

# Unemployment Spell and Skills Mismatches: The Case of Macedonia's Youth

## Abstract

This paper aims to investigate the impact of the job search period on skills mismatch of the individual. The motivation behind this comes from the high and persistent youth unemployment in the country in the past two decades despite many active labor policies directed towards the youth segment of the labor market. Probabilistic logistical models are used for the empirical analysis, which are suitable for research characterized with a sequential nature of the choice problems. This investigation is accompanied by a survival analysis. This research considers the case of Macedonia using the survey data on School-to-Work transition (SWTS) conducted by ILO for 2012. The results have suggested that the longer the search period, the lower the probability that the individual will be at "the right place" once he/she is employed.

**JEL:** J24; J21; J31; J62.

**Keywords:** Youth, unemployment, skills mismatch, job search duration, Macedonia.

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## 1 Introduction

The forces of globalization and liberalization, as well as the last financial crisis, have led to significant transformations in the labor market worldwide, giving rise to a mismatch between education skills and (un)employment (Dullien et al., 2010, p.124). The most recent global financial destabilization has even further aggravated the position of youth, with unemployment soaring to unprecedented levels. In the 1980s, European countries were characterized with relatively high growth rates on one hand, and persistently high unemployment rates on the other, which was difficult for economists to explain. Specifically, the high unemployment rates remained steady despite the average growth rate of approximately 4%, something that cannot be explained by the business cycle framework (Entorf and Kramarz, 1998, p.1). The high growth rates notwithstanding, the high unemployment was the result of increased imbalances arising between the patterns of labor supply and demand. In other words, the rising unemployment was attributing to a greater mismatch. From then onwards, the topic of mismatch unemployment has attracted much attention mainly because the literature has offered a great deal of evidence supporting the premise that mismatch explains a significant portion of unemployment (Sahin et al., 2012; Barlevy, 2011; Bauer 2013; Di Pietro and Urwin, 2006).

Transition countries, including Macedonia, are more likely to experience mismatch unemployment given the long transitional phase and the inflow of foreign capital, which force substantial restructuring in the labor market. Whether the labor market in Macedonia has adjusted to meet these requirements of the labor demand side is unknown, but it is known that the unemployment rate is among the highest, especially for young people. Since the independence of Macedonia and the adoption of market economy, young individuals have had great difficulty in finding and maintaining a job (Arandarenko and Bartlett, 2012). The literature argues that in transition economies, the companies are not reluctant to hire employees, but have difficulties in finding "the right person" for "the right place", raising the issue of mismatch unemployment. Sattinger (2012) conducted a comprehensive study regarding the types of mismatch, their reasons and consequences, as well as policy implications, and because of this, in our investigation we mainly draw on this study. The author argues that mismatch exists where there are great differences between the skills of work both individually and on an aggregate level and the skills required for their jobs. Such mismatches in turn lead to losses to individual workers in the form of reduced salaries and a reduction in job satisfaction. Moreover, firms experience a decline in productivity, and the country faces limited growth potential. Hence, the discussion above emphasizes the importance of mismatch unemployment and the interest for this issue among researchers (Sattinger, 2012).

The aim of this paper is to examine the impact of job search duration to the likelihood one employee is undereducated, overeducated or matched for the position, with a focus on young people. Next, it aims to analyze the experience of young people in their school-to-work transition. The importance of this research question is explained by Green et al., (2000) who suggest that a long and inefficient job search results in prolonged unemployment spells, emotional distress for job seekers, as well as wider societal costs. As a result, the main objective of this paper is to identify the impact of the duration of the job search period on the possible skills mismatch.

This paper is organized as follows: Section 2 reviews the most prominent literature on skills mismatch and its effects on employability. Section 3 gives overview on the data, methodology and the model specification employed in this empirical study. Section 4 summarizes the main findings and their implications for Macedonia's current employment policies, followed by an overview of policy recommendations for improvement of the situation in the labor market and reducing the mismatch.

## 2 Literature review

Skills mismatch refers to the scope of skills and educational level one possesses, but which are different from the skills and education required for the position that one holds at the moment. As already mentioned, there is vast literature on this topic, and the findings differ among countries. Looking back at the beginning of human capital empirical literature, particularly Becker's human capital theory (1964) it is notably argued about the remuneration for all marginal product that individuals can produce relative to their human capital, yet workers with the same human capital happen to receive different wages. This raises further discussion on whether wages are adequate to control for adequacy between the obtained education and the held position, or if there are other personal characteristics that can explain the mismatch. According to the matching theory offered by Jovanovic (1979) the answers to these questions can be found if one focuses on the imperfect market information and the cost of the search period.

The modern literature on skills mismatch was introduced by Duncan and Hoffman (1981) who defined three possible job statuses: (i) overeducation, (ii) undereducation and (iii) matched skills for a specific job. This issue was further researched by Maacorda and Petrongolot (1999), in a study conducted for various OECD countries, where they showed that there has been an increase in skills mismatch in a few OECD countries over the past two decades, but this has not been a generalized phenomenon. The Cuesta (2005) analysis, using an ad hoc module of labor force survey, came to three important conclusions: (i) overeducated workers experience shorter durations in their first significant job, (ii) there is no direct link between search time and employment duration, (iii) and

there are unobserved factors that increase the first unemployment job search after completing education, and that also increases the subsequent employment duration. Sahin et al. (2012) estimating the mismatch index on the data from the Current Population Survey (CPS) and the Job Openings and Labor Turnover Survey (JOLTS) found that mismatch across industries and occupations explains at most 1/3 of the total observed increase in the unemployment rate, where geographical mismatch plays no apparent role, and occupational mismatch has become in particularly more severe for college graduates since the job creation for tertiary education position is more rigid. Di Pietro and Urwin (2006) conducting an analysis on data from ISATA, found that earnings can be a strong predictor of the probability of one to start looking for another job. Graduate workers who consider their level of education to be excessive relative to the job task they have to perform are close to three times more likely to look for another job relative to their peers who feel that their own level of education is appropriate for the job. Under education also has a significant positive effect on the probability of seeking alternative employment. Baert and Cockx (2012) conducting an investigation using data from the SONAR survey (2003 and 2005) have found that young men tend to delay the transition to an adequate job by accepting a job for which they are overeducated more at the start of the employment spell rather than later. Moreover, the authors also found that only short-term unemployed young people get trapped in over-education and that the employment gap between foreign and native youth is significantly larger for the transition into jobs for which one is overeducated than for the transition into adequate jobs. The findings also suggest that there is a stable positive effect of an honors degree in tertiary education on the transition to adequate employment, and conducting any work during education affects the transition to adequate employment with a similar magnitude. Marelli et al. (2014) analyzed university administrative data and data from employment centers and found that the rate of matches differs greatly across universities and type of degree. The authors' findings also suggest that: (i) gender significantly affects the rate of a good match in the sense that females perform better than males, (ii) foreign graduates present the highest incidence of bad matches, and (iii) good matches are higher for young people who are residents of the city under investigation. Rubb and Quinn (2011) also contributed to the literature on mismatch by analyzing over education as both a cause and effect of migration. Using the Public Use Micro data of the 2000 U.S. Census, the authors came to several conclusions: the likelihood of over education is positively related to local unemployment rates, meaning that the higher the local unemployment is, the longer the search period, hence the lower the likelihood of obtaining a matched job. Next, the authors' investigation found that having a disability can have a greater impact on the likelihood of over-education than incidence data suggest.

The search theory was introduced by Mortensen and Pissarides (1999) where they refer to the search period as a key determinant of the probability of getting a good job by the way of searching for it. The authors suggest that the key is the imperfect information that job seekers have about the procedures and exact requirements that employers have when recruiting workers, yet their suggestions are that a longer search will generate higher wages. This refers to the perfect circumstances where the decision of the employee is not influenced by different socio-economic conditions, but the search period is only dependent on the individual qualifications and that one is ready to wait longer until they are placed in a matched job-skills position with appropriate remuneration. Many other authors have utilized the search theory in order to provide insights into how dispersed wage equilibrium can exist. Following Burdett and Mortensen (1998) wage dispersion exists even when all employees are equally productive in all jobs. The authors further argue that other strong predictors of the relationship are the following: (i) people with more years of experience are more likely to find higher-wage jobs, (ii) there is a positive relationship between the size of the labor force and wages and (iii) there is a negative association between wages offered and quit rates (p.258).

Considering the overview of the literature presented above, it is clear that there are several ways to approach the skills mismatch issue. Nevertheless, although many scholars have tackled the issue of mismatch, there are always gaps to be filled, hence in this paper the attempt is to explain further the impact of the search period on the possible mismatch in the Macedonian labor market.

### **3 Data and Descriptive Statistics**

#### **3.1 Motivation and context**

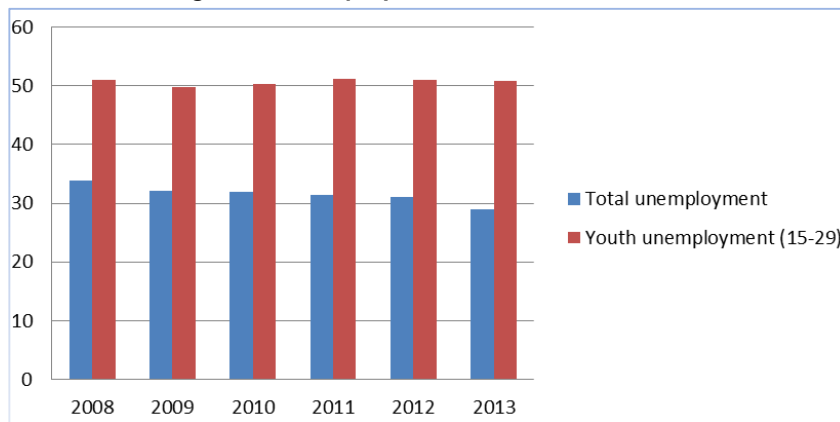
Macedonia represents an interesting context for investigating the labor market and skill mismatch with reference to young adults in particular. The unemployment in Macedonia started rising drastically after 1995 when the transition started and the structural changes took place. Contrary to the expectations that the labor market would become more competitive, the reality showed that human capital stock was not ready for the fast market changes, which in turn resulted in high job losses. Even though the latest unemployment figures suggest that there is a decreasing trend, the unemployment rates are still quite high. This is despite many active measures<sup>1</sup> from the

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<sup>1</sup> Action plan for employment in the Republic of Macedonia 2006-2008; Action plan for employment in the Republic of Macedonia 2009-2010; National employment strategy 2015; Action plan for employment in the Republic of Macedonia 2011-2013; Operational plans for active employment policies and measures (annual frequency); Action plan for youth employment 2015 etc.

government directed at reducing the unemployment, supported by the inflow of FDI, mainly in the fields of industry (automotive) and textile. The high and persistent total unemployment rate reflects in youth unemployment, too, where the figures are strikingly high. These are almost double for the observed period, around 50% (total unemployment 28% and youth unemployment as of 50% in 2013).

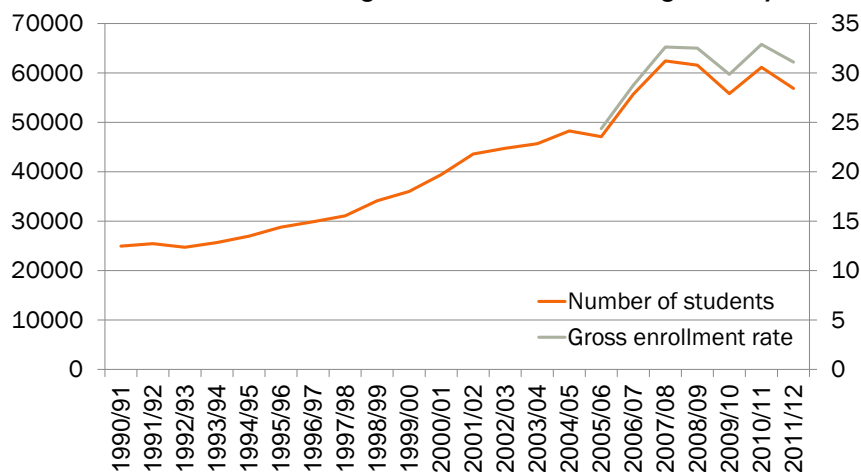
**Figure 1: Unemployment rates in Macedonia**



Source: State Statistical office and authors calculations

At the same time, as presented in Figure 2, within the last twenty years the number of students which have enrolled in higher education has almost tripled, and this trend was not followed by a proportional increase in the number of job vacancies for highly educated workers.

**Figure 2: Number of students enrolled in higher education or enrolling in 1st cycle studies over time**



Source: State statistical office

Looking at the cross-section of one academic year enrollment (2012/2013) it is evident that there is a major discrepancy between the popularity of social and natural sciences in the sense that social fields of study are more attractive to students.



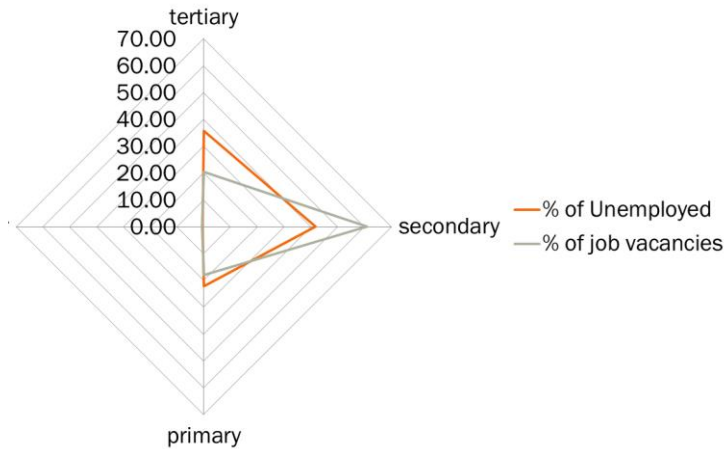
**Table 1: % of Students enrolled in a particular field of study (1st cycle degree) 2012/2013**

<b>Social Sciences</b>	<b>% of total students</b>
Economics, Management, Business Administration	22.32%
Law, Political Sciences, Journalism	14.95%
Tourism	4.67%
Agricultural studies	2.55%
Philology, Philosophy	17.68%
Pedagogy	7.88%
Arts and other	4.49%
<b>% of total students enrolled in Social Sciences</b>	<b>74.55%</b>
<b>Natural Sciences</b>	
Biotechnical sciences	5.40%
Architecture	5.24%
Civil and mechanical engineering	3.02%
Natural sciences and mathematics	7.02%
Electrical engineering and IT	0.47%
Technical sciences and other	4.30%
<b>% of total students enrolled in Natural Sciences</b>	<b>25.45%</b>

Source: State statistical office

In order to draw a conclusion regarding the potential for mismatch, we also look at the spread of available job vacancies. Considering the trend identified above, Macedonia should be characterized with an increase in job vacancies and career possibilities for social science students. Analyzing the data available from the State Statistical Office and the Employment Office in Macedonia, we can see that the spread of available job vacancies is highest for people with secondary education (manufacturing and services), which is inconsistent with the trend in education. Additionally, we see that the available positions for people with only primary and higher education are significantly lower.

**Figure 3: % of Unemployed vs. % of Job Vacancies for year 2013**



Source: State statistical office

This suggests that there is an existing imbalance between supply and demand on the Macedonian labor market, or more specifically that there is a gap between skills offered and skills required. Moreover, the fact that the trend in education is not followed by an appropriate trend in job vacancies also points to a different problem – a large number of graduates are being forced into accepting non-graduate level jobs. In other words, such characteristics of the labor market in Macedonia force many people with higher education to end up in a position that requires less education and simpler skills. Such conclusions are also supported by the School-to-Work transition survey (2012) which found that 19% of Macedonian youth settle for lower skilled job positions, and 14% held positions that are above their educational level. This means that a substantial proportion of young workers have an education which does not match the requirements of their jobs. In terms of the results suggesting that a portion of the Macedonian youth are on positions for which they lack the appropriate educational background, especially for the ones that are “undereducated”, this could be a signal of the existence of favoritism or nepotism. In the Macedonian context, knowing the political and economic situation, it is expected to have a disparity in the skills and position held, especially when one is undereducated, as many of the positions are kept or created to “award” employees for specific engagement with the political party. This leads to a very important point at the beginning of the paper, that in the Macedonian context, some of the results cannot be explained exclusively with economic intuition on the topic, but rather with the general socio-economic and political circumstances.

**Table 2: Education-employment mismatch**

	Overeducated	Undereducated	Primary education or less	Secondary education	Tertiary education
Armenia	21.6	11.4	0	57.1	42.9
Cambodia	4.2	56.4	61.8	33.6	4.7
Egypt	11.1	33.9	31	49.3	19.6
Macedonia	19	14.4	15.5	58.3	26.3
Jordan	9.4	43	47.2	18.3	34.6
Liberia	9.3	45.7	44.9	49.7	5.3
Malawi	1.7	81.8	83.3	14.8	1.9
Peru	30.1	17.4	18.7	48.7	32.6
Russian Federation	13.8	31	6.9	39.7	53.5
Togo	3.6	54.7	54.5	42.6	2.9

Source: School to Work Transition Survey, various countries, ILO 2012

Answering some of the questions concerning youth unemployment resulting from skills mismatch is of special policy relevance, since the creation of effective and successful national strategies and policies for enhancing youth employability should initially rely on in-depth analysis which reflects the current labor market conditions in Macedonia. However, to the best of our knowledge, there is a lack of empirical studies with regard to this. An investigation into the extent to which workers' skills are matched with the requirements of their jobs can lead to major policy implications, mainly aimed at the promotion of youth employment. Such an investigation can provide useful insights into how the labor market should reform in order to be fully able to accommodate the increased inflow of individuals with higher education.

### 3.2 Data

For the purpose of answering the research questions, we use the School-to-Work transition survey (SWTS), a unique survey prepared by the national statistical offices for ILO's purposes, which includes relevant information on youth labor market (15-29 years). The survey includes cross-section information on movements in the local labor markets; it is very useful and applicable for investigating more labor market issues and its determinants. Namely, the SWTS includes five body parts: demographics (personal, family and household information); formal education/training, activity history and aspirations; young workers; non-working youth; and youth not in the labor force. The purpose of this survey is to provide policymakers and researchers with comprehensive and analytical reports on the difficulty that young people face in transitioning from education to a job (Matsumoto and Elder, 2010).

The SWT-survey, used in this study, was conducted in 2012 for Macedonia on a total sample of 2,544 individuals. It was calculated based on the census data from 2002, using those between the ages of 15 to 29. The stratification was done in two ways: geographically and the size of region. There are 32 stratas created for the purpose of the survey. The allocation of the respondents was relative to the census data from 2002 and accordingly distributed to each stratum. The stratas for the enumeration regions were done following the NUTS 3 classification, based on eight regions, rural urban and according to the size of the region (below 90 and above 91). In all our analysis based on the data, descriptive statistics and econometric analysis, we include the sample weights (ready in the survey) in order to avoid possible biases from non-response, stratification, etc. Initial descriptive statistics from the SWTS that we find important for our study suggest that 76.9% of the young people in Macedonia seek a job for more than a year; Almost 50% of young people already employed have spent more than a year to find that job; more than 54% claim that there are not enough available positions related to their qualifications; 14.4% argue that the requirements for the job were higher than the education/training they received. As it is explained in the next section, some questions in the SWTS follow a nested structure which means that subsequent questions are conditional upon a previously answered question. Hence, not all questions are answered by all respondents, and as a result, when estimating the model, some observations were omitted. Because of the fact that some questions are excluded, we work with smaller samples in order to answer the research questions in this study.

After inspecting the structure of the employed workers in the survey according to ISCO9 and ISCED classifications, we obtained this matrix suggesting that the highest percentage of people that are on a matched position have secondary education; referring to section 2, this complies with the market requirements.

**Table 3: % of undereducated, match and overeducated, by level of education**

	University	Secondary	Primary	<b>total in %</b>
undereducated	5.37%	6.07%	0.00%	<b>11.44%</b>
match	12.31%	42.98%	8.32%	<b>63.61%</b>
overeducated	2.95%	5.89%	16.12%	<b>24.96%</b>
<b>total in %</b>	<b>21%</b>	<b>55%</b>	<b>24%</b>	

Looking further into details (Table 4, column Total in %) it is evident that out of the total employed respondents, only 43% are on a matched position, whereas 36% are undereducated for the position that they are holding and 20% are overeducated for the current position, according to the ISCO9 and ISCED classifications.

**Table 4: Occupation-ISCO9 classification**

	Professional, technical and related workers	Administrative and managerial workers	Clerical and related workers	Sales workers	Service workers	Agriculture, animal husbandry and forestry workers, fishermen and hunters	Production and related workers, transport equipment operators and laborers			Total in %
Undereducated	0.14%	2.86%	3.55%	2.46%	6.41%	0.00%	0.00%	0.27%	21.01%	<b>36%</b>
Matched	0.27%	9.00%	0.41%	1.50%	14.60%	2.73%	1.09%	6.68%	6.55%	<b>42.9%</b>
Overeducated	0.27%	0.55%	3.41%	0.14%	1.50%	3.55%	10.23%	0.82%	0.00%	<b>20%</b>
<b>Total in % by groups</b>	Group 1 <b>0.68%</b>	Group 2 <b>12.41%</b>	Group 3 <b>7.37%</b>	Group 4 <b>4.10%</b>	Group 5 <b>22.51%</b>	Group 6 <b>6.28%</b>	Group 7 <b>11.32%</b>	Group 8 <b>7.77%</b>	Group 9 <b>27.56%</b>	

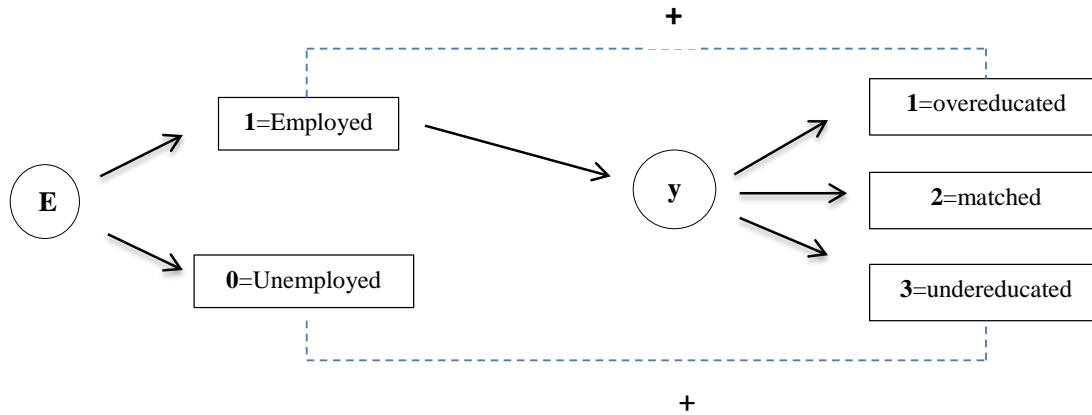
### 3.3 Model specification

In order to investigate the influence of the duration of the job search period on the possible skills mismatch and the determinants of the mismatch in particular, we estimated a model using the questions in the available SWTS which follow a nested structure of choice. This means once one choice is made, the following choices are conditional upon it. In order to achieve this we begin by estimating a probabilistic logistic models, which are appropriate for choice settings in which the selection process possesses a hierarchical structure, as when a final choice decision is made as a sequence of decisions, each being dependent on the previous (Suh, 2008, p.14). The structure of our model is such that it has two levels (sequences). The decision in the second level is conditional on the decision in the first level of the model. Nevertheless, in a nested structure some “choices” are implicit; i.e. once one gets employed, he or she can be in one of the following three categories: overeducated, undereducated or in a matched position, meaning the choice is instantaneous within a nested structure. By using the nested Logit model, in attempt to deal with correlation between alternatives, grouping similar alternatives into nests within which the Independence from Irrelevant Alternatives (IIA) does hold (Williams, 1977). Choices are correlated inside the nest but independent between the nests. Due to this, if one variable is used in the first sequence of the model, it cannot be used in the second. We did not proved the IIA hypothesis of the nested logit, however we include it in the report since it is very intuitive first step of the analysis. In order to solve the sample selection bias problem which can appear after excluding the not observed search duration period for the unemployed individuals in the estimation sample and

obtain efficient estimates we further proceeded with estimation of probit selection model (the Heckprobit model).

Our model, presented below, includes endogenous (observed and unobserved - latent) and exogenous indicators.

**Figure 4: Model specification**



Explanation for the probability (P) a young person to be employed is obtained by the following model:

$$P[E|X_1] \text{ and } P[y|X_2, E = 1]$$

Where: E represents the employment state (1 being employed and 0 being unemployed); y represents the categorical variable<sup>2</sup> which reflects a skills mismatch i.e. whether a young person has a higher, adequate, or lower education than the work position requirement.

### 3.4 Estimations

The econometric model is estimated using the SWTS on a sample of 1239 respondents that participated in the labor force: at the time being already working or actively seeking for a job. Several variables were created from the survey indicators due to the requirements for the model: (i) employment status of the respondents, (ii) mismatch variables, and (iii) dummy variables for level of education, gender, region, income, search period and migration. From the available data we have constructed two mismatch variables, one subjective and one objective. The subjective variable is constructed from personal evaluation of the respondents regarding how they perceive themselves on the current working position. Whereas, the objective mismatch variable is

<sup>2</sup> It can be interpreted as ordered or nominal, in this papers estimations it is treated as nominal.

constructed from two separate variables of the survey: field of work according to the ISCO classification, which was redefined according to conversion of classification of education classes (ISCED) for each ISCO group, and then the required level of education for certain position was compared to their highest level of education completed. In the table below we present the difference between the subjective and objective definition of the mismatch:

**Table 5: Skills Mismatch (%)**

	subjective	objective
Overeducated	23.74	36.7
Matched	72.71	42.84
Undereducated	3.55	20.46

What we found interesting is that in the subjective definition only 3.6% of the respondents perceived themselves as undereducated, whereas according to the objective definition 20.5% held position for which they possessed lower skills than required. Opposite to this, the subjective mismatch variable is suggesting that fewer people perceived themselves being overeducated for the current position (only 23.7%) whereas the objective one is showing us that there are more employees overeducated for their positions (36.7%). Both variables are providing different views regarding how many respondents are at matched positions. Namely, under the subjective definition, close to 73% of respondents believe their skills are matched with the requirements of their current job, whereas under the objective variable only 43% of respondents are currently at matched positions.

Table 5 provides a summary description of the variables, the number of observations, and their mean and standard deviation.

**Table 5 : Description of the variables**

Variable	Obs	Label	Mean	Stan. dev.
The employment status (employed)	1239	Dummy variable equal one if the respondents is employed, zero otherwise.	0.59	0.49
The education level (mismatch)	733	Distinguishes three categories: overeducated (employees whose current position requires lower education qualifications than what they possess), matched (employees who possess adequate education level for the position they hold) and undereducated (employees whose current position requires higher education qualifications than what they possess)	1.84	0.74
Elementary	1050	Dummy variable equal to one if the respondent's highest completed level of education is elementary, zero otherwise.	0.18	0.39

Secondary	1050	Dummy variable equal to one if the respondent's highest completed level of education is secondary, zero otherwise.	0.61	0.49
University	1050	Dummy variable equal to one if the respondent's highest completed level of education is tertiary, zero otherwise.	0.20	0.40
Age	1239	Years at the moment of participating in the survey, can capture some unobserved skills.	23.75	3.46
Gender	1239	Dummy variable equal one if male, zero otherwise	0.61	0.49
Search period (searchall)	1191	Continues variable that encounters the total labor force and take several values: "0.5" searching up to one month, "1.5" searching between one and three months, "4.5" searching between three and six months, "9" searching between six and 12 months, "18" searching between 12 and 24 months, and "36" if searching longer than 24 months.	18.25	15.53
Regional unemployment rate (unempregion)	1239	The country is divided in eight regions and each region was given the appropriate unemployment rate.	29.71	11.36
Regional dummies	1239	Vardar	0.12	0.32
	1239	East	0.09	0.29
	1239	Southeast	0.19	0.39
	1239	Northeast	0.08	0.28
	1239	Polog	0.13	0.33
	1239	Pelagonija	0.12	0.32
	1239	Skopje	0.12	0.32
	1239	Southwest	0.09	0.28
Poor	1239	Dummy variable equal to one if the respondent comes from poor household, zero otherwise.	0.25	0.43
Parent's highest education (maxeduc)	1214	Calculated as a maximum education level of both parents.	12.24	2.61
Migrate	1239	Dummy variable equal to one if the respondent has migrated, zero otherwise.	0.07	0.25

Before proceeding to the results it is worth mentioning that the model was estimated with both definitions of mismatch (subjective and objective). However, the subjective definition provides results that cannot be presented due to lack of observations for the "undereducated" category (which prevented estimation convergence). Hence, only the objective definition analysis of the mismatch variable is being presented.

Our estimation approach begins with an assumption that one individual that participates in the labor force can have two probable statuses: employed (one) or unemployed (zero). If in the first "sequence" an individual is employed, in the next it can take one of the three probable alternatives: being overeducated, being matched or being undereducated.



**Table 7a: First sequence - nested logit estimates**

Total sample:1050	employed		
	elementary	secondary	university
Age	<b>0.239**</b>	<b>0.222***</b>	<b>0.453**</b>
Gender	1.677	<b>0.595*</b>	-0.221
Mothers (chilwom)	0.630	0.137	-0.212

\* Significantly different from zero at 95 percent confidence

\*\* Significantly different from zero at 90 percent confidence

\*\*\* Significantly different from zero at 99 percent confidence

We start by considering several socio-demographic variables such as age, gender and whether the respondent is a mother. In terms of age, empirical studies have suggested that the probability of being employed varies with age. Namely, it tends to first increase with age as individuals collect more experience and knowledge, and then to decrease because of old age and reduced productivity. In terms of gender, by investigating markets in Latin America, Edwards and Lusting (1997) argue that the probability of being employed is systematically higher for men than for women of the same age and educational background (p.323). Also, by considering OECD countries, Kostoris and Lupi (2002) and Quintano et al. (2012) found that being a female is related with a higher probability of being unemployed. Looking at the first sequence, as a starting point for conditional nested analysis, we found that the likelihood of being employed increases with the age at all education levels (elementary, secondary and tertiary) suggesting that the higher the experience in the labor market the higher the probability of getting a job. In this case we assume age as a proxy for experience, even though it can be argued that age can be a poor proxy for experience (Mincer, 1974). Nevertheless, as argued by Zoghu et al. (2010), age along with education levels can capture for the potential experience on the individual. Additionally, for respondents with secondary education, males have a higher likelihood of getting a job which might be a signal for possible female discrimination. Overall, and at a given age, we can say that the likelihood of one being employed is higher if one has higher level of education. Having in mind the nature of the survey, the percentage of employed people with secondary education is expected to be higher compared to others. There are two main reasons for this; one is the age constraint of the respondents, while the second one is due to a change in the legislative that declared secondary education to be mandatory for all. Additionally to this, as mentioned previously, female discrimination is suspected for those with secondary education. The discrimination suspicion arose from the labor market developments, for in the past years most of the FDI inflows were in technical and mechanical field. But this can be only transitory, since Macedonia is a textile industry country, branch that employs high portion of female workers. In

table 8 we give brief overview on the highest level of finished education for female participants in the labor force.

**Table 8: Female workers distribution:**

	University	Secondary	Primary
undereducated	5.26%	4.31%	0.00%
Match	19.14%	37.32%	11.00%
overeducated	5.26%	6.22%	11.48%

The second sequence accounts for the impact of the job search length on the likelihood of one to be overeducated, undereducated or matched for the position. For better understanding what is happening on the market we are estimating three separate regressions for each education level (primary, secondary and university) and we can see how the job search length can influence the matching for each education level. The motivation for this segmentation came from the initial descriptive statistics of the Macedonian labor market for 2012 (as presented in Section 2) where it was evident that a significant excess supply of job seekers with tertiary and primary education existed, while the market was in an excess demand for employees with secondary education. This may give us an insight why people even with a lengthy job search might still end up in a non-matched position, i.e. from the radar in section 2 it can be stated that there is likelihood for job seeker to end up in a position for which he or she will be either undereducated or overeducated.

**Table 9: Second sequence - nested logit estimates**

Subsample: 733	elementary		secondary			University	
	matched	under	Over	matched	under	over	matched
Search period (searchall)	<b>-0.291*</b>	-0.011	<b>-0.079***</b>	<b>-0.057***</b>	<b>-0.054**</b>	<b>-0.237**</b>	0.006
Regional unemployment rate (unempregion)	-0.415	<b>-0.654*</b>	-0.1869	-0.201	<b>-0.174*</b>	0.081	0.14
Vardar	-13.771	11.594	2.229	1.846	0.97	-7.684	5.101
East	11.536	-28.324	-0.59	-0.33	-1.301	7.32	1.952
southeast	9.486	<b>-15.968*</b>	0.575	-2.104	-2.161	6.266	-1.239
northeast	7.486	<b>17.536*</b>	2.104	4.846	3.267	6.092	-8.652
Polog	6.457	1.65	-2.32	1.316	0.829	<b>11.163**</b>	<b>-7.566*</b>
southwest	13.78	5.012	2.629	2.292	2.283	-8.664	4.344
Poor	7.046	<b>-6.667*</b>	0.851	-1.33	-0.764	<b>-17.223*</b>	12.453
Parent's highest education (maxeduc)	-1.563	0.716	-0.217	-0.006	-0.115	0.751	-0.282
Migrate	<b>10.449*</b>	-5.487	-0.617	-0.018	-1.019	-13.454	15.412

- \* Significantly different from zero at 95 percent confidence
- \*\* Significantly different from zero at 90 percent confidence
- \*\*\* Significantly different from zero at 99 percent confidence

The initial results suggest that length of job search period has a negative impact on the probability of getting a job. Namely, as it is indicated from the nested logit estimates presented above, the search period coefficient is always negative, and it only changes in magnitude across different groups suggesting that the higher the search period the lower the probability of getting any kind of job (matched or not). Therefore, longer search period implies a lower probability of getting a job. One rational behind this might be employers' preferences to hire individuals with experience related to the job opening, hence in this regard individuals that have been searching for a job for a longer period have a disadvantage. Moreover, as mentioned previously, in Macedonian labor market the probability of being employed could also be influenced by social-economic and political circumstance among which relationships with individuals active in the political or business arena are considered to be crucial. Individuals that spend significant time searching for a job fail to establish such relationships. Our estimates are also in line with the initial descriptive statistics, for individuals that are in groups having excess labor supply, with finished only elementary education, it is less likely to get a matched position for their skills. For the individuals with university degree, if they search for a job longer, it is less likely that they will get in a position for which they are overeducated. However this is a little bit misleading when one considers the fact that the job creation in Macedonia is mostly in the secondary/technical fields, so it is expected that the longer they wait, the likelihood of being in a position for which they are overeducated will increase. For individuals that are with secondary education, the estimates are in line with the initial descriptive on the labor market; meaning individuals with secondary education are likely to have shorter search periods. However as the search period increases the likelihood of getting a good position decreases.

In terms of individuals with primary education, the only likely outcomes are that they can be matched or undereducated for a position. Our estimates suggest that the longer the job search duration is, the less likely a person with low education will be in a matched position for his or her skills. This too can be explained by the market situation (presented in section 2), for the market has excess supply of workers with primary education. Regional unemployment estimates suggest that relative to the unemployment rate in the region it is less likely that one will be in a position for which he or she is undereducated. However when controlling for different regions, the estimates suggested that there is high likelihood that if employees are from the Southeast or Northeast region of the country they will be undereducated for the position. This might be partly explained by the fact that within the last several years these two regions were characterized with significant growth

in tourism (in the Southeast region) and FDI inflows (in the Northeast region) and most of the positions that were opened required technical skills (secondary and vocational education). Being from a poor household suggests less likelihood for one to be undereducated for a position, which may imply that coming from poor household decreases the likelihood that the one will be in a position for which he or she does not possess compatible skills. This can be explained by the fact that individuals who come from poor households probably had limited access to education and training hence the jobs that they possess are for workers with basic skills. The estimates of the migration variable suggest high likelihood that one is in a matched position after migrating meaning that one most likely migrated for a job.

The estimates of the job search duration period for respondents with secondary education are suggesting that the longer the search period is the less likely a person will be overeducated for the position that he or she will earn, and there is almost same likelihood that he or she will be in undereducated or matched position. Further, the regional unemployment estimates suggest that relative to the unemployment rate in the region it is less likely that one will be in a position for which he or she is undereducated. One possible reason for this can be the fact that once a person leaves the education system in Macedonia, he or she rarely engages in further formal or non-formal training so the unobserved skills relative to experience (proxied by the age) are limited. This can partly be explained with the labor market situation that there is an excess demand for workers with secondary education and probably they have shorter search periods.

Investigating the likelihood of the individual with tertiary education to be in a mismatch position explained by the job search duration variable suggests that it is less likely that one will be overeducated for a position if the search period is longer. However, the likelihood for one respondent to be overqualified or in a match position can be dependent on the region of residence. Namely, it is very likely for an individual that lives in the Polog region to be overeducated for the position he holds, hence it is less likely that one will be in a match position. This is very typical for the Polog region, where in the last 15 years two universities have been established and motivated people to continue their studies to higher education, while at the same time this region is characterized with a job creation process that is more in services - a market segment that requires more vocational training and skills. This might be partly explained by the severe labor market conditions, strong social network and high politicizing of almost every aspect of living, meaning that by coming from a poor family you have limited access to business people and that can influence the job prospects one will have, regardless of the formal skills and education.

Regarding the variable search all, the nested logit results are negative for all education levels, and this is expected due to the fact we do not have perfect market conditions and each candidate before getting in to employment had a specific search period length. The lower the coefficient is the shorter the search period is, meaning that in a labor market segment according to education attainment, with higher job offer the search period will be shorter compared to the opposite. It is also the case if someone is in a position for which he or she is overeducated, which does not mean he or she got into that position straight away, but rather after searching for some time period, and taken into consideration different variables which influence the decision can end up in a position for which he or she is overeducated. This time period might be expected to be even higher, as people that are highly educated are prone to be more selective when it comes to accepting a job for which they are, or they assume to be overeducated.

As already mentioned, due to the problem with the IIA in the nested logic estimation, we proceed with the probit selection model (the Heckprobit model) in order to solve the sample selection bias problem. We again proceed with three main specifications for the three possible job (mis)matching positions (over, matched and under). The estimation results and the marginal effects of the heckprobit model are presented in table 10. In two out of three estimation specifications  $\rho$  is non-significant, which suggest that for the specification of over education and match we did not find statistically significant evidence that exclusion of the observations for the unemployed is generating sample selection bias; Whereas, for the estimation specification for the under education there is still some evidence of the selection bias. However with this specification we show improvement in the joint significance of the estimates.

**Table 10: Results of the Heckprobit estimations**

<b>Equation:</b>	<b>Overeducated</b>		<b>Matched</b>		<b>Undereducated</b>	
<b>Variable</b>	<b>Coefficient</b>	<b>Marginal Effect</b>	<b>Coefficient</b>	<b>Marginal Effect</b>	<b>Coefficient</b>	<b>Marginal Effect</b>
university	1.773***	0.324***	-1.499	-0.532*		
secondary	1.087***	0.198***	-1.576*	-0.559**	0.640***	0.196***
elementary			-1.689*	-0.599**	1.156***	0.353***
age	-0.055***	-0.010***	0.079**	0.028***	-0.073***	-0.022***
gender	0.299**	0.055**	-0.374**	-0.133**	0.094	0.029
unempregon	-0.035***	-0.006***	-0.009	-0.003	0.029***	0.009***
poor	0.060	0.011	-0.064	-0.023	0.156	0.048
polog	-0.476	-0.087	0.263	0.093	0.128	1409
east	-0.080	-0.015				
vardarski	0.552**	0.101**	-0.081	-0.029	-0.245	-0.075

northeast	0.466	0.085				
southwest	0.490	0.090	-0.175	-0.062	0.007	0.002
searchchall	-0.009*	-0.002*	-0.009	-0.003	0.024***	0.007***
<b>Selection equation</b>						
university	-0.171		-1.374***			
secondary	0.2278*		-1.019**		0.256**	
elementary			-1.308***		-0.034	
age	-0.039***		-0.0375***		-0.035***	
gender	0.101***		0.112***		0.069***	
unempregion	0.268**		0.261**		0.231**	
poor	-0.065***		-0.031***		-0.037***	
polog	-0.462***		-0.427***		-0.404***	
east	0.241					
vardarski	0.040		-0.124		-0.102	
northeast	0.667***					
southwest	1.248***		0.243		0.248	
searchchall	0.883***		0.260		0.303	
urban	-0.066		0.023		-0.047	
marital						
1	0.215		0.194		0.140	
2	0.297**		0.318**		0.358***	
3	0.535		0.884*		0.627	
<b>Model Criteria</b>						
Total number of						
observations	1035		1035		1035	
Censored observations	467		467		467	
Uncensored observations	568		568		568	
Log Likelihood	-147947.4		-170157.8		-154011	
Wald chi2	289.36		30.04		188.88	
Prob > chi2	0		0.0016		0	
Rho (Prob > chi2)	0.0678		0.6036		0.0043	
***1% significance; **5% significance; *10% significance						

Looking at the estimation results, we found that the probability of being overeducated and being undereducated for a position decreases with the age for 1% and 2.2%, respectively, whereas the probability of being on a matched position increases with the age for 2.8%. The estimates for the overeducated and undereducated suggest that increase in age does not increase the probability

of one becoming more employable due to the fact that if the individual was out of the job position is not getting more experienced despite the increase in age as a proxy for experience. The estimate for the matching position is expected as we assume that the increase in the age leads to more experience and better matching in the labor market. Additionally, males have a higher probability of getting on an over or undereducated job position of 5.5% and 2.9%, whereas probability of a male being on a matched position decreases for 13.3%. Considering the highest education degree possession, our estimates suggest that for the individuals with university degree there is 32.4% probability of being on a position for which they are overqualified, whereas for the individuals possessing secondary education degree there is a 19.8% probability for being overqualified. Similarly, getting a position for which one is undereducated increases by 35.3% and 19.6% for elementary or secondary degree, respectively. This may give us insight that even labor market participants with a lengthy job search will still end up in a non-matched position, i.e. from the radar in section 2 it can be stated that there is likelihood for job seeker to end up in a position for which he or she will be either undereducated or overeducated. Regional unemployment estimates suggest that relative to the unemployment rate in the region it is less likely that one will be in a position for which he or she is undereducated. The overall unemployment rate in the region decreases the probability for 0.6% of one being overeducated for a position, whereas it increases the probability of one being undereducated for a position for 0.9%. However when controlling for different regions, the estimates suggested that only in the Vardar region there is 10.1% probability that one will end up on a position for which is overeducated. Being from a poor household does not suggested any significant impact on the job matching. Looking at the searchall variable, the results suggest that length of job search period has a negative impact on the probability of earning a matched job. Namely, as it is indicated by the estimates presented above, the longer unemployment spell suggest decrease in probability of being overeducated for the position for 0.2%, which suggest the longer job search period would minimize the probability of one getting a position for which one is overeducated. Longer unemployment spell increases the probability for 0.7% of being under-qualified. Being under qualified may imply receiving a "higher than deserved labor income", so for the individuals with lower educational levels waiting for a position might pay-off in monetary terms, as they will be paid more for the lower education level and less skills. Longer unemployment spell does not indicate statistically significant probability of one getting a matched position. The ambiguous result of the search spell is not unexpected, due to the fact that we have positive effect of the job search period on the probability of one being undereducated and negative effect on the probability of one being overeducated for a specific position, so the search duration spell can have unclear impact on getting a matched position.

### 3.5 Survival analysis

In order to further check for the reliability of the results we proceeded with additional econometric estimation model, the duration/survival analysis. Following Florens et al. (2008) his method is also known as a "failure time process", that observes the probability of an "event" to occur in specific point in time (once one employed whether will be on a matched position, or will be overeducated or undereducated for it). In our model there are initially two possibilities, the event to occur (individual to get employed) or not to occur (the individual to remain unemployed). The moment the event occurs, we obtain the so called censored event, as that is the point when the observation for that individual stops. The "failure time process" is consisted of three stages: 1) the initial point in time; 2) duration of the survival (search period) and 3) the occurrence of the event (moment in time when one is getting employed, we get to know the matching between the education and the job requirements skills). We get information from the "failure event" meaning that once event occurs, we get insight about the link between the length of job search period and the position that one gets.

The Kaplan-Meier estimate is considered the simplest way of computing the survival analysis over time in spite of all difficulties associated with subjects and situations (Goel et al., 2008). Hence we start with the plots of Kaplan-Meier estimates of the survival function that assumes that the probability of one individual to get employed will exceed the time  $t$  within certain sample:

$$t_1 \leq t_2 \leq t_3 \leq \dots \leq t_n.$$

where  $t$  corresponds to the time when one gets employed (intervals between events are not uniformed). The estimator is nonparametric MLE of  $S(t)$ , is the product of the form:

$$S(t) = \prod_{t_i < t} \frac{n_i - d_i}{n_i}$$

where the maximum is taken over the set of all constant survival curves with breakpoints at the event times  $t_j$

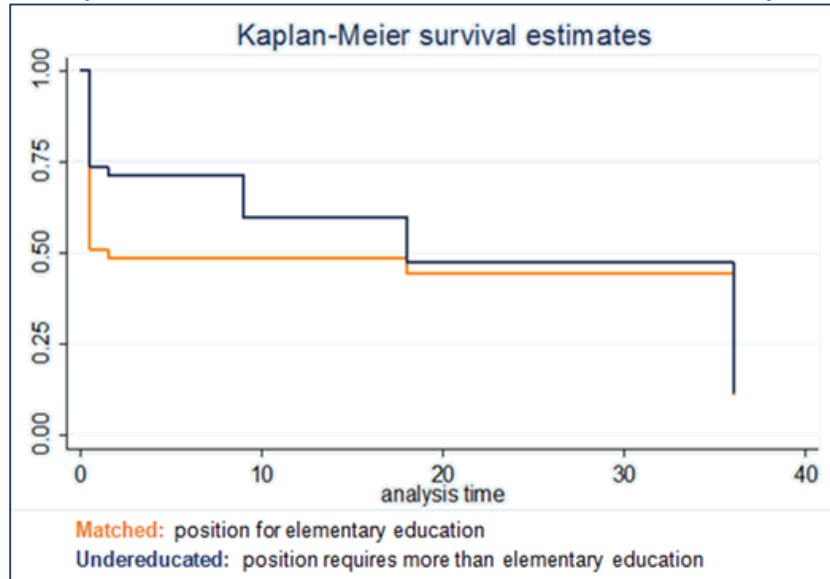
The initial findings we got from running the survival analysis on our data have confirmed the initial findings from the section 3.4 conditional probability model, suggesting that the longer the search period the likelihood that one will get any better job position (matched or not) decreases.

The Kaplan-Meier graphs for individuals with only elementary education suggests that the likelihood that one will get position for which he/she is undereducated is higher in the first periods of search and that likelihood decreases as the search period duration increases. However, at all points of search it is more likely that an individual will get a position for which he or she is undereducated,



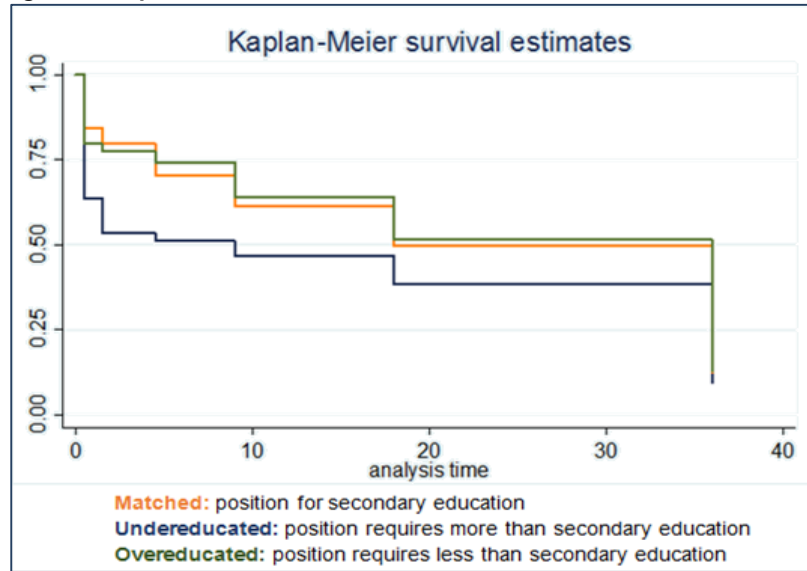
relative to the likelihood of getting a matched position. However, considering that the longer individuals wait, the likelihood of getting a job decreases, it is best if they accept the offers in the first periods.

**Figure 5: Kaplan Meier survival estimates for individuals with elementary education**



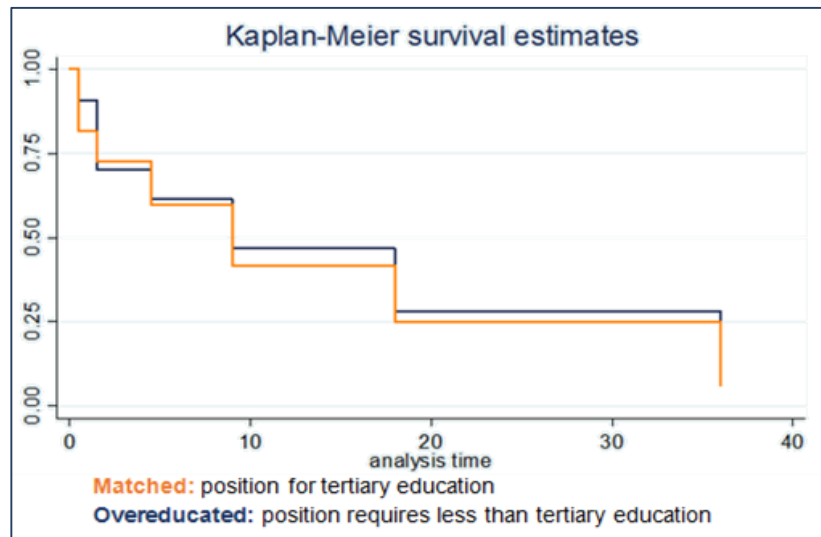
For the individuals with completed secondary education, the likelihood that they will be on a matched position is highest if they accept a job in the first periods of search, than it decreases and it is very likely that they will be on a position for which they are undereducated. On the other hand, the probability of getting on a position for which they will be overeducated is significantly low during the whole period and this complies with the situation on the labor market. For this individuals the best would be if they accept job in the first periods of search, because after some time the likelihood is higher that they will earn a position for which they are overeducated, consequently earn less for the skills they possess.

**Figure 6: Kaplan Meier survival estimates for individuals with secondary**



Finally, for the individuals with university degrees, the likelihood of being overeducated for a position is highest at the beginning of the search period. This can be partly explained by the lack of experience but as the search period increases the likelihood for obtaining matched position increases. Again referring to the situation of labor market and the slow job creating for university level educated people, the probability of one being overeducated is slightly higher compared to the likelihood of being on a matched position.

**Figure 7: Kaplan Meier survival estimates for individuals with tertiary education**



The model takes the reduced form:

$$searchall = \alpha + \beta educ.level_i + \beta reg.unemp.rate + \beta poor + \beta reg.dummies + \mu,$$

Where *searchall* is the length of the job search period,  $\beta educ.level_i$  can take value of elementary, secondary and university, represents the highest level of education finished,  $\beta reg.unemp.rate$  calculated for year 2012 for all the administrative regions in Macedonia, that are different in terms of economic development. *poor* dummy that accounts for social background of the respondent, which is assumed to have impact on the decision of how long one will wait for "good" job,  $\beta reg.dummies$  set of dummies for each region, and  $\mu$ , the error term.

In table 10 we present the Cox (1972) model estimates and hazard ratios where we only check for probability of being on a mismatch position for each education level. In general, the estimates from the Cox model are confirming the descriptive statistics and initial findings in the two level nested logit model and Kaplan–Meier survival estimates. Namely, the longer the search period the higher the likelihood that the one will be in e mismatched position.

**Table 11: Summary survival-time data**

	Time at Risk	Incidence Rate	No. of Subjects	Survival Time		
Total	86936	0.410992	4764	<b>4.5</b>	<b>36</b>	<b>36</b>

**Table 12: Survival analysis-Cox estimates**

	<u>Elementary</u>		<u>Secondary</u>		<u>University</u>	
	Hazard	Estimate	Hazard	Estimate	Hazard	Estimate
elementary	0.952	-0.049				
secondary			0.841	<b>-0.173***</b>		
university					1.431	<b>-0.358***</b>
unempregion	1.033	<b>0.033**</b>	1.037	<b>0.037**</b>	1.041	<b>0.041***</b>
poor	0.897	<b>-0.109*</b>	0.882	<b>-0.126**</b>	0.916	<b>-0.088*</b>
maxeduc	1.009	0.009	1.014	0.01	0.993	-0.007
vardarski	0.713	<b>-0.338**</b>	0.719	<b>-0.329**</b>	0.696	<b>-0.362***</b>
east	1.658	<b>0.506***</b>	1.801	<b>0.588***</b>	1.842	<b>0.611***</b>
southeast	2.333	<b>0.847***</b>	2.547	<b>0.935***</b>	2.677	<b>0.985***</b>
northeast	0.331	<b>-1.104***</b>	0.303	<b>-1.194***</b>	0.278	<b>-1.279***</b>
polog	0.651	<b>-0.429***</b>	0.636	<b>-0.452***</b>	0.605	<b>-0.502***</b>
southwest	0.491	<b>-0.712***</b>	0.458	<b>-0.782***</b>	0.44	<b>-0.820***</b>

\* Significantly different from zero at 95 percent confidence

\*\* Significantly different from zero at 90 percent confidence

\*\*\* Significantly different from zero at 99 percent confidence

From the estimates presented in Table 5 it can be noticed that when distinguishing between different education levels, the employees with different skills share similar length of job search periods. Moreover, the job search period increases relative to the unemployment rate of the regions meaning that the higher the unemployment rate of the region the longer the search period. When controlling for specific regions<sup>3</sup> we find that more developed regions (Vardarski, Northeast, Polog and Southwest) have negative significant coefficients. Such findings suggest that the search period is shorter in more developed regions and hence longer in less developed parts of the country (East and South east). Looking at the individual characteristics, as already indicated by the nested model, individuals with secondary education have shorter search periods. This is in line with our expectation considering the characteristics of Macedonian labor market explained earlier. Following the Cox estimates for individuals with tertiary education, we find that the search period for these individuals is longer as the market does not have enough job creation for high skilled workers. Hence the longer the search period, the higher the probability that a tertiary - educated individual will end up in a mismatched position. The estimate for the elementary education does not have any explanatory power.

## 4 Conclusions and policy recommendations

This paper attempts to investigate the impact of the job search duration period on the probability of one to be on a job position matched to his/her education level. For the analysis purpose we used cross-section SWT survey data for Macedonia collected in 2012. We have three possible outcomes, being on a matched position, being over-educated or under-educated for the obtained position. This differentiation is important due to the fact that Macedonian labor market is characterized by high unemployment rates and slow job creation on the labor demand side, and rapid and uneven labor force creation on the labor supply side. This is expected to be useful for improvement of the labor policies and labor market conditions in general. The findings from our analysis suggest that the longer the job search period, the more uncertain is the probability for being employed on a matched position. In particular, for the individuals with only elementary levels of education the likelihood of getting on a matched position is invers to the job search length. The probability of one employee with secondary/vocational level of education to be on a matched

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<sup>3</sup> Skopje and Pelagonija regions are omitted due to co-linearity

position is also lower as the search period is longer, but the search period for these individuals is shorter compared to individuals with elementary education which is in line with the labor market characteristics and job creation. Finally, for the employees with tertiary education levels, the probability of getting a matched position also decreases as the job search period increases. This is also in line with expectations since the job creation for the university level positions in Macedonia is very limited, so the longer one waits for a matched position the higher the likelihood of landing on a position for which he or she is overeducated. What is also revealed by this investigation is that not all groups are equally penalized by the unemployment spell. Namely, the results from our analysis suggest that individuals with tertiary education are affected the least whereas the elementary educated group is affected the most in the sense that individuals in this group are less likely to get a matched job when compared to the other groups. The insight from estimates looking at the three possible employment outcomes (overeducated, matched or undereducated) for the position held suggest that the individuals with university degree have twice higher probability of being on a position for which they are overqualified compared to the individuals with secondary education degree. When it is observed whether one is undereducated for a position held we found that probability of one with elementary education degree is significantly higher to be undereducated for the position compared to the one with secondary educational degree. Knowing this, it is indication that even people with a lengthy job search might still end up in a mismatched position.

These findings are confirmed by estimation methods and provide insight into the Macedonian labor market developments. First, it indicated that there is tremendous discrepancy between the supply and demand on the labor market associated with the high creation of labor supply mainly university level graduates, whereas on the side of the demand there is slow but also mainly secondary education level job creation. Policy makers should account for this issue when attempting to address the problem of high unemployment and when creating labor policies, especially active labor policies that are directed mainly towards the young workers. Second, there is difference in the labor conditions in different regions in the country and very low internal migration, except migration to the capital city. This partly can be assigned to the education system inefficiencies and lack of cooperation between the policy makers on both education and labor sides. Evidently, there are many laminations in this paper that mainly come from the data availability, yet many issues need further investigation and consideration.

However, the findings from this investigation are of great importance for Macedonian labor policy improvements. Undoubtedly, youth unemployment in Macedonia is one of the burning issues that can cause (i) social tensions and (ii) brain drain, having in mind that most of the youth is with tertiary education. Especially that there are many policies aimed at addressing the unemployment in

general, but the scope and impact of those is not measured yet and the current conditions are showing that there is a need for more policy engagement for reducing this problem. One of the policy priorities should be better communication and education of the young people how to plan the education in order to increase the employability, hence reducing the job search period. Another policy engagement should be directed in monetary social schemes directed towards young people that will encourage them to get more involved with the elementary occupations and vocational careers, since the job creation is mostly in the technical/manufacturing fields. Third policy recommendation is directed towards two main stakeholders, social employability and education policy makers. There should be better cooperation among these two ministries that can facilitate the communication between the education institutions and the real sector entities. This is important due to the fact that the education institutions will adjust their programs to the market needs, and produce professionals that can enter the market with specific skills, and on the other hand the real sector will have ready workers that can increase the overall productivity. This on long run will decrease the skills mismatch and reduce the job search duration.

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