

## Changing Educational Pathways and Economic Activity. Time and Space Aspects in Slovakia after 1989<sup>1</sup>

Michal SZABO – Branislav BLEHA\*

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### Abstract

*The study presents an empirical view on changes in educational pathways in the Slovak Republic, in relation to the changes in the economic activity of the population. The study is based on data from the three most recent population censuses carried out in 1991, 2001 and 2011. They represent a suitable data base for exploring the development of educational pathways. The study also provides a spatial view of regional differentiation at the level of administrative units LAU-I, districts. From the viewpoint of theory, the study is based on certain demographic and sociological theories, including the second demographic transition. The study tries to explain the changes in the phases of economic activity in relation to the changing educational pathways, which are primarily determined by altered reproduction pathways, i.e. by the timing of demographic processes. It originally combines labour market participation of various categories of economically active and inactive population, both in terms of age and at the level of the last three censuses.*

**Keywords:** education, educational pathways, demography of education, economic activity rates

**JEL Classification:** I25, J21, J24

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### Introduction

Today's world is dynamic, as it has never been in the past history. In times of knowledge economy and innovation, education appears to be one of the most crucial parameters of success. A special attention is paid in particular to higher education. After political and social events in 1989, the higher education system

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\* Michal SZABO – Branislav BLEHA, Comenius University, Faculty of Natural Sciences, Department of Human Geography and Demography, Ilkovičova 6, 842 15 Bratislava, Slovak Republic; e-mail: szabo44@uniba.sk; branislav.bleha@uniba.sk

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began its transformation to suit the new economic conditions. The next wave of transformation was launched in 1999 by the ratification of the Bologna Declaration and a year later the Treaty of Lisbon, which among other things talks about the knowledge-based economy. This took place in the form of new higher education centres, as well as in the form of increasing number of enrolled students and consequently also the number of graduates. This has rapidly and dramatically manifested itself in the change of the educational structure, namely in the representation of the tertiary educated population. According to the 1991 census, people with tertiary education represented 5.8% of the population. 20 years later, the 2011 census showed an increase of tertiary educated people, reaching 13.8%<sup>2</sup> of the population.

These changes in one of the population structures may have, and most likely also have an impact on other demographic phenomena and economic processes. It is necessary to add that in the case of post-socialist and transforming Slovakia, the parallel running of the second demographic transition also played a significant role in this regard. Life strategies and subsequent timing of demographic processes, such as maternity, have changed, resulting in the shift of phases in the life cycle of the population. The study is based on the assumption that there is a close link between reproduction pathways, educational pathways and, ultimately, the economic trajectory within the life cycle.

Demography of education is a relatively new sub-discipline (Barakat and Blossfeld, 2010). Its focus is in the analysis of the relationship between education and demographic phenomena and processes. In the sphere of economic research, it then merges into analyses of human resources in terms of educational structures (Moretti, 2002), especially when forecasting future potential of human resources, but also in terms of economic burden of the population (Lutz, Goujon and Doblhammer-Reiter, 1999; Lutz, 2010; Striessnig and Lutz, 2014).

An information about changes in educational structure of Slovak population has been relatively comprehensive so far. Recent studies observed mainly the absolute numbers of students. They focused also on some spatial aspects with regards to new universities; however; a deep structural view has been missing. There is a scope for additional analysis. The study brings a new view coming from the last three censuses, calculating and combining many of available data-censuses. The major theoretical works the study comes from, are the Second demographic transition and the Concept of Martin Throw. Their interlinkages to the problematics are discussed below. The study comes from two fundamental research questions and hypotheses.

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<sup>2</sup> The reference population in the 1991 census is the 15+ population, while the reference population in the 2011 census is the 16+ population. This small difference is due to a change in the legislation governing the length of compulsory schooling.

The first hypothesis has a spatial substance. The quantitative increase in absolute numbers and relative schooling rates is very likely uneven in terms of regional picture across Slovak regions. The level of districts (LAU 1) was used in this concern. The assumption is that more urbanised districts are forerunners in terms of educational „boom” that Slovakia faced after 1989 despite fact that the share of tertiary educated in these areas was higher even before 1989. Like in case of some other social and demographical processes (Bleha and Ďurček, 2017), they are to be something like the „cores of change” from which the changes are spreading into the other regions. On the other hand, the assumption is that the regional differences remain significant over time. There are a lot evidences of regional inequalities in Slovakia. Among others, the educational inequality would be one of the most typical. As Korec and Ondoš (2006) pointed out, the factor of settlement hierarchy and macro-location attractiveness matter very intensively, and their impact has been still very significant. There is one contra-argument as well. It lies in the boom of new universities founded across regions of Slovakia that bring the study more accessible in the regions with less or no tradition of the university education.

The second hypothesis deals with the structural aspects. The assumption is that the changes in age-specific participation rates are uneven. Moreover, the indicators of economic activity by the level of education has some more or less typical features with some changes over time (and space) strongly related to the transformation of life cycles from both the sociological and demographic perspectives as confirm several studies mentioned below. This study attempts to combine three (in some cases four) dimensions – time, age, economic structure and level of education to discover more or less expectable interlinkages between educational and labour-market features. As some authors have confirmed, there is a rapid shift in several lifecycle events among which the demographical ones are often stressed.

## **1. The Relevant Theoretical Concepts in Relation to Changes in Education**

### **1.1. The Second Demographic Transition**

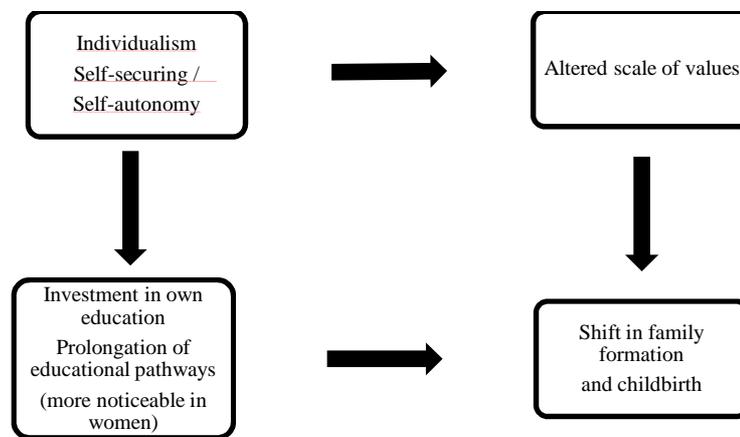
Although the concept of the second demographic transition was presented three decades ago (Lesthaeghe and van de Kaa, 1986; van de Kaa, 1987), it has not yet been fully accepted among demographers, and sporadically, it tends to be even challenged (Coleman, 2004; Koschin, 2005, Pastor, 2015). It certainly provides a very concise summary of the changes in demographic processes and

structures that have occurred in developed countries in the late 1960s and early 1970s. In post-socialist countries,<sup>3</sup> these changes were suppressed, as they could not penetrate the social, economic, but especially the political barriers of the Iron Curtain. Therefore, the above-mentioned changes occurred only after the fall of socialist regimes, i.e. in the late 1980s and early 1990s, and were supported by social and economic changes associated with the fall of the „certainty regime“ and the onset of the „capitalist uncertainty“.

The second demographic transition describes, among other things, changes in the approach to marriage. Not only on the part of the individual, but also on the part of the society that becomes (at least partially) more tolerant, with tendencies towards decrease in marriage rates, increase in the average age at marriage, increase in divorce rates, increasing proportion of cohabitation, increasing rate of births outside marriage and others (Mládek, 1998; Marenčáková 2006; Lesthaeghe, 2010). This is accompanied by a decline in birth rates and an increase in mothers' age at childbirth, resulting in a natural decline (2001 – 2003), only covered by profits from foreign migration.

Figure 1

**Basic Scheme of the Second Demographic Transition**



Source: Prepared by the authors, based on Lesthaeghe (2010).

Another aspect of the second demographic transition is the increasing degree of individuality, which, apart from some of the factors mentioned above, is also manifested by a greater desire for personal „well-being“. In addition to financial or housing security, this includes non-material security of personal growth, in

<sup>3</sup> Sometimes referred to as CEE (Central-East Europe) within the meaning of the position within Europe.

particular in the form of better education, formalized by undergoing higher education than was standard before the onset of the second demographic transition. Lesthaeghe (2010) summarized it as follows: „Alongside individual autonomy, self-realization will become a major goal in its own right. This will produce a rising demand for higher education, especially among women, stimulate other tastes and life styles, and result in sub-replacement fertility.“ A simple graphical representation of the process is given in Figure 1.

Increased number of students and tertiary educated people consequently influences other demographic processes and structures, such as reproductive behaviour (Šprocha and Potančoková, 2010; Testa, 2012; Tesching, 2012), mortality (Sobotík and Rychtaříková, 1992; Rychtaříková, 2005), or migratory behaviour (Groen, 2004; Šprocha, 2011a; 2011b; Striessnig and Lutz, 2014), or even religiosity (Hungerman, 2011).

## 1.2. Martin Trow's Concept (1974)

American Sociology Professor Martin Trow is best known thanks to his essays, in which he identified three basic systems of tertiary education (Trow, 1974; 2005). These changes were first captured in developed countries after the Second World War.<sup>4</sup> Elite education, mass education and universal education, these are the successive development stages of education systems that each society gradually goes through. The transition between these phases is determined by the proportion of enrolled relative to the reference population. These include the graduates of secondary education, who can continue their studies at institutions providing tertiary education.<sup>5</sup>

Trow (and subsequently, Brenann, 2004) points out in his essays that the boundaries between the various transitions are not fixed but indicative.

The system of elite tertiary education is limited to 15% of people admitted from the reference population in question. When the limit is reached, the system is forced to transform because it ceases to be able to fulfil its tasks due to the increasing number of students while maintaining the original conditions. After successful transformation into the system of mass tertiary education, this system is capable to admit a growing number of newly enrolled students up to the limit of 50% of the reference population. Because of this ratio of admitted students, the system is again forced to transform into a system of universal tertiary education.

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<sup>4</sup> While there was a transition from the elite to the mass system in the Western European countries, the transition from mass to the universal tertiary education system was recorded in the US.

<sup>5</sup> However, Trow himself does not explicitly state exactly what the reference population is, but the definition is the closest to his general statements.

However, the difference in the share of the admitted students is only external, although it is conditional. On the other hand, there are internal differences and these are conditional. These internal differences were comprehensively processed by Brennan (2004) and subsequently by Trow (2005). They summed up these internal differences into 10 specifics, for which they determined the form according to the relevant system of tertiary education.

In broader terms, we can talk about increasing openness and democracy. These are, in the end, the conclusions coming from well-recognized tertiary education researchers, such as Altbach, 1999; Guri-Rosenblit, Sebkova and Teichler, 2007; Teichler, 2003. Despite the fact that Trow published his first essays on this topic in the first half of the 1970s, other researchers later focused only on one aspect of tertiary education transitions (Pabian, 2008).

## 2. Data and Methodology

The source data come from the population censuses carried out in 1991, 2001 and 2011. They are available in the databases published by the Statistical Office of the Slovak Republic, or upon request at the Statistical Office of the Slovak Republic. While the first part of the empirical study focuses on the time aspect and compares the changes in the rates of schooling between individual censuses, the second part of the study focuses more specifically on the last census of 2011.

The main instruments are the quasi-specific rates and then their quasi-total rates (the names of the specific and aggregate rates will be used in the text below). Classical specific rates measure the number of demographic events at age  $x$  and the population size exposed to the „risk“ of this event at age  $x$ . The aggregate rate is the sum of these specific rates (especially age-specific rates). In this case, demographic events are replaced by participation in individual categories of economic activity of the population.<sup>6</sup>

Representation of the used indicators is as follows:

- The age-sex specific schooling participation rate represents the share of students in the population at different ages:

$$AS\ SP\ R = \frac{\text{number of students}_x}{\text{mid-year population}_x} \quad (1)$$

- Consequently, the cumulative rate of schooling participation is expressed as:

$$CR\ SP = \sum_{i=16}^{35} AS\ SP\ R_x \quad (2)$$

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<sup>6</sup> These are selected rates by EAO categorization according to the 2011 Census.

This rate determines how long (on average) the population remains in the educational process after completion of compulsory schooling.<sup>7</sup> Other rates are determined analogically.

- The age-sex specific employment rate:

$$ASER = \frac{\text{number of employed}_x}{\text{mid-year population}_x} \quad (3)$$

represents the share of employed in the population at different ages.

- The cumulative rate of employment:

$$CRE = \sum_{16}^{65} ASER_x \quad (4)$$

determines how long (on average) the population remains employed in the working process after the completion of compulsory schooling.

- The age-sex specific unemployment rate:<sup>8</sup>

$$ASUER = \frac{\text{number of unemployed}_x}{\text{mid-year population}_x} \quad (5)$$

represents the share of the unemployed<sup>9</sup> in the population at different ages.

- The age-sex specific retired rate:

$$ASRR = \frac{\text{number of retired pension}_x}{\text{mid-year population}_x} \quad (6)$$

represents the share of the population in the „retired” category at different ages. This category includes pensioners, who receive pension due to old-age or invalidity. Working pensioners are not included, since they are included in the category of the working population.

All rates used are further calculated separately for men and women, and separately according to the level of the highest attained education into 3 categories: primary – PRIM (primary education and secondary education without GED<sup>10</sup> certificate), secondary – SEC (secondary education with GED certificate and higher vocational education) and tertiary – TER (university/tertiary education).<sup>11</sup>

<sup>7</sup> In this case determined as the completed 16 years of age.

<sup>8</sup> The calculation methodology is different than the one used by the Headquarters of Labour, Social Affairs and Family.

<sup>9</sup> Unemployed persons actively seeking the job irrespective of they are in the evidence or not in time of census (see more in Datacube SODB (2011), <statistisc.sk>).

<sup>10</sup> GED – General education degree. Equivalent to “Matura”, or “Maturita”.

<sup>11</sup> As compared to Novotný and Pregi (2016).

For regression analysis is used simple linear regression.

- linear regression:

$$y = a + bx \quad (7)$$

- where parameter  $b$ :

$$b = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^n (x_i - \bar{x})^2} \quad (7.1)$$

- and parameter  $a$ :

$$a = \bar{y} - b\bar{x} \quad (7.2)$$

- coefficient of determination  $r^2$ :

$$R^2 = \frac{\sum_{i=1}^n (\hat{y}_i - \bar{y})^2}{\sum_{i=1}^n (y_i - \bar{y})^2} \quad (7.3)$$

coefficient of determinations explains to what extent is variable  $y$  determined by variable  $x$ . It varies on scale  $<0, 1>$ , or in other words on scale  $0 - 100\%$  (i.e.  $R^2 = 0.35$  means variable  $y$  is determined by variable  $x$  by  $35\%$ ).

### 3. Results

#### 3.1. Development in Nationwide Participation in Education in the Period of 1991 – 2011

Three population censuses, which took place after November 1989, point to a significant change, which took place in educational pathways of the population. It is not only well known gradual increase in the number of students, but also the shifting of the completion of education and the resulting change in the age structure of students.

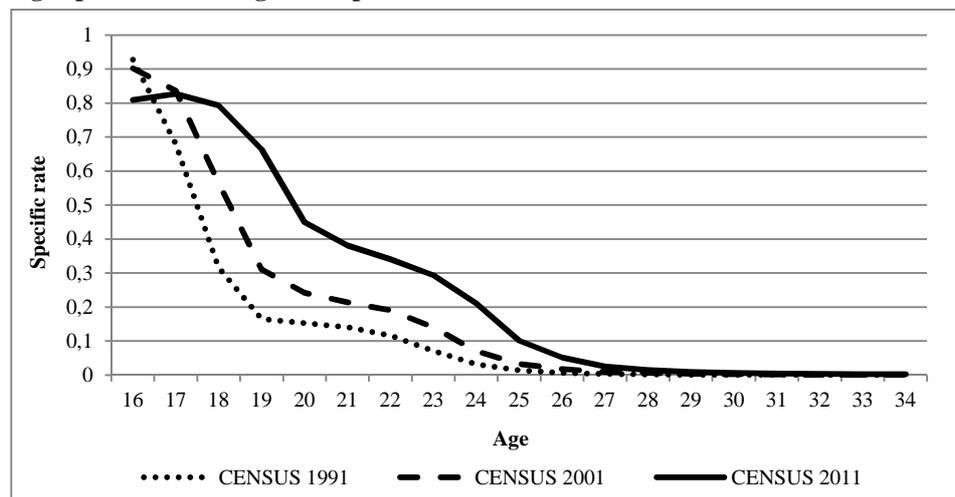
The general and expected trend in all three censuses is the high rate of schooling participation at the age of 16 years (0.80 – 0.96) and the subsequent rapid decline at the age of 19 – 20 years, after which the decline becomes moderate. Significant are also the changes between individual censuses (Figure 2). When looking at the individual time slots, the first two censuses (1991, 2001) demonstrate a similar pattern, although a shift of the curves towards the right is clear in the second analysed census. The third census (2011) shows some significant differences and this is in time-line with the major changes on the university labour-market. The first difference lies in the considerable maintenance of a high

level of schooling participation up to the age of 18 (0.89) and the subsequent decline after the age of 20, but at almost double the level compared to the previous censuses. The following slowdown of decline happens at much higher rates and ends at the age of 23 years. This is followed by a gradual expectable decline down towards values close to zero. The biggest difference between 2011-census and the two previous censuses is thus between the ages 20 – 23 years.

The significant leap in the 2011 census is due, among other things, to the massive development of a network of universities after the change of regime in 1989. While the approximate number of students in that year reached 60 500, by 2006 their number increased to exceed 200 000 (Šprocha, 2013).

Figure 2

#### Age-specific Schooling Participation Rate



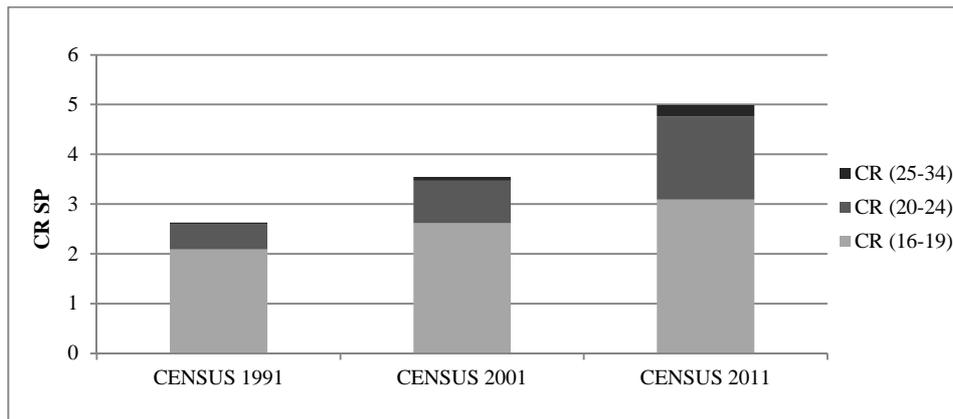
Source: Statistical Office of the Slovak Republic, Population Census (1991; 2001; 2011).

In the first period monitored, there is a sharp decline, which culminates at the age of 18 years, and subsequently decreases. This means that only a few students finish their studies at that age. Later, there is a slight increase culminating at the age of 23 years. In 2001, a shift of the first significant drop towards higher age is already noticeable together with reduction in the intensity of the decline. The first drop corresponds predominantly to the completion of secondary school, while the second one corresponds mostly to the completion of tertiary education. Rapid onset of leaving education in the first census of 1991 indicates secondary education without GED. Its gradual shift to higher age indicates a change of preferences from secondary education without GED to secondary education with GED. Moderation of this drop, in turn, indicates that more and more people continue in their studies. The shift of the second drop corresponds to the increase in

the number of undergraduates. Its extension points to more flexible options in case of unsuccessful graduation. Termination of an educational course does not automatically mean the successful completion of the given level of study.

Figure 3

### Cumulative Rate of Schooling Participation



Source: Statistical Office of the Slovak Republic, Population Census (1991; 2001; 2011).

Figure 3 demonstrates the gradual increase in aggregate rates. Between the first and the last census, the overall participation rate has more than doubled. This is an increase from 2.63 years, which corresponds to secondary education, to 4.99 years, which approximately corresponds to the first level of university studies. Similarly, age-differentiated aggregate rates have also grown up. CR SP (20 – 24) shows the most significant growth, as its values rose almost fourfold. Although the CR SP (25 – 34) rose to 7-fold, its values are still very low. Therefore, the last row of the table shows the relative value of CR SP (16 – 24) against the total CR SP, and thus expresses the extent to which the CR SP is explained. It is above 95% in all periods monitored. The increase in the category 16 – 19 years is induced by the lower share of 2 and 3 years study programs. Their graduates entered the labour market usually as 16 or 17 years old during communist period and in the first half of the 1990s.

### 3.2. Development of Participation in Education in the Period of 1991 – 2011 at the District Level (LAU1)

The censuses provide the opportunity to analyse schooling participation not only at the national level, but also at the regional level. In this section, the focus is paid on the total rate of schooling participation in the districts<sup>12</sup> of the Slovak

<sup>12</sup> The urban districts of Bratislava and Košice are aggregated.

Republic according to the last three censuses. The population census provides the results based on the permanent or usual residence. The permanent residence was used in this case.

In the light of the 1991 census results, majority of the districts show CR SP (cumulative rate of schooling participation) in the last interval (2.00 – 2.99), which corresponds to the national value of 2.63. Only 4 districts (Bratislava, Košice, Banská Bystrica and Zvolen) have reached the interval above. According to the 2001 census, we see a shift of most districts to the interval above (3.00 – 3.99), which matches the national value of 3.55. Finally, a general shift to a higher interval (4.00 – 4.99) can be seen in the last reporting period (2011 Census), where more than half of the districts even shifted up by two intervals (5.00 – 5.99). The total national value of CR SP is 4.99. Table 1 shows the basic descriptive statistics of the variability in the set of 72 districts, the first row is the national value (population weighted average of district values).

Table 1

**Basic Statistical Indicators Related to the Group of Districts**

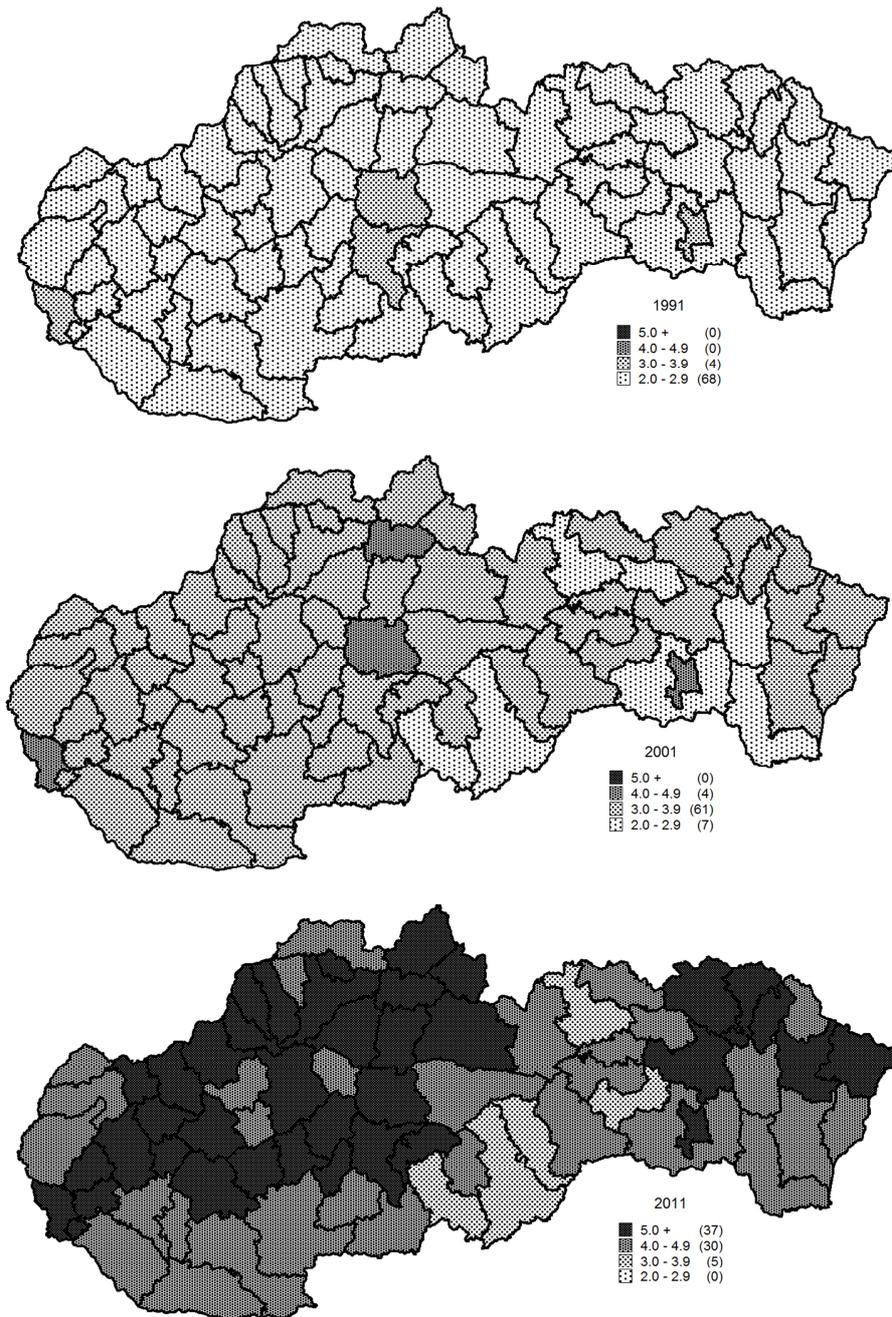
	1991	2001	2011
Cumulative rate of School participation (national value)	2.63	3.55	4.99
Standard Deviation	0.30	0.30	0.51
Variable margin	1.58	2.18	2.35
Coefficient of Variation (in %)	11.53	11.19	10.21

Source: Statistical Office of the Slovak Republic, Population Census (1991; 2001; 2011).

In Figure 4, some spatial patterns may be identified, although not as significant as, for example, in the case of differences identified from the point of view of the socio-economic situation of the districts or the levels of regional development (Kling, 2002; Korec, 2011; Rajčáková and Švecová, 2009; Matlovič and Matlovičová, 2005). Several centres of education existed in 1991 and 2001, but their dominance in 2011 was not as significant, while a considerable increase in values was recorded in other districts, especially in the Western and Central Slovakia, where centres of newly established universities were founded, i.e. in districts with centres having a stronger agglomeration effect. The South, South-West Slovakia, and a large part of Eastern Slovakia, with a different settlement structure and smaller urban centres, showed a generally below average, or average values of schooling participation.<sup>13</sup> There are several districts of the Southern and Eastern Slovakia in case of which the index of growth was much lower than elsewhere between 1991 and 2011.

<sup>13</sup> More about centres of tertiary education can be found in materials by Szabo (2012; 2014), or Lauko et al. (2011).

Figure 4  
Total Rates of Schooling Participation in Districts in Slovakia (16 – 35 years)



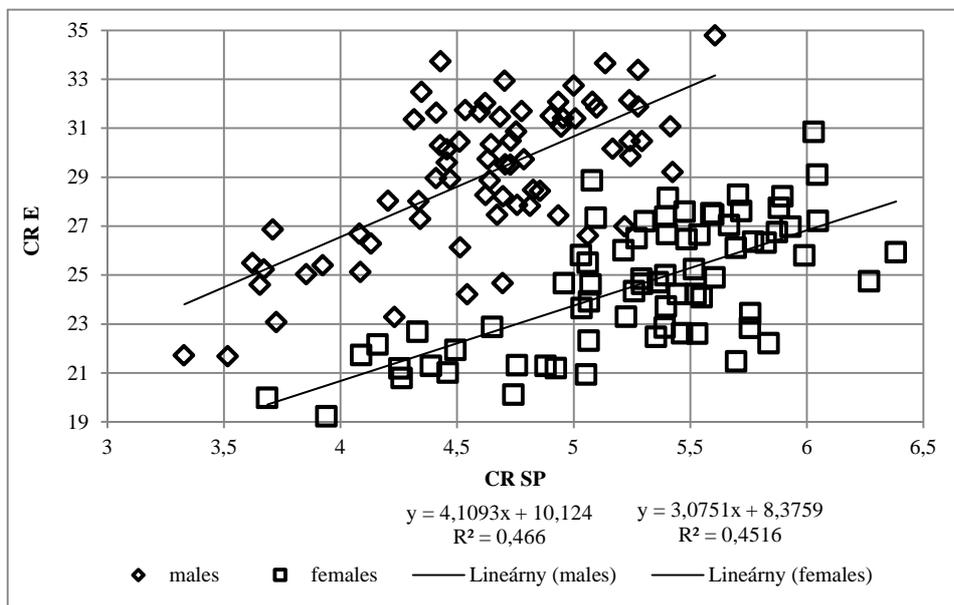
Source: Statistical Office of the Slovak Republic, Population Census (1991; 2001; 2011).

### 3.3. Changing Rates of Economic Activity in Relation to Changes in Education

The level of education attained has an impact not only on the timing of the living and working pathways, but also on their intensity. This is also illustrated in Figure 5, which shows linear regression between TR SP<sup>14</sup> and TR EA<sup>15</sup> at the level of districts of the Slovak Republic in 2011.

Figure 5

#### Regression Analysis of CR SP and CR E



Source: Statistical Office of the Slovak Republic, Population Census (2011).

The coefficient of determination ( $R^2$ ) is in both sexes at the level of 0.46, representing a moderately strong statistical dependence. This means the longer people are studying, the longer they are staying employed. One could expect a higher statistical dependence; however, there are very likely several antagonistic determinants Stenberg and Westerlund (2013) using detailed longitudinal data also confirmed that higher education increases labour market survival rates.

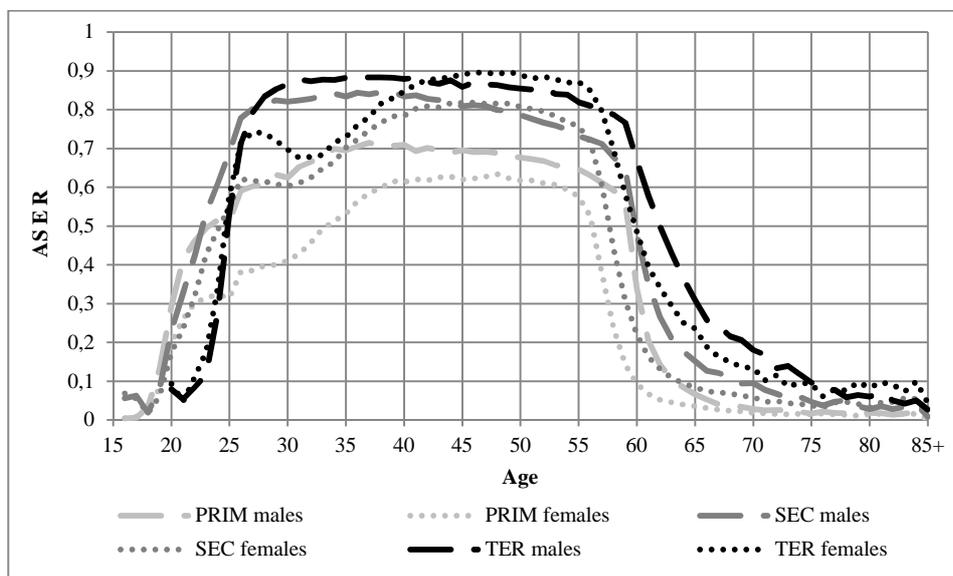
Another evidence that the higher educated people staying longer as economic active, is given in Figure 6. Tertiary educated people enter the labour market a few years later, but they establish themselves in the market very quickly and to a high degree, and they tend to leave the labour market more slowly. The lower

<sup>14</sup> It means how long a person studies on average.

<sup>15</sup> It means how long a person is employed.

participation rates of women in the work process, especially up to the age of 40, are due to family formation and reproductive activities. In the case of women with tertiary education, the study completion and the subsequent formation of family is also evident, while in the case of women with primary and secondary education, there is a more gradual approach to the process of establishing a family, though the curve represents the indirect evidence only.

Figure 6  
Age-sex Specific Economy Activity Rate by Education

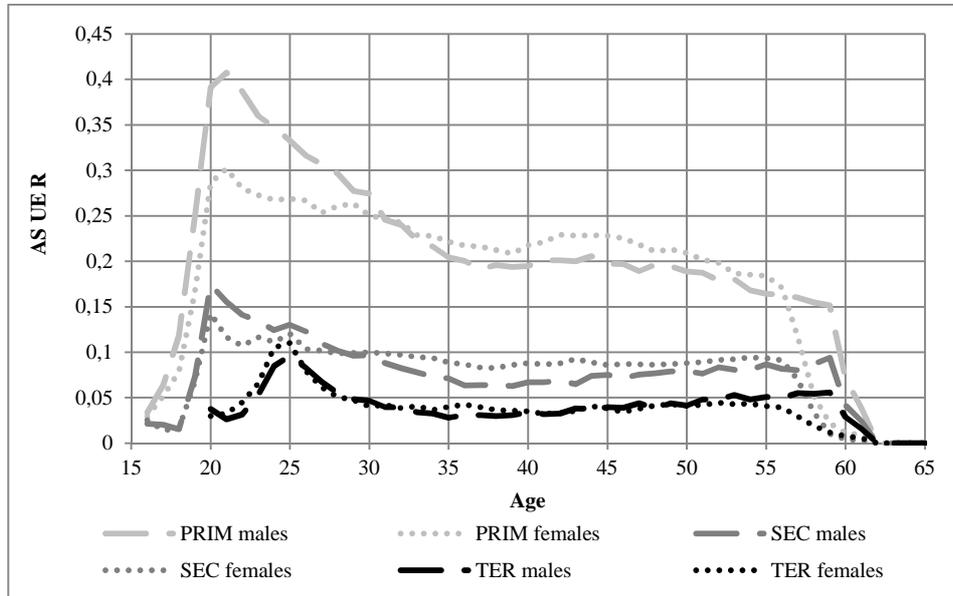


Source: Statistical Office of the Slovak Republic, Population Census (2011).

Although family and reproductive behaviours have been mentioned, they did not seem to be the key determinants of lower employment rates. Unemployment has much higher weight in this respect, as shown in Figure 7. The chart clearly shows that all educational categories are experiencing problems of fresh graduates, but at significantly different levels.

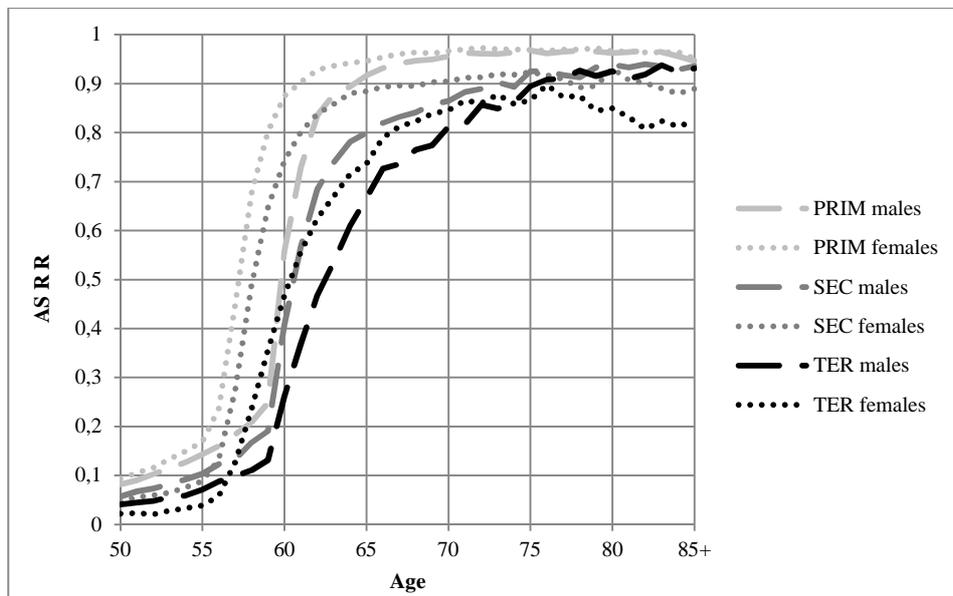
Differences between male and female rates again show the effect of maternal duties of women, PRIM category, slightly in the SEC category, but not at all in the TER category, which may indicate differences in the scale of values of the analysed educational categories. The higher unemployment rate of tertiary-educated women than men around the age of 20 to 25 may also be surprising. This can be justified by a higher preference over technical disciplines by men, which create better conditions for their faster engagement, but further investigation is in need to confirm this assumption.

Figure 7  
Age-sex Specific Unemployment Rates by Education



Source: Statistical Office of the Slovak Republic, Population Census (2011).

Figure 8  
Age-sex Specific Retired Category Rates by Education



Source: Statistical Office of the Slovak Republic, Population Census (2011).

The last economic category, not only in terms of career paths, but in particular life paths, is the category of retirees. Figure 8 shows retirement rates (as mentioned above, it includes old-age pensioners, but also disabled, retired early, etc). The transition between the age of 55 and 65 is particularly noticeable, especially among women. In case of men, this transition takes place almost entirely around the age of 60. As expected, tertiary educated men and women form an exception. Although women start the transition about three years earlier, the curves are similar. In each education category, it applies that men retire later, in concordance with the other European countries and the U.S. It is questionable to which extent is this fact influenced by official parameters of pensions systems and to other factors depending on the free decisions of workers, there is a need for some qualitative research that can discover more about strategies than quantitative data.

#### **4. Discussion**

Some of the empirical results presented above are expected, some others are less expected and the explanation of them is very difficult. The first hypothesis was confirmed. The quantitative increase in absolute numbers and relative schooling rates has been uneven in terms of regional picture across Slovak regions since 1991. More urbanised districts are forerunners in terms of educational „boom” that Slovakia faced after 1989 despite fact that the share of tertiary educated. There seems to be something like „cores of reluctance”, especially in the southern part of Central Slovakia. These regions are underdeveloped and the social and economic structure of population demonstrates some specific features there. On the other side, the North-Eastern districts are over-averaged from the view point of education despite they belong to the less developed regions, furthermore, the migration outflow towards the Western Slovakia increased in the last decade (Šprocha, Vaňo and Bleha, 2013), and migration very likely affects the educational structure of population since being educationally selective. The tertiary educated persons take part in the longest migration flows within the Slovak Republic (Kakaš, 2017). Thus, the question is to what extent is the spatial picture modified by the internal migration. There is a need for other detailed geo-statistical and structural analyses in this concern. The assumption is that the districts being closer (in terms of interlinkages) to the largest two university centres (Košice and Prešov) demonstrate the higher share of tertiary educated. Finally, there is also the essential implication with respect to the international migration. The out-migration matters in terms of educational structure undoubtedly; however; just estimations rather than the exact quantification are allowed for in the context of data to be available. Several studies focusing on the regional disparities in education attainment level in Europe have been released recently (Chocholatá

and Furková, 2017; Faggian and McCann, 2009; Rodríguez-Pose and Tselios, 2011), some of them using the sophisticated econometric and geo-statistical methods, but the interstate educational disparities are insisting also a country – specific approach because of the different spatial scale.

The second research question is dealing with the structural enquiries. Though the increase of participation rates is unsurprising, the study as the first has quantified age-specific differences in the range of the increase and accomplished that patterns in 2011 differ much from the previous ones and the biggest difference between 2011-census and the two previous censuses is between the ages 20 – 23 years. There are several turning-points in the life-cycles of both males and especially women. The postponement of motherhood due to (not only) educational aspirations remodelled economic trajectories as well. There are a lot studies dealing with the impacts of economic, societal and educational transition on timing of entry into motherhood also in Czech and Slovak Republic (Kantorová, 2004; Potančoková, 2009) and other post-communist countries (Philipov, Speder and Billari, 2006). Results confirm the strong impact of educational attainment and reproductive strategies. It should be stressed that the connections and influences between timing of education and employment are bidirectional. The impact of education on timing of retirement is strong as well. Thus, the study confirms that Slovakia does not stand out in the crowd in this concern (see for instance Venti and Wise, 2015).

## Conclusion

The boom of university education after 1989 is clear. It is typical not only for Slovakia, but also for other countries of the former Eastern bloc. It is certain that these changes also affect the timing of the demographic processes, such as the trajectory of reproductive pathways. The relationship between education and demographic changes is undoubtedly bidirectional. Postponing parenthood into an older age allows people to freely choose their participation in tertiary education. On the other hand, the decision to study naturally leads to a postponement of parenthood. The study empirically identified these links, even in relation to the economic activity of different segments of the population based on their economic activity. The rate and speed of change has been so strong and the turn so sharp that the impact of effects connected with the Second Demographic Transition is indisputable. The lower education rates in Slovakia allowed the massive increase in relatively short time like many demographic indicators changed rapidly in few years. There is an assumption (like in population development holds), that the later the educational changes occur, the faster they take place. Of course, both supply and demand are needed, and both really occurred in the Slovak Republic after 1989.

The total schooling participation has risen dramatically, especially in between the last two censuses in 2001 and 2011. The level of education attained has an impact not only on the timing of the living and working pathways, but also on their intensity. Longer participation in the educational system implies a higher level of education attained. It also shows that tertiary educated people enter the labour market a few years later, but they establish themselves in the market very quickly and to a higher degree, and also later, they tend to leave the labour market in a slower rate.

The spatial aspects are also interesting. There is a noticeable heterogeneity within the group of districts of Slovakia, but the east-west gradient is not as significant as, for example, the unemployment rate and the overall economic performance of the regions. The regional centres of education in Central and Eastern Slovakia have some influence on this. Large differences were also revealed by the different categories of economic activity of the population, but these were not analysed in the context of space and time, but according to the level of education attained. Several findings confirmed that the education matters in the context of life cycle trajectories, timing of reproductive and parenthood strategies. There is a strong difference between the educational categories in age 60 years and over. It confirms the trend from the Western Europe.

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