataset we are unable to include such variables.

Two variables are added from additional sources. We include the labour market tightness as measured by the unemployment-vacancy (UV) ratio to control for the labour market status. The UV ratio captures the number of unemployed persons per one notified vacancy. Additionally, it is used as a standard indicator of the labour market adjustment flexibility (Dicks-Mireaux and Dow, 1958). Technically, in our model, the UV ratio also controls for the overall economic development in relation to the labour market.

Finally, we attempt to measure the effects of the new regulatory environment after the above-described Labour Code reform took place. We use alternative techniques to control for the regime change. We include a set of dummy variables into the pooled sample to account for the time period a respondent fell into unemployment. We identified three time periods as a combination of the economic development and the Labour Code presence. The first period that comprises the years 2005 and 2006 is the one when the economy was growing and there was

no political process indicating the new Labour Code becoming a reality. In the second period, January 2007 to May 2008, the economy was still on its upward slope and the number of unemployed people was decreasing. However, in January the government already announced the intention to push the new Labour Code through. In June 2007 the legislation was passed in the parliament. Therefore the second period is a time of (still) good economic performance but limited labour market flexibility. The third period, after May 2008 is marked by the strict and still valid Labour Code and simultaneously worsened economic conditions.

2.1. Method: Survival Analysis, Proportional Hazard Function and Regression Model

Survival analysis and hazard analysis are ways of examining the duration of certain condition and the possible effect that different control variables might have on the duration. Survival means keeping the condition, which in the present case means staying unemployed. It is usually reported as a conditional probability, given that an individual “survived” up to the time in question. Hazard or risk relates to the end of the condition, i.e. exiting the unemployment (also conditional – exiting unemployment given survival until that time).

Another important issue is the completeness of information about the unemployment duration. If a person became unemployed, but there is information missing on how, when or whether the unemployment ended at all, such an observation is called “right-censored”. This normally happens when a person is still unemployed at the end of the observation period. On the other hand, there is a problem of the “left-censored” observations, where the circumstances of the beginning of an event are unknown (at the beginning of the observation period, when the person enters observation being unemployed, or when unemployment is preceded by missing data). The latter present a more serious problem than the former because there is no information on any individual characteristic at the time of the beginning of an event. Therefore we follow the common practice and exclude the left-censored observations from the analysis (see Appendix 3 for the exact numbers of the left-censored and right-censored observations).

The Prentice-Gloeckner model (1978) works with hazard rates and treats the hazard ratios (a hazard rate at time t over the baseline hazard rate) as an exponential function of a set of predictors. This allows us to run a duration regression model and fit the model to our data. The results are presented in an understandable form of hazard ratios and can be interpreted as an increase in probability of exiting unemployment corresponding to a one-unit change in predictor, while controlling for the others. The model assumes proportionality of hazards, which we discuss below.

When estimating the effect of several factors on the unemployment duration we realise that it is almost impossible to measure all the hypothetically influential variables. This means that there is a possibility that an unmeasured factor or a selection bias might be also influencing our estimates. This problem is commonly known as the unobserved heterogeneity problem. In order to deal with the unobserved heterogeneity in our data we employ the Meyer's extension to the abovementioned models. Meyer (1990) proposed a way how to summarize the unobserved heterogeneity (called also frailty).

2.2. Hazard Proportionality Assumption

The assumption of hazard proportionality means that a certain predictor has the same effect on the dependent variable over time. Related to our case, this assumption does not differentiate whether a person stays unemployed for a month or for two years, the difference between chances of exiting unemployment for, let's say, older and younger people will remain the same.

Many times the proportionality of hazards is not only a matter of statistical fit of a model. Depending on the research field, different effect of a predictor over time might arise as a substantial necessity. Considering the research question and the duration of unemployment, it would be reasonable to expect that predictors such as education or gender might play a larger role at the beginning of unemployment and the difference between them diminish as the duration of unemployment increases. It would also be reasonable to expect that persons with higher education (comparing to people with lower education) have considerably higher chances to exit unemployment shortly after falling unemployed, but the gap would get smaller after being unemployed for several years. We check if the hazard proportionality assumption holds using the so-called Schoenfeld test.

2.3. Econometric Model

Our explanatory analysis is based on the proportional hazards regression model known as the Prentice-Gloekler Model. This model takes the following form:

$$h(t) = h_0(t) \exp\{\beta(t)\mathbf{X}\} \quad (1)$$

where the $h_0(t)$ is the baseline hazard function, e.g. function for an hypothetical individual whose covariates all have value of zero. Symbols \mathbf{X} stands for a vector of the individuals' characteristics and β represents the vector of estimated effects these characteristics have on the hazard of exiting unemployment. The baseline hazard is determined by the empirical data and the model makes no

assumption about the shape of the hazard over time. The abovementioned model, however, does not take into account the unobserved heterogeneity. If the unobserved heterogeneity is present, the function takes the following form:

$$h(t) = \theta_i h_0(t) \exp\{\beta(t)\mathbf{X}\} \quad (2)$$

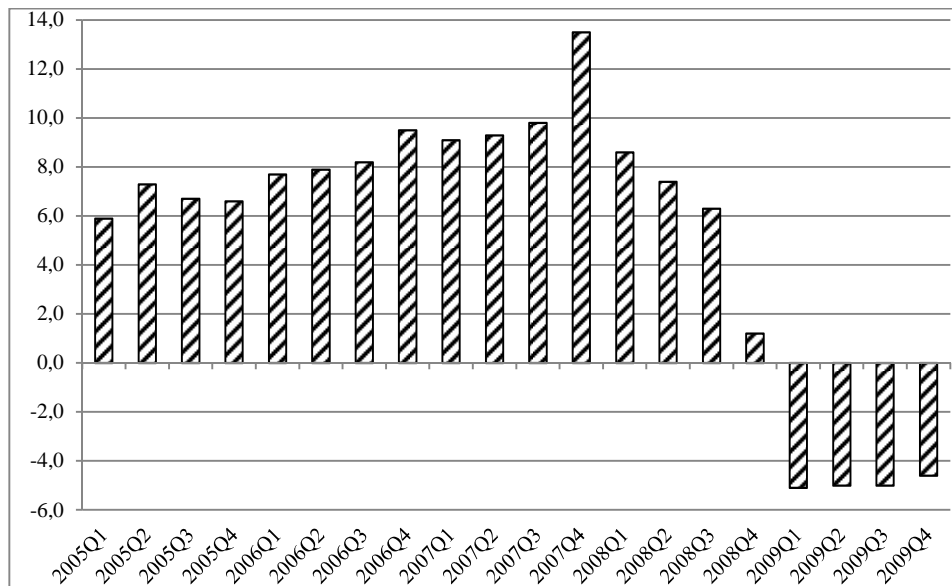
where θ is a random variable that should be independent of the measured variables expressed by \mathbf{X} . Typically the distribution of θ is assumed and “commonly used distribution for θ is the gamma“ (Meyer, 1990). We will use the gamma distribution frailty model as suggested by Jenkins (2004). Although, as Meyer explains, „even if the distribution of θ_i is unknown, [parameters] can be consistently estimated“ (1990, p. 770).

3. Empirical Analysis

We start this section with a short overview of the economic development between 2005 and 2009 in order to illustrate the changes in economic and labour market environments induced by the economic crisis. Figure 1 below documents three periods of the Slovak economy development during the investigated period.

Figure 1

GDP Growth Rate, Quarterly Data, Change Compared to the Corresponding Period of the Previous Year



Note: Percentual change to the previous corresponding period, at market prices.

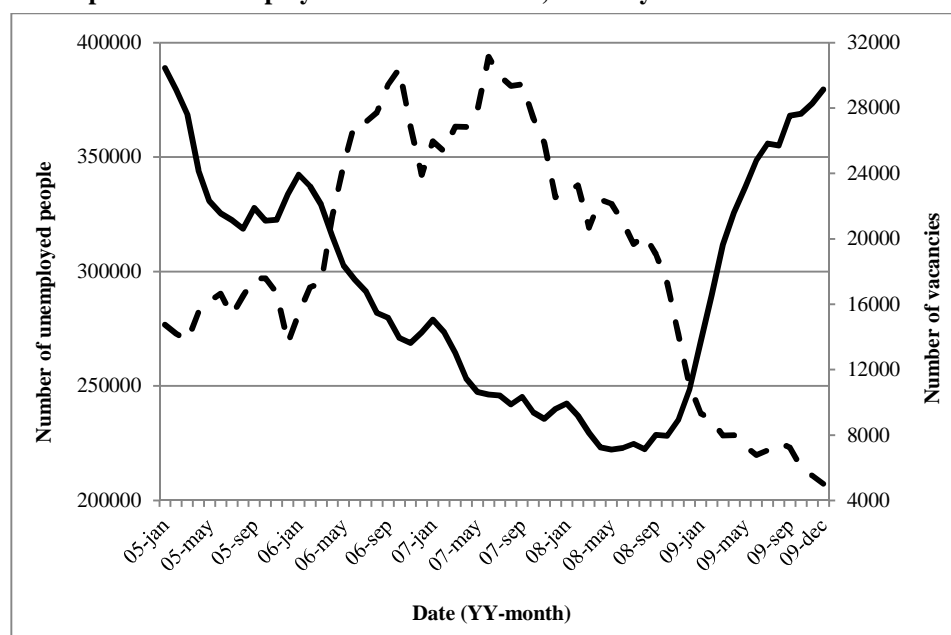
Source: Eurostat; authors' calculation.

Firstly, Slovakia has undergone a rapid economic growth in the mid-2000s. GDP and employment have been growing, and unemployment declining in particular following the accession to the EU (2004). In 2007 the GDP growth continued to rise until it reached its peak of 13.5% in the 4th quarter. The economy was still growing in 2008, although the growth pace was slowing down. Finally, during 2009 the GDP started to decline. Thus the year 2008 can be considered as the onset of economic crisis that subsequently fully developed during 2009.

It is often observed that the changes in economic development have only lagged effects on the labour market. Figure 2 shows the development of unemployment and vacancies between 2005 and 2009³ measured on monthly basis.

Figure 2

Development of Unemployment and Vacancies, Monthly Administrative Data



Source: Office for Labour, Social Affairs and Family, Slovak Republic; authors' calculation.

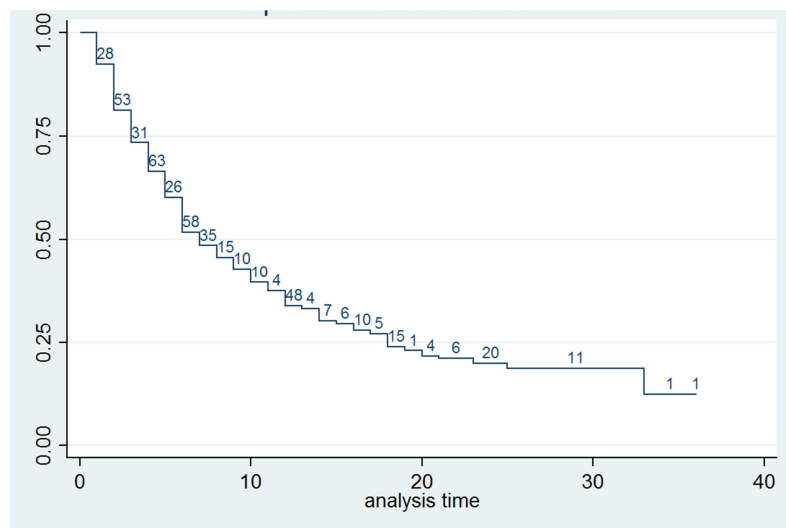
It can be seen that the unemployment level was gradually declining until early 2008, reaching its minimum of 7.4% (or 222 thousand unemployed people) in May 2008. Subsequently the unemployment started to rise. The vacancy data show the opposite trend: the number of vacancies was rising until autumn 2006.

³ It is important to note that these are administrative data and thus might slightly differ from Eurostat's survey-based figures. We prefer this source of data as it provides more compatible measurement of unemployment, vacancies and thus a consistent measure of the labour market tightness (u/v) that is used in our analysis.

There was relatively high level of vacancies between October 2006 and June 2007. Afterwards the number of vacancies has been continually decreasing. These stylized facts show that although the effects of crisis did not hit the labour market and the economic growth at the same time, the year 2008 was the period of structural change that witnessed major reversal of trends in overall economic development (as measured by GDP growth) and labour market tightness (as measured by the number of unemployed and vacancies). The year 2008 separates the period of economic growth from the period of opened recession. Prior to 2008 the period of growth took place that was characterized by positive and increasing GDP growth rate and decreasing labour market tightness (u/v ratio). After the year 2008 GDP started to fall and the labour market tightness started to increase. Thus, the people who became unemployed prior to 2008 and after 2008 faced entirely different conditions in terms of the “external environment”, which also influences the individual probability of finding a job.

Before presenting the results of the non-parametric analysis, we explore a bit further the main characteristics of the data. The longest duration found in the dataset is 36 months. This is due to the nature of the data and it is well possible that there are persons with longer unemployment duration in the population. Figure 3 below presents the development of the unemployment exits in form of a survival estimate.

Figure 3
Kaplan-Meier Survival Estimate of Unemployment Duration



Source: EU-SILC; authors' calculation.

It is clear that the number of exits from unemployment decreases over time. About half of the unemployment spells end until the sixth month. This could be caused by the fact that the entitlement for the unemployment benefit is six months. We can also see that an extra high number of exits take place on the 12th month of the unemployment duration. Most likely, once person makes it beyond the sixth month he/she stays unemployed for another half-year.

Table 1 below presents the mean duration of unemployment spells for selected categories of the independent variables (descriptive statistics of all the variables are listed in the Appendix 1). Total number of unemployment spells in the study is 1,083 corresponding to 981 individuals (some individuals have multiple unemployment spells over the examined period). Distribution of unemployment spells is not symmetric regarding education categories: there are relatively many individuals with secondary education in the study. There are also few unemployed people whose partner was unemployed or inactive at the beginning of their unemployment spell.

Table 1
Mean of Unemployment Duration and Frequencies of the Control Variables in Pooled Sample

Categorical Variable		Obs.	Median	Mean	Std. Dev.	Min	Max
Gender	Women	543	5	7.199	6.440	1	36
	Men	552	4	6.139	5.566	1	34
Partner's economic status	Employed	334	5	6.919	6.176	1	36
	Unemployed	48	5.5	8.354	7.698	1	32
	Inactive	53	7	8.472	7.413	1	30
	No partner	639	4	6.275	5.706	1	36
Education	Primary	208	5	7.663	6.879	1	32
	Secondary	784	5	6.545	5.916	1	36
	Tertiary	94	4	5.564	4.473	1	24
Chronic illness	No	903	5	6.509	5.957	1	36
	Yes	187	5	7.422	6.414	1	30
Time period	Jan 2005 – May 2007	658	4	6.347	5.996	1	36
	June 2007 – May 2008	288	6	7.865	6.776	1	30
	June 2008 – Dec 2009	149	5	5.752	4.077	1	15

Source: EU-SILC; authors' calculation.

Looking at the mean duration of unemployment for different categories we can already notice a difference in the mean duration between men and women; on average, men exit unemployment almost a month earlier than women. There seems to be positive effect of the education on the unemployment duration. With the higher attained education the average unemployment duration gets shorter. Finally, the descriptive analysis suggests that the average unemployment duration

was about a month and a half shorter before the Labour Code changes comparing to the time period after (June 2007 – May 2008). It remains to be seen how many of the suggested relations will be confirmed when controlling for the other variables in the regression analysis.

4. The Regression Models for Slovakia

We built and ran two models. Firstly, we tested the effect of individual, institutional and contextual effects without including the parameter for the unobserved heterogeneity. In the next step we tested the model that includes the unobserved heterogeneity. We present the results accordingly, in the Table 2 below (for descriptive statistics see Appendix 1). The hazard proportionality assumption test (so-called Schoenfeld test) indicated that the assumption holds for all the variables. Since the value of theta and the log-likelihood test of the models indicate that the unobserved heterogeneity is present, we will interpret the frailty model only.

Table 2

Comparing Two Models, with and without Unobserved Heterogeneity

Variable	No Frailty	Frailty
Age (years)	0.963**	0.925**
Work experience (years)	1.025*	1.060*
Male (yes/no)	1.209*	1.341
Secondary education (yes/no)	1.453**	1.546
Tertiary education (yes/no)	1.950***	2.686*
Chronic illness (yes/no)	0.818	0.713
Having an employed partner (yes/no)	0.986	0.541
Having an inactive partner (yes/no)	0.852	0.426
Having no partner (yes/no)	0.837	0.548
Children benefits (in 100s EUR)	0.999	0.996*
Unemployment benefits (in 100s EUR)	1.006	1.005
Household Equivalised Income (in 100s EUR)	1.004*	1.003
Unemployment Vacancy ratio	0.982*	0.961**
Time period 2	0.642***	0.608 ^(a)
Time period 3	0.685**	0.555*
constant	0.290	0.718
ρ	1.111	2.354
$1/\rho$	0.900	0.425
theta		3.081
No. of people		981
No. of spells		1,083
AIC	3,518,089	3,363,872
BIC	3,518,173	3,363,961

Note: The results are shown as hazard ratios, i.e. the ration of hazard rates for the corresponding values of the independent variables. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Source: EU-SILC; authors' calculation.

Turning back to our hypotheses, we expected that male, highly educated, younger workers with no additional income would have higher chances of exiting unemployment. The regression results show that not all of the expected relations are present in Slovakia. The effect of age was indeed confirmed and in the expected direction, younger workers indeed have higher chances of exiting unemployment. On the other hand, the difference between men and women that we found is not statistically significant (p-value 0.122). As for the education, there is a significant difference between the primary education on the one hand and secondary and tertiary education on the other hand. Workers with the secondary education as the highest achieved degree have around 55% higher odds of exiting unemployment than people with just elementary education. The effect of the having tertiary education is increasing chances of exiting unemployment as well, by about 270% as compared to persons with primary education. The second hypothesis expected the Labour Code to have a negative effect on the unemployment duration. We tested this hypothesis by including a set of dummies dividing the observed time period into three parts. The results show that there is a negative fixed-effect of being in the second period significant at 0.1 level (p-value equals 0.055). In other words, in the period after passing the new Labour Code in parliament and still relatively good economic circumstances, the chances of getting out of unemployment were almost over 40% lower than before. Although the economic growth was relatively smaller than in the first period, there was still growth and the number of unemployed people was decreasing. Therefore we have a reason to believe that the economic circumstances are not the cause of the negative impact and this can be ascribed to the Labour Code changes. The effect of the third period, the time of growing nominal unemployment and worsened economic circumstances is even more negative, compared to the previous periods. People who fell unemployed in the third period have about 45% lower odds of getting out of unemployment. We explain this result in the way that the third period presents the worst circumstances on the labour market (both the Labour Code and the crisis effect) and so the odds of getting out of unemployment is the lowest.

Simply, we observe three time periods with worsening circumstances for the labour markets as we go from period one to two to three. In the second period, compared to the first one, the economic growth slows down (although it's still a growth) and the Labour Code is stricter. In the third period the Labour Code remains relatively strict while the economic circumstances worsen even more. As we move on from the first to the third time period, we see the chances of exiting unemployment shrinking. In addition to the set of dummies we control the economic development by including the unemployment-vacancy ratio in the model. Therefore we argue that the drop in the odds between the first and the second time period is caused by the Labour Code reform.

5. Discussion and Conclusion

The main contributions of our study lies in the use of the most recent information, alternative type of data (monthly self-determined unemployment status combined with information derived from administrative data sources) and investigating the effects of regime change (economic crisis and regulatory environment) on the determinants of unemployment duration.

The results of the Prentice-Gloeckler regression models confirmed that there is an impact of selected individual characteristics on unemployment duration in Slovakia. We found, in line with the previous research (Lubyova and van Ours, 1997; 1999), that younger and educated persons have higher probability of exiting unemployment. On the other hand, our analysis failed to confirm some of the hypothesized effects, both individual (e.g. gender) and institutional (unemployment benefits, household income).

Finally, we found that change of regulatory environment due to the restrictive Labour Code reform in 2007 exerted a significant influence on the likelihood of exiting unemployment. The probability of getting back into any form of employment after the new Labour Code came into effect dropped by about 37%.

Studying unemployment duration might have an important impact on designing employment and social policies. On the one hand, it might help identify the most vulnerable groups of unemployed people; on the other hand, it might point attention to the most efficient policies. Our analysis shows that especially older and lower educated workers are amongst the most vulnerable when it comes to the risk of becoming long-term unemployed. Therefore potential policies might focus on incentives for employers to hire the selected group workers. Also the proportion of transitions from unemployment to other than full-time employment (full table in Appendix 2) is very small. Therefore policies oriented towards promotion and support of part-time work and self-employment might help people exiting unemployment.

Our analysis showed that unemployment duration in Slovakia is influenced by particular characteristics, which are not necessarily in line with the research findings from other countries. More importantly, using panel data the analysis also showed the effect of the regulatory environment change on the unemployment duration – something that has been previously done mostly in the cross-sectional comparative designs. Since the research of unemployment duration is relatively rare (Lubyova and van Ours, 1999; van Dijk, 2006), this paper contributes to the bigger picture of how exiting from unemployment developed over time.

References

- BORSIC, D. – KAVKLER, A. (2009): Modelling Unemployment Duration in Slovenia Using Cox Regression Models. *Transitional Studies Review*, 16, No. 1, pp. 145 – 156.
- CZIRIA, L. (2007): Parliament Adopts Controversial New Amendments to Labour Code. Report for the European Industrial Relations Observatory. Available at: <<http://www.eurofound.europa.eu/eiro/2007/09/articles/sk0709029i.htm>>. [Accessed 25 April 2013.]
- D'AGOSTINO, A. – MEALLI, F. (2000): Modelling Short Unemployment in Europe. [Working Paper 06.] Colchester, Essex: Institute for Social & Economic Research.
- DICKS-MIREAUX, L. A. – DOW, J. Ch. (1958): The Excess Demand for Labour: A Study of Conditions in Great Britain, 1946 – 1956. *Oxford Economic Papers*, 10, No. 1, pp. 1 – 33.
- FLEK, V. – HÁLA, M. – MYSÍKOVÁ, M. (2015): Duration Dependence and Exits from Youth Unemployment in Spain and the Czech Republic. *Economic Research – Ekonomika Istraživanja*, 28, No. 1, pp. 1063 – 1078.
- GARROUSTE, CH. – KOZOVSKA, K. – PEREZ, E. A. (2010): Education and Long-term Unemployment. [Paper prepared for the third edition of the workshop “Geographical Localisation, Intersectoral Reallocation of Labour and Unemployment Differentials” (GLUNLAB3), RCEF, June 10, 2010.] Available at: <<https://core.ac.uk/download/files/432/12025153.pdf>>. [Accessed on 21 March 2016.]
- JENKINS, S. P. (2004): PGMHAZ8: Stata Module to Estimate Discrete Time (grouped data) Proportional Hazards Models. *Statistical Software Components*, available at: <<http://econpapers.repec.org/software/bocbocode/s438501.htm>>.
- KETTUNEN, J. (1997): Education and Unemployment Duration. *Economics of Education Review*, 16, No. 2, pp. 163 – 170.
- KUPETS, O. (2006): Determinants of Unemployment Duration in Ukraine. *Journal of Comparative Economics*, 34, No. 2, pp. 228 – 247.
- LÖFMARK, M. H. (2008): Unemployment Duration in Taganrog, Russia. [Presented at the Annual EALE Conference, Amsterdam, 2008.] Available at: <www.eale.nl/Conference2008/Programme/PapersD/add69097_p1wgRcz5Xj.pdf>. [Accessed 25 April 2013.]
- LUBYOVA, M. – van OURS, J. C. (1997): Unemployment Dynamics and the Restructuring of the Slovak Unemployment Benefit System. *European Economic Review*, 41, No. 3 – 5, pp. 925 – 934.
- LUBYOVA, M. – van OURS, J. C. (1999): Effects of Active Labor Market Programs on the Transition Rate from Unemployment into Regular Jobs in the Slovak Republic. *Journal of Comparative Economics*, 27, No. 1, pp. 90 – 112.
- MEYER, B. D. (1990): Unemployment Insurance and Unemployment Spells. *Econometrica*, 58, No. 4, pp. 757 – 782.
- MUSSIDA, C. – FABRIZI, E. (2014): Unemployment Outflows: The Relevance of Gender and Marital Status in Italy and Spain. *International Journal of Manpower*, 35, No. 5, pp. 594 – 612.
- NIVOROZHKIN, A. (2006): Essays on Unemployment Duration and Programme Evaluation. [Economic Studies, No. 149.] Available at: <<http://www.handels.gu.se/epc/archive/00004686/>>. [Accessed 25 April 2013.]
- OLLIKAINEN, V. (2003): The Determinants of Unemployment Duration by Gender in Finland. [VATT Discussion Paper, No. 316.] Available at: <http://www.vatt.fi/file/vatt_publication_pdf/k316.pdf>. [Accessed 25 April 2013.]
- PRENTICE, R. – GLOECKLER, L. (1978): Regression Analysis of Grouped Survival Data with Application to Breast Cancer Data. *Biometrics*, 34, No. 1, pp. 57 – 67.
- STETSENKO, S. (2003): On the Duration and the Determinants of Ukrainian Registered Unemployment. [A Case Study of Kyiv.] Kyiv: National University of Kyiv – Mohyla Academy. Available at: <http://www.eerc.kiev.ua/research/matheses/2003/Stetsenko_Serhiy/body.pdf>. [Accessed 25 April 2013.]

- TANSEL, A. – TASCI, H. M. (2005): Determinants of Unemployment Duration for Men and Women in Turkey. [IZA Discussion Paper, No. 1258.] Available at: <<http://ftp.iza.org/dp1258.pdf>>.
- Van DIJK, B. (2006): Treatment Effect of Job-training Programmes on Unemployment Duration in Slovakia. *Statistica Neerlandica*, 60, No. 1, pp. 57 – 72.
- Van OURS, J. C. – RIDDER, G. (1995): Job Matching and Job Competition: Are Lower Educated Workers at the Back of Job Queues? *European Economic Review*, 39, No. 9, pp. 1717 – 1731.

Appendix

Appendix 1

Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Age (years)	1,092	33.174	12.349	17	62
Work experience (years)	1,092	11.010	12.277	0	43
Male (yes/no)	1,092	0.510	0.500	0	1
Primary education	1,088	0.186	0.389	0	1
Secondary education	1,088	0.721	0.448	0	1
Tertiary education	1,088	0.005	0.074	0	1
Chronic illness	1,087	0.176	0.381	0	1
Having an employed partner	1,092	0.307	0.462	0	1
Having an unemployed partner	1,096	0.044	0.205	0	1
Having an inactive partner	1,092	0.052	0.221	0	1
Having no partner	1,092	0.577	0.494	0	1
Children benefits (in 100s EUR)	1,092	3.692	5.618	0	39.434
Unemployment benefits (in 100s EUR)	1,092	0.386	2.499	0	46.141
Household Equivalised Income (in 100s EUR)	1,092	43.097	27.565	-7.558	327.236
Unemployment Vacancy ratio	1,092	17.284	9.893	7.911	75.503
Time period 1 (Jan 2005 – May 2007)	1,092	0.605	0.489	0	1
Time period 2 (June 2007 – May 2008)	1,092	0.267	0.443	0	1
Time period 3 (June 2008 – Dec 2009)	1,092	0.128	0.334	0	1

Source: EU-SILC; authors' calculation.

Appendix 2

Status after Unemployment

Status after unemployment	Frequency	Percent
<i>Full-time employment</i>	481	44.05
<i>Part-time employment</i>	37	3.39
<i>Self-employment</i>	35	3.21
<i>Self-employment part-time</i>	1	0.09
<i>Retired</i>	20	1.83
<i>Student</i>	22	2.01
<i>Other inactive</i>	24	2.20
<i>Right-censored</i>	472	43.22
Total	1,092	100.00

Source: EU-SILC; authors' calculation.

Appendix 3

Crosstabulation of Censored Unemployment Spells

		Right censored		
		NO	YES	Total
Left censored	NO	630	465	1,095
	YES	560	494	1,054
	Total	1,190	959	2,149

Note: Table shows the crosstabulation of the observations by the left- and right-censoring.

Source: EU-SILC; authors' calculation.

Appendix 4

Descriptive Statistics for Two Separate Samples of Respondents; Those who are Both Right-censored and Left-censored and the Rest

Not censored from both sides					
Variable	Obs.	Mean	Std. Deviation	Min	Max
<i>Age</i>	1,655	34.044	12.349	17	62
<i>Education (primary)</i>	1,644	0.918	0.492	0	2
<i>Equival. Household income</i>	1,655	4,029.157	2,638.048	-755.824	32,723.640
<i>Work Experience</i>	1,655	11.463	12.223	0	43
<i>Male</i>	1,655	0.500	0.500	0	1
<i>Living in a partnership</i>	1,655	0.445	0.497	0	1
<i>Chronic health issues</i>	1,650	0.166	0.372	0	1
<i>Receiving child rel. benefits</i>	1,655	0.649	0.477	0	1
<i>Partner's econ status</i>	1,631	1.842	1.381	0	3
<i>Unemployment benefit</i>	1,655	82.365	348.892	0	7,745.74
<i>Labour Code (before/after)</i>	1,655	0.295	0.456	0	1
Censored from both sides					
Variable	Obs.	Mean	Std. Deviation	Min	Max
<i>Age</i>	494	37.927	11.862	17	62
<i>Education (primary)</i>	491	0.758	0.491	0	2
<i>Equival. Household income</i>	494	3,051.560	2,017.957	523.162	13,749.650
<i>Work Experience</i>	494	12.119	11.259	0	39
<i>Male</i>	494	0.472	0.500	0	1
<i>Living in a partnership</i>	494	0.543	0.499	0	1
<i>Chronic health issues</i>	489	0.180	0.385	0	1
<i>Receiving child rel. benefits</i>	494	0.559	0.497	0	1
<i>Partner's econ status</i>	493	1.635	1.324	0	3
<i>Unemployment benefit</i>	494	72.688	243.826	0	1,823
<i>Labour Code (before/after)</i>	494	0.247	0.432	0	1

Source: EU-SILC; authors' calculation.