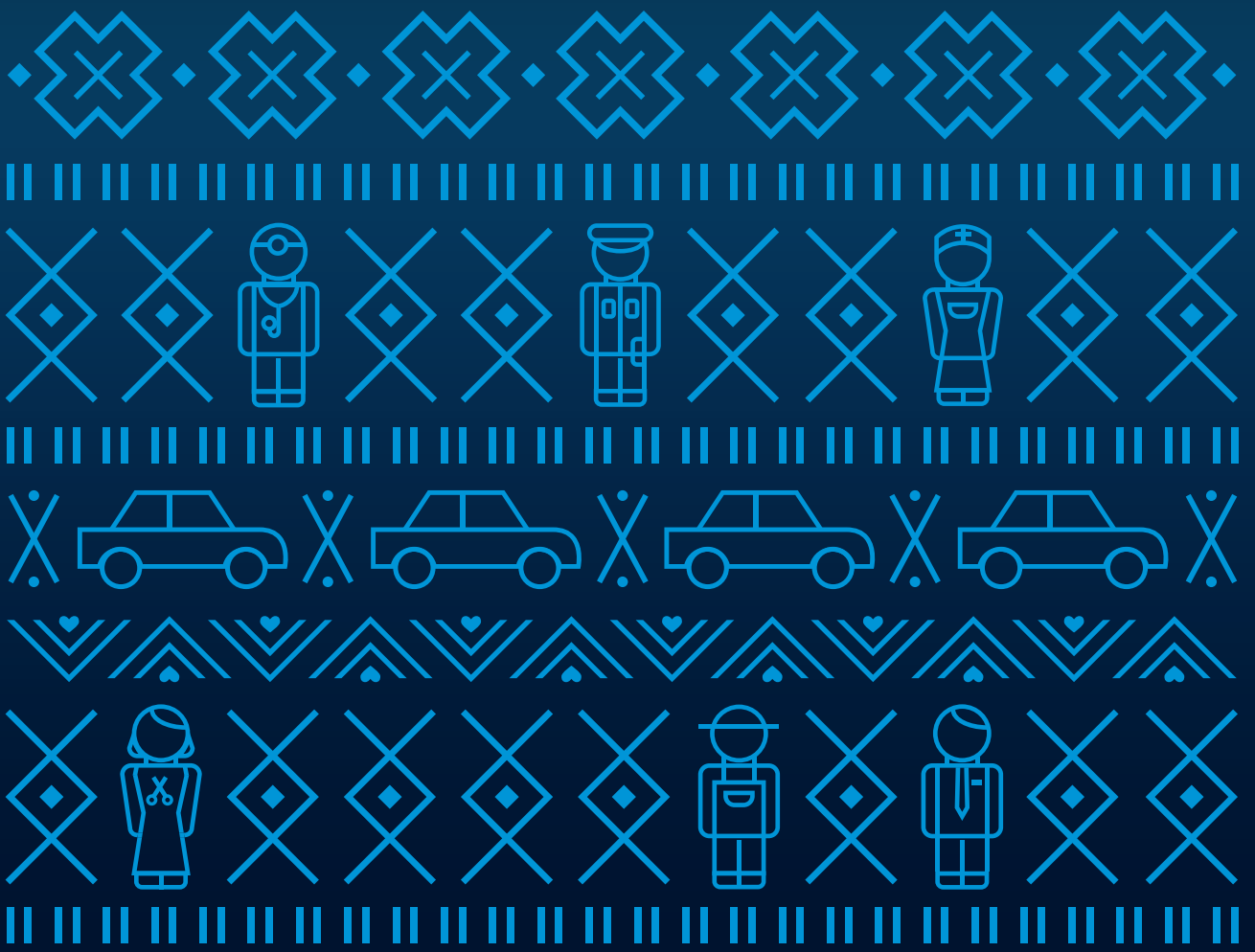

LABOUR MARKET IN SLOVAKIA 2017+

Martina Lubyová & Miroslav Štefánik et al.

APVV

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FACULTY OF ARTS
COMENIUS UNIVERSITY IN BRATISLAVA

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Bratislava 2016

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CONTENT

INTRODUCTION

This book represents another volume of the series of annual reports on the situation at the Slovak labour market resulting from a research project funded by the Slovak Research and Development Agency. The main goals of this report are: (i) to review the recent labour market developments, (ii) to provide short-term and mid-term forecasts of the labour market development, and (iii) to examine the causes of selected structural problems of the Slovak labour market.

The report is targeting the key stakeholders in the field of labour market policies, the research community and the general public. The current volume is published in the English language complemented by short summaries in Slovak for each chapter.

The first chapter provides an overview of the recent labour market developments in Slovakia, as well as stylised facts that attempt to place the existing trends into a broader macroeconomic picture and policy-making context.

In the second chapter, we present the results of a revised mid-term forecast of employment by economic sectors, occupations and qualifications based on the VZAM model. Its demand side is based on CGE modelling, and the supply side was recently rebuilt into a microsimulation form.

The third chapter uses the Beveridge curve concept to examine the relationships between unemployment outflows and vacancies over the period 2001-2016 and the effectiveness of the so-called matching process. In the second part of the chapter, we present the short-term forecasts of unemployment and vacancy indicators based on ARIMA models.

The fourth chapter focuses on the long-term effects of a particular active labour market measure – the Traineeship Programme for Graduates. Using four counterfactual impact evaluation techniques we estimate the net impact of this measure on income and employment of programme participants.

The results are showing the increase in employment probabilities 30 months following the participation.

In the fifth chapter, we use simulations based on the EUROMOD model to estimate the impact of changes in the parameters of minimum subsistence benefit scheme.

In the sixth chapter, we use the EU-SILC data to explore the situation of working poor in Slovakia and to examine the transitions into and out of the poverty. The analysis places Slovakia into international comparison.

The final chapter describes in detail the supply side of the VZAM model that has been recently re-designed into a microsimulation model. Here we also report the results of the now-casting version of the model and assess the reliability of the predictions reported in the second chapter.

Authors

1 KEY DEVELOPMENTS IN SLOVAK LABOUR MARKET INDICATORS

Veronika Hvozdíková, Ivana Studená

The Slovak labour market further improved in the aggregate measures during 2015. This positive trend was forecasted last year (Lubyová, Štefánik et al., 2015) but its confirmation brought relief, following up on a long expected recovery that started as late as 2014, after 5 years of Slovak labour market decline. Moreover, in the first half of 2016, the aggregate employment rate surpassed the psychological benchmark of the pre-crisis 2008 level. Further improvements in aggregate measures are forecasted for the end of 2016 and for the year 2017.

The positive development in Slovakia follows the overall improvement of the EU labour market. However, in the context of Slovak labour market performance within the EU area, the position of Slovakia with respect to other EU countries might not have improved that significantly. The vulnerable spots in the Slovak labour market need continued attention which is discussed further in this chapter.

In terms of reaching the Strategy 2020 targets, most countries in the EU continue making modest improvements closing up on the 2008 pre-crisis indicator levels. Thus, they are falling behind on the planned 2020 targets, which are planned to be achieved in the short time span of the coming four years.

1.1 Employment in Slovakia finally rebounds from the recession

In the years after the 2009 recession, employment has been struggling to rebound from the slump in economic activity; this area of the economy lagged behind the recovery in production and did not correspond to more favourable dynamics of the GDP growth. The growth of jobs was erratic and uneven over the years, even in 2013, four years after emerging

from the recession, the year-on-year (y-o-y) change in employment reached, almost symbolically, zero value (though in absolute terms the economy reported 44,000 employed persons[1] more compared to 2010, when the post-crisis drop in employment hit bottom). After years of not very convincing results, a more notable improvement in employment was observed in 2014. The pace of growth in the number of employed persons has been accelerating quarter to quarter, and after months of small improvements, employment peaked in the last quarter of 2014, reaching 2.6% y-o-y.

The rate of employment growth also remained almost identical over all quarters of 2015 (2.5% to 2.7% in quarters of 2015). An average annual value of 2.6% in absolute terms means that employment grew by 61,000 persons y-o-y in 2015, the number of employed reached a level of 2.4 million persons for the second time in the history of the Slovak Republic; after the year 2008 which was the most successful year in terms of employment size (see Figure 1.1). To compare, in 2008, when Slovak employment reached its historical peak, the number of employed persons was higher by only 10,000 than the 2015 value: 2,424,000 persons (according to the Statistical Office, estimated by LFS methodology).

Already by the end of 2014, the mentioned favourable development in employment reduced the "post-crisis shortfall in employment" by almost half y-o-y.[2] The ongoing positive course over the year 2015 reduced this shortfall (compared to the situation at end of 2013) to tenfold. Towards the end of 2015, there were only about 13,600 employed persons lower than in the same period of 2008, when the Slovak economy was hit by an external shock resulting in a decline in employment. Thus, persistence of a positive path in employment development in 2015 has brought the employment recovery to (almost) pre-crisis levels.

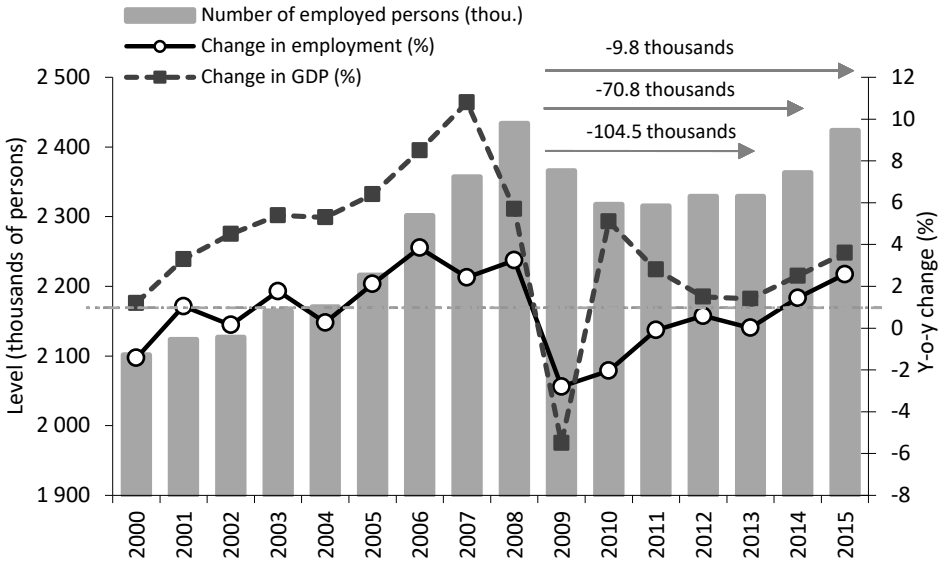
---

[1] The difference in the number of employees by LFS (Labour Force Survey) between the first quarter of 2010 (employment decline bottom) and the last quarter of 2013.

[2] Comparison of 4th quarters of 2014 and 2013 to 4th quarter of 2008 (last quarter before GDP downturn).

F i g u r e 1.1

Average annual development of employment (LFS) and GDP (2000-2015)



Note: GDP – Year-on-year change, production function, at constant prices, ESA 2010 (national accounts).

Source: Based on the Statistical Office of the SR (SO SR) data.

However, it is necessary to add that this reduction in the post-crisis drop in employment (to 13,600 employed persons) was realized against the background of the parallel increase in the number of economically active persons (by almost 55,000 between the end of 2008 and 2015). This slightly relativizes the perspective of the crisis effects attenuation. It also suggests that persisting negative difference in employment is not a result of the demographic change (contraction of the population in working age indeed occurred, but along with the growth of the economically active population).

Post-crisis development in employment revealed another important aspect. Since the second half of the 90s, economic development in Slovakia was accompanied by relatively high values of "employment threshold". Weak relation between economic growth and increases in employment, reflected in high rates of economic growth needed to maintain growth in employment (see development before 2008, Figure 1.1), might be typical

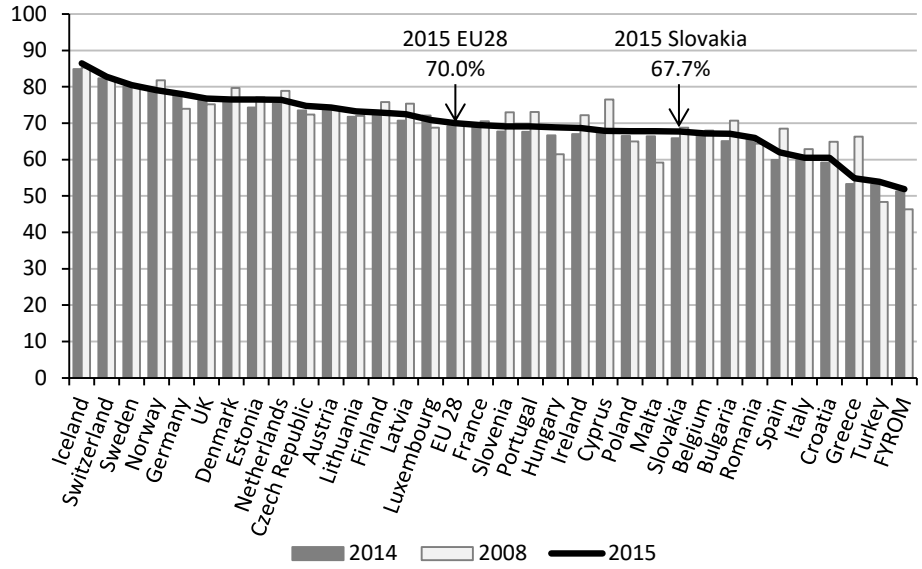
for economies that are closing a productivity gap. However, in the case of Slovakia, the relation between economic growth and employment has been unusual – "employment threshold", defining labour intensity of economic growth, oscillated at about 4% for more than a decade before the recent crisis. Comparison with the other countries in Central and Eastern Europe reveals that the value was higher than in other comparable economies. Economic growth in Slovakia was particularly pulled by the sectors with high levels of productivity growth rather than by employment/labour intensive sectors.[3] Besides unusually high increases in productivity, the changes in import intensity of production, in export performance of key sectors (changes in economy structure towards higher share of export-intensive industries), in technology capacities, all has a negative impact on domestic employment. However, beginning with 2012, the economy has witnessed a trend of closing the gap between growth rates of GDP and employment (Figure 1.1). This may be a sign of a structural change towards sectors with higher employment intensity – this is supported by evidence on the solid growth of employment in market services in recent years.

Employment recovery in Slovakia follows in its main features, territorial employment development. The EU labour market was finally catching up with the pre-crisis employment level, in 2015 the EU average employment rate reached 70% compared to the 2008 employment rate of 70.3%. The EU employment rate needs to grow more than 1% per year on average to reach its Strategy 2020 target of 75% in 2020, and the Slovak employment rate needs to have similar employment growth dynamics to arrive at the 72% target in 2020. So, in the context of EU labour market developments, the Slovak labour market improvements are, in its aggregate performance, in line with the European labour market trend in 2015. While positive shifts are optimistic, when comparing Slovak employment rate with other EU countries, Slovakia continues ranking among EU countries with low employment rates, below the EU average (Figure 1.2).

[3] Slovakia´s unique path of productivity gap closure can be seen when international comparison of cumulative changes in hourly labour productivity is used; another part of the explanation is uncovered when using calculation of employment threshold by sectors of economy based on the value added and the numbers of employed by sector.

F i g u r e 1.2

Employment rates in EU, 2015 update

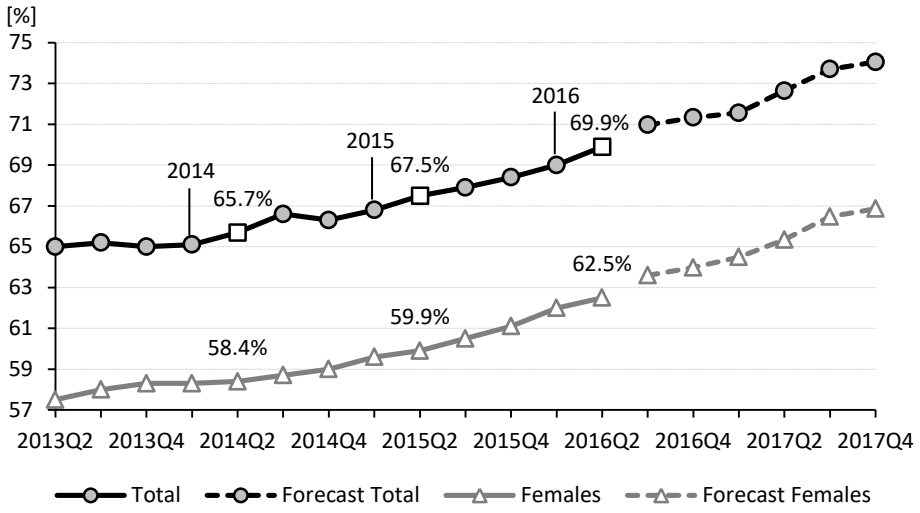


Source: Authors based Eurostat data.

A positive trend in employment also continues in the first part of 2016 (PÚ SAV, 2016). Based on quarterly levels of employment, the annual increase reached 3.1% as of June 2016, while the acceleration of increase in the number of employed was stronger for females than males. The total employment rate further improved in 2016 (Figure 1.3). The employment rate of individuals 20-64 years old reached 69.9% in the second quarter of 2016, and in the third quarter of 2016, the employment rate increased by 1.7% compared to the same quarter last year. This is one of the best results among EU countries for the third quarter of 2016 (Eurostat, 2016). At the moment, for the first time, the labour market has outperformed the best employment rate result which was recorded in 2008 (i.e. in the period prior to the latest economic crisis, after which employment declined and did not significantly improve for six years, before recovery could be observed in 2014). An improvement in employment rates took place for both males and females. Positive annual improvements in employment rate and levels are forecasted to continue throughout the end of 2016 and in 2017 (Figure 1.3).

F i g u r e 1.3

Employment rate in Slovakia quarterly: total, females and forecasts



Source: Adapted from PÚ SAV, 2016 (based on LFS).

1.2 Spotlight on sectoral employment statistics

One of the sectors which benefited the most from the labour market recovery, was the manufacturing sector, where an increase of 48,000 employed persons was noted in 2015. When compared to the total annual growth of employment in the economy (by 61,000 employed persons) it can be assumed that this sector was a key driver of employment growth in 2015. The number of persons employed in the manufacturing sector thus increased to almost 600,000 in total, representing about one quarter of all employment in Slovakia. The positive trend in this sector continued from the end of 2014, when significant rise of employment in industrial sectors was a decisive factor of the turning point in total employment path – unlike in 2013, when declining industry along with a gloomy construction sector mostly contributed to stagnation in total employment in Slovakia. Employment growth in the industry corresponded to the development of other parameters in 2015. Sales in industry grew by about 9%, the index of industrial production (based on the 2010 level) increased to 137 (of which only in manufacturing it increased to 149, of which in vehicles production it even exceeded 181); labour productivity grew by 6.9% y-o-y (it especially increased in the second half of the year) (SO SR, 2016b).

T a b l e 1.1

Employment by sectors of economy (employed persons; NACE Rev.2)

	2015 in thousands pers.	Y-o-y change in thousands pers.	Index 2015/2014 (%)	Index 2015/2008 (%)
Economy	2 424.0	61.0	102.6	99.6
A Agriculture	77.1	-5.6	93.2	80.1
B Mining	12.0	2.4	125.0	85.1
C Manufacturing	598.3	47.9	108.7	93.5
D Electricity	25.0	-1.6	94.0	83.6
E Water supply	26.2	-1.4	94.9	74.4
F Construction	213.6	-9.7	95.7	82.9
G Wholesale and retail	296.9	12.7	104.5	101.6
H Transportation	161.4	9.4	106.2	101.9
I Accommodation	114.8	-4.4	96.3	106.7
J Information and comm.	65.5	8.9	115.7	143.0
K Financial services	39.4	-11.5	77.4	71.0
L Real estate	13.3	-1.5	89.9	102.3
M Prof., scien. and tech.	73.0	-3.5	95.4	95.4
N Administrative services	64.6	3.7	106.1	107.3
O Public administration	217.3	6.3	103.0	130.1
P Education	175.2	8.3	105.0	106.8
Q Health	181.0	5.4	103.1	119.7
R S Other services	67.1	-2.4	96.5	106.2

Note 1: Employed persons – persons aged 15 years and over, who during the reference week worked for at least one hour for pay, profit or family gain (including those who were temporarily absent from their job at that moment).

Note 2: The three highest values in each indicator are highlighted.

Source: Based on LFS SO SR data (2016).

Among the other sectors with the largest increases in employment (LFS) we can list wholesale and retail, transportation and storage, and information and communication. Besides LFS, the employment growth in these sectors was also documented by different methodology – employment in quarterly statistical reports by enterprises. From the public sectors, the biggest increase in employment was noted in education.

Similar to the previous year, the development in the construction sector was evolving in the opposite direction and the number of employed persons contracted by another almost 10,000 (negative tendency was also confirmed by the largest decrease of employed persons compared to all sectors based on quarterly statistical reporting). The decline in employment in the construction sector has remained since the crisis, despite the turnaround in sales. Sales in the construction sector experienced a y-o-y

increase of 20% in 2015, after three years of decline. Therefore, the assumption about the positive impact of accelerated implementation of the Structural fund programmes on employment in the construction sector was not confirmed by the end of 2015. In fact, the turnaround in sales was driven by a significant increase in labour productivity. It grew (also after several years of decline) by 19% in 2015 (SO SR, 2016b). The high productivity growth in construction was recorded especially in the second half of the year 2015. However, the end of 2015 brought clear positive turnabout for employment in construction and such reversal also continues to be confirmed by the development in 2016 – the construction sector finally experiences growth in the number of employed persons, lasting for four consecutive quarters (4th quarter of 2015 to 3rd quarter of 2016).

In terms of size of employment, the biggest advance compared to the pre-crisis year 2008, was recorded in the information and communication sector, where employment grew by 43% since 2008 (however, this sector also experienced a drop in employment in 2013). In a medium term, employment developed positively between 2008 and 2015 also in public sectors, particularly in public administration (increase in employment by 30%) and health (increase in employment by 20%). Other service sectors also exhibited a positive shift in employment over the post-crisis time period: administrative services, education, accommodation and other services. On the other end of the scale, we can find financial services, water supply, agriculture and construction, where employment levels still persist well below the 2008 pre-crisis level (see Table 1.1).

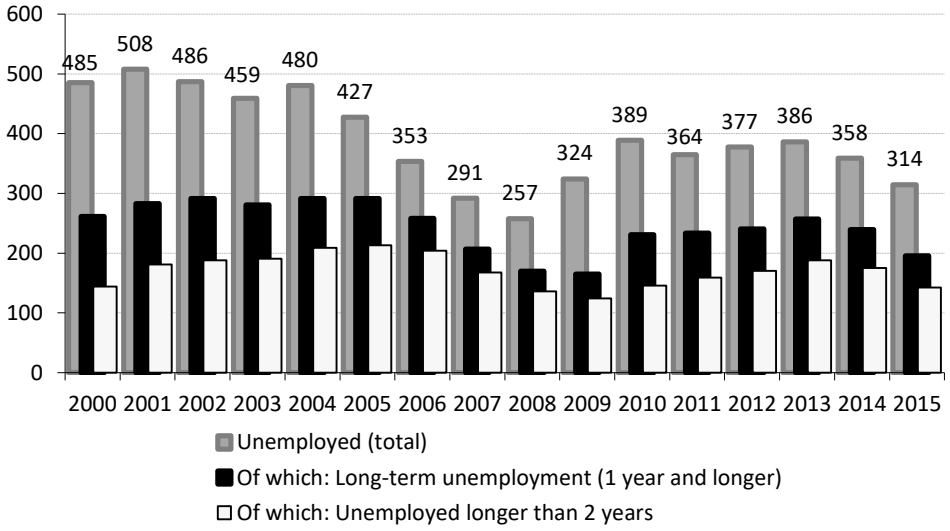
1.3 Positive prospects confirmed by both methodologies of unemployment reporting

Unemployment indicators in Slovakia have further improved in the past year of 2015 and in the first half of 2016, in accordance with the overall EU positive trend. The decline in unemployment slowly continues, since the last year of decline in 2013. The first signs of reverse occurred in the last quarter of 2013 (although average annual 2013 results were not so bright), positive turn towards a drop in unemployment was clearly confirmed in 2014, when y-o-y, 27,300 fewer unemployed were estimated

(LFS). A downward trend in unemployment continued in 2015, this time the number of unemployed shrank by another 44,400 persons, resulting in a total number of 314,300 unemployed. A recent favourable development in employment led to a significant reduction in the post-crisis unemployment spike: While in 2014 there were still about 101,200 more unemployed compared to the pre-crisis year of 2008, in 2015 the post-crisis unemployment bulk shrank to less than 57,000 persons (Figure 1.4).

F i g u r e 1.4

Total unemployment and long-term unemployment (number of unemployed persons; in thousands)



Source: Based on LFS data of the Statistical Office of the SR (2016).

A momentous and promising observation is that in 2015, the fastest (and also sizeable) decline in the number of unemployed was recorded in categories with the longest duration of unemployment: unemployed who were out of work a) 6 months to 1 year, b) 1 year to 2 years, c) more than 2 years. In each of these three categories the number of unemployed decreased in 2015 (y-o-y) by approximately one fifth. Long-term unemployment (defined as lasting longer than one year) is one of the most serious and persistent problems of the Slovak labour market. Taking this into account, the fact that y-o-y decrease in long-term unemployment by 43,900 persons in the year 2015 was almost identical to a drop in total

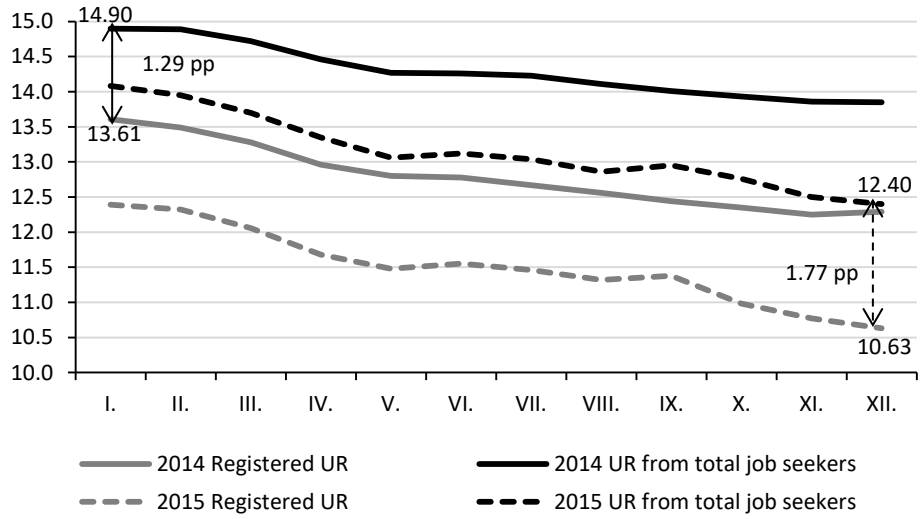
unemployment (the above mentioned 44,400 persons) should be especially noted. In 2015, the decline in the number of long-term unemployed was the main driver of the overall decrease in unemployment in Slovakia. As a result, the share of long-term unemployment, in total unemployment, declined from 67% to 62%. The fact that long-term unemployment represents the largest component of unemployment, and the extent to which it contributed to a decline in total unemployment in 2015, can be seen in Figure 1.4.

Detailed decomposition of unemployment by its duration actually reveals the fact that short-term unemployment (persons unemployed for less than one year) has been declining in Slovakia since 2010 (with the exception of 2012), while long-term unemployment continued to grow until 2014. In 2014, the rate of decline in both categories of unemployment was almost the same (approx. 7%), however, in 2015 long-term unemployment fell by 18.3%, while short-term unemployment dropped by an insignificant 0.5%. Within long-term unemployment itself, the main component seen behind overall unemployment growth was the segment of persons unemployed longer than 2 years. The number of persons with the longest duration of unemployment has grown continuously since 2010. Reversion of this negative trend in 2014 and contraction in the number of persons in this particular category (cumulatively by 45,500 persons for 2014-2015), is therefore an important confirmation of favourable trends in employment development.

This development corresponds to the fact that the average length of registration in registries for job seekers, managed by labour offices, decreased from 17.4 months in 2014, to 16.1 months in 2015 (although this is a different reporting methodology for unemployment, derived from administrative data, not from a labour force survey). The registered unemployment rate declined from 12.8% to 11.5%, which is the same value for 2015 as reported by LFS. However, there is also another rate of registered unemployment, which is calculated from the number of total job seekers registered with labour offices (official rate of registered unemployment is calculated from the number of ´available´ job seekers). Divergences in development of both rates can be useful in revealing what could have partially contributed to the positive results in unemployment administrative statistics in the past two years.

F i g u r e 1.5

Difference between registered unemployment rate and unemployment rate calculated from the total number of job seekers (months of 2014 and 2015, %)



Source: Based on data from COLSAF, 2016.

In both years (2014 and 2015), the rate of registered unemployment declined slightly faster than the unemployment rate calculated from the total number of job seekers registered with labour offices. As a result, the difference between both rates grew between January 2014 and December 2015 from 1.29 percentage points to 1.77 percentage points (Figure 1.5). This is the outcome of the growth in number of job seekers who were registered with labour offices, but reported as not available. While the average annual number of available job seekers decreased between 2014 and 2015 by 34,929 persons, the total number of registered job seekers decreased by only 31,079 persons. This means that last year (2015), the number of unavailable job seekers grew by almost 4,000 persons. In 2014 and 2015, the number of unavailable job seekers increased by 10,095 persons.

This was influenced by legislative changes affecting the methodology of calculation. The first change related to availability was introduced in May 2013, when an amendment to an act widened the definition of not available job seekers, by including persons participating in so-called small municipality services and voluntary services. Meanwhile, the number

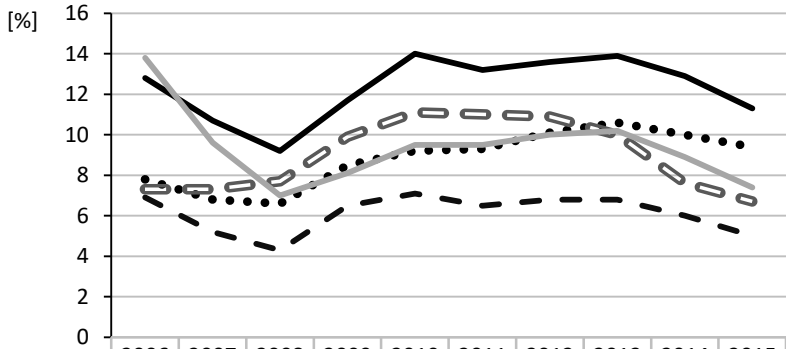
of persons engaged in small municipality services has almost doubled since the amendment went into effect, and the number of persons in voluntary services increased several times over that period. It was the outcome of another amendment to an act, which encourages job seekers to accept participation in small municipality services and voluntary services (otherwise, they could be removed from labour office registers). As a result, the number of unavailable job seekers increased by 55% between the amendment (mid 2013) and the end of 2015. Therefore, the downward trend in the registered unemployment rate in the last two years, seemed to be more favourable than the one calculated from the total number of registered job seekers.

The other related aspect is a strengthened effort in the implementation of the active labour market policy (ALMP) tools, as the end of the programming period was approaching. For example, the number of unavailable job seekers engaged in education and training programmes increased from zero level at the time of the amendment to the act, to over 3,000 persons and peaked by the end of 2015 (for details see Morvay, 2016). In general, the extent of ALMP implementation has steadily grown in the recent years – while in 2013 over 412,000 job seekers/job vacancies were supported by the ALMP measures, in 2014, its coverage increased to 519,500 job seekers/job vacancies and in 2015, almost 766,000 job seekers/job vacancies were supported by the ALMP tools. This was also reflected in financial requirements – in 2015 the ALMP measures consumed almost 6 million euro more than the year before (COLSAF, 2016). On the other hand, a drop in the number of registered unemployed did not bring relief to Social Insurance Agency funds: although the number of persons eligible for unemployment benefits decreased by 2.6% y-o-y, the volume of paid unemployment benefits increased y-o-y from 154,721 euro to 158,624 euro, as the average unemployment benefit grew from 332 euro per month to 344 euro in 2015. The development in unemployment beneficiaries slightly worsened in recent months, between November 2015 and October 2016 (12-month period to latest available month) the number of persons eligible for benefits increased from 33,800 to 36,200 persons. (At this time, the maximum unemployment benefit, effective from July 2016 to July 2017, is 900 euro per month).

Similar to changes in registered unemployment methodology, the changes to the LFS ILO definition of employment (introduced in 2013) could have partially influenced accuracy when comparing the results over time in past years (however, comparison over regions/countries is not affected when using LFS methodology unlike administrative data). When referring to the LFS data, we can conclude that the recent development is in line with development in neighbouring economies. Improvements in the total unemployment rate in Slovakia follows the overall positive development of the European unemployment rate. The positive development of the regional, Visegrad labour market Figure 1.6 has been more accentuated within the EU context in 2015.

F i g u r e 1.6

Unemployment rates in the Visegrad countries and EU, 20-64 years old (%)



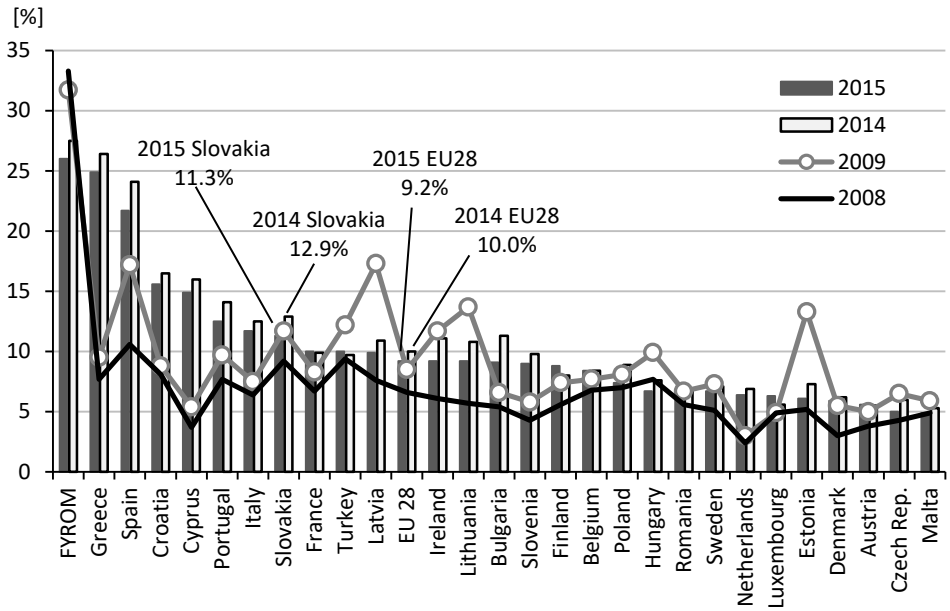
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EU 28	7.8	6.8	6.6	8.5	9.2	9.3	10.1	10.6	10	9.4
Czech Republic	6.9	5.2	4.3	6.5	7.1	6.5	6.8	6.8	6	5
Hungary	7.3	7.3	7.7	9.9	11.1	11	10.9	10	7.6	6.7
Slovakia	12.8	10.7	9.2	11.7	14	13.2	13.6	13.9	12.9	11.3
Poland	13.8	9.6	7	8.1	9.5	9.5	10	10.2	8.9	7.4

Source: Authors based Eurostat data.

Improvements in the national unemployment rates in all V4 countries exceeded the EU average unemployment decline. Despite improvement in the rate of unemployment, Slovakia still remains among the EU countries with the highest rate of unemployment (8th in 2015, from 7th in 2014) and continues to exceed the EU average (Figure 1.7).

F i g u r e 1.7

Unemployment rates in EU, 2015 update of post-crisis development



Source: Authors based Eurostat data.

So far in 2016, the unemployment rate continues to take a positive downward trend, mirroring the positive trend in employment. The unemployment rate decreased further, below 10%, in the second and third quarters of 2016 (to 9.6% and 9.5% respectively; LFS, SO SR data) but remains very high for those with the lowest education level attained. The number of unemployed (LFS) decreased most recently to 262,400 persons (third quarter of 2016), which means 144,700 fewer unemployed persons than in the first quarter of 2010, when unemployment spiked in Slovakia due to the latest crisis.

As illustrated by the unemployment results presented in this section, only part of the improvement in statistical results and in administrative data on unemployment (irrespective of reporting methodology) can be attributed to changes in legislation and/or methodology. The rest should be considered in light of the overall economic improvement. In 2011, the volume of GDP in Slovakia (in bn euro as well as per capita; at both, current and constant prices) had already surpassed the pre-crisis level, the indicator of economic sentiment documented the revival of optimistic

expectations in the EU in the last two years. Standard business-side austerity measures, including cuts in employment costs and inventories, came to the end of the cycle and renewed demand-side pressures fuelled recovery of economic activity in the main economy sectors. Against a background of low or zero inflation and increased investment activity, the demand for recovering production also resulted in higher demand for workforce. Intensified implementation of active labour market policies at the end of the programming period (related to an effort not to waste the opportunity provided by the cohesion fund resources) contributed to the creation of new jobs. However, concerns raised about sustainability of the job positions supported by such one-time factors should be taken into account.

Despite confirmed positive development in the past two years, the Slovak labour market still faces persistent long-term issues. Between 2002 and 2012, Slovakia ranked first among EU countries in long-term unemployment. This one-decade negative leadership reflects several aspects that complete the overall picture of the recent situation: unemployed persons who have never had a job represent 20% to 25% of total unemployment (in the long-term; the absence of work experience, skills and acquired work habits creates a serious barrier to their employability); 52% of all unemployed in Slovakia are those with primary education as their highest level attained or vocational education (absolute leader in the EU); and finally, the problem of disadvantaged groups in the labour market is linked to the perception of the marginalized Roma community in the Slovak labour market.

1.4 Position of disadvantaged groups in the labour market remains difficult

The difficult employment position of disadvantaged groups is a long term and particularly problematic area of the Slovak labour market. Those with the lowest levels of education and some age cohorts consistently face major obstacles acquiring adequate job positions. The factors which are particularly risky for unemployment incidence include low education level and duration of unemployment. This is also confirmed by comparing the relative deviations of unemployment rates of the Slovak unemployed with the EU average values, revealing the largest gaps with the EU average are

confirmed for those with the lowest level of attained education and for the long term unemployed, as summarized in Figure 1.8, and followed by, a bit surprisingly, older unemployed, then youth and lastly by the unemployed with secondary education. In these categories, the gap between the SR and EU average is bigger than in the case of total unemployment levels.

While Slovakia ranks high among EU countries in facing problems with particular groups in the labour market, the rate of early school leavers (ESL) ranks well below the EU average. Early school leavers are, along with youth unemployment and youth inactivity worrying for the EU member states. Within the Europe 2020 strategy (S2020) the European Union wants to decrease the rate of early school leavers (18-24 year olds) to 10%; unlike other S2020 areas the trend in this indicator is quite optimistic as the rate of 13.9% as the 2010 EU average, has decreased to 11% in 2015. Slovakia is among the countries with a significantly low share of early school leavers compared to the EU average, in 2015 it was 6.9%. The positive situation of keeping youth in education is also related to the publicly financed school system which is, however, becoming increasingly stressed by budgetary pressures. The sustainability of the public education system is questionable. Long term low investments in the education system and an unattractive compensation scheme for education professionals implies that the consequences will be the decreasing quality of graduates. As we comment below, this has technical implications for high youth unemployment rates, which might be interpreted as higher than in countries with a comparable situation, where youth in similar situations would no longer be in the secondary education system. The crucial point is whether secondary education for Slovaks leads to better market prospects for them. The comparison of relative deviations from EU averages suggests that this might not be the case. On the other hand, the weakest labour market position of the unemployed with the lowest education levels, indicate that education organisations might need to become more innovative and assume other functions to support more effectively the transition to the world of work for different groups of disadvantaged adults. To begin with, these functions could involve the development of the social capital of individuals.

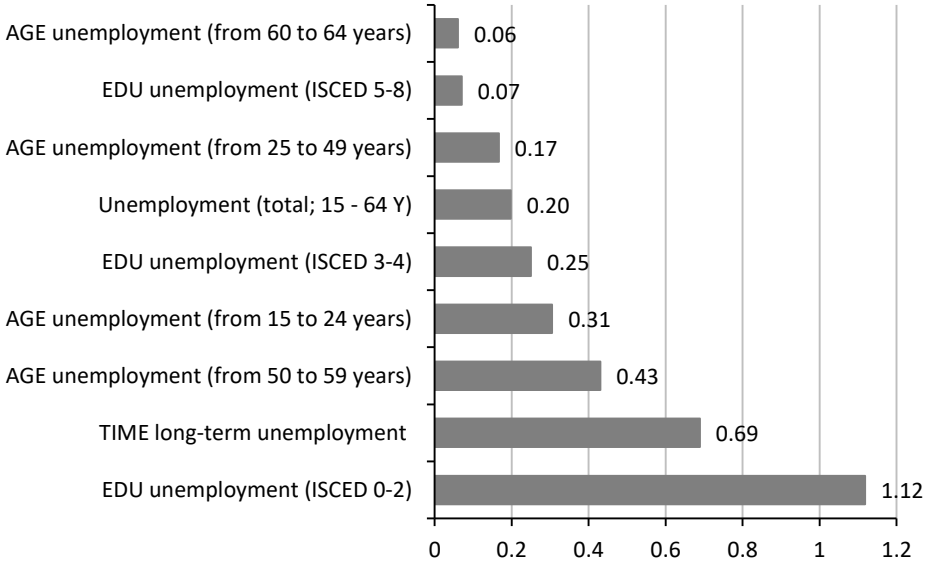
The comparison of relative deviations of unemployment rates also reveals that unemployment of older cohorts 50-59 years old is a more

significant problem when benchmarked with the EU average. Older cohorts have not yet been a primary policy concern and in view of increasing demography pressures, special policy focusing on the older unemployed might be a priority for the coming years.

Finally, from Figure 1.8 we can also see that compared to the EU average, the deviation of total unemployment is higher than that of tertiary educated or older unemployed, but still in the two latter categories, unemployment rate is higher than the EU average. For the tertiary educated, this could be seen as evidence that while it is (despite public policy discourse) true that tertiary education plays a role in employability, the relative deviation from the EU average speaks in favour of the evidence on the decreasing quality of numerous institutions offering higher secondary and tertiary education.

F i g u r e 1.8

Unemployment rates by age, educational level and long-term unemployment – SR relative deviation from the EU average



Note: EDU unemployment (ISCED 0-2) value means that SK EDU unemployment rate (ISCED 0-2) is higher by 112% compared to the EU average unemployment rate (ISCED0-2), SK TIME long-term unemployment rate is higher by 69% compared the EU average long term unemployment rate etc.

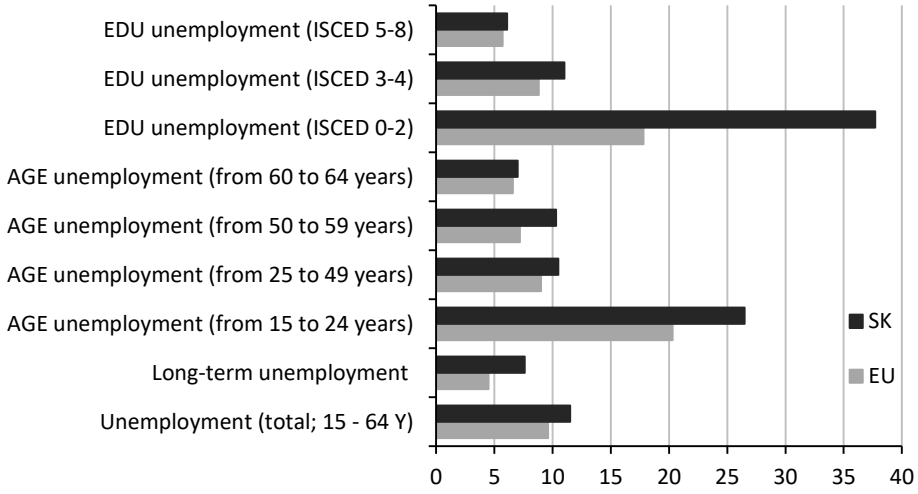
Source: Calculation based on Eurostat data.

Besides comparing the relative deviations from EU averages, the unemployment rates of selected groups remain helpful for an illustrative description of the employment positions of individuals, since it demonstrates not just the relative situation compared to other countries (or EU average) but the actual position towards other segments in the particular labour market.

This view brings attention back to the situation of Slovak youth. The trend in 2015 is positive, but high youth unemployment rates that have troubled Slovakia over the past years remain a concern. The unemployment rate of 15-24 year olds considerably declined, by 4.7 percentage points over one year, to 20.4%. In the second quarter of 2016, the ranking with respect to youth unemployment rate improved from the 8th to the 10th position among EU countries. But still, at least every fourth young individual was unemployed in the first half of 2016 compared to one in five young unemployed individuals in the same age group in the EU on average (Figure 1.9).

F i g u r e 1.9

Unemployment rates in selected groups (SK – EU comparison, rates in %)



Source: Eurostat.

Slovak indicators of the unemployment rate of 15-24 year olds might be viewed somewhat differently when taking into account the large base

of secondary students.[4] Secondary education is, in quantitative terms, well-functioning with 85.4% of the population attaining at least upper secondary education in 2015; this ranks Slovakia third in the EU and also high among all developed countries. Consequently, the base of the youth labour force is smaller compared to the number of unemployed, and it follows that the unemployment rate might be viewed as higher not because of more youth being unemployed, but because of more youth studying in a less selective public secondary schooling system[5] compared to EU countries with higher rates of ESL.

1.4.1 Age structure of population and activity status of particular age groups

In 2015, the average age of the population in Slovakia was 40.13 years old and the median age was 39.40 years old, which means that approximately half of the Slovak population is younger than 40 and the other half is older than 40. Over the past one and a half decades, the average age of the Slovak population rose from 35.98 in 2000, to the mentioned 40.13 years, that is by 4.15 years (somewhat more for women and less for men). Not just the average or median age, but many other indicators which characterize the age structure of the population clearly document the ongoing process of population ageing. Only in the last five years, the number of persons in the oldest age group (65+) has grown by 93,300 individuals, while the total population increased merely by 22,000 persons over the same period. The share of this particular age group has thus expanded by 1.7 percentage points to 14.45% in 2015, while the share of both child (15-) and the economically active (15-64 year olds) population contracted (in the last five years working age population lost 1.6 percentage points from its share in total population). A decline in working age women was faster than working age men. A more long-term flashback reveals that between 2000 and 2015 Slovak population has "lost" 101,000 girls younger than 15 and 104,000 boys younger than 15 (roughly 150,000 for

[4] The formal education system in Slovakia supports the transition of most 14-15 year olds from elementary to secondary education levels. Secondary schools are to some extent, implicitly motivated to accept and retain students for their own institutional self-sustainability. Most youth participate in formal education until they are about 18 years old.

[5] The public school system is also increasingly complemented by private school organisations.

both genders when age 0-17 is considered), while total population increased by 23,700 people over the period.

The age structure of the economically active population itself is illustrated in the next table. As can be seen from comparison based on division by standard main age groups, the population aged 50 years and over represents approx. one quarter of the total economically active population in Slovakia (Table 1.2). Age structure in older cohorts[6] is quite even: each 5-year age cohort between 40 and 60 years old comprises a little more than one tenth of the total active population. Along with persons older than 60, they (40+) represent slightly more than half (51.9%) of the total active population in Slovakia (consisting of 1.4 million individuals). Contrary to that, the age structure of the younger population[7] is completely uneven: when decomposed by 5-year age cohorts, the number of persons in each group is steadily increasing, making their share in total population growing from 0.7% (15-19 years) to 14.7% (35-39 years).

T a b l e 1.2

Structure of economically active population by age groups (2015)

Main age groups (Years)	Level (Thousands)	Percentage of active population
15-24	209.1	7.6
25-49	1 805.8	65.9
50-64	703.8	25.7
Younger cohorts in details		
15-19	18.4	0.7
20-24	190.7	7.0
25-29	341.1	12.5
30-34	363.2	13.3
35-39	403.3	14.7
SUM 40-	1 316.7	48.1
Older cohorts in details		
40-44	374.3	13.7
45-49	324.0	11.8
50-54	322.1	11.8
55-59	294.4	10.8
60-64	87.4	3.2
65+	19.5	0.7
SUM 40+	1 421.7	51.9

Source: Own calculation from data of the Statistical Office of the SR (database Slovstat).

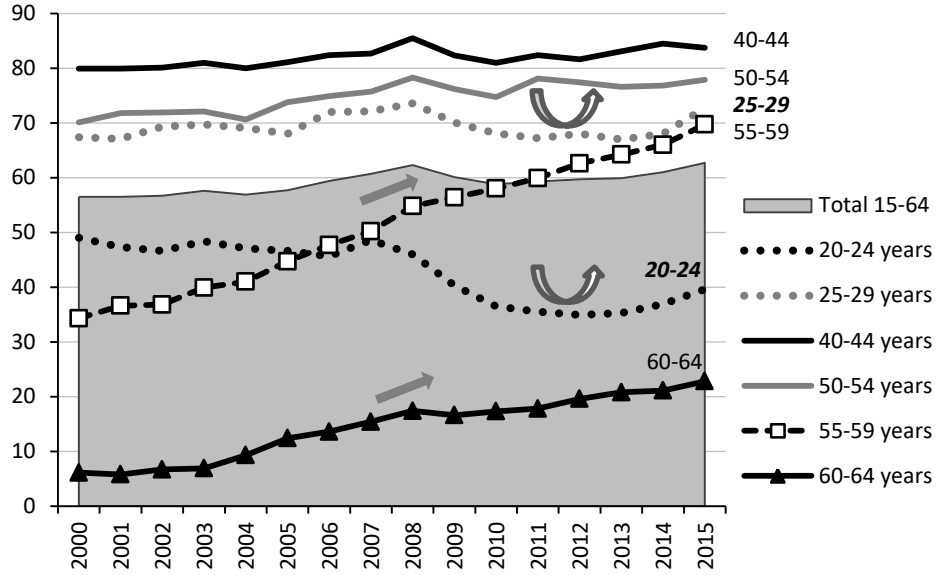
[6] Means older than median age.

[7] Means younger than median age.

Regarding the employment status of people of different ages, it is important to point out the fact that employment patterns differ across age groups, most significantly when comparing the youngest and the oldest age cohorts. As can be observed in time series for employment rate by various age groups, the development of employment varied from age to age, especially in difficult macroeconomic conditions. The next figure clearly illustrates the divergent development in employment rates in younger and older age groups after the last recession (2009).

F i g u r e 1.10

Development trends in employment rates in selected age groups (%; 2000-2015)



Source: Based on data of the Statistical Office of the SR (database Slovstat).

The highest employment rate in the long-run is achieved by persons aged 40-44 years old, ranging over 80%. A very similar development pattern can be observed in the next age cohort 45-49 (thus we do not show this one in the figure). Not only people aged 40 to 50 belong to those with the highest labour force participation – also persons in the 50-54 age group show an extremely high employment rate, more than 10 percentage points above average (average for economically active population; 15 to 64 years old). Looking at the change dynamics over the series, all three mentioned 5-year cohorts (which means persons 40 to 54 years old) basically

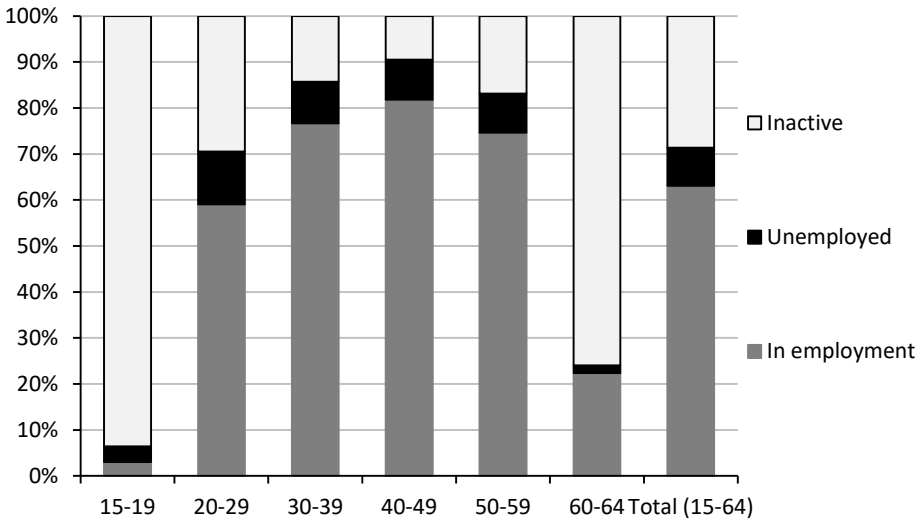
copied the development tendency of the total population. An interesting deviation can be noted in the development curve of the 55-59 age group, where the employment rate rose to an above average level. At the start of the series the rate in this group was 34% and surpassed the total employment rate (60%) in 2011, when total employment finally started to recover from the recession. The employment rate of people aged 55-59 more than doubled over the examined period and this upward trend was not halted by the economic crisis. Partially, it is the outcome of societal changes and related pension reform (former pension age for women was 53-57 years old, depending on the number of children). Along with the 60-64 year age group, they comprise the group with a steep increase in employment rate (both age groups may have been influenced by the administrative increase in pension age; changes were gradually effective since the 2004 pension reform). However, an important observation is that the crisis did not significantly break this process.

The lowest employment rates were recorded in the youngest (20-24) and oldest (60-64) age groups (the only groups with employment rate below average/aggregate rate). However, looking at employment patterns since the start of the 2008 crisis, the employment in both groups developed in the opposite direction. Employment rates have fallen especially in the youngest group, and a very similar trend was observed when considering all people aged under 34 years old (and also in the 35-40 category, although to a smaller extent). Older people fared better during the recession (and in the post-recession period) with respect to employment dynamics. Contrary to that, the population younger than 29 years old experienced a clear downward swing in employment (swing marked in Figure 1.10).

We can conclude that in unfavourable economic conditions, the youngest age groups become particularly vulnerable and disadvantaged on the labour market (case of Slovakia). Employment rates in the oldest age groups have risen almost constantly since 2000. The drop in total employment during the recession in 2009 was notable, has deepened in the following years and lasted until 2015 (when total employment rate recovered to the pre-crisis level), but did not influence the long-run trend of increase in employment rate in older ages. Contrary to that, the crisis had profound impact on employment of young people.

F i g u r e 1.11

Structure of economic activity in total population (aged 15-64 years old) and decomposed by age groups (%; 2015)



Source: Own calculation based on data of the Statistical Office of the SR (database Slovstat).

Besides being more resistant to unfavourable economic conditions (in terms of employment rate changes), older age groups also exhibit a higher share of employed persons to unemployed and inactive persons, compared to younger groups. In the 40-49 years old age category, only 9.5% were inactive, as opposed to 14.3% in the 30-39 age cohort or even 29.4% in the 20-29 age group (or 28.6% in total population aged 15-65 years old; see Figure 1.11). A higher portion of inactive population in young groups is caused particularly by people 20-24 years old (where 45.5% of population is inactive, including students) and in the total population by the 60-64 age group (where pensioners represent the major part of inactive persons). Also in terms of unemployment, only 8.7% in the 40-49 age group were unemployed (8.5% in the case of 50-59 age group), whereas the share of unemployed in the 30-39 age group reached 9.0% and in the 20-29 age group, it surpassed 11.5%. Only 18% of persons aged 40-49 were workless (inactive and unemployed), as opposed to 31% workless persons in the aggregated category 20 to 40 years, or 37% workless persons in the total population.

1.4.2 Youth has been dramatically affected by the economic downturn

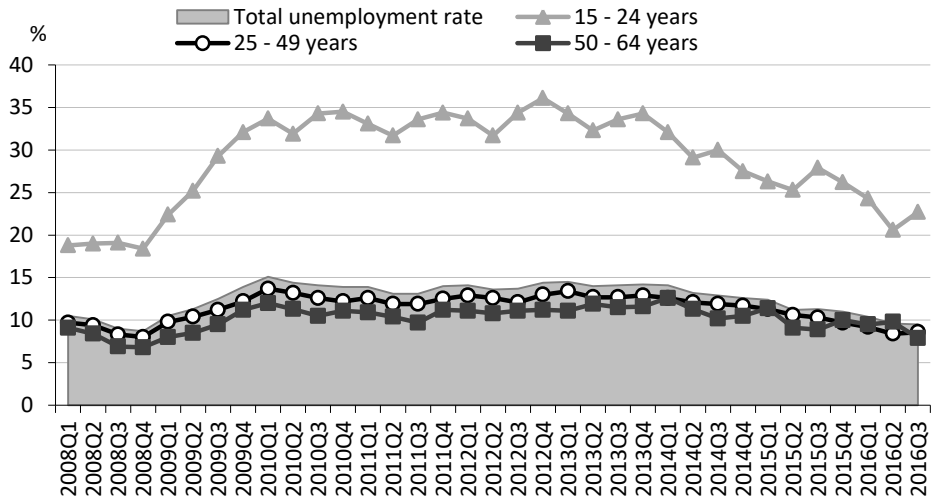
As confirmed by the latest economic crisis, regarding employment opportunities, particularly the young workforce is being severely exposed to the downward swings of the economic cycle. Also in the case of the Slovak Republic, the youngest people were the ones hit the most by crisis adaptation processes which took place on the labour market (comparing the changes in un/employment rates by age groups). While unemployment rates of middle aged and mid-to-old workers basically copied the development of total unemployment, youth unemployment rate "burst" between the first and the last quarters of 2009 and has remained high for years afterwards.

The long-term comparison of youth unemployment across Europe, reveals that prior to the crisis Slovakia experienced significant convergence in the unemployment rate of young people. In the year 2000, in Slovakia, the unemployment rate of persons aged under 25 was not only twice as high as the European average, it was actually the highest among today's EU28 countries (reaching 37.3%). In 2002, the unemployment of young people started to decrease, after Slovakia´s accession to the European Union the positive trend continued and shortly before the crisis it accelerated: in 2008 the unemployment rate of persons under 25 years of age was only 3.5 percentage points higher than the EU average and Slovakia ranked seventh within EU countries (to compare, in 2000 it was roughly 20 percentage points above the EU average). Slovakia and Poland, former leaders in youth unemployment, both reduced the unemployment rate of the youngest persons (25-) to less than half between 2000 and 2008.

Owing to the consequences of the crisis, the unemployment rate of young people in Slovakia peaked again and mounted from its 2008 historic low (below 20%) to more than 33% immediately after the recession, and remained above this level for the next four years (this means that every third person aged 25 or younger was unemployed over this period). In 2014, in line with emerging overall employment recovery, the unemployment rate in the youngest group finally dropped below 30% (which was indeed still high, compared to overall unemployment reaching 13.2%).

F i g u r e 1.12

Unemployment rate by main age group (Slovakia, %)



Source: The Statistical Office of the SR (database Slovstat).

Between 2009 and 2014, only two age cohorts recorded an unemployment rate higher than the total unemployment rate in the economy: persons under 25 years old and persons aged 25-29 (in the second case, unemployment spiked in 2013 reaching 18.6%). At the same time, when decomposed by 5-years age cohorts the 20-24 and 25-29 age groups comprise the two largest groups of unemployed persons, with both consisting of approximately 57,000-58,000 unemployed persons (annual average over 2009-2015). The recovery of overall employment in 2015 brought a reduction in the number of young unemployed (younger than 30 years old) by 21,000 (year-on-year). To compare, it represents almost half of the total unemployment decline (44,000). However, there are still 87,000 young persons under 30 years of age that are unemployed (number for 3rd quarter of 2016), representing exactly one third of total unemployment in Slovakia.

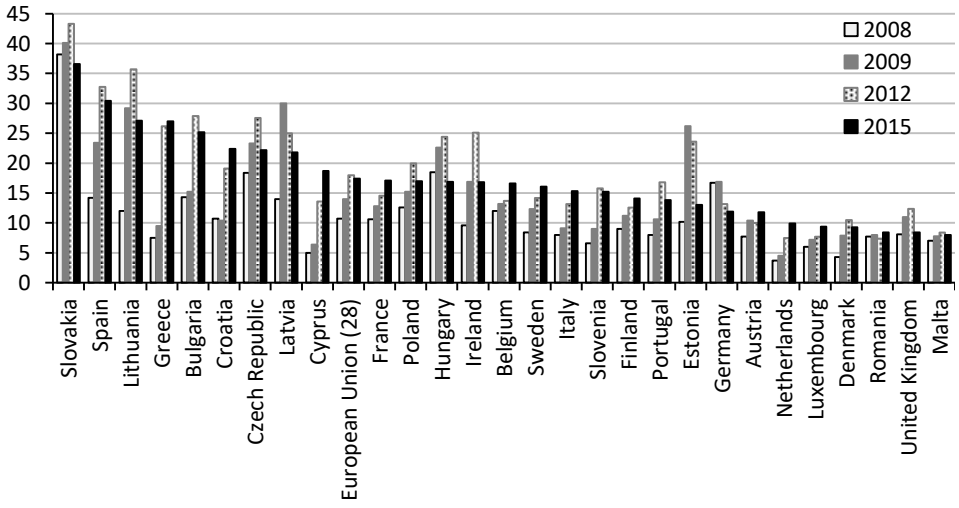
1.4.3 Persisting leadership in unemployment of the low-qualified

A comparison of the employment prospects of persons with the lowest education attained among European countries, feels rather gloomy for the Slovak people; unfortunately this is true in a long-run view. Almost over

the entire last decade, the unemployment rate of low-educated persons in Slovakia has exceeded the EU average by more than (an incredible) 30 percentage points. In 2005, when unemployment of the low-qualified workforce peaked in Slovakia, its value exceeded the EU average by 41.2 percentage points (more than half of the active population with low education was unemployed in Slovakia; when "low-educated" or "low-qualified" refers to pre-primary, primary and lower secondary education). Since 2005, we have witnessed notable improvement in a form of continual decrease in the unemployment rate for the low-qualified that was halted with the crisis that came in 2008. However, as unemployment in this education segment has also risen in other labour markets affected by the crisis, gradual convergence to the EU average continued.

F i g u r e 1.13

Unemployment rates of low-qualified persons in the EU 28 countries (%)



Note 1: Ranked by 2015 values.

Note 2: Education level 0 – 2 by Eurostat methodology = pre-primary, primary and lower secondary education.

Note 3: For economically active population defined as 20 to 64 years old.

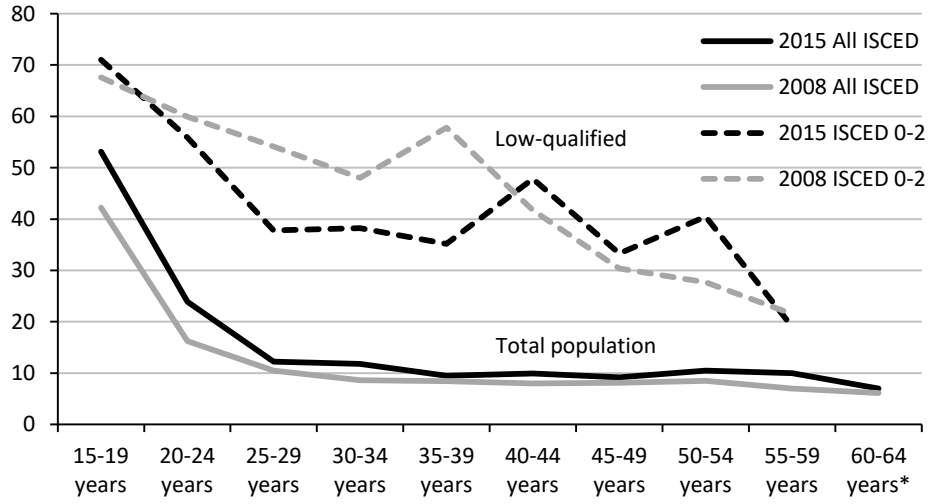
Source: Based on Eurostat database.

In spite of notable improvement in employment of the low-qualified Slovak workforce after 2005, and despite even higher increases in unemployment of low-qualified persons in some other EU countries (owing

to the crisis), Slovakia has retained its undignified 1st place in the unemployment rate of the low-qualified among the EU member states, from 1998 (beginning of the series for most of today's EU countries) until today. Figure 1.13 demonstrates a rather dramatic increase in unemployment rates of low-qualified persons in several member states between 2008 and 2009, particularly in Baltic countries, Spain and Ireland. The comparison with later years (displayed in the Figure) documents that in many member states it was not a single-shock effect, in some the problem of unemployment of the low-educated has even deepened in the years afterwards (Greece, Bulgaria, Croatia, Ireland, Lithuania, Czech Republic, and others). In the case of Slovakia, the crisis induced less change when compared to other European countries, since the initial level of unemployment of this segment was higher than in any other EU member state.

F i g u r e 1.14

Unemployment rates in the SR of total population and of persons with less than primary, primary and lower secondary education, by 5-year age groups (%)



Note 1: Less than primary, primary and lower secondary education = ISCED educational level 0-2.
Note 2: *For persons aged 60-64 years old, unemployment rate for ISCED 0-2 is not available.

Source: Based on Eurostat data.

This is not a complete and fair picture. In this case, the indicator of unemployment rate should be confronted with the absolute values, but first,

we can use a more detailed decomposition by age to explore whether the employment chances of the low-qualified are influenced by their young age (the issue of youth unemployment previously described) and whether their chances of finding a job increase with age. Figure 1.14 illustrates how the unemployment rate of the low-qualified varies across the age groups compared to the total population. In both cases, the rate achieves the highest values at the young age, but unlike the low-qualified segment, unemployment rate in the total population quickly decreases before reaching 30 years of age and then develops smoothly around the 10% level. Thus, combining the low-educated unemployment problem with youth unemployment is correct only to some extent.

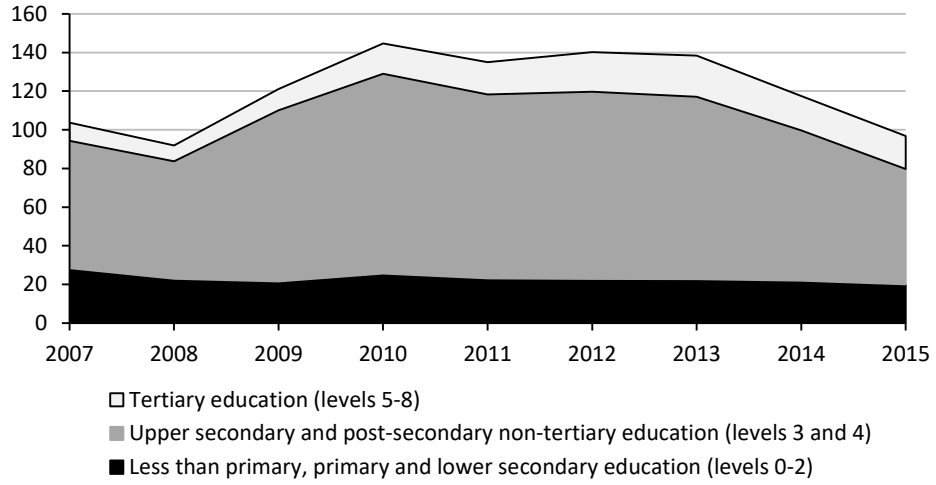
However, this comparison has a limitation which becomes clear right after looking at the Figure 1.14. The development line referring to the low-qualified by age, presents quite a puzzling picture, it increases and decreases with age several times, although decomposition by 5-year cohort is sufficiently detailed. This behaviour uncovers an important observation: the group of low-qualified persons in some ages is too small to deliver adequate cross-time or cross-country comparisons of relative indicators. To illustrate, in the youngest group (15-19 years of age) of low-educated persons (ISCED 0-2), there are only 3,600 unemployed persons, in the 20-24 years old group there are only 9,100 low-qualified, unemployed persons and in the 25-29 years old group, there are 7,300 low-qualified unemployed persons. In all three examples, the share of low-qualified in total unemployment in these particular (young) age cohorts decreased between 2008 and 2015 (from 46% to 37%, from 25% to 20%, and from 18% to 17%, respectively). Altogether, the share of low-qualified in youth unemployment represents 20% (20,000 out of 96,800 young people looking for a job are those with education lower than upper secondary education; i.e. people of 0-2 ISCED class; 2015, Eurostat). To complete the picture, we can compare youth unemployment in absolute terms by all educational levels (ISCED) (Figure 1.15).

Besides the above mentioned 20,000 young persons with less than primary to lower secondary as their highest educational level, out of 96,800 young unemployed (under 30 years of age) 60,000 were those with upper secondary and post-secondary education and 17,000 were university graduates (tertiary education) (Figure 1.15). The largest group of unemployed young people is comprised of persons with upper secondary to

post-secondary non-tertiary education. With regard to the total population, persons with vocational education/apprenticeship without a school-leaving exam make up the largest group of unemployed in Slovakia in the long term (106,000 persons create one third of total unemployment). The second largest group of unemployed is represented by people with upper secondary vocational education (78,500 persons make up another quarter of total unemployment). Also, the highest post-crisis increases in unemployment were observed in these groups, while the size of the primary education category almost did not change after the crisis.

F i g u r e 1.15

Structure of youth unemployment (15-29 years of age) by ISCED levels of education (thousands)



Source: Based on Eurostat data.

To sum up, when considering the highest education attained, due to recession the groups of unemployed people with secondary education expanded the most, while the group of people with lowest qualifications is stable though smaller in size. In this group, Slovakia remains the European leader in terms of unemployment rate comparison.

In this context, the educational structure of the total population must also be considered: in Slovakia, only 14.6% of the total active population (15-64 years of age) has attained less than primary to lower secondary educations, as their highest level of education, compared to 26.9% in the EU

on average (2015 Eurostat values). This means that the unemployment rate of the low-qualified in Slovakia is also high because their share in the total population is comparably low and most jobs can be filled by a higher qualified labour force.

However, it does not change the fact that with lower skills and qualifications it is more difficult to secure employment, even in a favourable economic situation; low-qualified persons face barriers when trying to get, as well as maintain jobs – in periods of economic turbulence, employability of this disadvantaged group weakens.

Evidence from research on the employability of graduates (Ilieva-Trichkova & Boyadjieva, 2016) points to education-job mismatch in Slovakia. The authors show the importance of country-specific institution setups. The results are based on data from the European Social Survey as of 2010, but the presence of such job-education mismatch is likely to still be present and would also support the patterns observed in aggregate statistics, as commented on in detail throughout this chapter. Employed graduates might be facing important risks, such as being employed in jobs which do not correspond to the level of their education, including compensation schemes. Moreover, in such situations, the higher educated are pushing out the lower educated from their potential employment opportunities.

Returning to unemployment rate comparison, considering the largest post-crisis increases in the unemployment rates of the low-qualified, this segment of the labour force was most severely affected by the crisis in Greece, Spain, Lithuania, and Cyprus (the rate rose by 13 to 20 pp. in these countries, in Slovakia, it dropped by 1.6 pp.). Slovakia approached the EU average in the unemployment rate of the low-qualified by 8.3 percentage points between 2008 and 2015, not thanks to radical improvement, but essentially at the expense of the other countries affected by the crisis. However, since 2012 we can see a positive sign of decline in the unemployment rate of the low-qualified in Slovakia, but the trend is not consistent in all age categories (particularly in the youngest and oldest groups of the active population, the rate has again slightly increased in the last two years). Slovakia is experiencing a long-term trend of visible improvement of the qualification structure of its population. The share of low-qualified (ISCED 0-2) in Slovakia's total population is falling in the long

run. The drop by more than 7 percentage points between 2000 and 2015 is rather significant,[8] the share of the low qualified in the active population is now the third lowest in the EU, following the Czech Republic and Lithuania.

1.4.4 Policy response to tackle youth unemployment

Policies supporting youth rank high on policy agendas in the European Union and across the world. Research revealed that the incidence of unemployment at early stages of life is connected with grave consequences for the psychological and social development of the young individuals concerned. Therefore, investing in youth is a public policy that is becoming increasingly recognized and publicly supported across most economies. This creates favourable environment for policy delivery. Providing youth with the skills and tools to support them in finding and keeping an adequate job is crucial for their future professional lives and personal prospects. Increased attention to the position of youth in labour markets, brought some improvements in the last two years, that were possible to observe on the European level. In 2015, youth unemployment in EU28 declined by 820,000 persons (younger than 30 years of age) to 7.9 million, which represents a decline of almost 150,000 more persons than the year before. However, youth unemployment still counts for more than 34% of total unemployment in Europe (for young unemployed < 30 years).

The flagship initiative of the European Commission, the Youth Guarantee Programme was introduced in 2013 with the aim to improve the labour market performance of the youth. The key elements of the initiative are focused on improving the employability and on supporting the continued education of young people not more than 25 years of age, so that they can receive a good employment offer, or continued education which includes training programmes at workplaces. Such opportunities should be available for youth who became unemployed or left formal education, in a period less than four months[9] following the change in their situation. The initiative is co-financed from EU resources.

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[8] From 21.7% to 14.6% of total population.

[9] All EU countries have committed to the implementation of the Youth Guarantee in a Council Recommendation of April 2013.

The unemployed who have never had a job constitute a significant part of the total unemployment in Slovakia – nearly one quarter of all unemployed falls into this category. Large part of these unemployed are young people targeted by the YG measures implemented in Slovakia. The implementation of the Youth Guarantee in Slovakia has been launched in 2014 and currently consists of four programmes. The key modification of the Slovak implementation scheme of the YG is the age extension for the eligibility for the programmes from the maximum 25 years in EU general scheme to 29 years in the Slovak YG scheme. The current programmes have been designed or re-defined in the course of 2015:

1. "Right for the first employment." a ALMP, in operation since January 1st 2015 aiming at supporting access to first regular employment. The programme is based on a job creation subsidy for a young unemployed <29 years old,[10] previously not employed in a position lasting more than 6 consecutive months. The subsidy may be granted to the employer for 6-12 months, and the job must be maintained for consecutive period not of a shorter duration than a half of the subsidy duration.
2. "Via internship towards employment." Launched in September 2015, the programme is based on providing a subsidy for the costs related to creating and supporting a new half-time employment position of a young person (< 29 years old). The subsidy is being provided during the first 9 months following the job position creation and the costs covered include 95% of the total wage costs of the young employee, contribution to other incurred costs related to needs for workplace inclusion such as mentoring, the wage cost of the mentor and additional costs linked to the workplace insertion and experience. 16 thousand young unemployed in Slovakia are expected to benefit from this scheme.
3. "Traineeship for graduate starts employment." The Traineeship for Graduates Programme (TGP) has been launched in 2004 and it was included under the YG in 2014. The programme has been subject to some modifications. The current scheme is the result of an update in November 2015 and it includes 2 support programmes. First scheme is the continued programme for traineeship for young unemployed who

[10] <25 years old must be seeking employment at least 3 months, those 25-29 years old at least 6 months to qualify.

graduated at least a secondary education programme and have not been continuously employed. This is to some extent a continuation of the programme scheme that has been in place since 2004. Secondly, the programme involves a job creation support for a young successful participant of the traineeship, when a new job position is created by the employer where the graduate has successfully concluded his/her traineeship (within TPG scheme).

4. "Successfully at the labour market." This programme offers subsidies directly to young unemployed who will create a self-employment positions. The beneficiaries have to remain continuously active for at least 2 years. The maximum amount provided is 3 500 euro.

Some elements of current programmes under the YG in Slovakia having been in place in previous years as in the case of the Traineeship programme for graduates. In the period of 2014-2015, the government assigned 200 million euro to cover the programmes of the Youth Guarantee initiative. 50 million euro were planned to be allocated from the state budget, 72 million to be covered from the ESF and the remaining part to come from the subsidy for the Youth Guarantee initiative (Šikulová, 2014).

The evaluation of the youth policy programmes put in place last year will require longer period of time not only with regard to the duration of the programme implementation but also for the length of the period following the programme implementation. However, we know from the research on ALMPs and evaluation of similar programmes that training programmes which are not cost intensive and are of shorter duration have positive long term impact on the employability of the participants. This was confirmed also by impact evaluation of the previous years of the TPG by Stefanik et al. in chapter 4 of this book. Alternations of the programme structure will provide good basis for future research and analyses of how programme structures influence its outcomes mainly in terms of employability of the programme participants.

Job creation subsidies in the private sector are often criticized by the entrepreneurial community as a source of distortions. Indeed, as research in ALMPs measure revealed, wage subsidy schemes are associated with considerable dead-weight costs (supporting job creation at private employers who would have created the job anyway) as well as with displacement effects (jobs created for programme participants are displacing

other potential employees who would be hired with the programme not being in place). Particular attention is worthwhile for the structuring of the wage subsidy schemes, as private sector targeted hiring subsidies may work whereas public sector subsidies tend to fail (Martin, 2014). Concluding by a final argument in favour of job subsidies, giving an advantage to a particular target group of job seekers, we are seeking to introduce more equity into the job opportunities' distribution.

1.4.5 Young, low-qualified, and women disadvantaged by earnings as well

Favourable development in the economic and employment performance was reflected also in the improved remuneration of employed persons. The fastest growth rates y-o-y in the nominal wages occurred in the sectors information and communication and construction; in the latter one the dynamics of the wage growth soared particularly in the second part of the years (from 4% in July to 11% in December; SO SR, 2016b). This hints toward the boom in construction activities having been reflected rather in wages than in employment (as was suggested previously). A decent wage growth was experienced in other sectors as well; more than 5% growth rate was recorded by transportation and storage, by accommodation and by industrial subsector sale and repair of motor vehicles. Increased demand for Slovak employees was accompanied by the growth in average nominal wage of 2.9%. Thus, the average monthly wage in Slovakia increased from 858 euro in 2014 to 883 euro in 2015. In real terms, the average wage rose by 3.2%. The growth of the average wage (in both, nominal and real terms) outpaced the growth in employment (total employment grew by 2.6% y-o-y; LFS).

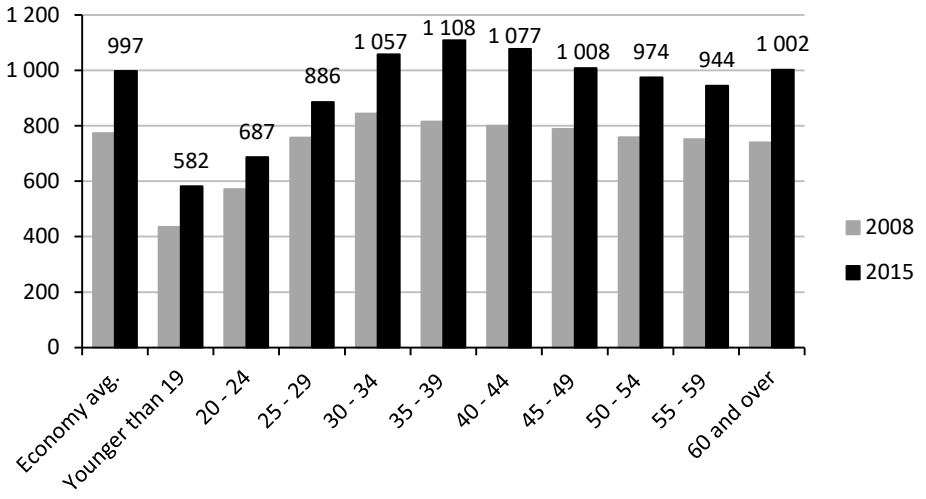
The most attractive sector in terms of income is the sector information and communication activities, where average nominal monthly wage rose to 1,751 euro in 2015 (the telecommunication industry is leading in driving the total wage growth, with the average nominal wage reaching 2,019 euro in 2015). The financial and insurance activities sector (with average wage 1,686 euro) follows in the average nominal wage. On the opposite side of the sectoral wage range is the accommodation and food services, where average nominal wage is more than three times lower than in the two "best paying" sectors (533 euro). Special focus should be paid

to manufacturing, as this part of industry employs one quarter of the total employment in Slovakia. This largest sector has special importance particularly in unfavourable economic cycle phase (it was a driver of employment recovery in 2015 as well). The average wage in manufacturing rose to 945 euro in 2015.

The differences between the best and the worst paid jobs (in terms of the sectoral wage levels) point at large discrepancies in wage levels between the branches, which are naturally given by the nature and difficulty of the job and related requirements, as well as by differences in labour demand by economy activity or particular labour force scarcity. Various scale of pay inequality can be observed when comparing average monthly wage of employees by their age or education level, and wage gap is obvious also in earnings of women in relation to earnings of men.

F i g u r e 1.16

Average monthly wage of employees by age group (euro)



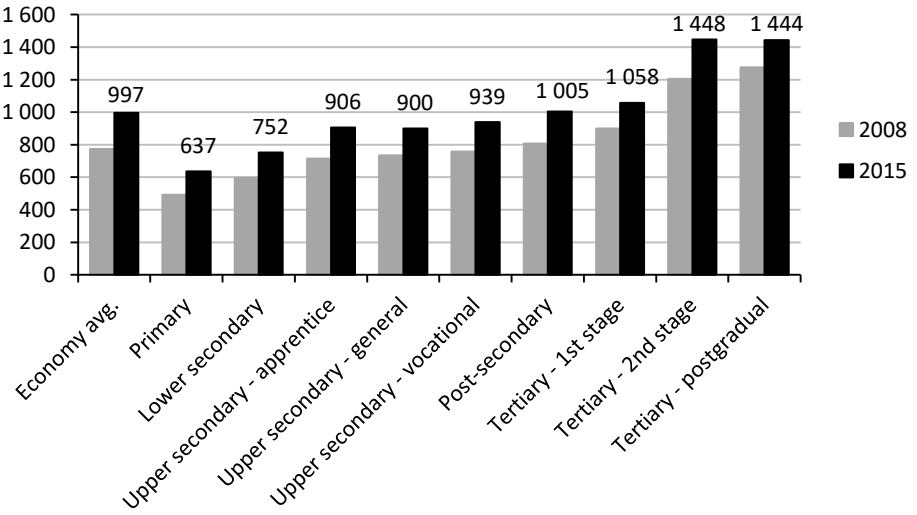
Source: Based on data of the SO SR.

Figure 1.16 illustrates that worsened economic position of young people after the recession of 2008 has been reflected not only in the employment and unemployment indicators analysed above, but also in the earnings. Not only are young employed the worst paid category of workforce, their salaries grew at the slowest pace in the examined period. People

younger than 19 years are naturally the lowest earning group, however, also wages of persons aged 20 to 30 years are still well below the average wage in the economy (997 euro) (see Figure 1.17).

F i g u r e 1.17

Average monthly wage of employees by highest education attained (euro)



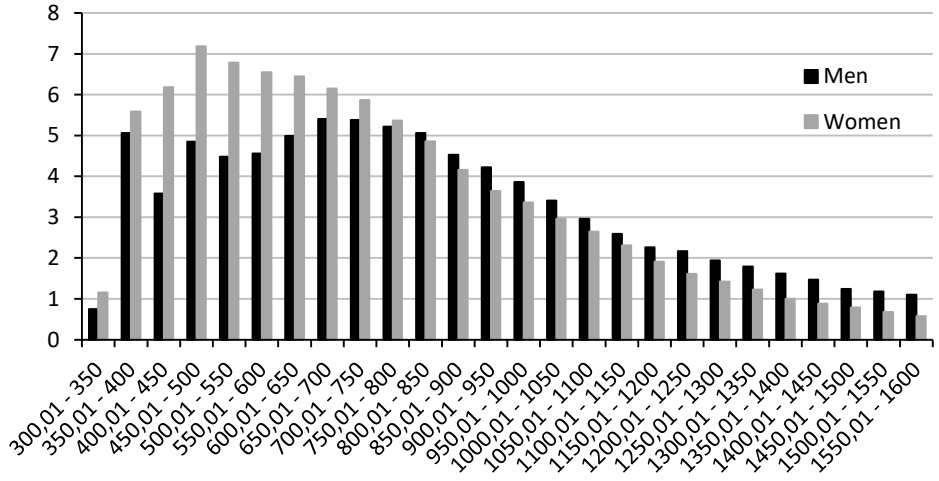
Source: Based on data of the SO SR.

The wage growth in this age group was lower by more than 10 percentage points compared to the aggregate wage growth after the crisis. This should be of particular concern also because it is happening against a background of a reduction in size of the young workforce (the number of young persons in Slovakia is decreasing). Moreover, this category of labour force consists also of people who have never had a job and have limited working experience and skills; the longer they are out of the labour market, the more difficult are their employment chances. The negative tendency in the employment situation of persons with no employment history has persisted for several years after the crisis, even though they are relatively cheap workers. Thus, special focus on designing and implementing active labour market policy in Slovakia is needed with reference to the young persons. Lower discrepancies are being seen in the average wage by educational level, except for earnings in the category of employees with the primary and lower secondary education which are markedly lower than in other

categories. The wages of employees with completed tertiary education surpassed the economy´s average the most. Also, when comparing wage growth dynamics, unlike in pay differences by age, in this case were the wage increases over the period more equal.

F i g u r e 1.18

Distribution of employees (men, women) in average monthly nominal wage intervals (%; 2015)



Note 1: Wage intervals (axis x) in euro.

Note 2: Extreme values (less than 300 euro and over 1 600 euro) are not considered due to low shares of employees in these intervals.

Source: Based on data of the SO SR.

Figure 1.18 reveals more detailed view of the wage levels in the Slovak labour market than that provided by simple average wage comparisons. The picture shows that the largest mass of workforce is concentrated in the below-average wage intervals. It is important to say that the median wage increased to 775 in 2015, however the average wage is 222 euro higher than that. Especially women expend their shares in the low-earning categories (see the Figure). Thus, the figure provides us also with the gender perspective. The clear pay gap can be derived also from the median wage comparison: it represents 842 euro for men, but 710 euro for women (gross monthly wage). The temporal comparison would show a modest improvement: while median wage for men increased by 26% since 2008, median wage for women grew by 30%. However, despite faster growth

rate for women, due to the wage discrepancy in genders, the median wage for men rose by 10 euro more in real terms than in the case of women. Most women have gross average monthly wage 450 to 500 euro, while most men earn 650 to 700 euro (see Figure). This comparison confirms high gender discrimination in wages in Slovakia.

1.5 Conclusions

The Slovak labour market is improving in its aggregate performance. Nevertheless, Slovakia continues ranking among the weakest EU countries in terms of high unemployment and low employment rates respectively. Slovakia also remains relatively weakly performing compared to other EU countries when it comes to the labour market position of specific vulnerable groups.

Hence, despite improvements in the overall labour market performance, the labour market in Slovakia still needs to deal with harsh prospects of specific groups among which the worst prospects face low educated individuals, long term unemployed, and young unemployed. The persisting large share of long term young unemployed is alarming despite decline that started in 2015 and continued in the first part of 2016. Low educated individuals are in most precarious positions when it comes to their employability prospects. Comparing the unemployment rates of specific age and education groups to the EU average level reveals that also older unemployed and those with secondary education face more difficulties at the Slovak labour market.

Based on the aggregate labour market statistics the higher initial education still acts positively for employability but less so in Slovakia than in other EU countries. Crowding out of the lower skilled by the higher skilled cannot by excluded. Unemployed in more mature age categories need more policy attention. Especially in view of increasing demographic pressures it is important to develop policy tools addressing also employability of diverse age cohorts. Developing lifelong learning policy tools and solutions in line with the Strategy 2020 recommendations lead more systematically to increased employability. There is an evident need for increased support to authentic learning opportunities across the whole spectrum of qualifications and age specific employability problems.

2 MID-TERM PROJECTION OF SLOVAK LABOUR MARKET WITH EMPHASIS ON OCCUPATIONAL DEVELOPMENT

Ivan Lichner, Tomáš Miklošovič, Marek Radvanský, Miroslav Štefánik

The recent positive developments on the Slovak labour market raises a question about its further development in the years to come. Unemployment levels tend to have low values similar to ones that occurred in 2007. Economic activity is increasing, and the economy is starting to show signs of overheating. On the labour market, the question of structural unemployment and mismatch, again became critical. Several occupations in many sectors strongly feel the lack of skilled workers. One of the best examples, is the expected start of the fourth large automotive company in Slovakia. Existing companies are experiencing increased competition for specialists, and are starting to provide attractive incentives both for incoming, as well as for existing employees. Additionally, they are beginning to provide extensive, specialized training to ease the transition from other occupations.

This chapter is aimed towards providing anticipation of the main sectoral employment trends up to 2025. This year's results are based on the methodological update of methods applied in Lubyová and Štefánik et al. (2015). The demand side of the economy is based on augmented CGE approach, described in the following part of the chapter and provides information about the expected demand on 64 sectors of Slovak economy, and also nine occupational levels. This year's outlook is aimed towards identifying changes in occupational structure and the related challenges. The supply side is based on the microsimulation approach described in the last chapter of this book. The replacement demand is currently based on a narrow definition, where we only consider direct transition from employment to retirement and early retirement, as well as the transition from employment to disability. Besides these transitions, we also account for the possibility of death during employment. From the user's perspective,

we provide and briefly describe, the results aggregated to 18 first digit NACE sectors and three levels of qualification defined by ISCO-08[11] occupational groups.

2.1 Methodology

Long term forecast of labour demand, as well as occupational forecast, is based on a recent update of the recursive-dynamic CGE model developed by the authors. This methodology was widely applied for the impact analysis of several economic policies.[12] Their application is mainly aimed towards examining changes in the economy based on analysis of utility and production functions. Applied augmentation of the model is suitable for indication of structural changes in the Slovak labour market, under assumed macroeconomic development externally provided by the econometric model developed at IER SAS.[13]

This year's update is based on the previous version of the model used in the previous forecast (Lubyová & Štefánik et al., 2015) and described in more detail in Miklošovič and Páleník (2016) or Radvanský and Miklošovič (2016). The previous model[14] divided the sectoral demand into 5 levels of education, while the current update focuses on occupational structure divided into nine levels of ISCO classification, which can be assumed to be a more proper application from the productivity point of view within selected sectors. The model keeps the structural complexity of the previous application, thus covering 64 NACE sectors. This complexity is limited by the available structure of applied SAM matrix for the year 2010, which was constructed and described in Miklošovič (2014).

The model was calibrated on the basis of available data from National Accounts provided by the Slovak Statistical Office up to the year 2015.

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[11] ISCO – International Standard Classification of Occupations.

[12] See for example: Francois & Reinert (1997), Decaluwe & Martens (1988), Caliendo & Parro (2014), Weisbrot, Rosnick & Baker (2004), Giesecke & Madden (2007).

[13] Radvanský, Miklošovič & Lichner (2016).

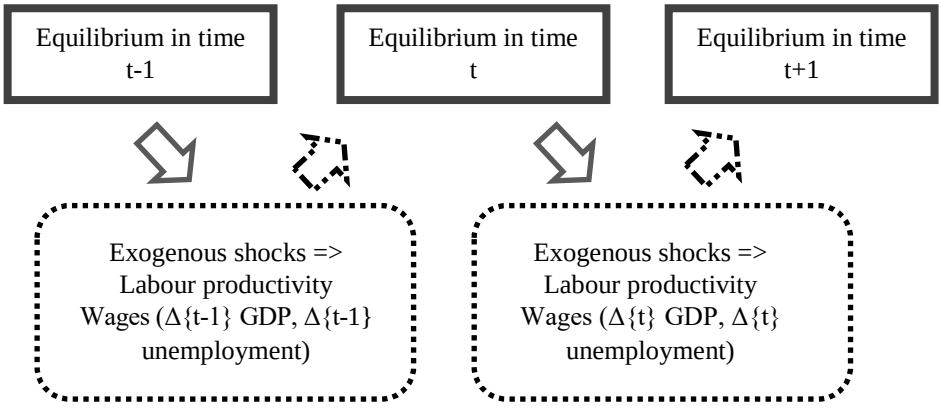
[14] The CGE methodology comes from Dervis, De Melo, Robinson (1982). The structure of the program code is inspired by the model USDA (Robinson, Kilkenny, Hanson, 1990). The base for the static part of the model comes from authors McDonald, Robinson and Thierfelder (2005).

As the main target for ex-post development, we considered a development of main macroeconomic variables such as gross domestic product, employment status, etc. To create a projection of economic development by the CGE model, the long-term forecast of economic development in Slovakia was utilised (Radvanský, Miklošovič & Lichner, 2016). This forecast was based on the quarterly ECM econometric model of IER SAS (B_IER_ECM 2016).

The applied CGE model required data modifications regarding the structure of demand for labour occupation, while National Accounts provides only aggregate employment data. In the absence of detailed labour market information on occupational structure, relevant occupational shares based on individual LFS data were applied for disaggregation of employment data from National Accounts. The main determining factors of the employment changes within the sector, by occupation level in the CGE model, were the remuneration level (wages)[15] and labour productivity (both increasing with occupation). The model utilises full first digit structure of ISCO.[16] The concept of the projection for labour demand is provided in Scheme 2.1.

Scheme 2.1

Concept of the projection for labour demand used in the CGE model



Source: Authors.

[15] Wage changes in the time t was calculated on the basis of economic results (GDP and unemployment level) in the time periods t-1 and t-2. The equation for wage level in time period t included Δ(t-1) GDP and Δ(t-1) level of unemployment.

[16] The last group of ISCO classification 0 – the armed forces occupations were not included.

Results presented in this chapter are aggregated into 18 sectors (first digit NACE) and three levels of occupation (Low, Medium, High). The aggregation of the occupational structure is presented in Table 2.1.

Table 2.1

Aggregation of ISCO into three qualification levels

ISCO	Level of occupation
1 Managers 2 Professionals 3 Technicians and Associate Professionals	High
4 Clerks 5 Service and Sales 6 Skilled Agricultural workers 7 Craft and related 8 Operators and Assemblers	Medium
9 Elementary Occupations	Low

Source: Authors.

2.2 Results[17]

The recovery period in the Slovak labour market took a relatively long time. The period with relatively low growth of real economy between the years 2011-2014, even resulted in an increase in the unemployment rate, but it can be perceived more as stagnation. Despite relatively slow economic growth in 2014 (2.5%), in respect to its pre-crisis levels we witnessed significant positive impact on employment. This trend also continued in 2015 and 2016 with relatively strong economic growth of over 3%, which is also expected to occur in the following periods. There are two major issues, which can significantly affect the development of the Slovak labour market in the near future. The major one is the expected demographic challenge in the coming years. From the demographic perspective, we expect that the working-age population will reach its highest level around 2018. Thus, even with a slight increase of activity rate we can expect a slow but steady decrease of the economically active population, which will strongly affect the supply side and increase tensions on the labour market due to low inflow of new employees. Additionally, the ageing population will increase the size of replacement demand, which will be

[17] <http://ekonom.sav.sk/uploads/work/Chapter2_online_annex.xlsx>.

described later in the chapter. On the other hand, the older age structure of the population could lead to interesting changes in job creation patterns in terms of Silver economy (Štefánik et al., 2013). The second issue is related to the expected decline of the unemployment rate. Despite that the model does not fully reflect the current decrease of unemployment; it still indicates a steep decline during the period of projection which should be taken with caution. Several, national[18] short-term macroeconomic forecasts are even more optimistic, expecting to reach the historically lowest unemployment rate, well below 9%, by 2017. From this development a question is raised about the natural level of unemployment in Slovakia, especially under significant regional disparities and skills mismatch. The Slovak labour market is relatively rigid regarding labour migration due to various reasons. The unemployment level in the strongest regions is already at its long term low, and it will probably be very difficult to attack the core of long-term unemployment, which is at a level of around 6%. We are thus concerned about the possibility of a further significant decrease of unemployment, somewhat below 8%. This issue will really depend on regional development and possibilities to create new jobs in lagging regions. Slovakia will probably observe very uneven development, on one side there will be regions with high demand and lack of available and skilled labour, which will increase wage pressures and on the other hand, there will be parts of Slovakia with a relatively significant stock of unskilled labour and lack of opportunities.

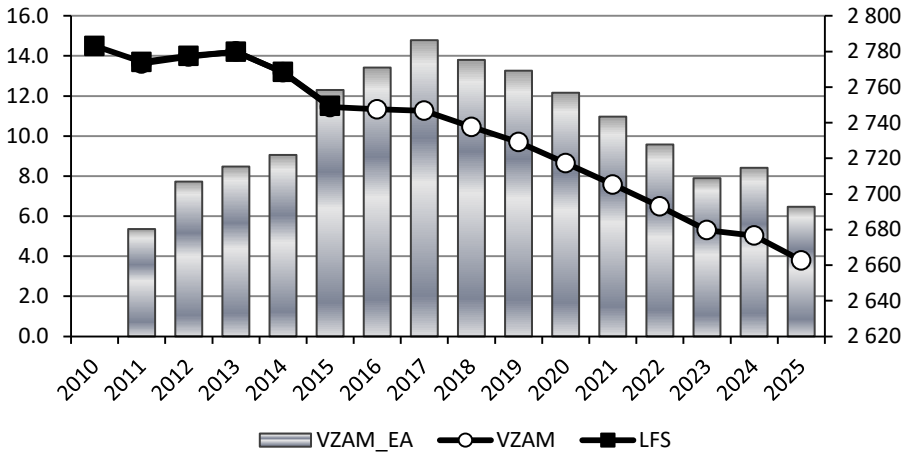
Regarding employment, Slovakia reached a significantly higher number of employees than in the pre-crisis period in 2007 (slightly less than 2.4 million). Rather unrestricted demand provided by the CGE model based on current assumptions about mid-term real yearly GDP growth over 3% shows a further steady increase of employment with a slightly decreasing trend (Figure 2.2). As was mentioned in the previous part, the limitation on the supply side can negatively affect expected employment levels in terms of structural and regional imbalances. On the other hand, provided projection is slightly conservative in the short term period (2016-2020), but maybe too optimistic in the following years. There are

[18] For example the one recently published by the Ministry of Finance of the Slovak Republic at: <http://www.mfsr.sk/en/Default.aspx?CatID=340>.

lively discussions about the effects of further technical development of employment (Industry 4.0), but we do not expect high negative impact in this respect during the next decade in Slovakia.

Figure 2.1

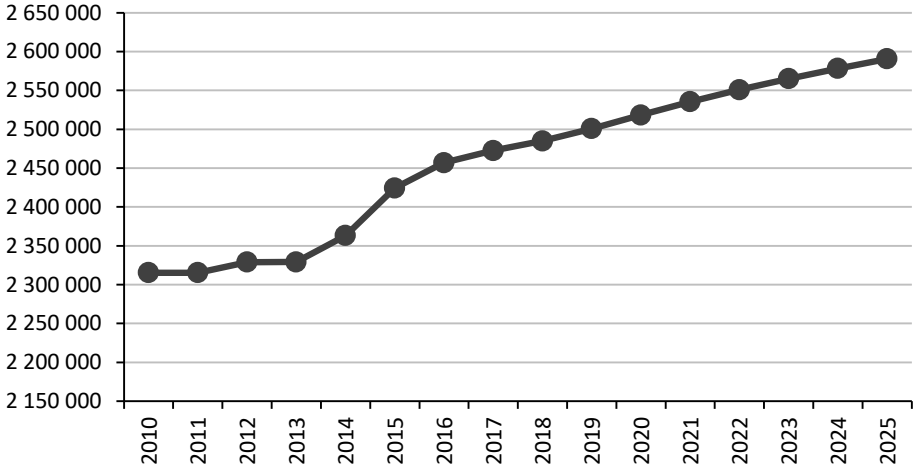
Development and forecast of LFS unemployment rate in % (left axis) and economically active population in thousands (right axis)



Source: Slovak Statistical Office, authors.

Figure 2.2

Total employment, in thousands of persons



Source: Slovak Statistical Office, authors.

2.2.1 Sectoral development

Labour demand will dynamically evolve with respect to future needs of the Slovak economy, as well as the initial structure of employment. The total demand for labour in different sectors is based on two fundamental factors. The first is the overall change in employment – expansion demand, which may also take negative values in the case of a fall in employment. The second is replacement demand for labour, which is created due to the need for replacing existing employees who are leaving their current job for a certain reason (e.g.: exiting to retirement, disability, change of profession, etc.). Leaving the labour market and related replacement demand is closely related to the age structure of employees in each sector. The replacement demand usually represents the larger share of the total demand for labour in each sector. We are currently considering the replacement demand only by the narrow definition of leaving the labour market to retirement, disability, or as a result of mortality.[19] We will focus attention on both of these factors in the following sections regarding individual sectors.

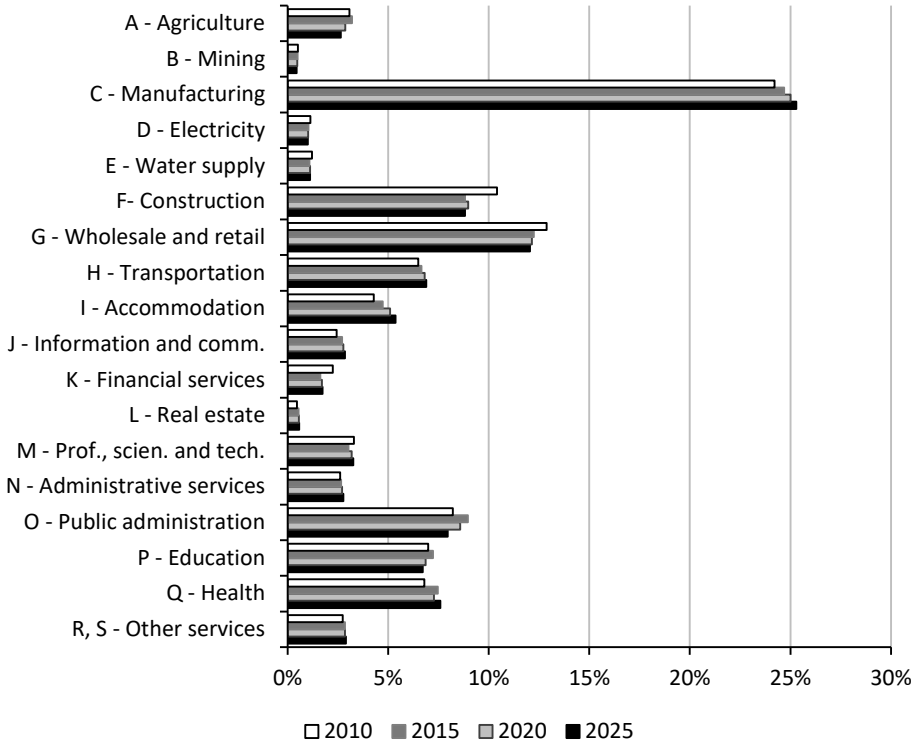
Structural development of employment by sectors over the period of years 2015 to 2025 will be relatively stable in terms of the continuation of past trends. The share of agriculture, forestry and fishing will follow the long-term downward trend, despite the slightly positive development over the past five years which was due to large interventions of EU funds; mining and quarrying will sustain its current share. In the case of the manufacturing sector, additional growth of its share is expected with a 5-year growth rate of approximately 0.3%. The sectors of electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities will remain at levels of around 1% of total national employment. Construction after a significant drop over the past five years, from almost 10.5% to 8.8%, will remain at this level over the coming decade. Wholesale and retail trade; repair of motor vehicles and motorcycles sector will remain at approximately a 12% level after 2015, with a slight downward trend. Between the years 2015 and 2025, positive development of share on total employment are expected

[19] Indicated replacement rates are, therefore, by definition, relatively lower in comparison to the methodology introduced in Willems & de Grip (1993).

in all remaining private services sectors and in the sector of arts, entertainment and recreation and other service activities. Share of sectors of public administration and defence; compulsory social security and education is supposed to continuously decrease during the next ten years. In the case of the human health and social work activities sector, its share will decrease during the next five years and start to grow during the period of 2020-2025, due to increasing demand from an ageing population.

Figure 2.3

Share of sectors on total employment, %



Source: Slovak Statistical Office, authors.

2.2.2 Expansion demand

Results of the model projection suggest that on the national level, between the years 2015 and 2020, approximately 94,000 new jobs will be created. In the next 5 year period (2020-2025), jobs creation should only

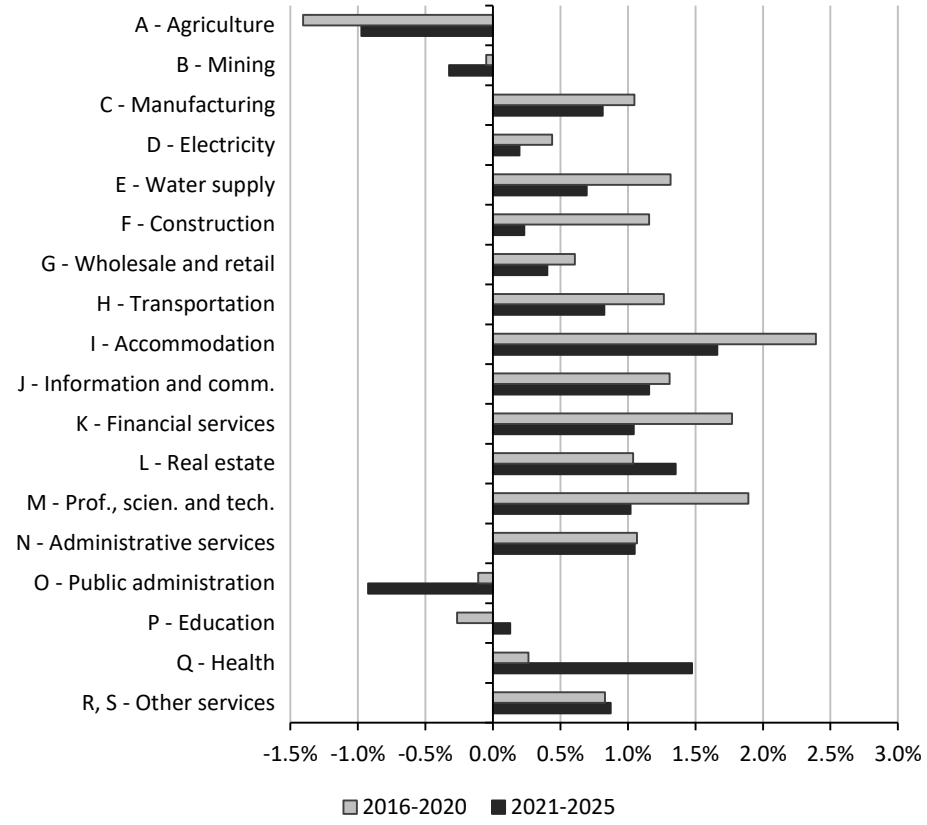
slightly slow and more than 72,000 additional, new jobs will be generated on the national level. In the following paragraphs a more detailed analysis of this development on the level of sectors is provided.

Over the coming decade, the most positive development in employment is expected to occur in the manufacturing sector, in which more than 56,000 additional jobs are about to be created. Highest relative growth is expected in the accommodation and food service activities sector, with more than 2% yearly growth over the next five years and 1.7% during the years 2021-2025. This accounts for more than 24,000 new jobs to be created in the sector, over the next ten years. The third most promising sector is the transportation and storage sector, in which approximately 17,000 new jobs are about to be generated. This sector is followed by human health and social work activities, wholesale and retail trade; repair of motor vehicles and motorcycles, and construction. In those sectors, around 15,000 new jobs are expected to be added by 2025. The last sector in which, on average, more than 1,000 jobs per year (11,000 total) are about to be created, is professional scientific and technical activities.

Sectors in which a drop in employment over the next decade are expected are: agriculture, forestry and fishing, mining and quarrying, public administration and defence; compulsory social security, and education. The highest decrease is expected in the case of public administration and defence; compulsory social security with a loss of more than 11,000 jobs. The relatively positive development in the sector of agriculture, forestry and fishing from the past few years is expected to divert, and almost 9,000 positions will be lost. In the case of the education sector a drop by approximately 2,000 jobs is expected over the next five years, after the year 2020 employment in sector will be relatively stable, but subtle growth will occur. In the mining and quarrying sector, a drop of approximately 200 jobs over the coming decade is expected. Thus, in this sector, no significant changes other than those related to usual replacement process will occur.

Figure 2.4

Expansion demand by sector, yearly growth, %



Source: Authors

A detailed look at the development within the subsectors of manufacturing, as the biggest single digit NACE sector in the Slovak economy, provides more complex information on the future needs of this sector. The fastest expected growth is in the subsector of the manufacture of motor vehicles, trailers and semi-trailers, in which more than 15,000 additional jobs are expected to be created over the next decade. The second most promising subsector seems to be the manufacture of fabricated metal products, except for machinery and equipment, with 7,500 new jobs. This subsector is followed by manufacture of machinery and equipment n.e.c., in which approximately 5,000 new jobs are about to be generated. Those subsectors are followed by manufacture of computer, electronic and optical

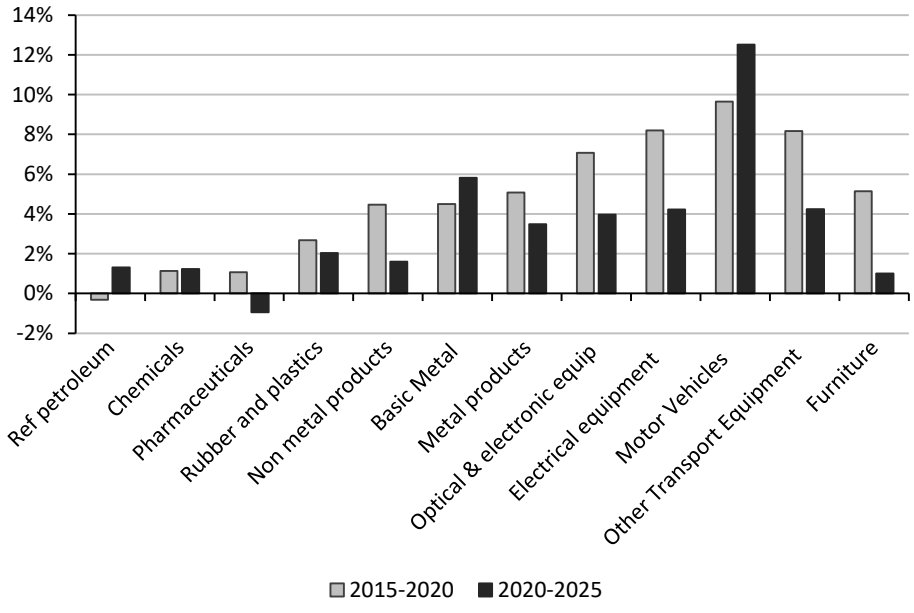
products (3,500) and manufacture of basic metals (3,000). In the case of the latter, in light of recent developments in the subsector (expected withdrawal of the U.S. Steel investment in Košice) creation of those jobs should be substituted in the future by imports of basic metal products.

In the subsectors of manufacture of coke and refined petroleum products, and manufacture of basic pharmaceutical products and pharmaceutical preparations, only marginal changes are expected. Stagnation is expected in the case of manufacture of chemicals and chemical products subsector, over the next ten years.

In the remaining subsectors of manufacturing (manufacture of rubber and plastic products, manufacture of other non-metallic mineral products, manufacture of other transport equipment, and manufacture of furniture) between 100 to 200 new jobs will be created on a yearly basis on average, over the next ten years.

F i g u r e 2.5

Expected changes in total employment, Manufacturing, %



Source: Authors.

Occupational change

Over the past 15 years the occupational structure of employment in Slovakia was relatively stable. Between the years 1998 and 2010 the number of employees in high occupational positions increased by more than 160,000 persons. Over the same period, employment in medium and low-level occupations decreased by 23,000 and 33,000, respectively. This situation occurred due to the fact that employment in high level occupations, also continued to grow in the crisis years of 2009 and 2010. In the case of medium and low occupational groups, they went from their highest levels in 2008, to rapidly drop over the first two years of the crisis. In the first year of the crisis, employment in the low occupational positions dropped by 7.2%, in medium occupations by 4.3%. In the case of the high occupational group, employment increased by 0.7% between the years of 2008 and 2009. Between the years 2008 and 2010, employment in medium occupations decreased by 128,000 persons (9.4%). High occupation positions were influenced by the crisis with a two-year delay and dropped by more than 126,000 jobs (14.7%) between the years 2010 and 2013. Between the years 1998 and 2015, total employment in high and medium occupational groups increased by 9.5% and 13% respectively. Meanwhile, employment in the low occupational positions dropped by almost 10%.

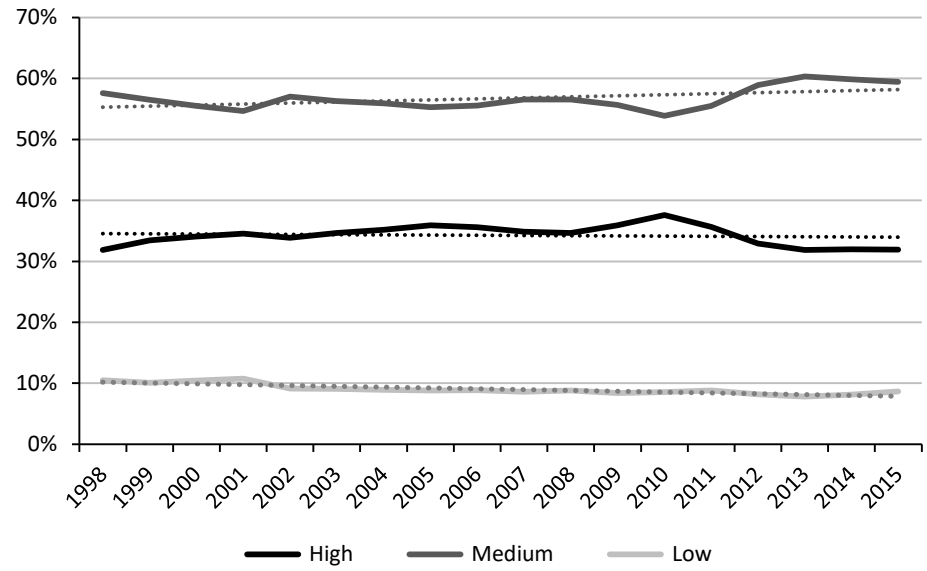
The total occupational structure developed in two phases. During the first phase, which lasted from the year 1998 to 2010, the share of high occupation positions increased. Since the year 2011, the share of medium occupation positions has been rapidly growing. In the case of low occupation positions, its share of total employment has been continuously decreasing over the past 18 years and decreased to a level under 10%. The trend of high occupational group share is relatively stable, and trend of medium occupations share slightly grew over the same period.

A more detailed look at the occupational structure by sectors, shows that the largest share of the high occupational group was in the sector of information and communication services (87%). At the same time in this sector, there was also the lowest share (less than 1%) of low occupation positions. The sectors of professional, scientific and technical activities

(82%), financial and insurance activities (73%), education (70%), electricity, gas, steam and air conditioning supply (55%) and human health and social work activities (53%) are the remaining sectors, with more than half of the positions at a high occupational level. The lowest share of high occupation positions in 2015, were in the sectors of accommodation and food service activities, transportation and storage, and administrative and support service activities (all 16%) and agriculture, forestry and fishing (17%).

F i g u r e 2.6

Historical development of employment by occupation and long term trend, %



Source: Slovak Statistical Office.

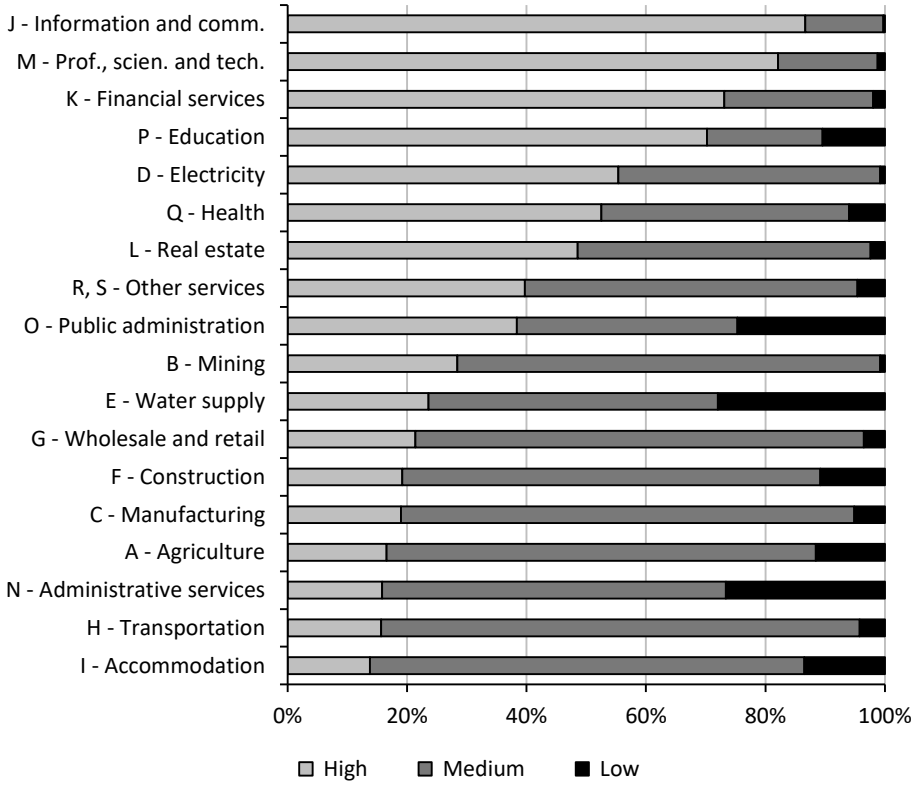
In 2015, the largest share of medium occupation positions was in transportation and storage (80%), manufacturing (76%) and wholesale and retail trade; repair of motor vehicles and motorcycles (75%), followed by accommodation and food service activities (73%). The lowest share of medium occupation positions was in information and communication (13%), professional, scientific and technical activities (17%), education (19%) and financial and insurance activities (25%). In the remaining sectors, the share of medium occupation positions in 2015 was over 25%.

In 2015, over 25% of positions with low occupational levels were in the sectors of water supply; sewerage, waste management and remediation activities (28%), administrative and support service activities (26%), and public administration and defence; compulsory social security (25%). In 2015, less than one percent of positions at a low occupational level were in the above mentioned sector of information and communication services, electricity, gas, steam and air conditioning supply, as well as mining and quarrying.

Those values served as a starting point for projection of future development of occupational structure in the sectors of Slovak economy. In the following text expected occupational changes are described in detail.

F i g u r e 2.7

Employment by NACE and occupation in 2015, %



Source: Slovak Statistical Office.

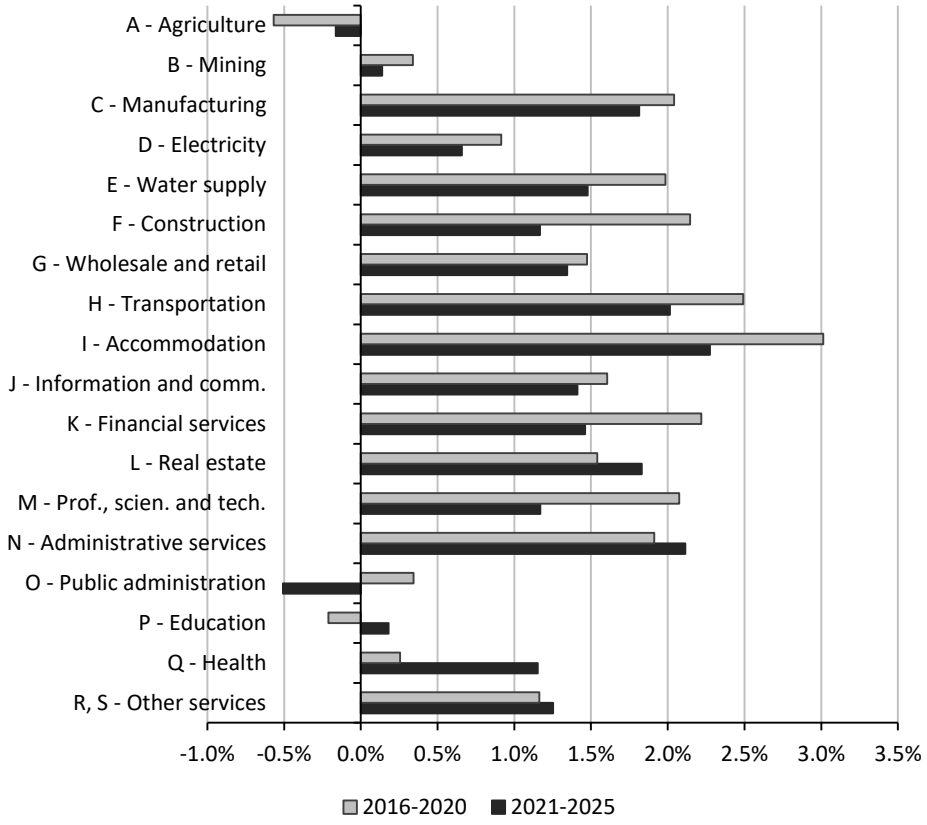
Over the next ten years increase in a number of high occupation positions is expected to reach almost 90,000. On average, between the years of 2016 and 2020, the number of new, high occupation positions per year will reach slightly more than 9,000. In the following five years, this number will drop to approximately 8,800 new, high occupation positions per year.

In the sector of accommodation and food service activities, the highest relative increase in both five year periods (2016-2020 and 2021-2025) is expected. As this is currently the sector with the lowest share of high occupation positions, this increase will only partially compensate for the current state. The only sector with expected decrease in both periods is agriculture, forestry and fishing. In the sectors of education and public administration and defence; compulsory social security, a lower number of high occupational employees is expected. In the case of education, a drop in the first period (2016-2020) is expected and in public administration, a drop in the second period (2021-2025) is expected. In the first 5-year period, the second highest growth in number of high occupations is expected in the transportation sector. This sector will have the third highest growth in the years 2021-2025. The second highest growth in the second 5-year period will occur in the administrative and support service activities. High occupation positions will grow between 0.5% and 2.5% on a yearly basis in most of the sectors, with the exclusion of the abovementioned sectors that expect a drop in those positions and also in the mining and quarrying sector.

By the year 2025, we expect that the number of medium occupation positions will grow by almost 65,000 jobs. This will be mainly created by the increase in sectors of manufacturing (more than 29,000), accommodation and food service activities (16,000) and transportation and storage (10,000). During the same period, a drop in the number of medium positions is expected to occur in agriculture, forestry and fishing (almost 8,000), and public administration and defence; compulsory social security sector (7,500).

F i g u r e 2.8

Changes in high occupation positions by NACE sector, yearly average, %



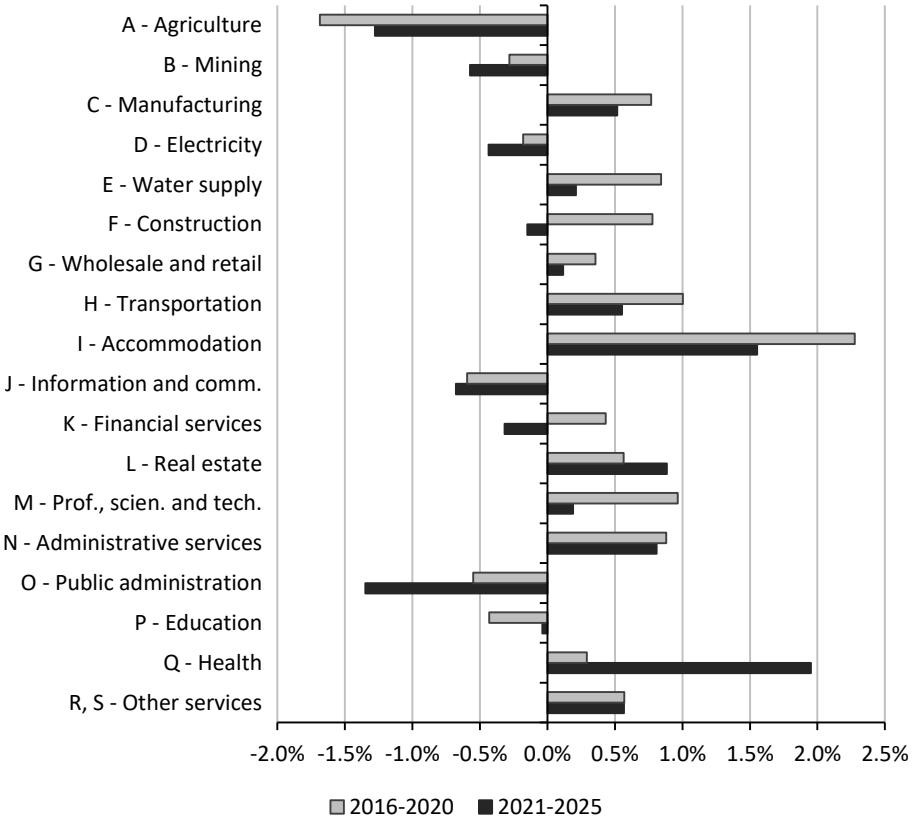
Source: Authors.

More than 1.5% of medium occupation positions will be lost each year in the agriculture, forestry and fishing sector during the years 2016 to 2020. In the period of 2021-2025, a drop in the number of medium occupation positions will be relatively similar in the sectors of agriculture, forestry and fishing and public administration and defence; compulsory social security (both -1.3%). Relatively high increase in medium occupations is expected in the accommodation and food service activities sector in both five year periods (2.3% and 1.6%, respectively). In the second 5-year period, highest growth in the number of medium occupations is expected in human health and social work activities (2.0%). Only modest changes in the number of medium occupation positions are expected

in the rest of the sectors with magnitudes less than 1% yearly, the majority of sectors are expecting an increase in the number of medium positions over the next decade.

F i g u r e 2.9

Changes in medium occupation positions by NACE sector, yearly average, %



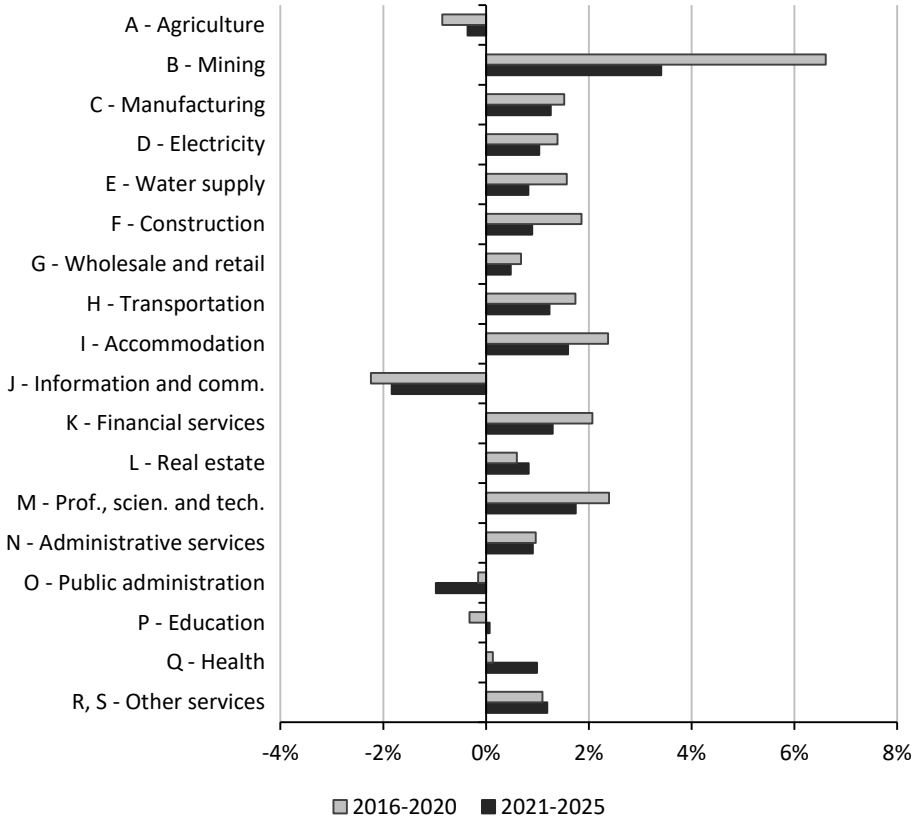
Source: Authors.

The number of low occupational positions increased by 17,500 jobs between 2014 and 2015. Over the next decade, further growth by more than 12,000 jobs (6.1%) is expected. The majority of those new low occupation positions will be created in the sectors of manufacturing (4,400), construction (3,300) and accommodation and food service activities (3,200). The highest drop in low occupations is expected to occur in the sectors

of: public administration and defence (3,000) and agriculture, forestry and fishing (500 jobs).

F i g u r e 2.10

Changes in low occupation positions by NACE sector, yearly average, %



Source: Authors.

Highest growth in relative terms, in the number of low occupation positions is expected in the mining and quarrying sector over the first 5-year period, but this is the result of a low number of those positions and expected yearly growth in absolute numbers is a single digit. A similar picture is the case of a relatively high drop in low occupation positions in information and communication, where during 2016-2020, only 4 jobs yearly will be lost and during the years 2021-2025, only 3 jobs will be lost yearly, on average. Over the next decade, more than marginal changes in

the absolute numbers of low occupation positions in the sectors of administrative and support service activities (1,600), transportation and storage (1,000), water supply; sewerage, waste management and remediation activities (900), wholesale and retail trade; repair of motor vehicles and motorcycles, and human health and social work activities (both 600) are also expected.

2.2.3 Replacement demand

Replacement demand captures the demand arising from transitions[20] and implied job openings.[21] Replacement demand typically presents a substantial part of the demand created in each labour market (Kriechel & Sauermann, 2010). Moreover, due to a significant ageing process in almost all European countries, the replacement demand caused by exiting to retirement is going to become even more important.[22] The applied microsimulation approach[23] reveals the probability of transition from employment in a particular sector to other economic statuses. More precisely, the replacement demand caused by exits to retirement, disability or even death. These transitions are mainly determined by age structure. One can assume, that under such *narrow definition* applied in the model, significant channels affecting replacement remain uncovered by the results. The major one is the transition from employment to unemployment. A significant part of elderly are leaving to retirement via unemployment, but at the same time a substantial part of the elderly return from unemployment back to employment. Additionally, there are several other sources of replacement demand, for example exiting to maternity or schooling, which are not considered in the current version of the applied model. All these exits (unemployment, maternity or schooling) are not considered

[20] The transitions commonly considered are those between segments (sector and occupation) as well as into unemployment and various forms of inactivity (retirement, schooling, maternity leave, other). It is also closely related to the age structure of employees in each sector (Willems & de Grip, 1993).

[21] Different approaches to calculate replacement demand are described in CEDEFOP, ETF, ILO (2016).

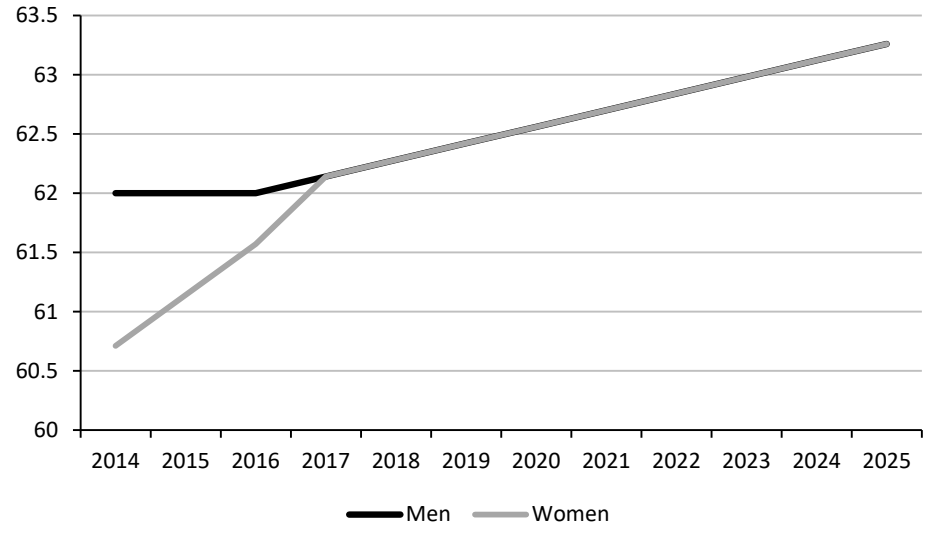
[22] One good example is Slovakia, where in the following decade, there is expected to be one of the most significant ageing process in Europe (Hvozdíková, 2012).

[23] Described in more detail in the last (seventh) chapter of this book.

because of their temporary nature, with possible subsequent transitions back to employment. On top of that, there is a typical transition between occupations. Thus, employees are moving between occupations without changing employment status, but their previous position in the particular occupation needs to be filled. This part of replacement is not typically covered, even in the wider definition of replacement demand and is being referred to as "churn" (Burgess, Lane & Stevens, 2000). Thus the results of replacement demand are significantly dependent on the choice of definition. In Slovakia, the regular retirement process is based on reaching pension age and is similar for all sectors. Until 2004, there was an individual retirement age set for men and a lower one for women (based on number of children). Since then, retirement age has continuously increased and is set to a pension age of 62 for both men and women, which should be in effect until 2017. Valid from 2017, a new scheme of continual increase of pension age has been introduced, based on the increase in life expectancy. We are utilising an expectation of increased pension age in a simulation calculated by Slovak Council for Budget Responsibility (Figure 2.11).

F i g u r e 2.11

Estimated development of retirement age for men and women up to 2025

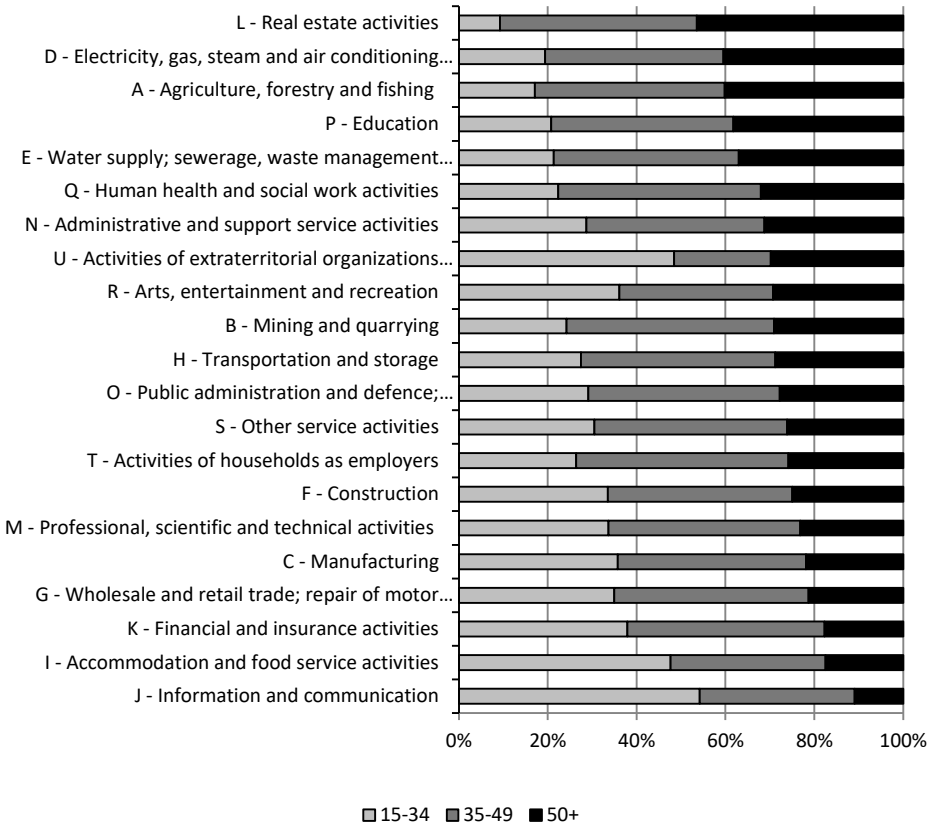


Source: Slovak Council for Budget Responsibility (RRZ).

Uneven age structure within sectors presented in Figure 2.12 will significantly influence different labour demand patterns in the following years.[24] The simulation approach based on derived probabilities from the logit model is described in the last (seventh) chapter of this book.

F i g u r e 2.12

Age structure of employees in the main sectors, 2014



Source: Authors.

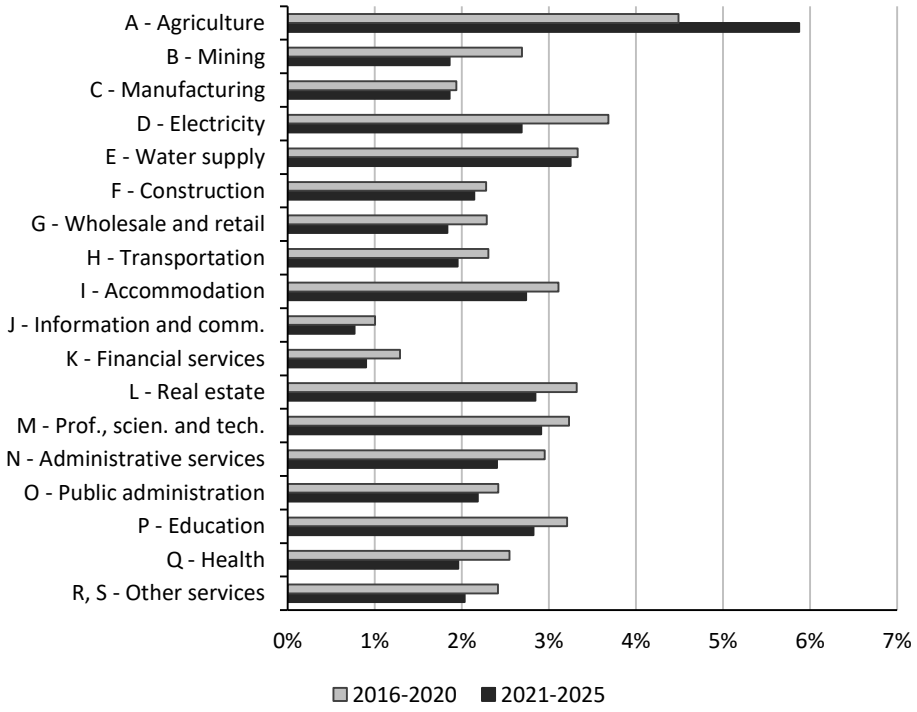
The replacement demand based on the narrow definition is presented in Figure 2.13. The lowest replacement is expected in the "young" sectors, i.e. information, communication and financial activities. Agriculture

[24] Currently, Slovakia is among the countries with a very high level of disabilities, even recent forecasts do not consider a significant improvement (Radvanský & Lichner, 2014).

is the sector with the highest share of working pensioners and highest expected replacement rate. Significant problems remain in the education sector, where approximately 40% of employees are over 50 years of age. Teachers and other education workers tend to remain on the labour market significantly longer than the country average, but the applied policies should consider the current situation cautiously. The situation in the health sector could be perceived slightly differently (better), but several studies, e.g., Radvanský and Dováľová (2013), implied that there are significant differences between particular occupations.[25] The provided analysis does not provide enough detail to cover this issue fully, but a more detailed future analysis should be done in this respect, particularly from a regional point of view.

F i g u r e 2.13

Replacement demand in selected sectors



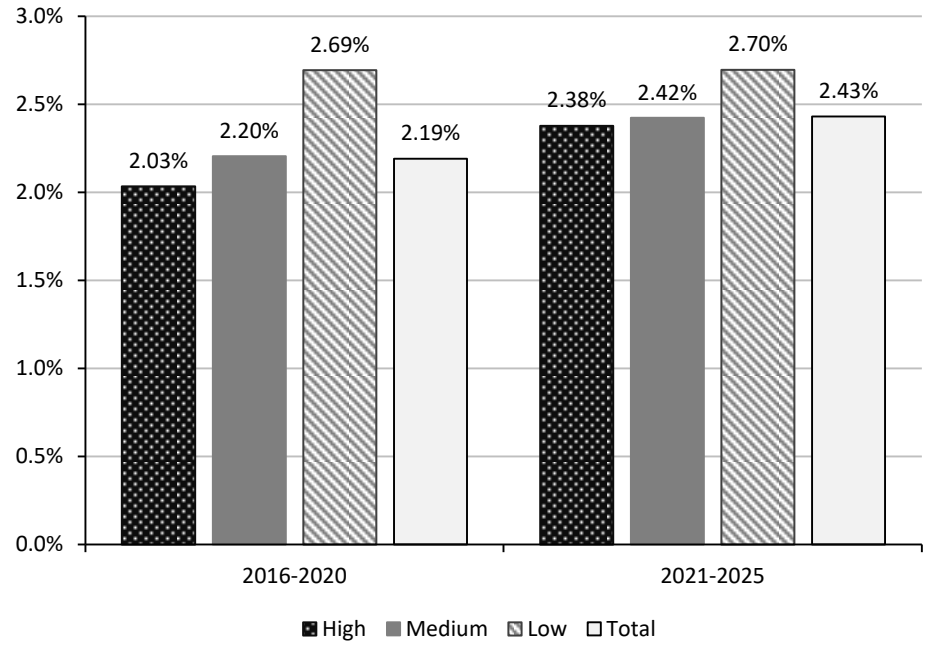
Source: Authors.

[25] An alarming situation might be observed e.g., at dentists.

From the occupational point of view, there is a significantly higher replacement rate for occupations with lower qualifications, especially in those requiring vocational education. In general, there is a 15 to 25% higher replacement demand for low skilled occupations, but their share in the Slovak economy remains relatively low. This is the issue in all countries within the region, where overskilling in elementary occupations is typical. Additionally, there are many craftsmen who have a problem to find a relevant replacement in their occupation, while the medium occupations remain similar to the country average.

F i g u r e 2.14

Aggregate replacement demand by occupation level



Source: Authors.

2.3 Discussion and conclusions

Results of the model projection suggest that on the national level, between the years 2015 and 2020, approximately 94,000 new jobs will be created. In the next 5-year period (2021-2025) job creation should only

slightly slow and more than 72,000 additional, new jobs will be generated on the national level. On the other hand, with decreasing unemployment and a decreasing number of economically active due to the ageing process, it will be more and more problematic to fill these vacancies. Structural imbalances and lack of skilled labour could be a significant bottleneck to further economic growth in the near future, and Slovakia must transform from more intensive growth (creating new employment), to growth based more on increasing productivity, along with job upskilling towards more advanced technological growth where applicable.

The most positive development in employment is expected to occur in the manufacturing sector, in which more than 56,000 additional jobs are about to be created. Again, the current rise of the automatization of jobs in advanced manufacturing (Industry 4.0) can affect these expectations, mainly in the most significant manufacturing sectors in Slovakia – automotive and the manufacture of computer, electronic and optical products.

Highest relative growth is expected in the accommodation and food service activities sector with more than 2% yearly growth over the next five years, and 1.7% during the years 2021 to 2025. This accounts for more than 24,000 new jobs to be created in the sector over the next ten years. The highest decrease is expected in the case of public administration and defence; compulsory social security, with a loss of more than 11,000 jobs. Relatively positive development in the past few years, in the agriculture, forestry and fishing sectors, is expected to divert and almost 9,000 positions will be lost.

Over the next ten years an increase in the number of high occupation positions is expected to reach almost 90,000. The majority of those will be created in the sectors of: manufacturing (22,000), professional, scientific and technical activities (10,000) and wholesale and retail trade; repair of motor vehicles and motorcycles (9,000). By the year 2025, we expect that the number of medium occupation positions will grow by almost 65,000 jobs. This will be mainly created by the increase in sectors of manufacturing (more than 29,000), accommodation and food service activities (16,000) and transportation and storage (10,000). The number of low occupation

positions increased is expected to grow by more than 12,000 jobs (6.1%) over the next decade. The majority of those new low occupation positions will be created in the sectors of manufacturing (4,400), construction (3,300) and accommodation and food service activities (3,200).

From the replacement point of view, the significant ageing process related to increased retirement outflow can intensify the process of replacement demand in various sectors. The most problematic situation is in the agriculture sector, and also the public sector (health and education), and several market services should be cautiously observed. From the occupational point of view, the replacement demand is most significant in elementary occupations, which have the highest share of older workers, as well as in medium craft related occupations and occupations requiring vocational education.

Part of identified imbalances, can be from the short term point of view, resolved by importing workforce from neighbouring Slovak regions, or in relation to influential companies, by importing workers from the Balkan region (e.g., the automotive industry) or Ukraine. From a long-term perspective, all the countries in the CEE region have a similar ageing problem and lack of properly qualified persons. Thus, the main option will rely on the adjustment of the educational system in Slovakia. This issue has been discussed by professionals for almost two decades. Some improvements can be observed in terms of dual education at secondary schools, but complex improvement has still not been observed. Educational policy in Slovakia remains one of the weakest in Europe and implemented policies are rather fragmented. Moreover, the necessity of lifelong learning and qualification upgrades / transition during work life remains uncovered by proper legislation (e.g. certifying qualifications). Additionally, active labour market policies should react more precisely to the expected development of Slovak labour market (sectoral and regional). Improving knowledge transition regarding building a sustainable system of skill anticipation and requirements in Slovakia, with impact on applied policies, could also be a crucial step forward. Until now, all initiatives were prepared more as ad-hoc exercises than systematic approaches.

This analysis provides an overview of the expected long-term development of the Slovak labour market, but more comprehensive and targeted analysis could still be provided in this respect. The next logical step is to enrich the model into the regional level to provide more targeted recommendations.

3 BEVERIDGE CURVE, LABOUR MARKET DYNAMICS AND SHORT-TERM FORECASTS OF LABOUR MARKET INDICATORS

Eva Rublíková, Martina Lubyová

In this chapter we try to shed light on labour market dynamics and matching functions in Slovakia during the period 2001-2016, using the empirical concept of the Beveridge curve and labour market flows. The labour market can be viewed as a very dynamic system, in which economically active and inactive persons flow from one status to another. Therefore, it is necessary to study labour market dynamics along with labour market stocks. Labour market dynamics can be defined by aggregate monthly flows of registered unemployment to employment (the outflows (O) from unemployment into employment), and the aggregate monthly flows to unemployment (the inflows (I) to unemployment). Both these flows influence the monthly aggregate stocks of unemployed. The latter also depends on the monthly stocks and the flow of registered job vacancies offered by firms. We analyse the time series of monthly stock and flow data on the unemployed and job vacancies, to make inferences about unemployment dynamics, matching process and short-term forecasts of basic labour market indicators in Slovakia.

3.1 The Beveridge Curve

The relationship between unemployment and job vacancies is known in literature as the Beveridge curve – a hump-shaped relationship which provides an indication of how effectively unemployed workers are matched with vacancies. The Beveridge curve is thus a measure of labour market efficiency. Labour market flows have been studied in numerous works. Among the most influential authors are Blanchard (Blanchard & Diamond, 1989) and Pissarides (Pertongolo & Pissarides, 2001) for the theoretical part, and Boeri and Burda for its application to the transitional economy (Boeri & Burda, 1996).

In economic literature, there has been a great deal of empirical work aimed at explaining the Beveridge curve and its functions. For example: Spain, Antolin (2005); Australia, Fahrer and Pease (1993); the Czech Republic, Galuščák and Münich (2007); Slovakia, Burda and Lubyová (1995), and Harvan (2011). Burda and Lubyová (1995) used the matching function to estimate effects on outflow from unemployment of expenditures on active labour market policies, based on aggregate data from labour offices in both Slovakia and the Czech Republic.

Harvan (2011) examined flows from unemployment in the context of evaluating effectiveness of active labour market measures (support for employment of school leavers and placing the unemployed into short-term jobs which are useful to the public – the so-called activation works). The study used both administrative data and Labour Force Survey data. A similar analysis for Slovakia was performed by Bořík and Caban (2013) who used the counterfactual method to evaluate the impact of active labour market expenditures on outflow from unemployment into jobs (including self-employment).

The aim of this chapter is to analyse labour market dynamics in Slovakia during the years 2001-2016. The analysis is done in two parts. Firstly, our analysis is inspired by the approach expressed by Layard, Nickell and Jackman (1992) that simplifies the analysis of matching function in order to explain the basic relationship between unemployment rate and vacancy rate, given outflow rates and inflow rates during the period from January 2001 to August 2016. Secondly, we base ourselves on the analysis of individual monthly time series for the stock indicators in absolute form (unemployment (U) and vacancies (V) registered by the labour offices), as well as in the relative form (unemployment rate (UR) and vacancy rate (VR)). We use flow indicators (such as inflow to unemployment (UI), outflow from unemployment (UO), vacancies inflow (VI) and vacancies outflow (VO)).

In addition to the analysis of the above-mentioned aggregate indicators of unemployment in Slovakia, we are also interested in the relationship between unemployment rates and vacancy rates given by the UV curve, also known as the Beveridge curve. This empirical hump-shaped relationship can be a useful tool to measure the mismatch between the aggregate

level of unemployment and vacancies. The shape of the Beveridge curve can be approximated by a downward-sloped hyperbolic function (as a higher rate of unemployment occurs with a lower rate of vacancies). If it moves outwards over time, then a given level of vacancies would be associated with higher and higher levels of unemployment, which would imply decreasing efficiency in the labour market. Inefficient labour markets are due to mismatches between available jobs and the unemployed, and an immobile labour force. The position on the curve can indicate the current state of the economy in the business cycle. For example, recessionary periods are indicated by high unemployment and low vacancies, corresponding to a position on the lower side of the 45 degree line, and likewise, high vacancies and low unemployment indicate the expansionary periods, above the 45 degree line. The movements in the Beveridge curve may be specified according to the:

– *matching process,* which tells us how efficiently workers find new jobs. Improvements in the matching system would shift the curve towards the origin, because an efficient matching process will find jobs faster – filling vacancies and employing the unemployed. Improvements can be made by the introduction of agencies ('job centres'), increasing the mobility of labour, etc.;
– *skills mismatches,* which occur when changes in the skills employers want differ from the available skills in the labour pool. Greater mismatches would shift the Beveridge Curve outward. If this were the driving factor behind the shift, one would expect to also see employers bid up wages for the few candidates who were desirable;
– *labour force participation rate,* as the number looking for jobs increases relative to total population, the unemployment rate increases, shifting the curve outwards from the origin. Labour force participation can increase due to changes in education, gender roles, population age and immigration;
– *long-term unemployment* which will push the curve outward from the origin. This could be caused by deterioration of human capital or a negative perception of the unemployed by the potential employers;
– *frictional unemployment,* because decrease in frictions would reduce the number of firms searching for employees and the number of

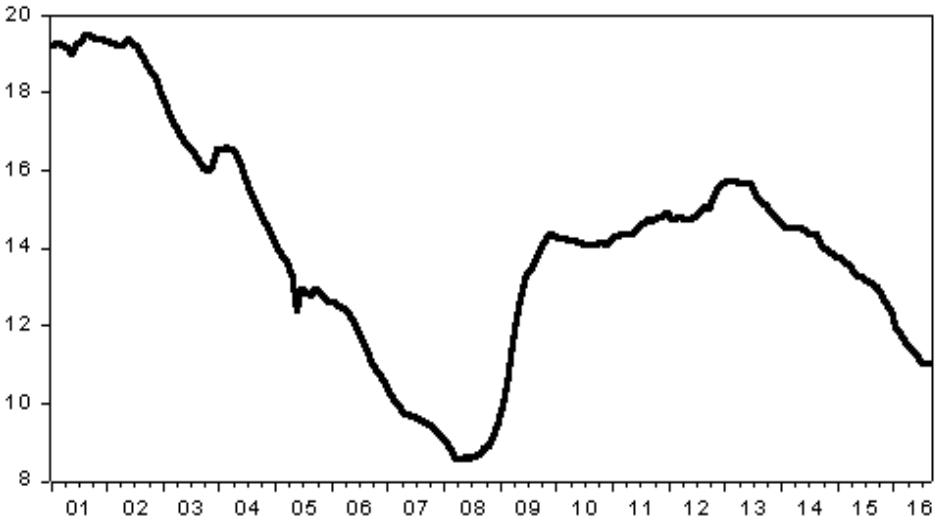
unemployed searching for jobs. This would shift the curve towards the origin. Frictional unemployment is due to job losses, resignations and job creation;

– *economic and policy uncertainty*, may cause employers to hold vacancies open longer in the search for the "perfect candidate", particularly when there is high unemployment with a large number of candidates from which to choose. More uncertainty would tend to shift the curve outward.

The Beveridge curve for Slovakia describing the U-V relationship during the period from January 2001 until August 2016, is depicted in Figure 3.3. In order to better recognize the movements in the UV curve, both indicators Unemployment and Vacancy rate were seasonally adjusted by means of CENSUS X-12, method multiplicative. Both these indicators are depicted in Figures 3.1 and 3.2.

F i g u r e 3.1

Seasonally adjusted Unemployment rate (%), January 2001-August 2016



Source: Own calculations.

By eye-balling the data we can say that the rate of registered unemployment reached the value of about 9% in 2008, and from that year, its values gradually increased due to the economic crisis, to a value of 15.4% in the year 2013. From the year 2013, the rate of unemployment has been decreasing due to the increasing vacancy rate, as depicted in Figure 3.2.

F i g u r e 3.2

Seasonally adjusted Vacancy rate (%), January 2001-August 2016

Source: Own calculations.

Figure 3.2 shows the year 2015 to be unique, as firms proposed more job vacancies (nearly three times more) than in the previous year, therefore the unemployment rate dropped to nearly 10%. During 2008, the Slovak economy was hit by a recession that lasted until 2013, in terms of labour market effects. Only in the last two years did firms start to offer more job vacancies and the rate of unemployment began to decrease. The relationship of both these indicators is depicted in Figure 3.3, which provides a picture of the empirical Beveridge curve for Slovakia.

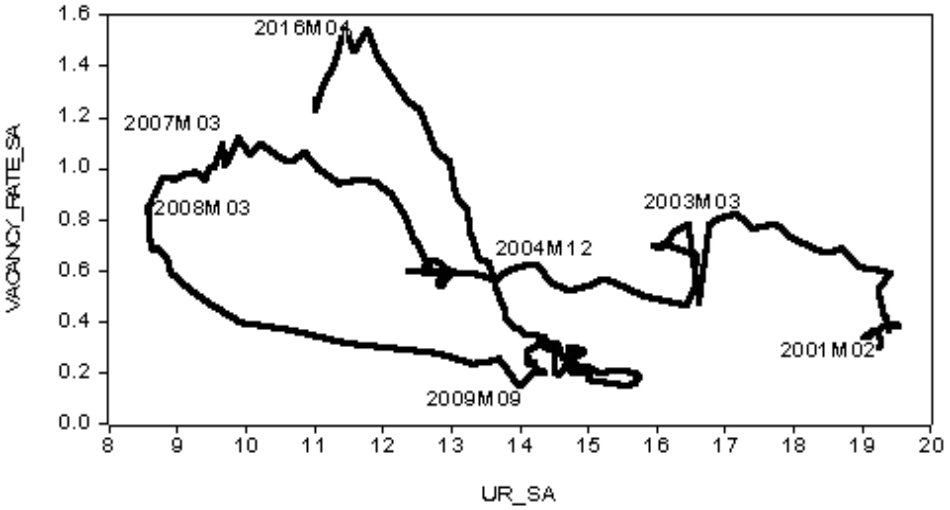
Figure 3.3 displays monthly seasonally adjusted data of unemployment rate (horizontal axis) and vacancy rate (vertical axis), during the years 2001-2016. The negative relationship between variables is estimated as

$$\log(ur\_sa_t) = \underset{(0,022)}{2,544} - \underset{(0,023)}{0,1584}\log(vacancy\_rate\_sa_t),$$

which could be attributed to a cyclical pattern in the labour market depicted in Figure 3.4. The periods of expansion are specified by increasing vacancies and decreasing unemployment. During recessions the opposite is true, vacancies decrease and unemployment increases.

F i g u r e 3.3

Unemployment rate and Vacancy rate in Slovakia, January 2001-August 2016

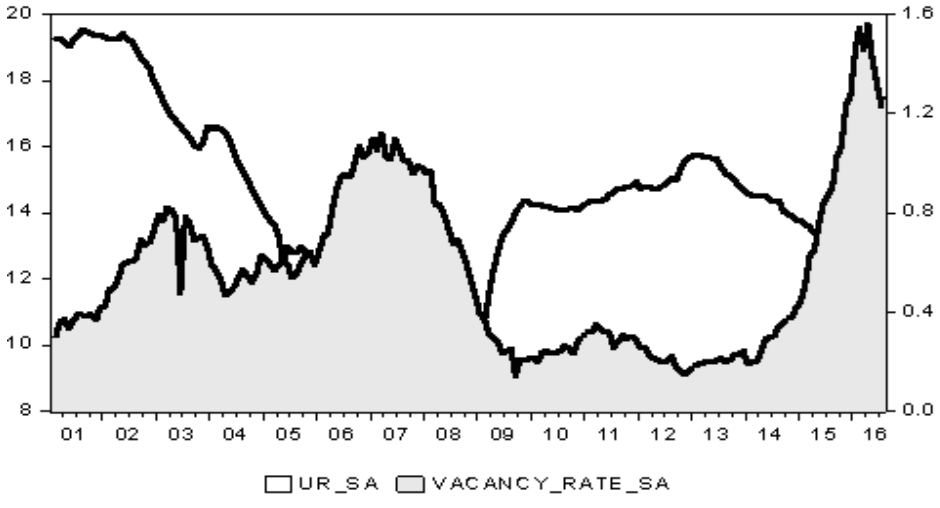


Note: Unemployment rate (UR) = Registered unemployment / Labour Force (%), seasonally adjusted (SA), Vacancy rate (VR) = Vacancies/Labour Force in (%), seasonally adjusted (SA).

Source: Own calculations based on data from the Ministry of Labour, Social Affairs and Family of SR.

F i g u r e 3.4

Seasonally adjusted Unemployment rate (%) and Vacancy rate (%), January 2001-August 2016



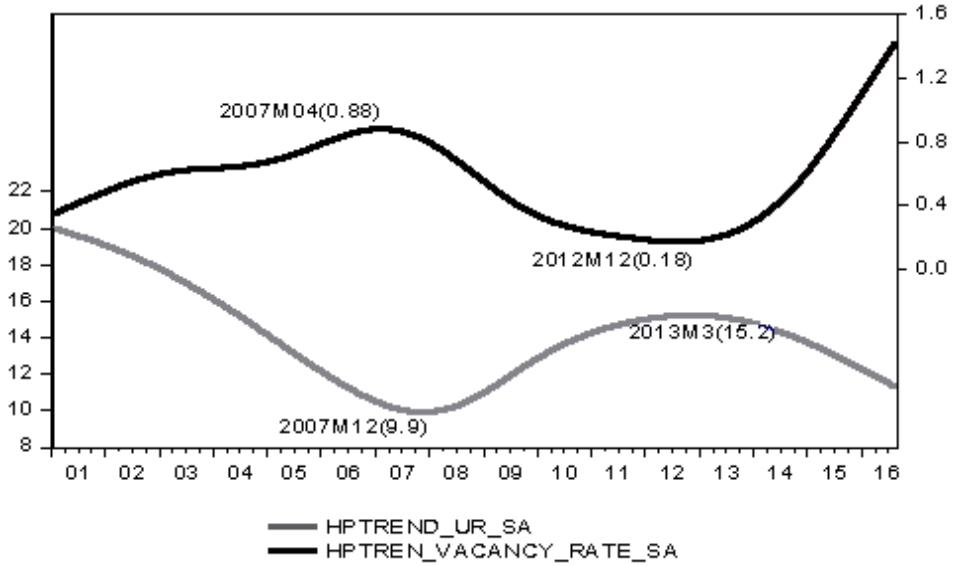
Note: Left axis: Unemployment rate (%), seasonally adjusted; Right axis: Vacancy rate (%), seasonally adjusted.

Source: Own calculations.

The vacancy rate can be used as a good indicator of turning points in the business cycle. To analyse the turning points in the Slovak economy cycle, we use Figure 3.5, in which the trends of unemployment rates and vacancy rates are depicted. The trends have been estimated by the Hodrick Prescott filter applied to the seasonally adjusted indicators.

Figure 3.5

Unemployment rate (%), Vacancy rate (%) and the Business Cycle



Note: Left axis: Trend of Seasonally Adjusted Unemployment rate (%); Right axis: Trend of Seasonally Adjusted Vacancy rate (%).

Source: Own calculations.

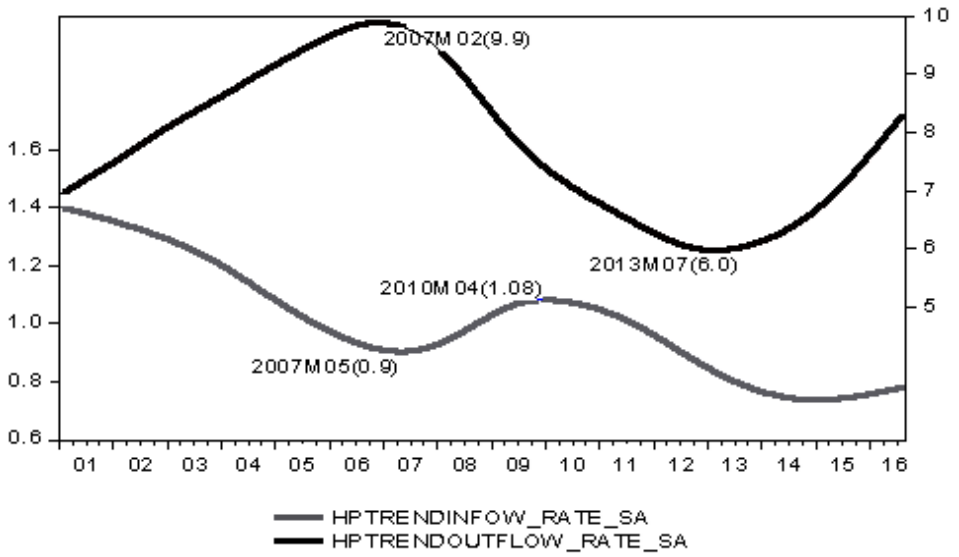
In Figure 3.5, we can see that there are periods of economic expansion associated with increasing vacancies and decreasing unemployment. The first such period began in 2001 and lasted until mid-2007. The second period lasted from the end of 2012 until the end of 2016. We can also see that the start of the unemployment rate cycles are postponed by lags of about eight months.

The economic slowdowns in 2007 and 2013 may also have been predicted by the changing trends in the unemployment flows (inflow to unemployment and outflow from unemployment), which have again been

estimated by means of the Hodrick Prescott filter and applied to the seasonally adjusted inflow and outflow rates depicted in Figure 3.6.

F i g u r e 3.6

Unemployment Flows (%) and Business Cycle



Note: Left axis: Trend of Seasonally Adjusted Inflow Rate (%); Right axis: Trend of Seasonally adjusted Outflow Rate 0%).

Source: Own calculations.

The previous analysis of the Beveridge curve shows that the stock of unemployment is influenced not only by the stock of job-vacancies, but also by the flows into or out of unemployment, along with flows of job-vacancies. This is the reason we would like to look for a dynamic model of unemployment in Slovakia during the years of 2001-2016, and based on outflow rates and inflow rates described in terms of the matching function.

3.2 A simple Model of the Matching Function

In this section we turn to the time-series analysis on what determines outflow (matches = M) from unemployment. The most general model has the form M = m(U,V) where the number of matches M (Outflows

from unemployment) is explained by the stocks of unemployment U and vacancies V. A typical form of the matching function is the Cobb-Douglas log-linear model

$$\log M = \log c + \beta_1 \log U_t + \beta_2 \log V_t + \varepsilon_t \qquad (3.1)$$

Instead of absolute variables we are turning to the rates, so the model (3.1) could be rewritten as follows:

$$\log \frac{outflowU_t}{U_t} = \log d + \alpha_1 \log \frac{V_t}{U_t} + \alpha_2 t + \varepsilon_t$$

or

$$\log(outflow\_rate_t) = \log d + \alpha_1 \log(vacancy\_ratio_t) + \alpha_2 t + \varepsilon_t \qquad (3.2)$$

where t is time trend variable.

We estimate model (3.2) with time series adjusted for seasonality and with time variable (instead of taking the first differences of the series to account for their trend). The estimation of the log-term relationship between outflow rate and vacancy ratio during the period of January 2001-August 2016 is as follows:

$$\log(outflow\_rate\_sa)_t = 1.932648 + 0.195142 \log(vacancy\_ratio\_sa)_y -$$
$$(0.0196) \quad (0.0099)$$
$$- 0.001449\, t$$
$$(0.0001)$$

with $R^2 = 0.7451$, S.E. of regression = 0.099 and D-W=0.6235.

Thus the long-run elasticity with respect to the vacancy-ratio is 0.1951, which is less than the value 0.3 estimated by Pissarides (1986). The reasons behind this, could be explained by the fact that Pissarides estimated the model only for male outflow and unemployment, assuming that female outflow and unemployment are greatly affected by varying benefit regulations. For Slovakia, the estimated model provides an explanation that

the outflow rate does not substantially change with the growth in vacancy ratio, which is associated with growth in long-term unemployment. The negative trend in the model could be explained by the degree of employment protection and by the reduced pressure from authorities to seek work, along with any general changes in work ethics (Layard, 1992).

The autoregressive model of residuals $\hat{\varepsilon}_t = 0.68867\,\hat{\varepsilon}_{t-1}$ improved the MAPE of in-sample forecast errors of the model (3.2) to 5%.

To analyse the time-series behaviour of the inflow rate we run a regression model (3.3)

$$\log(\text{inf}\ \ low\_rate\_sa)_t = c + \gamma_1 \log(\ vacancy\_ratio\_sa)_t + \\ + \gamma_2 d(\log(\ vacancy\_ratio\_sa)_t + \gamma_3 t + \varepsilon_t \qquad (3.3)$$

(where "d" denotes first differences) on monthly seasonally adjusted time series during the period 2001/01-2016/08 with the following results:

$$\log(\text{inf}\ \ low\_rate\_sa)_t = \underset{}{0.38636} - \underset{(0.026)}{0.0822}\log(\ vacancy\_ratio\_sa)_t - \\ - \underset{(0.087)}{0.1933}\,d(\log(\ vacancy\_ratio\_sa)_t - \underset{(0.0002)}{0.0032}t$$

with $R^2 = 0.8010$, S.E. of regression = 0.133 and Durbin-Watson = 0.51.

The autoregressive model of residuals $\hat{\varepsilon}_t = 0.801\hat{\varepsilon}_{t-1}$ improved the MAPE of in-sample forecast errors of the model (3.3) to 6%.

As we can see from both estimated models, the long-run behaviour of the aggregate probability to be employed is not strongly affected by the development of the vacancy ratio during the analysed period. The same is true for the inflow rate.

We believe that the decreasing unemployment rate could be explained only in the short run given by short-term administrative changes, as long-term unemployment in Slovakia is very high and stagnant.

We use the Box-Jenkins methodology of SARIMA models to make short-term forecasts for these variables from September 2016 until February 2017. This methodology was briefly described in the previous monograph (Lubyová & Štefánik et al., 2015, p. 35-44). There are also numerous other books dealing with this methodology.

3.3 Short-term forecasts of labour market indicators in Slovakia

Data used in our analysis are taken from the database of the Ministry of Labour, Social Affairs and Family of the Slovak Republic, notably monthly data about registered unemployment given as the number of job applicants registered by the labour offices (U), number of registered vacancies (V), outflows from unemployment to employment (O) and inflow to unemployment (I). We work with both absolute data and relative data defined as follows:

– Unemployment rate (UR) = Unemployment (U) / Labour Force (LF) to explain the aggregate probability that a randomly chosen person from the labour force is unemployed;

– Inflow rate (IR) = Inflow to unemployment (UI) / Labour Force (LF) to explain the aggregate probability that a randomly selected person from the labour force will enter unemployment;

– Outflow rate (OR) = Outflow from unemployment (UO) / Unemployment (U) to explain the aggregate probability that an unemployed person will be employed;

– Vacancy rate (VR) = Vacancies (V) / Labour Force (LF) to explain the aggregate probability that a randomly selected person from the labour force matches the vacancy;

– Average duration of unemployment (AD) = Unemployment / Inflow (UI) expressed in months, assuming a steady state of labour market (i.e. when inflow equals outflow) explains the expected “average time” for those who enter unemployment to remain there.

For the analysis and forecasting of individual indicators of unemployment in Slovakia, the monthly time series has 188 observations. The total estimation period begins in January 2001 and ends in August 2016, while the forecasted period begins in October 2016 and will end in February 2017.

Developments of individual series are depicted in Figures 3.7 to 3.11.

During the years 2001-2009 the unemployment rate had a decreasing trend. The change in the trend started at the end of 2008, obviously due to the effects of the economic crises. From 2013 onwards, there has again been a positive trend of a declining unemployment rate. As can be seen in Figure 3.8, for the inflow rate we observed a similar development of an increasing trend during the years 2001-2008, which changed in 2008 (to decline), and from 2012 has been almost stationary.

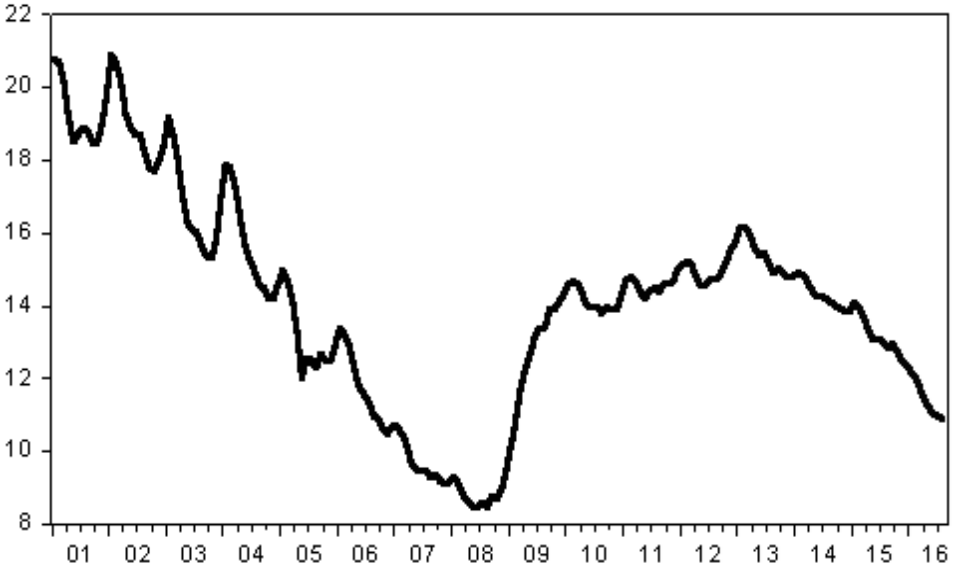
As documented in Figure 3.9, the development of outflow rate could be divided into two parts: the first part from 2001 until the end of 2008, is characterised by a slow increase of the trend, while the second part, from 2009 to 2016, exhibits an almost stationary level.

Finally, as can be seen in Figure 3.10, the development of vacancies in Slovakia is very difficult to comment on due to its large variability that could not be stabilised by any transformation. We still use at least a logarithmic transformation. The increasing trend in the last two years was among the reasons behind the recent decrease of the unemployment rate in Slovakia. But the question is – for how long will this tendency continue?

We were also interested in the development of the theoretical "average duration" of unemployment that is depicted in Figure 3.11. The development of the "average duration" had a decreasing trend during the period 2001-2008, an increasing trend during 2009-2013, and then a decreasing trend again. The assumption of a steady state economy still shows that the average duration of unemployment at present, is currently more than one year. This documents how the Slovak economy suffers from long-term unemployment.

Figure 3.7

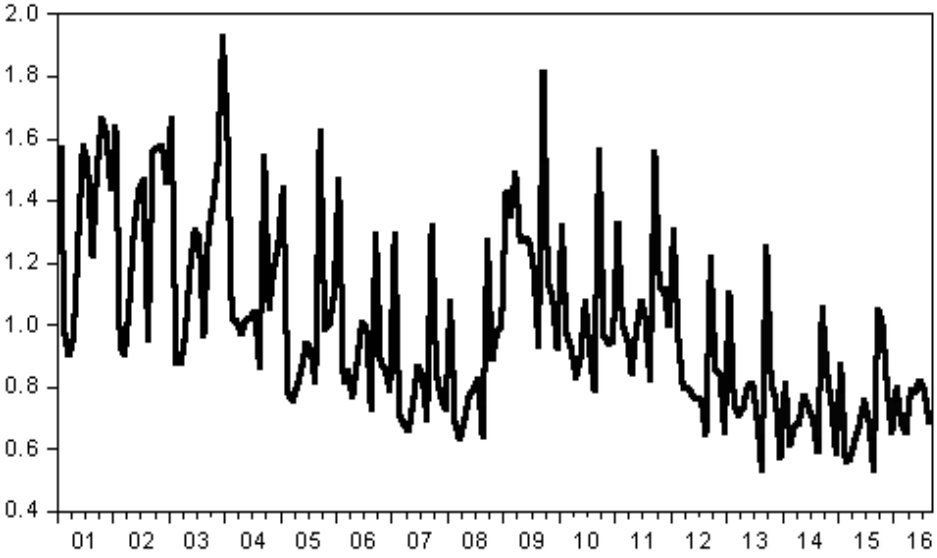
Unemployment rate (%) January/2001-August/2016



Source: Based on data from the Ministry of Labour, Social Affairs and Family of SR.

Figure 3.8

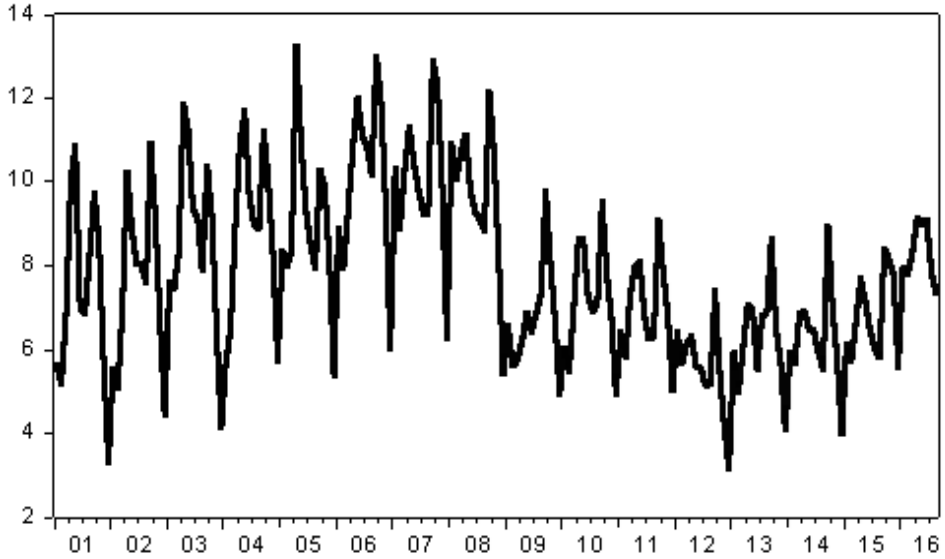
Inflow rate (%), January 2001-August 2016



Source: Own calculations based on data from the Ministry of Labour, Social Affairs and Family of SR.

Figure 3.9

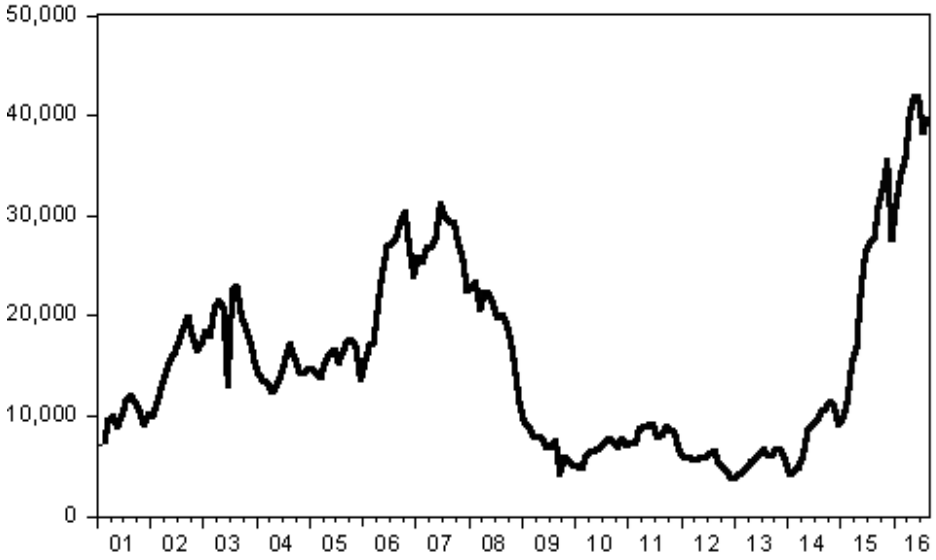
Outflow rate (%), January 2001-August 2016



Source: Own calculations based on data from the Ministry of Labour, Social Affairs and Family of SR.

Figure 3.10

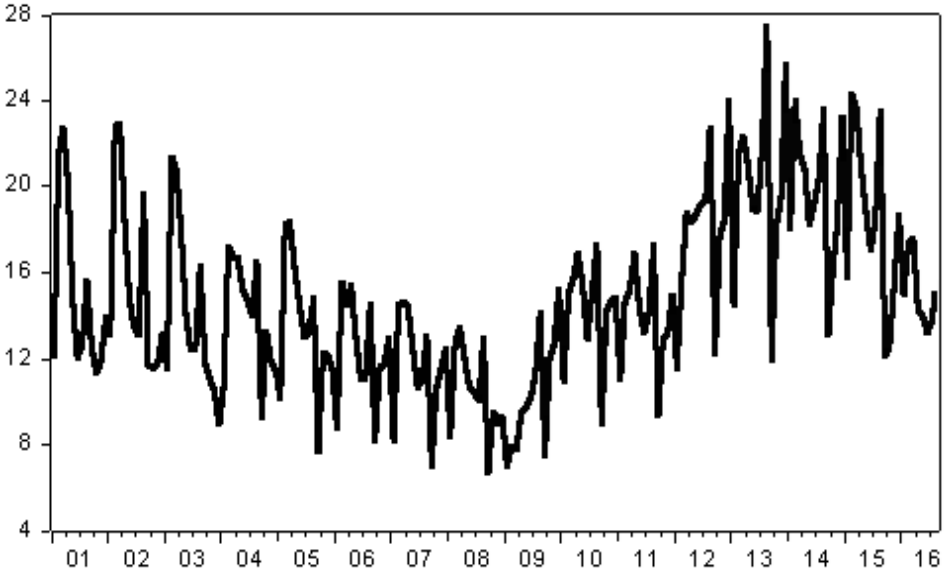
The number of job vacancies in SR, January 2001-August 2016



Source: Ministry of Labour, Social Affairs and Family of SR.

F i g u r e 3.11

Average Duration of Unemployment (months) in SR, 1/2001-8/2016



Source: Own calculations.

As documented by the figures, all the monitored indicators are non-stationary, exhibiting stochastic trends and seasonality with changing variability. Therefore, Box-Jenkins methodology is used to look for a model that would describe their development in the past and forecasting their future. This methodology is described in numerous books, e.g. T. C. Mills (1990).

The steps of the Box-Jenkins analysis for all mentioned indicators could be summarised as follows:

1) Transformation of non-stationary series y_t for $t = 1, 2, \ldots, 188$ to the stationary one, because all indicators are non stationary in both the variability and the mean. Before looking for an appropriate ARIMA(p, d, q) (P, D, Q)s model, we shall stabilize the variability of indicators by the means of logarithmic transformation. To make series stationary in the mean, the non-seasonal $(1-B)\log y_t$ differencing together with seasonal differencing $(1-B^{12})\log y_t$ will be used as $z_t = (1-B)(1-B^{12})\log y_t$, for t = 14, 15, …, 188.

2) The stationary series z_t are then analysed by the means of autocorrelation function (ACF) and partial autocorrelation function (PACF) and the appropriate model is selected, estimated and verified (as described in T. C. Mills, 1990).

3) The estimated model is verified in terms of their coefficients at 5% level of significance (0.05). The conditions of stationarity and invertibility are checked. The most important analysis of residuals, their independence, is depicted by the means of Box-Pierce Q_m statistics with its P-value. The checked model is selected for making in-sample forecasts with horizon h = 6, from February 2016 until August 2016, and computing the measure of these errors (MAPE).

4) The measure MAPE of in-sample forecast errors, given for March 2016 – August 2016 is used to predict the MAPE of out-of-sample forecasts errors with the same horizon h = 6 months ahead, starting from August 2016 until February 2017.

5) The last step is the computation of out-of-sample forecasts for each indicator for the period from September 2016 until February 2017, beginning in August 2016.

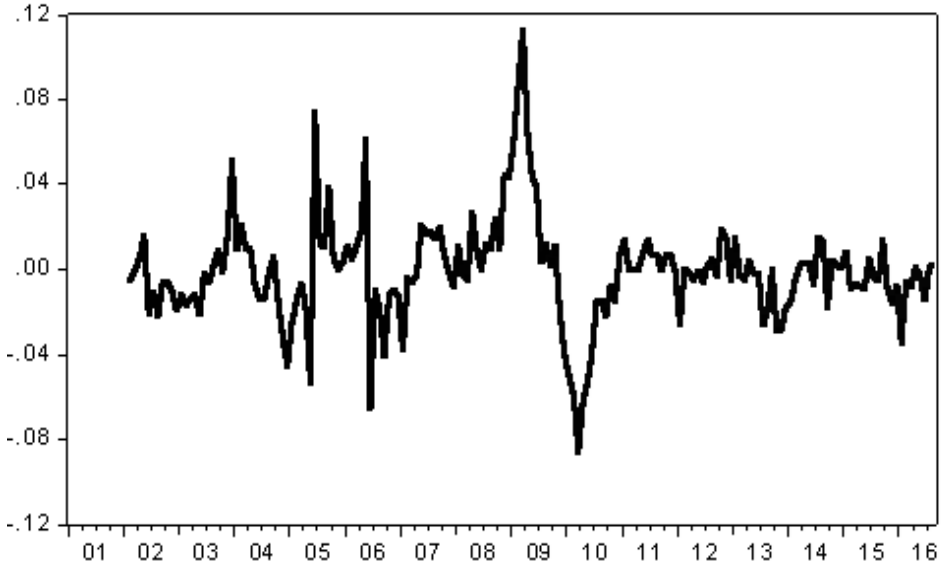
The next part deals with the analysis and forecasting of individual labour marked indicators in Slovakia based on the above-described methodology.

3.3.1 Fitting ARIMA(2,1,0)(0,1,1)12 or ARIMA(0,2,1)(0,1,1)12 model to Unemployment rate (%) and Unemployment

As mentioned earlier, to make the unemployment rate stationary, we will use a transformation: $z_{1,t} = (1 - B)(1 - B^{12}) \log UR_t$ for t = 14, 15, …, 188 depicted in Figure 3.12.

F i g u r e 3.12

The stationary transformation for Unemployment rate in SR, 2/2002-8/2016



Source: Own calculations.

The partial autocorrelation function for the transformation in Figure 3.12 have statistically significant autocorrelations at lags 1, 2 and 12 and hence the ARIMA (2,1,0)(0,1,1) is fitted, which yields

$$\underset{(0,07411)}{(1-0,460464B-0,258331B\text{\^{}}2)}\underset{(0,07393)}{(1-B)(1-B\text{\^{}}12)}\log UR_t = \underset{(0,05289)}{(1-0,69183B^{12})}\varepsilon_t$$

$\hat{\sigma}_\varepsilon^{\,2} = 0,0002519$ with 172 *d.f*`; $Q_{24} = 19,7901$ with P-*value* = 0,534587.

The estimated model is verified since all its parameters are statistically significant at 5%, coefficients satisfy condition of stationarity and invertibility, residuals are non correlated. The model will thus be used to construct the short-term forecasts with horizon h = 6 months ahead which are provided in Table 3.1.

T a b l e 3.1

Forecast of Unemployment rate (%) in SR, September 2016-February2017

Period	Forecast (%)	Lower 95% Limit	Upper 95% Limit
9/2016	10.93	10.59	11.28
10/2016	10.86	10.28	11.48
11/2016	10.82	9.96	11.75
12/2016	10.87	9.75	12.12
1/2017	10.95	9.57	12.53
2/2017	10.91	9.29	12.79

Source: Own calculations.

It is expected that the registered unemployment rate will be about 11% and the mean absolute percentage error of these forecasts will be about MAPE = 0.59%.

There is one more model that could be used to forecast the unemployment rate in the SR using the combination of the second order of non-seasonal differences along with first order seasonal differences $z_t = (1-B)^2(1-B^{12})\log UR_t$ for t = 15, 16, …, 188. This transformation depicted in Figure 3.7 seems to be more stationary than the one depicted in Figure 3.12, but its autocorrelation function has statistically significant negative coefficients in lags 1 and 12, which indicates some over-differencing. We suggest the model ARIMA (0,2,1)(0,1,1)12.

Estimation of the model ARIMA(0,2,1)(0,1,1)12 yields the following results:

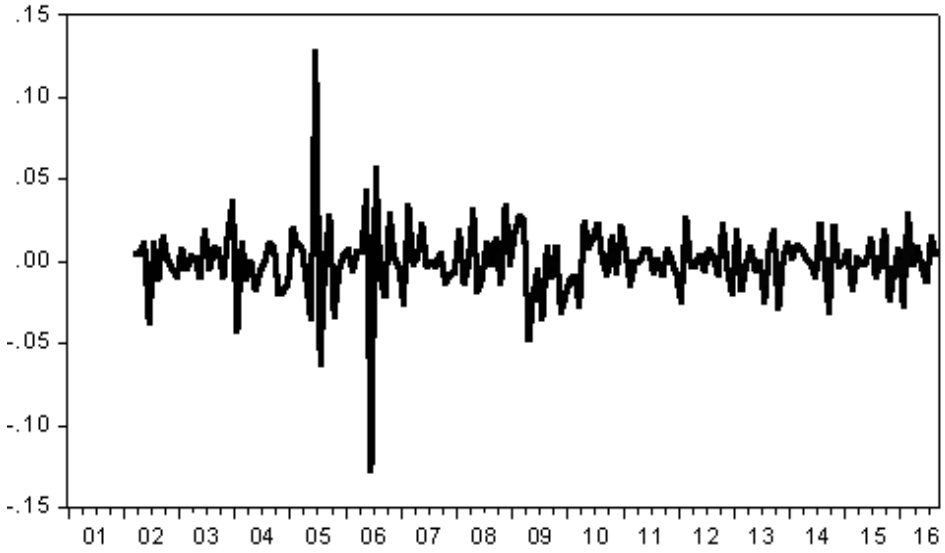
$$(1-B)^2(1-B\text{^}12)\log UR_t = \underset{(0,0673)}{(1-0{,}477255B)}\underset{(0,0551)}{(1-0{,}675792B^{12})}\varepsilon_t$$

$\hat{\sigma}_\varepsilon^2 = 0{,}000271353$ with 172 d.f`; $Q_{24} = 24{,}7268$ with P-*value* =0,310315.

The short-term out-of-sample forecasts with multiple horizon h = 6 months ahead are depicted in Table 3.2.

Figure 3.13

Second stationary transformation for Unemployment rate in SR, March 2002-August 2016



Source: Own calculations.

Table 3.2

Forecast of Unemployment Rate (%) in SR, September/2016-February/2017

Period	Forecast (%)	Lower 95% Limit	Upper 95% Limit
9/2016	10.90	10.55	11.26
10/2016	10.80	10.18	11.46
11/2016	10.72	9.81	11.72
12/2016	10.73	9.50	12.13
1/2017	10.78	9.21	12.63
2/2017	10.71	8.79	13.04

Source: Own calculations.

Comparing the results in Tables 3.1 and 3.2 show almost no differences, but if we compute MAPE for in-sample forecast errors with multiple horizon $h = 6$, this error is now larger: MAPE = 0.81%.

Thus, the question is which of these two models is better? From the statistical point of view it is the latter one, because it has a smaller number of parameters. However, the best answer will only be obtained in the future when the real values will be known.

The same model of ARIMA (0,2,1)(0,1,1)12 was chosen for forecasting the number of job applicants registered at labour offices. The estimation of the model gives the following results:

Estimation of the model ARIMA(0,2,1)(0,1,1)12 yields results for stock of unemployed U

$$(1-B)^2(1-B\text{\^}12)\log U_t = (1-0{,}166165B)(1-0{,}498371B^{12})\varepsilon_t$$
$$\qquad\qquad\qquad\qquad (0{,}02753) \qquad\quad (0{,}06275)$$

$\hat{\sigma}_\varepsilon^2 = 0{,}000151$ with 172 d.f`; $Q_{24} = 25{,}1823$ with P-*value* =0,288438.

The short-term out of sample forecasts with multiple horizon h = 6 months ahead are provided in Table 3.3.

T a b l e 3.3

Forecast of Unemployment in SR, September 2016 to February 2017

Period	Forecast	Lower 95% Limit	Upper 95% Limit
9/2016	296 530	289 424	303 811
10/2016	294 418	279 874	309 719
11/2016	291 658	268 648	316 639
12/2016	291 491	259 000	328 058
1/2017	292 739	249 908	342 912
2/2017	290 675	237 544	355 690

Source: Own calculations.

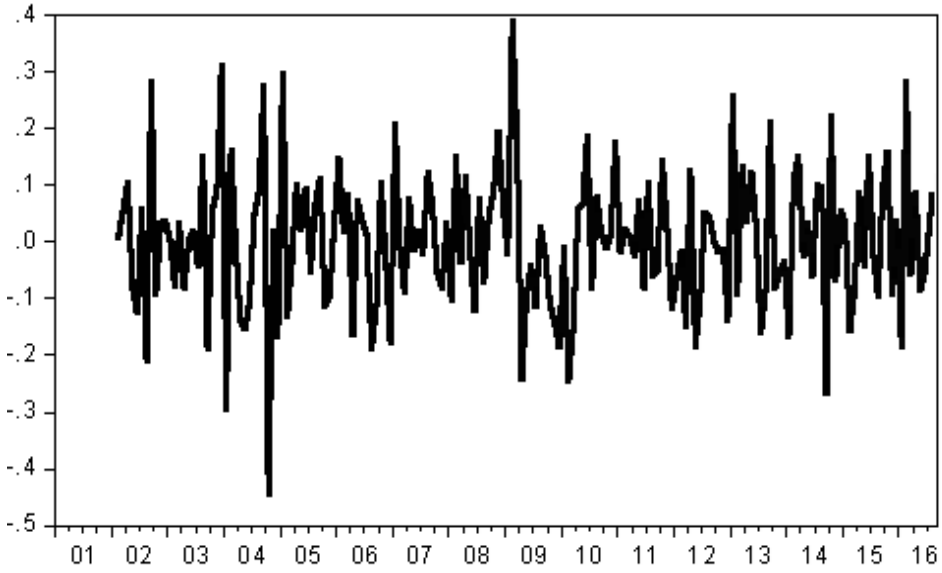
It is expected that the forecasts of registered unemployment in Table 3.3 will be done with the MAPE = 0.61%.

3.3.2 Fitting ARIMA(0,1,1)(0,1,1)12 model to Inflow Rate (%) and Inflow

Inflow rate could be interpreted as aggregate probability that a randomly selected person from the Labour Force will be unemployed. Development of inflow rate in Figure 3.2 is non-stationary, so we performed transformation of the data $z_t = (1-B)(1-B^{12})\log IR_t$, for t = 14, 15, …, 188, depicted in Figure 3.14.

F i g u r e 3.14

Stationary transformation for Inflow rate in SR, February 2002-August 2016



Source: Own calculations.

The autocorrelations of this transformation have statistically significant values at lags 1 and 12, so the model ARIMA(0,1,1)(0,1,1)12 was estimated with the following results:

$$(1-B)(1-B\text{^}12)\log IR_t = \underset{(0,07289)}{(1-0,289489\,B)}\underset{(0,0685)}{(1-0,436707\,B^{12})}\varepsilon_t$$

$\hat{\sigma}_\varepsilon^{\,2} = 0,0127308$ with 173 df`; $Q_{24} = 18,2195$ with P-*value* = 0,692898.

Forecasts with the horizon h = 6 months ahead of inflow rate are provided in Table 3.4.

From Table 3.4 it is expected that the monthly inflow rate will be from the interval 0.77% – 1.29% and the mean error of the model producing multiple forecasts will be about MAPE = 5.37%.

T a b l e 3.4

Forecast of Inflow rate (%) in SR, September 2016-February 2017

Period	Forecast (%)	Lower 95% Limit	Upper 95% Limit
9/2016	1.29	1.04	1.62
10/2016	1.11	0.84	1.45
11/2016	0.93	0.68	1.28
12/2016	0.75	0.53	1.07
1/2017	1.00	0.68	1.48
2/2017	0.77	0.51	1.18

Source: Own calculations.

The model ARIMA(0,1,1,)(0,1,1)12 for Inflow was estimated as

$$(1-B)(1-B\text{^}12)\log I_t = (1-0{,}29289\,B)(1-0{,}431396\,B^{12})\varepsilon_t$$
$$(0{,}07280) \qquad (0{,}0686)$$

$\hat{\sigma}_\varepsilon^2 = 0{,}012671$ with 173 df`; $Q_{24} = 17{,}8624$ with P-*value* =0,714114.

Forecasts with the horizon h = 6 months ahead of inflow are provided in Table 3.5.

T a b l e 3.5

Forecast of Inflow in SR, September 2016-February 2017

Period	Forecast	Lower 95% Limit	Upper 95% Limit
9/2016	35 530	28 452	44 370
10/2016	30 381	23 143	39 882
11/2016	25 558	18 667	34 994
12/2016	20 646	14 530	29 336
1/2017	27 598	18 782	40 551
2/2017	21 357	14 093	32 363

Source: Own calculations.

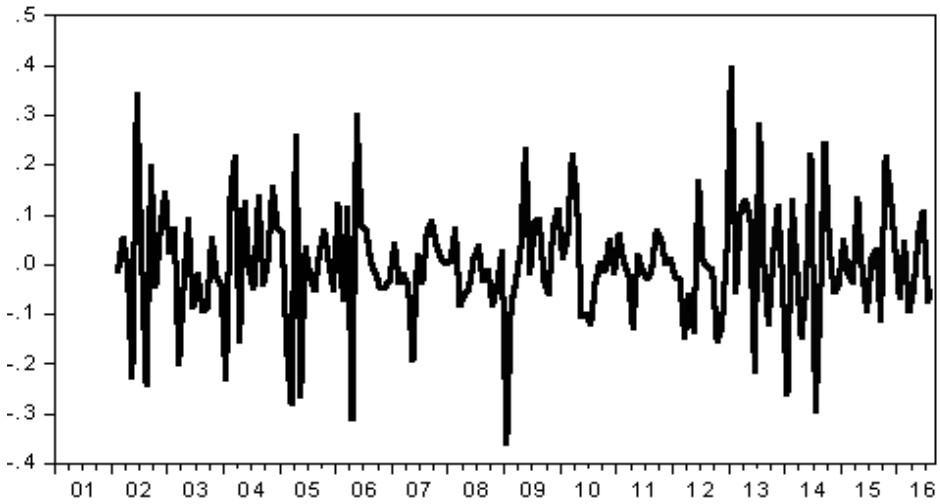
These forecasts are expected to be done with MAPE = 5.36% error.

3.3.3 Fitting ARIMA(0,1,0)(0,1,1)12 model for Outflow rate (%) and Outflow

Time series of Outflow rate depicted in Figure 3.3 is non-stationary and its transformation to the stationary series is $z_t = (1-B)(1-B^{12})\log OR_t$ is depicted in Figure 3.15.

F i g u r e 3.15

Stationary transformation for Outflow rate in SR, February 2002-August 2016



Source: Own calculations.

The partial autocorrelation of this transformation have statistically significant value at lag 12, so model ARIMA(0,1,0)(0,1,1)12 was estimated with the following results:

$$(1-B)(1-B\text{^}12)\log OR_t = (1-0{,}753801B^{12})\varepsilon_t$$
$$(0{,}0449)$$

$\hat{\sigma}_\varepsilon^2 = 0{,}00982$ with 174 df`; $Q_{24} = 25{,}7471$ with P-*value* = 0,313223.

Forecasts of Outflow rate with a horizon h = 6 months ahead are provided in Table 3.6.

T a b l e 3.6

Forecast of Outflow Rate (%) in SR, September 2016-February 2017

Period	Forecast (%)	Lower 95% Limit	Upper 95% Limit
9/2016	10.41	8.56	12.65
10/2016	8.76	6.64	11.54
11/2016	7.49	5.34	10.51
12/2016	5.30	3.59	7.84
1/2017	7.84	5.07	12.15
2/2017	7.24	4.48	11.68

Source: Own calculations.

The probability that an unemployed person will find a job during the next six months varies in the interval from 5.30% to 10.41%. It is expected that these multiple forecasts will be done with the MAPE = 7.47%.

Again, the model ARIMA(0,1,0)(0,1,1)12 was used for outflow from unemployment with the following results:

$$(1-B)(1-B\text{^}12)\log O_t = (1-0{,}77881B^{12})\varepsilon_t$$
$$(0{,}04272)$$

$\hat{\sigma}_\varepsilon^2 = 0{,}0091003$ with 174 *d.f*`; $Q_{24} = 26{,}2962$ with P-*value* = 0,287082.

The outflow forecasts with the horizon h = 6 months ahead are provided in Table 3.7.

T a b l e 3.7

Forecast of Outflow in SR, September 2016-February 2017

Period	Forecast	Lower 95% Limit	Upper 95% Limit
9/2016	30 776	25 494	37 152
10/2016	25 738	19 721	33 590
11/2016	21 850	15 770	30 275
12/2016	15 572	10 686	22 693
1/2017	23 388	15 351	35 632
2/2017	21 492	13 551	34 085

Source: Own calculations.

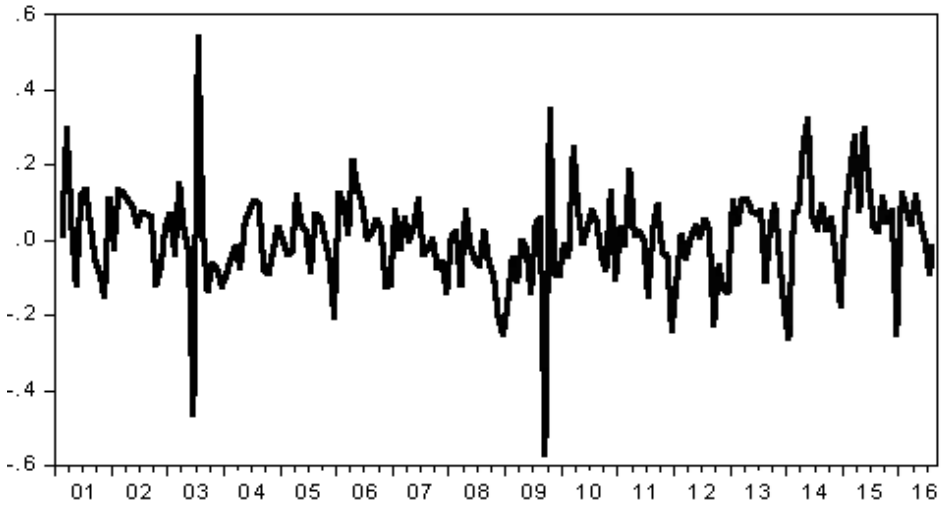
The outflow forecasts of unemployed persons moving to employment in the next six months are expected to be done with the MAPE = 7.60%.

3.3.4 Fitting ARIMA(0,1,0)(0,0,1)12 model for Vacancy rate (%) and Vacancies

As we can see, the development of vacancies is non-stationary and we did the stationary transformation $z_t = (1-B)\log V_t$ for t = 2, 3, …, 188 which is in Figure 3.16.

F i g u r e 3.16

Stationary transformation of vacancies in SR, February 2001-August 2016



Source: Own calculations.

The partial autocorrelation of the transformation for vacancies have a statistically significant coefficient in lag 11 and 12, so model ARIMA (0,1,0)(0,0,1)12 was selected and estimated with following results:

$$(1-B)\log V_t = (1+0{,}2310231B^{12})\varepsilon_t$$
$$(0{,}07154)$$

$\hat{\sigma}_\varepsilon^{\,2} = 0{,}00532$ with 186 d.f`; $Q_{24} = 21{,}2573$ with P-*value* = 0,565379.

The forecasts of vacancies for September 2016 until February 2017 are provided in Table 3.8.

T a b l e 3.8

Forecast of Vacancies in SR, September 2016-February 2017

Period	Forecast	Lower 95% Limit	Upper 95% Limit
9/2016	40 946	32 076	52 270
10/2016	41 310	29 248	58 346
11/2016	42 179	27 634	64 382
12/2016	40 095	24 605	65 339
1/2017	40 991	23 745	70 762
2/2017	41 456	22 795	75 392

Source: Own calculations.

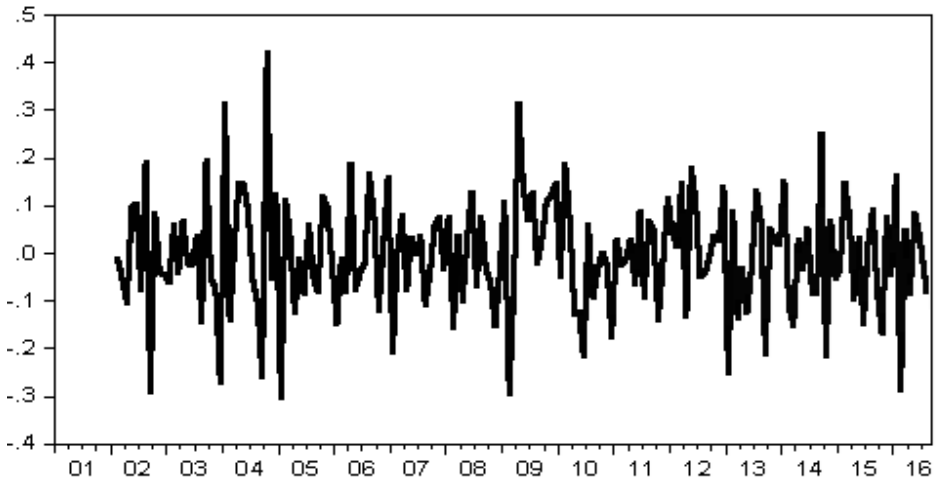
The forecasts of the number of vacancies in the next six months are expected to be done with the MAPE = 5.34%.

3.3.5 Fitting ARIMA(0,1,1)(0,1,1)12 model to average duration of unemployment in months

The development of the average duration of unemployment is depicted in Figure 3.11. Since this series is again non-stationary, we performed the transformation $z_t = (1-B)(1-B^{12})\log AD_t$ illustrated in Figure 3.17.

F i g u r e 3.17

The stationary transformation for Average duration in SR, February 2002-August 2016



Source: Own calculations.

The autocorrelation function of this transformation have statistically significant values at lags 1 and 12, so model ARIMA(0,1,1)(0,1,1)12 was estimated, yielding the following results:

$$(1-B)(1-B\text{\^{}}12)\log AD_t = (1-0{,}334564\,B)(1-0{,}412807\,B^{12})\varepsilon_t$$
$$\qquad\qquad\qquad\qquad\qquad\qquad (0{,}071651) \qquad (0{,}06943)$$

$\hat{\sigma}_\varepsilon^{\,2} = 0{,}0115752$ with 173 df`; $Q_{24} = 18{,}2177$ with P-*value* = 0,693005.

Forecasts with the horizon h = 6 months ahead of average duration of unemployment in months are provided in Table 3.9.

Table 3.9

Forecast of Average duration of unemployment (in months) in SR, September 2016-February 2017

Period	Forecast (%)	Lower 95% Limit	Upper 95% Limit
9/2016	8.37	6.77	10.39
10/2016	9.63	7.47	12.43
11/2016	11.34	8.47	15.18
12/2016	13.98	10.11	19.33
1/2017	10.49	7.37	14.94
2/2017	13.38	9.14	19.58

Source: Own calculations.

From Table 3.9 we can expect that the average time for those who enter unemployment, to remain there in the forecasted period, varies between 8 to 13 months. It can be also expected that these multiple forecasts will be done with the error MAPE = 5.83%.

3.4 Conclusions

In this chapter we analysed the empirical Beveridge curve in Slovakia using various adjusted time series of unemployment and vacancies. Our analysis showed that the effects of the economic crisis were manifested in the labour market in 2008 and lasted until 2013. The year 2015 was rather unique, as firms offered more job vacancies (nearly three times more) than in the previous year, therefore the unemployment rate dropped to nearly 10%. It has only been during the last two years, that firms have started offering more job vacancies and the unemployment rate has started to decrease.

The Beveridge curve analysis also showed that during the analyses time span there were periods of economic expansion associated with increasing vacancies and decreasing unemployment. The first such period started in 2001 and lasted until mid-2007. The second period is from the end of 2012 until the end of 2016. We can also see that the start of cycles in the unemployment rate are lagged by about 8 months.

The economic slowdowns in 2007 and 2013 could also have been predicted by the changing trends in the unemployment flows (inflow to unemployment and outflow from unemployment), which have again been

estimated by means of the Hodrick Prescott filter and applied to the seasonally adjusted inflow and outflow rates The long-run elasticity of outflow rate with respect to the vacancy-ratio was 0.1951, which is less than the 0.3 value estimated by Pissarides (1986). The reasons behind this difference could be the fact that Pissarides estimated his model only for male outflow and unemployment (assuming that female outflow and unemployment are greatly affected by varying benefit regulations). For Slovakia, the estimated model provides explanation that the outflow rate does not substantially change with growth in vacancy ratio, which is associated with growth in long-term unemployment. The negative trend in the model could be explained by the degree of employment protection and by reduced pressure from authorities to seek work (inactivity, lock-in effects).

The long-run behaviour of the aggregate probability to be employed is not strongly affected by the development of the vacancy ratio during the analysed period. The same is true for the inflow rate. We believe that the decreasing unemployment rate could be explained only in the short run by short-term administrative changes, as long-term unemployment in Slovakia is very high and stagnant.

In this chapter, we also provide short-term estimates of the future developments for selected labour market characteristics in Slovakia, using Box-Jenkins transformation and ARIMA models based on the diagnostics of partial autocorrelation functions. The estimation results point towards an improving labour market situation in the short run, characterized by a decreasing unemployment rate and increasing vacancies. Therefore, the short-term prospects of labour market development in Slovakia are positive. However, the insensitivity of employment probabilities point to the existence of a large and stagnant pool of long-term unemployed. Therefore, further improvements to the labour market situation will have to be achieved by structural measures, rather than by relying on the positive aggregate trends.

4 LONG-TERM EFFECTS OF THE TRAINEESHIP PROGRAMME FOR GRADUATES

Miroslav Štefánik, Katarína Karasová, Ivana Studená

The labour market prospects of youth in Slovakia continues raising concerns. The economy is and will be, increasingly confronted with structural changes on the labour demand side, and negative demographics on the labour supply side, with increasing pressures on the public education and social welfare systems. In past decades, youth unemployment rates in Slovakia rank systematically above average compared to both EU and regional, V4 levels.[26]

The occurrence and persistence of youth unemployment is a relatively new phenomenon of the dysfunction of labour markets in many developed economies. Significant cohorts of low-skilled, unemployed youth, tend to fall into the trap of long-term unemployment, with limited or even with no employment experience. Youth unemployment is a severe problem as it occurs at the beginning of the career. The related stigma affects the following stages of individual careers, biasing professional trajectories in significant ways. The disrupted or absent career paths of unemployed youth, also risk setting off other severe socio-emotional problems. These problems then affect both personal and working lives in multiple ways, often inflicting irreversible harm to the individual's well-being.

Hence, policies, especially active labour market policies (ALMPs) which target improving the labour market situation of youth, attract genuine interest from a wide range of actors including policy makers, practitioners, professionals and the general public. Among ALMPs targeting youth,

[26] A standard EU – Labour Force Survey has been carried out in Slovakia since 1998. During this period, the unemployment rates of the age groups: 15-24, 15-39 and 25-29 in Slovakia remained clearly above the EU average. Only in 2015, did the unemployment rate of the 25-29 age group in Slovakia drop slightly below the EU-28 average (12.2 for SK vs. 12.4 for the EU28).

training and education programmes are particularly well received in Slovakia. Positive perceptions of such interventions for youth creates favourable conditions for these measures and policy tools that can be further developed and improved. The main concern for doing this and to progress on policy development and delivery, is to operate with robust evidence on the effectiveness of training schemes, including information on how the impact varies with respect to i) factors related to the setup of the programme and the process of its implementation ii) conditions related to the individual.

In this paper, we present the impact analysis of the *Traineeship programme for graduates (TPG)* in Slovakia in the years 2007-2008. We address two key research questions that are crucial for future policy use and development. First, we inquire about the long term impact on income and employment related to participation in TPG. Based on the data we use for this analysis, we can follow the employment status and the income of programme participants up to 66 months following the end of programme participation. Second, we seek to understand how the impact on participants´ employment varies with the length of the participation in the programme; therefore, we estimate a dose-response function to participation in the programme.

The structure of the text is standard. First, an overview of the relevant literature is provided. In the second section, we describe the data and empirical strategy. Results are presented in the third section, and we conclude in the final, fourth section.

4.1 Overview of relevant literature

The literature on the impact evaluation of ALMPs is a dynamically developing field, along with new or improved data which follows the respective programme participants during longer spans of time. Additional support for evaluation studies stems from continued improvements in and availability of, panel or cross-sectional databases about the labour market situations of individuals and related individual characteristics. Technical developments in the past decades have been substantial as well, resulting in a number of econometric and microsimulation techniques providing

a wider grasp on potential impacts. Particular insights in recent empirical work come from analyses of administrative data collected within the delivery structures of public employment services and a combination of administrative and survey-based data for counterfactual analyses. Probably the most reliable approach is the use of randomised controlled trials (RCT) in social science evaluations. Empirical applications for ALMPs are limited but already available. In Slovakia, neither data nor legislative framework, is currently compatible with applying RCT for ALMP evaluation.

In a recent overview of a considerable sample of empirical work on the evaluation of ALMPs, Card et al. (2015) provide a meta-analysis of impact estimates from more than 200 econometric studies, comparing size, significance and signs of the estimated effects of ALMPs. Their analysis is based on effect size approach as opposed to sample size approach, and leads them to several meta level findings. The most relevant in our context are, that "human capital investment" ALMP measures show a low or even negative effect in the short term, but improve their performance in the long term. This is in contrast to the "work first" type of ALMP measures, which perform better in the short term. The measure under evaluation here is more of a human capital investment type.

The individual characteristics of participants may play an important role in how well different programmes work, e.g. training programmes tend to yield higher impacts on the long-term unemployed whereas job assistance and sanctions programmes fit the disadvantaged groups better. The authors also provide important evidence on how methodological frameworks interplay with the results yielded by econometric assessments. Particularly interesting for us are the results obtained by studies based on the newly developing use of randomised controlled trials (RCTs), as we do not yet work with data and information which allow such evaluations to be undertaken in Slovakia. Card et al. (2015) find that RCTs based estimates do not differ significantly from non-randomized estimates. As we will later show, the results of our study are in line with major findings of this review study. The final, important observation is that ALMPs tend to be more effective in periods of economic downturns, accompanied by higher unemployment and slow economic growth rates.

4.1.1 Literature on youth training programmes impact evaluation

Recently, youth training programmes have been increasingly opted for in countries facing the occurrence and persistence of youth unemployment. The variety of youth training schemes might seem considerable, with differences in target groups, structures of training schemes and their objectives, links with employers, delivery mechanisms and implementation structures. For the purpose of contextualising our analysis, we find two evaluations of similar programmes, to be interesting for discussion on policy relevance and methodology approach.

Dias and Rosas (2016) present an experimental impact evaluation of the Peruvian Job Youth Training programme known as 'Projoven'.[27] Their methodological approach rests on three major improvements of already available impact evaluations of the same programme: i) combine information available from administrative data on formal employment, with self-assessment on programme outcome obtained by a follow-up survey on a sub-sample of programme beneficiaries ii) measure impacts over a longer period of time, adding evidence on long term effects; iii) use experimental methodology. The authors also measure if the programme participants benefited in terms of their socio-emotional skills.

The structure of Projoven takes into account specific labour market problems, namely a high incidence of informal jobs. The programme targets underprivileged youth and starts with in-classroom technical training (provided by public or private training agencies) followed by an internship in a firm. There is an important element of cooperation with employers, as the content of classroom training is defined in cooperation with firms in which the programme participants later do their internships. An additional feature of this programme is the selection process, which helps meet the individual needs of potential beneficiaries.[28]

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[27] Projoven was designed and developed based on the Chilean training programme 'Chilejoven' implemented in several Latin American countries.

[28] The selection process was not exclusive, potential beneficiaries who did not pass the selection tests for the chosen training courses, were encouraged and could opt for other courses, with a total of three chances to choose and pass selection for training and qualify for participation in the scheme.

Results of empirical evaluations are strong for high, positive long-term impact on formal employment[29] in a period of economic downturn and high unemployment. The impact varies by gender and age, and the most significant impact has been confirmed for females and young adults. The authors suggest that the sample size effect might play a role in this for data disaggregated by categories. No evidence for socio-economics skills effect has been confirmed. According to this study, the programme increased the chances of finding a formal job in labour market conditions marked by a high informality of employment positions.

In an earlier evaluation study, Juznik (2012) confirms the overall findings on the positive effect of training schemes on employment in Slovenia. In terms of economic and social environment, and geographical proximity, the Slovenian case has intuitively closer links to the Slovak economic environment. However, Juznik's results contradict the prevailing evidence on the temporal effects on employment. She reports that the short-term effects on employment are positive and more significant than the long-term effects, which are also positive but smaller. This contrasts with the overall conclusions of recent empirical evaluation work. The differences, as commented earlier, might be attributed to the different temporal scope of the study.

To complement the overall perception of ALMPs, firm level perspective is proposed by Lechner et al. (2013). They claim that firms critically perceive ALMPs, and report rather negative effects. The analyses of a range of ALMP measures is based on exceptional employer-employee matched data and includes assessment of training. However, while authors show neutral or negative effects of training schemes on firms, their analysis covered longer, more complex and rather costly training schemes. Short term traineeship/internship low-cost programmes are less likely to distort the entrepreneurial environment and hiring conditions.

[29] In Peru the informality of employment situations is one of the key labour market problems.

4.1.2 Traineeship programme for graduates in Slovakia. Basic facts and previous evaluations

The traineeship programme for graduates (TPG) was introduced in 2004 by the Ministry of Labour, Social Affairs and Family (MLSAF) and has remained in place, with minor changes, until today. The programme was developed as an Active Labour Market Policy (ALMP) measure, and it has been integrated into the EU Youth Guarantee Programme after its implementation in Slovakia was launched in 2014.[30] The objective of the programme is that its participants acquire professional skills and practical experience for future employment, relevant to their respective education. From that point, the main benefits of programme participation are related to the potential acquisition of: i) working habits and working discipline; ii) professional skills iii) practical experience iv) professional contacts. Individuals eligible for the programme are graduates younger than 26 years of age, have not been previously employed and are registered as searching for a job.[31]

Box 4.1

Brief Description of the Traineeship programme for graduates (TPG)

During the evaluation period, TPG was provided to individuals under 25 years of age, registered as job seekers by the public employment agency (COLSAF). TPG related support was provided during a maximum period of 6 months, based on a three sided contract between COLSAF, the selected employer and the participant.

TPG requires the participant to spend up to 20 hours a week at the workplace, gaining relevant working experience. Employer selection should take into account the relevance of the experience to be gained at the workplace.

The employer´s costs related to participation in the programme are covered up to a level of approx. 30 EUR monthly. The TPG participant receives remuneration of approx. 60 EUR from COLSAF. The employer has no labour related costs linked to the TPG participant. A repeat involvement in the TPG is possible after 12 months.

[30] In 2015 the measure was amended with a job creation subsidy for the employer with whom the internship/apprenticeship took place.

[31] < 26 years old, graduates from secondary and tertiary education level, graduated not more than 2 years before enrolling in the programme, did not have a regular paid job since graduation and registered for unemployment for at least a month. Participants receive social security payments and an allowance amounting to 65% of the minimum

Employers do not receive any direct payments apart from minor contributions to cover direct costs that occur by accepting the graduates for traineeship, with a duration strictly limited to three to six months.

Previous assessments of the TPG scheme agree on a positive effect on the participants' employment chances. From previous assessments, Štefánik, Lubyová et al. (2014) review ALMPs including TPG. With respect to programme effectiveness, the authors conclude that compared with other ALMP measures implemented in the same period, TPG is among the more effective ones. They also suggest that the key attribute of the programme effectiveness is influenced more by the programme implementation than its structure. This is particularly valid for TPG and also explains regional differences in the impact of the measure. The methodology has a common framework with the method applied in this study, and the main difference is in the length of the period the participant is tracked, after he concludes participation in TPG. Earlier assessment studies (Harvan, 2011; Hidas et al., 2016) also assess the effect of ALMP measures (Harvan, 2011) or the effectiveness of relevant delivery structures (Hidas et al., 2016) signal the positive impact of the TPG. An impact evaluation study done by the implementing body also points at modest but positive effects of TPG (Bořík et al., 2015).

In international comparison, the main advantage of the Slovak TPG is the low costs related to the programme. This makes the TPG one of the most effective measures in the portfolio of Slovak ALMP measures when assessed from a cost-benefit perspective.

4.1.3 Literature on the dose-response function of a training programme

A rather specialised stream of studies can be followed in estimating the dose-response function of programme participation. When dealing with the problem of selection bias, authors rely on the concept of generalised propensity score introduced by Hirano and Imbens (2004). Following on this methodological improvement, Flores et al. (2012) bring evidence

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income. The duration of the internship/apprenticeship is strictly 3-6 months, 20 working hours a week, the participant remains registered as unemployed.

on the US Job Corps programme and provide a comparison of various estimation methods. Parallel to this effort, Kluve et al. (2012) estimate the dose-response function of a continuous training programme in Germany. Based on the available studies an inverse U-shape of the dose-response function may be expected.

4.2 Methodology

Our goal here is the quantification of the impact that participation in the TPG programme had on the employment and income of graduates. We are particularly interested in the long term impact, more than two years after the end of participation.

We are tracking outcomes of the TPG participants who successfully finished their participation between the beginning of January 2007 and the end of April 2008. This period is homogeneous in terms of the implementation rules and provides a sufficient number of observations. The selected time span with the consequent period of 66 months, is crucial for the possibility of tracking the participants´ outcomes during a relatively longer period of time after finishing the programme. Two outcome indicators are constructed, employment rate and average gross monthly income.[32]

4.2.1 Data

Our database was created by merging two autonomous administrative data sources. First, it is the official register of unemployed job seekers administrated by the governmental public employment agency – Central Office of Labour, Social Affairs and Family (COLSAF). Being registered in this database is a necessary precondition for gaining the status of a job seeker related to receiving unemployment benefits, state-covered health insurance and other rights and benefits such as support via active labour market measures. Information about a wide list of individual characteristics is collected at the moment of entering the database:

[32] The start of the evaluation period is being imputed for non-participants using a random variable; as in the case of Lechner (1999). Our results are not sensitive to the change of this variable design. The main findings were also confirmed when calendar dates were used.

- Age
- Local Office of Labour, Social Affairs and Family (regional specific dummies)
- Educational attainment (level)
- Educational attainment (field)
- Nationality
- Citizenship
- Family status
- Children in household
- Date of inclusion into the register of applicants
- The number of registers before registration during which received the measure
- Number of days registered as unemployed before registration during which received the measure
- Past unemployment
- Employed / unemployed before registration
- Last job (occupation – ISCO)
- Last job (sector – NACE)
- Last job (self-employed)
- Minutes commuting to last job
- Years of experience in the labour market
- Self-perceived employability barriers – long-term unemployed, graduate or over 50 years old
- Computer skills
- Foreign language skills
- Driving License
- Participation in other measures of active labour market policy

Information from the COLSAF registers of unemployed job seekers is complemented with information from the register of persons insured by the Social Insurance Agency in Slovakia. Payment of social insurance contributions is mandatory for all individuals in legal employment or self-employment in Slovakia. Using the database, we are thus able to follow all the individuals from the COLSAF register on a monthly basis. Based on the link between the two databases we were able to complement the original COLSAF registers with information about the two outcomes of interest:

- Employment in the post participation period (Outcome)
- Income in the post participation period, constructed for individuals with non-zero income (Outcome).

4.2.2 Estimation strategy

Taking advantage of the possibilities provided by the qualities of the available dataset, we seek to quantify impacts of participation in the GTP. Our empirical strategy focuses on estimating the average treatment effects on the treated (ATT)[33] using comparisons of participants´ outcomes to a counterfactual situation if participants´ did not participate in the programme. No randomised experiments have been organised to evaluate the programme of our interest in Slovakia. Therefore, we have to rely on observational data, originally collected as administrative data. Here we impute the missing information about the counterfactual situation of participants using information about non-participants' outcomes. We rely on techniques using individuals´ characteristics observed in our data (Propensity score matching, Inverse probability weighting) as on unobservable characteristics (Instrumental variable).

Separately, we operationalize the treatment variable in binary, as well as continuous forms. In the former, we quantify income and earning effect related to participation in the measure and its change in time after participation. In the latter case, we draw the dose-response function to the length of participation in the programme.

Impact estimation when a binary treatment variable is considered

When a binary treatment is considered, we focus purely on whether an individual participated in the measure or not. Here we consider two possible levels of the treatment variable (D), the individual has participated in the programme (D = 1), or the individual has not participated in the measure (D = 0). We aim to quantify the average treatment effect on the treated (ATT) which is the difference in outcomes of participants if they had participated (Y^1) and the outcomes of participants if they had not participated in the programme (Y^0). This and the average treatment effect on the treated is

$$\Delta ATT = E(\Delta \mid D = 1) = E(Y^1 \mid D = 1) - E(Y^0 \mid D = 1) \qquad (4.1)$$

[33] For more information about microeconomic estimation of the treatment effects and the quantification of the ATT see: Caliendo & Hujer (2006).

Because we are not able to observe the counterfactual situation, of participants′ outcomes if they had not participated in the programme ($Y^0 \mid D = 1$), we substitute this information with the information about the outcomes of non-participants (E($Y^0 \mid$ D = 0). Such substitution can be done in two alternative ways; by relying on observed or unobserved characteristics. If we rely on the information about individuals′ characteristics observable in our data, we would be trying to achieve the best possible balance between the group of participants and the quasi-control group, following the so-called Rosenbaum-Rubin causal model. When relying on the unobservable part of individuals′ characteristics, we would be employing the unexplained part of the variance in a two-step estimation.

Estimators relying on observable characteristics
(The propensity score matching (PSM) and Inverse probability weighting estimators (IPW))

In the propensity score estimation of the treatment effects we rely on the so-called Rosenbaum-Rubin causal model, employing a quasi-experimental setting on observational data. Rosenbaum and Rubin (1983) claim that after assuring a balance between the groups of participants and non-participants, the treatment assignment is strongly ignorable. In later literature, this claim was reformulated into the so-called unconfoundedness assumption:

$$Y_{(i)}(T) \perp D_i \mid X_i \qquad (4.2)$$

$$\text{for all T and D} \in [0, 1] \qquad \text{and i} \in \text{N}$$

Moreover, when looking for non-participants similar to participants in terms of observable characteristics, an overlap between the two groups is necessary. The second assumption related to propensity score matching is therefore called the assumption of the common support.

According to Rosenbaum and Rubin (1983), the best balancing score is the propensity score. If we adopt the above-mentioned assumptions, the missing information about participants′ outcomes in the counterfactual situation can be substituted by outcomes of non-participants.

In order to balance the groups of participants and the quasi-control group of non-participants we estimated a propensity score variable (PSV) using a probit equation to predict the probability of participating in the programme for all eligible (graduates under 26 years of age). The probit estimation can be formalised as a regression based equation:

$$\Pr(I = 1 \mid X) = \beta_0 + \beta_1 X + \mu \tag{4.3}$$

with I referring to participation in the programme and X representing the list of explanatory variables. The complete list of explanatory variables (X) basically covered all the information available in the dataset.[34]

The distribution of the PSV is different between non-participants and participants in the programme, with the mean values of PSV for participants being significantly higher than those of non-participants. Despite these differences, the distribution of the PSV of non-participants covers practically the entire distribution of the PSV of participants.

T a b l e 4.1

Summary statistics of the PSV

Variable	N	Mean	Std. Dev.	Min	Max
Non-participants	58,361	0.074869	0.089235	1.16E-05	0.676921
Participants	5,535	0.2112	0.131542	0.00024	0.688088

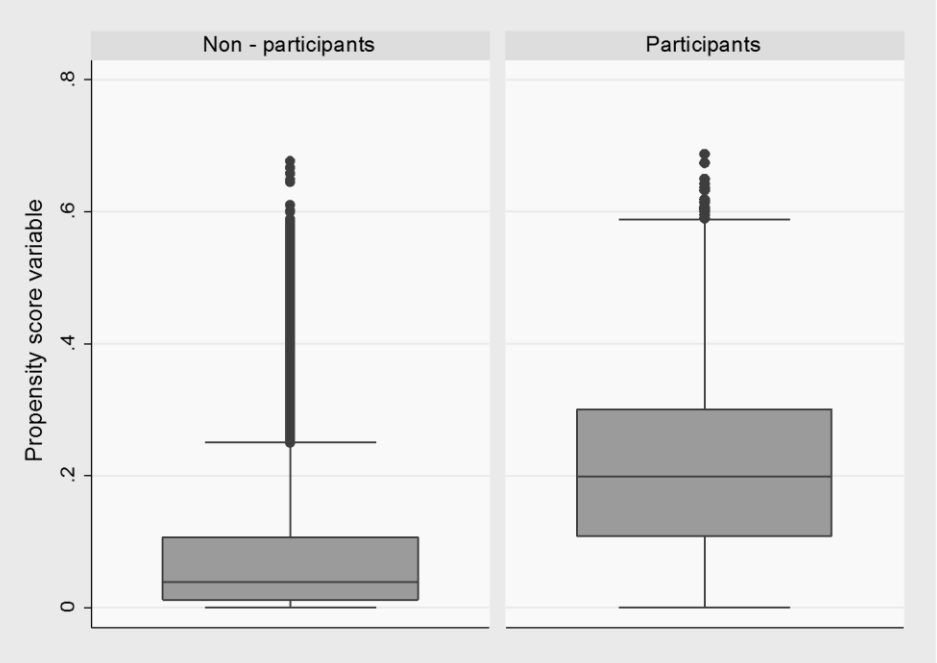
Source: Authors´ calculations using the COLSAF database.

The group of non-participants is more than ten times more numerous compared to the group of participants. Therefore, outliers from the group of non-participants can be sufficient to cover those participants with higher PSV values.

[34] Listed in the previous section, dealing with data.

F i g u r e 4.1

Propensity score variable distribution for participants and non-participants in the programme



Source: Authors´ calculations using the COLSAF database.

After we estimated the PSV, we used two algorithms to construct the quasi-control group. Firstly, we used the intuitive nearest neighbour algorithm selecting up to 20 neighbours, if they are available within the radius of 0.0001 distance measured on the PSV. Secondly, we used the kernel matching algorithm (Heckman et al., 1998a, 1998b), with epaneschnikov kernel with a bandwidth of 0.06.[35]

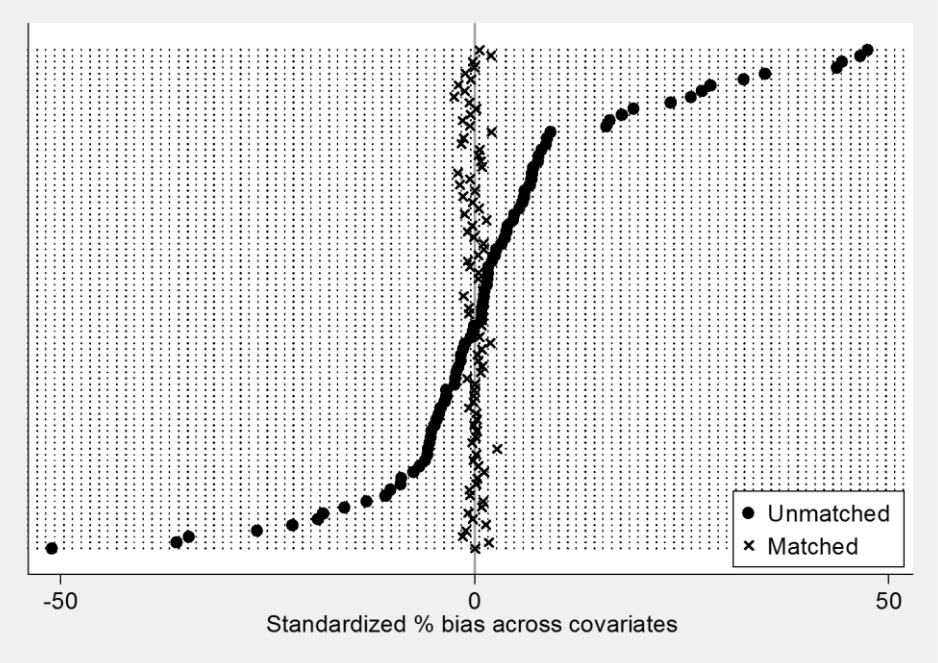
The following graph shows the standardised bias calculated from the mean difference between the participants' group and the control group, on observable characteristics used in the PSV estimation. We may follow the bias improvement as a result of matching when comparing the figures before and after matching, for the kernel matching. Achieved balance can

[35] For more detailed results on the IV estimation see:
<http://ekonom.sav.sk/uploads/work/Annex_NN.txt>;
<http://ekonom.sav.sk/uploads/work/Annex_KERNEL.txt>.

be considered as satisfactory, when kernel matching provides only slightly better results in comparison to the nearest neighbour matching.

Figure 4.2

Standardised bias before and after matching as a result of the kernel matching



Source: Authors´ calculations using the COLSAF database.

Estimator based on the inverse probability weighting works under a principle similar to the propensity score estimator. The PSV is used to weight non-participants' observations in the computation of the weighted average value of the outcome to be compared to the average outcome of the participants (Cattaneo, 2010).[36]

Methods relying on unobservable characteristics (Instrumental variable estimator)

In contrast to methods relying on observable characteristics, the instrumental variable estimator uses the unexplained variance to estimate

[36] For more detailed results on the IV estimation see: <http://ekonom.sav.sk/uploads/work/Annex_IPW.txt>.

the treatment effect of a policy intervention, in our case a graduate practice programme. This approach depends heavily on the availability of a suitable instrumental variable. Such variable needs to be correlated with the treatment assignment, but not with the outcome of interest. In programme evaluation practice, researchers are most often looking for exclusion characteristics. An observable feature based on which individuals, otherwise eligible, are excluded from participating in the programme. Nevertheless, an instrument works both ways in case of negative, as well as positive correlation with the treatment assignment. Based on this correlation, the treatment assignment is predicted as a product of the first equation. In the next step, the product is used in a regression equation estimating the treatments´ contribution to the outcome variable. These two equations are estimated using the two-stage estimator.[37]

Blundell and Costa Dias (2000) show that in the case of heterogeneous treatment effects of a programme, estimates obtained under the instrumental variable are referring only to the segment of individuals who are induced to change their behaviour because of a change in the instrument (Caliendo & Hujer, 2005). In such case, the so-called Local Average Treatment Effect – LATE is estimated.

Travelling time to the nearest COLSAF regional office, measured in minutes, was used as the instrument variable in our case. The correlation coefficient between minutes of travelling time to the nearest COLSAF regional office and programme assignment is rather small 0.077, but statistically significant. Its correlation to the outcomes is insignificant or relatively weaker. Testing the instrument after being used with other covariates in a regression equation, using F-test brought results that speak more in favour of the instrument. Nevertheless, we can consider this variable to be a weak instrument providing LATE estimates.[38]

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[37] For more details on the routine see Blundell and Costa Dias (2000).

[38] For more detailed results on the IV estimation see:
<http://ekonom.sav.sk/uploads/work/Annex_IV.txt>.

Impact estimation when a continuous treatment variable is considered

When a continuous nature of the treatment variable is being considered in the estimation of the treatment effects we adopt the concept of the generalised propensity score introduced by Hirano and Imbens (2004). Here the so-called weak unconfoundedness assumption is adopted applying conditional independence to hold for each value of the treatment variable instead of for each of its values separately. This can be formalised as follows:

$$Y_i(t) \perp T_i \mid X_i \qquad \text{for all t} \in \tau \tag{4.4}$$

where in a sample of units i=1…N, X refers to the vector of observable characteristics (covariates); T refers to the level of treatment and Y(t) is the potential outcome conditional on X. Applying this assumption together with the balancing score property, a generalized propensity score can be estimated as a score balancing the covariates, conditioning them on the level of treatment. When r(t, x) is the conditional density of the treatment given the covariates:

$$r(t,x) = f_{T|X}(t \mid x) \tag{4.5}$$

Under the weak unconfoundedness assumption, the treatment effects are estimated using the Inverse-Weighting estimator assuming a normal kernel distribution (IW kernel) originally described in Flores et al. (2012, p. 161) and later adopted by a user-written Stata package introduced in Bia et al. (2014):

$$\hat{\mu}(t) = \frac{D_0(t)S_2(t) - D_1(t)S_1(t)}{S_0(t)S_2(t) - S_1^2(t)} \tag{4.6}$$

where: $S_j(t) = \sum_{i=1}^{N} \tilde{K}_{hX}(T_i - t)(T_i - t)^j$

and $D_j(t) = \sum_{i=1}^{N} \tilde{K}_{hX}(T_i - t)(T_i - t)^j Y_i$, j = 0, 1, 2.

In our application 5,434 observations of participants were used in the estimation. We have used only individuals not participating in any other ALMP. Twenty-eight observations were excluded because they did not satisfy the common support assumption. Balance was assessed on four separate intervals of the treatment variable (up to 60 days, 60-120 days, 121-150 days and over 150 days).[39]

4.3 Results

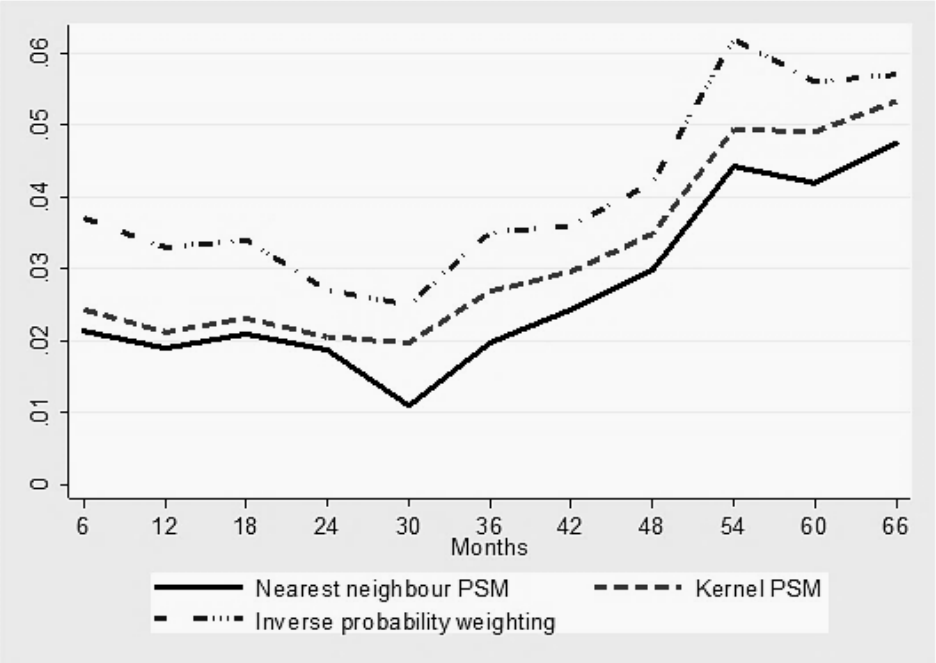
Our estimations reveal evidence on opposite effects of participation in the programme when tracked by two identified outcome indicators. When considering the binary nature of the treatment variable, employment effect remains in positive figures during the entire evaluation period, up to 66 months after the end of participation. Contrary to that, the employment effect remains negative during this period. Our results are homogeneous for all estimation methods applied, those relying on observable characteristics, as well as those relying on unobservables.

When we examine the employment effect using estimators that rely on observable characteristics, the employment effect remains moderate in the first half of the evaluation period (up to 36 months). After 3 years, the employment effect starts to grow to its maximum in the 54th month after the end of participation. Here the difference in employment rate between participants and the quasi-control group climbs clearly over 4 p.p. (in the case of the nearest neighbour matching). Estimates obtained by the Inverse probability weighting estimator provide statistically significant figures over 6 p.p. in terms of employment rate. All coefficients estimated here are statistically significant at a 0.01 level with the exception of the nearest neighbour based estimate for the 30th month.

[39] For complete results of the estimation please see:
<http://ekonom.sav.sk/uploads/work/Annex_DRF.txt>.

F i g u r e 4.3

Estimated treatment effects on employment of participants (estimators based on observables)



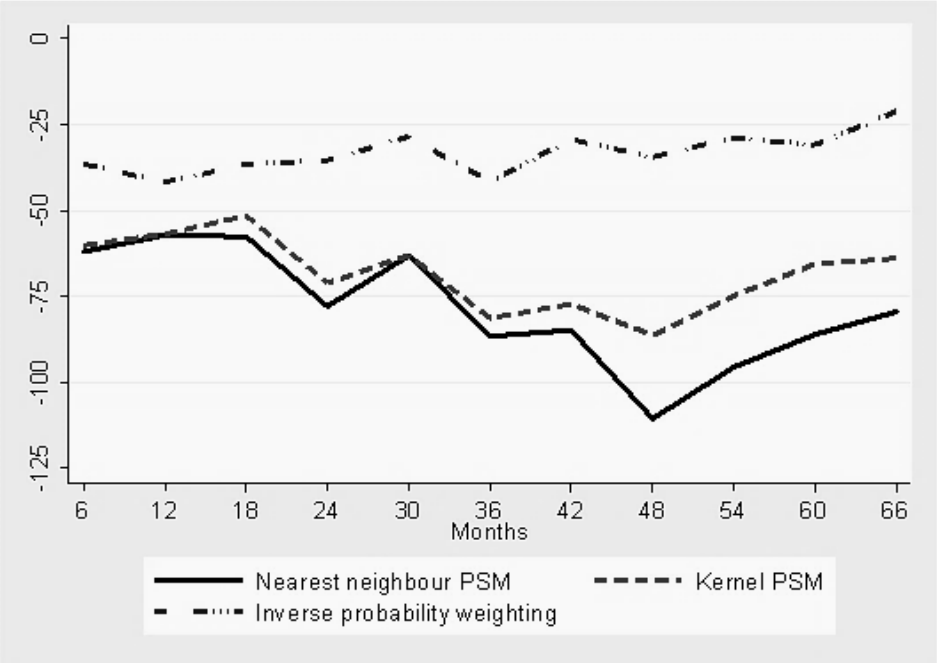
Source: Authors´ calculations using the COLSAF database.

The value added of this study when compared to previous evaluations of this programme, is the prolongation of the evaluation period. We have shown here that the employment effect of the programme grows after the usual length of the evaluation period, i.e. after three years. This comes after a period of slight decline in the treatment effects on employment.

In contrast, the income effect estimations bring negative and statistically significant results for all three estimators which are based on observable characteristics. Absolute figures of the income effect differ among three estimators. Inverse probability weighting estimator draws a stagnating pattern for the entire evaluation period, with figures between -50 and -25 euro difference between the average income of participants and the control group. For the last period (66 months after the end of participation), estimated effect rises to -21 euro with the significance level only 0.05.

F i g u r e 4.4

Estimated treatment effects on income of participants (estimators based on observables)



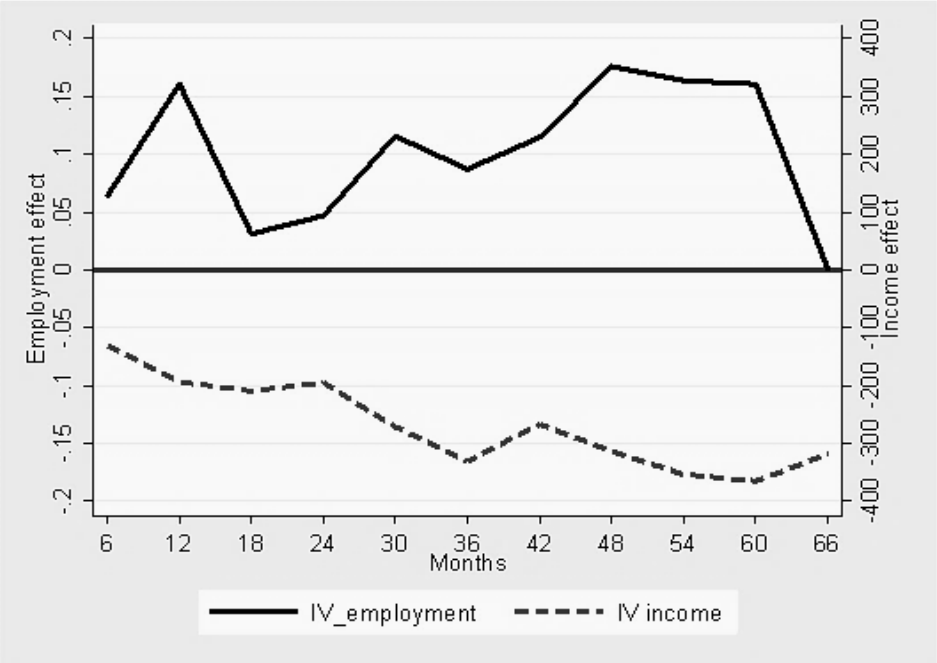
Source: Authors´ calculations using the COLSAF database.

Propensity score-based estimators reveal results of a higher difference in average income of participants and the control group. Based on these estimates, we may observe a minimum in the 48th month after the end of participation. After this point, the negative income effect of participation in the programme seems to slightly disappear.

A very similar pattern can be observed for the estimates that are obtained by the instrumental variable estimation technique. A positive employment effect with a maximum between the 48th and 60th month after the end of the participation is clearly drawn. A negative income effect estimated by techniques relying on observables was also confirmed by the instrumental variable based estimation. The minimum values slightly shifted towards a later, post-programme period of the 54th-60th month.

F i g u r e 4.5

Estimated treatment effects on employment and income of participants (IV estimates based on unobservables)



Source: Authors´ calculations using the COLSAF database.

The treatment effects obtained by the instrumental variable estimator are more often not statistically significant. In the case of employment, our instrument is relatively weaker. Treatment effects are statistically significant only at a 0.1 level for periods between the 48th and 60th month and in the 12th month. Treatment effects on income, where our instrument was performing better are statistically significant at 0.001 level for the entire evaluation period, with the exception of 6th months after the end of participation.[40]

In summary, our results draw a homogeneous picture with a satisfactory consistency in the pattern drawn by all four estimators. In the case of employment, the key message is, that after the initial period of approximately 30 months of declining employment effects, the trend changes.

[40] For complete information about the estimated coefficients, please see: <http://ekonom.sav.sk/uploads/work/Annex_IV.txt>.

From the 30th month after the end of participation, the employment effect of the programme on participants starts to increase. The difference in the employment rate of participants to comparable non-participants starts to increase. This is, among other factors, driven by an increase in the employment rate of participants, which is not followed by an increase in the employment rate of the quasi-control group. Both employment rates slightly decline in the middle of the evaluation period, between the 18th and 30th month. Such decline may be caused by the effect of the economic crisis, under which both groups suffered the same worsening of the labour market environment. Those who participated in the programme after graduating, have, in the later stages of their careers, adapted more easily to the economic crisis. This is one of the key findings of this empirical study. For this reason, we have selected the indicator of employment in the 54th month after participation as the outcome indicator used in the consequent analysis of the dose-response function to the length of the participation in the programme.

Secondly, our analysis has revealed a negative income effect, which shows some inverse features to the employment effect. In the later part of the evaluation period, when employment effect grows, the negative income effect deepens. This might be caused by those who participated in the programme in the early stages of their careers, were then, in the later stages of their careers, more willing to accept a job even for a lower wage. Partially irrational reasons can be hidden behind such behaviour, or it might be that participants simply did not lose contact with the working environment, which might press their reservation wage downwards.

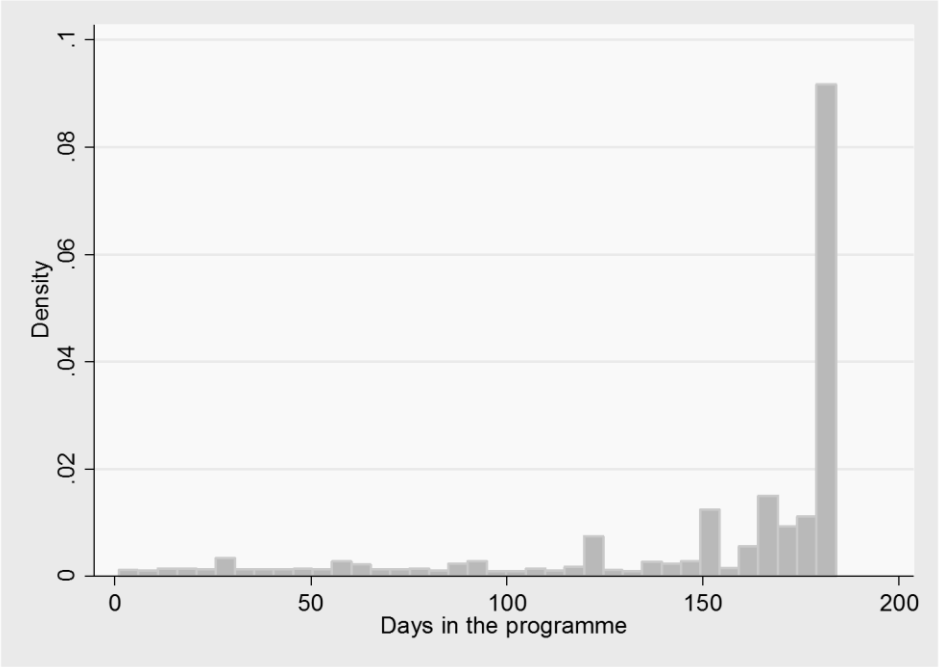
4.3.1 Results of the dose-response function on the length of participation in the programme

When we look at the length of participation in the programme measured in days, we can clearly observe the maximum allowed duration of six months. Each programme participation was based on a three-sided contract between the participant, the employer and the regional COLSAF office. This stimulates a planning moment resulting in signing the contracts under an initial lack of information, for the maximum possible period

of support. Indeed, the dominant part of the programme participation finished after approximately 180 days.

F i g u r e 4.6

Distribution of the durations of programme participations in days



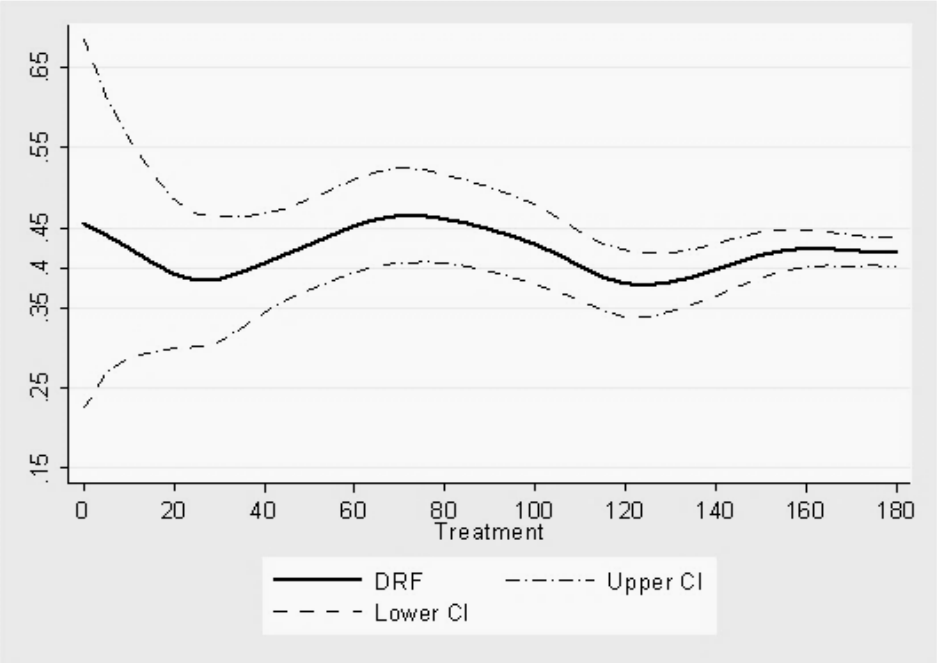
Source: Authors´ calculations using the COLSAF database.

The technique selected here for the estimation of the dose-response function is based on comparing the outcomes of participants with different levels of the treatment, in our case programme participation. The outcome of interest here is the employment effect 54 months after the end of the participation. This outcome provided the most favourable results when evaluating participation in the programme in the form of a binary treatment variable.

Our estimations draw a function with two maxima. An absolute maximum appears in the case of 70 days of programme participation. A local maximum is observable for 160 days of programme participation.

Figure 4.7

The dose-response function for participants in the programme on employment after 54 months



Source: Authors´ calculations using the COLSAF database.

The confidence interval narrows with the increase of treatment because of an increase in the numbers of observations. If we disregard this, a possibly interesting finding would also be the initial, high values of the dose-response function. Often ALMPs use short work environment insertions. Its purpose is to boost the employability of participants and provide an opportunity to prospective employees to try various environments, as well as present various employees to prospective employers. Higher dose-response function values for initial days would speak in favour of such measures. The evidence brought here should not be used in this way because of the low numbers of observations used in the estimation for these initial days, as well as because of possible bias caused by dropouts. We have no information about dropouts in the sense of not fulfilling the originally planned length of participation. Cases when individuals drop out from the programme because of entering regular employment could appear more often at the beginning

of participation. This could cause a bias to the dose-response function, which needs to be kept in mind when interpreting the results.

More relevant, from the perspective of policy making, is the evidence about a flat dose-response function after 160 days of participation. This could support eventual experimenting with moderate shortenings of the length under which TPG is supported.

4.4 Conclusions and policy implications

Training and internship schemes represent a policy tool widely applied across countries in different development stages. Thanks to this fact, a rich empirical base is available for policy assessments. In this research work, we are presenting an impact evaluation of the Traineeship programme for graduates (TPG) in Slovakia in a selected two years of its implementation (2007 and 2008). We also follow the impact for participants for more than five years after their participation in the programme.

Our methodology adopted here represents the current 'golden standard' in impact evaluations, also promoted by the European Commission and supported by the European Research Centre. The possible extension/ improvement through randomised controlled trials (RCTs), for which data is not yet available for Slovak TPG, might not bring additional insights as shown by Card et al. (2015), i.e. that RCTs estimates are not statistically different from estimates obtained via non-random econometric approaches.

Overall we confirm that despite ambiguities in terms of income effect, there are positive long-term effects on participants' employability. Our results are in line with evidence from other impact evaluation studies of similar and relevant training schemes in other countries.

The value added of this study is in providing a picture of long-term development in the impact of the measure. We claim that positive employment gains from TPG participation increase three years after participation. This is mirrored by a worsening in an already negative income effect. Such a drop might be connected with external factors, as the economic crisis was present during the period observed.

Our work and evidence provided by other similar impact evaluations point towards further policy implications as follows. Firstly, the actual setup and implementation of the graduate traineeship programmes might be playing a crucial role in its relative success. Thus, if prolonging or widening scheme coverage, the key programme structure could be fine-tuned but not altered dramatically, with emphasis on supporting structure and those elements which seem to work well with the delivery mechanism.

Secondly, there is systematic evidence that similar schemes are mostly relevant in times of employment downturns. In our case, the evaluation period was during a strong economic expansion and the consequently estimated impact increased during the period of recession and stagnation. Young individuals supported by the TPG in the early stages of their career had better adjusted to the recession than their counterfactuals. Implementation of the scheme also during a period of economic expansion needs adjustments to reflect on this.

Thirdly, as there is evidence that companies perceive some training schemes neutrally or even negatively (though such evidence is based on analysing more complicated, costly and longer training schemes than TPG considered here); communication with companies, especially with SMEs which cannot enter rent seeking behaviour, might lead to improvements on the policy design. In the case of TPG, the dominant part of employers involved are from the public sector. This can partially explain the combination of a positive employment effect with a negative income effect. TPG participants might, in the later stages of their careers, be more willing to enter employment in the public sector, where wages are lower, but job stability is relatively higher (especially during an economic downturn).

In a nutshell, we are suggesting here that short schemes placing young adults in workplaces are likely to produce positive effects on employment. This is especially true in the later stages of the beneficiaries´ careers.

Annex 1

Terminology – programme for graduates: traineeship, internship, or?

§51 Graduate programme aims at providing youth with workplace experience, and as such, sometimes appears in English versions of Slovak research papers and policy reports as ‘Graduate Practice’. The origin of this expression is related to the Slovak origin of the measure’s name ‘Absolventska prax’, i.e. literally practice of graduates. ‘Work/workplace practice of graduates’ describes the intentional content of the ‘Graduate practice’ expression, which, however, is hardly a linguistically correct expression. The descriptive terms of workplace practice of graduates is a confusing term in the context of literature about similar programmes.

The definitions of short workplace related programmes for graduates recognizes i) internship ii) traineeship iii) apprenticeship. Both internship and traineeship definitions to some extent fit the §51 programme structure.

By the character of the Slovak programme based on §51, it places graduates with employers for 3-6 months. As to their activities there, those remain for the employers to decide and may be of a general character. This is in line with internship structure, however, this is typically intended for professionals who are university, i.e. tertiary level graduates. Our scheme was intended for both, but 90% of the participants are secondary school level graduates. Traineeship, on the other hand, is a more, suitable term for the Slovak programme for graduates, even though traineeship might be, in general, often connected with employment position which is not the case of the Slovak scheme. So we opt for Traineeship programme for graduates (TPG) as a translation of “Absolventska prax”.

For illustration, explanation of different schemes available from European job mobility portal EURES:
<https://ec.europa.eu/eures/public/news-articles/-/asset_publisher/L2ZVYxNxK11W/content/traineeship-internship-apprenticeship-which-one-is-for-you-?_101_INSTANCE_L2ZVYxNxK11W_backLabelKey=news.articles.back.to.list&_101_INSTANCE_L2ZVYxNxK11W_showAssetFooter=true>.

Apprenticeships are legally binding and involve a contract. Their duration is clear, as is what will be learned. They make up part of an education, or training programme, combining practical, work-related training in the workplace and theoretical education in class. The European Alliance of Apprenticeships is working to boost the number and quality of apprenticeships across the EU.

Traineeships can be described as ‘work practice'. They give the trainee the chance to log some work experience hours and usually run from a few weeks to six months. There can be a blurred line between a trainee and someone working through their trial period after being hired. This is something that is clarified in the terms of the job contract. Unlike apprenticeships they are not linked to recognised qualifications.

Internships are usually shorter and frequently carried out by people looking for experience before job hunting. Usually internships are reserved for positions in professional fields – a law student may intern at a law firm over the summer. A science student will intern in a laboratory and so on. As with traineeships, these are not linked to recognised qualifications.

5 LIVING OUTSIDE THE LABOUR MARKET: OPTIMISING THE SLOVAK MINIMUM INCOME SCHEME THROUGH MICROSIMULATION

Daniel Gerbery, Tomáš Miklošovič

The term "minimum income scheme" refers to a non-contributory, means-tested programme for people with very low income which aims at preventing material destitution and ensuring a minimum standard of living (Frazer & Marlier, 2016: 6). It is of high relevance for persons staying outside the labour for a long time, as well as for other vulnerable categories because it often represents the single source of income. The design of minimum income scheme in Slovakia, called *Pomoc v hmotnej núdzi*, continues to be a subject of academic and policy debates. The way researchers and policy makers have addressed it is, however, biased. Attention has been almost exclusively paid to disincentives and opportunistic behaviour that minimum income scheme may produce.[41] Looking at a guarantee of the minimum standard of living only in terms of barriers to labour market participation, norm-breaking behaviour and misused public resources leaves aside the core of the programme – its adequacy. Adequacy is, however, a key aspect of social policy interventions. It represents a fundamental expression of social citizenship and contributes to the welfare state legitimacy through reduction of poverty and inequality. Understanding adequacy embedded in minimum income scheme is critical to preserving its orderly functioning. It means creating conditions for an acceptable living standard that ensures participation in society, including decent conditions for a job search.

A contradiction between emphasis on adequacy and disincentives reduction is common to social safety nets across all developed countries. In Slovakia, it takes escalated, very asymmetric form, which can be seen

[41] For the exceptions, see Kusá (2014); Machlica, Žudel & Hidas (2014).

in continuous increase in conditionality of minimum income benefits and neglecting their real values (Gerbery, 2015). This imbalance deteriorates living conditions of vulnerable categories and, in the end, weakens their future employment prospects – by reducing available material and social resources.[42]

Taking into consideration the tone of ongoing debates on minimum income scheme, accompanied by strengthening its workfare design, the paper focuses on the issue of adequacy. The aim is to capture adequacy-related effects of various changes in the minimum income scheme's parameters. We want to show how different policy changes, which relate to level of transfers and eligibility conditions, affect an extent of income inequality, income poverty and poverty gap. Microsimulation and assessment of changes in the parameters of minimum income scheme rely on the tax-benefit microsimulation model EUROMOD. EUROMOD allows for modifying settings of social security programmes and tracing their impacts. The paper offers the first use of EUROMOD for evaluation of changes in the adequacy of minimum income benefits.

The paper begins with an overview of main research findings in relation to minimum income programme and research questions that we formulate on their basis. We then turn attention to methodological and data issues. As a next step, we present and discuss results of four policy changes scenarios. In the final part, we try to feed in the discussions on potential policy reforms.

5.1 The story so far and research questions

In general, the poverty reduction capacity of social protection has decreased markedly in recent years (Cantillon et al, 2015: 6). This applies in particular to the minimum income schemes. Adequacy of minimum income benefits has eroded, partly because the majority of developed countries did not manage to keep benefit levels in line with the general living standard (Van Mechelen & Marchal, 2013: 49). In addition to benefit

[42] Living on inadequate minimum income may mean not only a material deprivation but also a social deprivation, preventing recipients from having access to meaningful social interactions, contacts, networks and activities.

cuts, non-interventions[43] played a crucial role in weakening their poverty reduction capacity. As a result, "even in the most generous settings, the minimum social protection floor is inadequate, in particular for families with children. Today, the minimum income protection is inadequate in providing income levels sufficient to raise households above the EU at-risk-of-poverty threshold (Cantillon et al, 2015: 6)."

Slovakia represents a specific case in this context. Since the capacity of the scheme *Pomoc v hmotnej núdzi* to alleviate poverty has been ignored as an object of public policy for a long time, the adequacy of benefits has remained low. Low adequacy of minimum income benefits has been confirmed several times by using various indicators. According to Kusá (2014: 26), the difference between the total amount of minimum income package and the amount of subsistence minimum, which is believed to represent a socially acceptable minimum standard of living,[44] is very striking, irrespective of household composition. Moreover, this difference persists even after taking into account the child benefits that are granted to households without means-testing. The gap widens when we compare – for various types of households – the total amount of minimum income package and the at-risk-of-poverty threshold, defined as 60% of median equivalent income.

According to the OECD database on income adequacy, in which the net minimum income levels are expressed as a percentage of median household incomes, adequacy of the Slovak minimum income scheme is low in comparison to the majority of the OECD countries. As Table 5.1 shows, the net minimum income amount for single persons represented 27% of median household income in 2014. It reached 28% for couples without children. Families with children are slightly better off: couples with two children (aged 4 and 6) could receive from the minimum income scheme financial resources equal to 29% of median income in 2014. The same applies to lone parents with two children. Similar conclusions can be drawn by using other databases which compare the minimum net incomes

[43] Non-interventions refer here to lack of capacity (resources) or willingness to act in order to adjust social transfers to changing living standard in given society.

[44] All available evidence shows that this assumption is far from a reality.

with some general income benchmark. The CSB-MIP database[45] may serve as an example. Existing differences regarding the level of adequacy stem to a large extent from the different treatment of income benchmark (median incomes vs. poverty thresholds), equivalence scales and housing costs.

Table 5.1

Net minimum income levels as % of median household incomes in 2014

	Slovak Republic	Czech Republic	OECD median	EU median
Single person	27	47	38	32
Married couple	28	44	38	34
Lone parent with two children	29	39	43	39
Married couple with two children	29	42	42	41

Note: Median household incomes were calculated from surveys around 2011 and expressed in current prices. Data account for all relevant cash benefits and take into account the household composition (equivalence scale is the square root of the household size).

Source: OECD Benefit and Wages Statistics.

A criticism of the minimum income scheme does not focus solely on the low level of the social transfers. Other parameters and related processes attract attention too. The differentiation of the benefit amounts according to the composition of household is criticised due to its weak child-sensitivity. It means that the number of children in households is taken into account only to a very limited extent. As we can see in Table 5.2, families with one child are entitled to the same amount of the benefit in material need as those with four children. For families with five or more children, the number of children does not play the role at all. Data in Table 5.2 also point to another problem. The amounts of the benefit in material need have remained unchanged for several years. Despite the fact that there were changes in price levels, as well as in general standard of living. The levels of the allowances (see Table 5.3) haven't been modified for an even longer period. This status quo is an example of the non-intervention as a reason of decreasing the capacity of social transfers to reduce poverty.

[45] Comparative Minimum Income Protection Indicators database at the Herman Deleeck Centre for Social Policy <http://www.centrumvoorsociaalbeleid.be/index.php?q=node/3270>.

Table 5.2

Amounts of benefit in material need (€)

	2009-2013	2014-2016
	Adult person	
No children	60.5	61.6
1-4 children	115.1	117.2
5+ children	168.2	171.2
	Couple	
No children	105.2	107.2
1-4 children	157.6	160.4
5+ children	212.3	216.1

Source: <www.upsvar.sk>.

Table 5.3

Amounts of allowances to benefit in material need between 2009 and 2016 (€)

Protection allowance	63.07
Activation allowance	63.07
Housing allowance – single person	55.80
Housing allowance – more than one person	89.20
Dependent child allowance*	17.20
Special allowance for first six months (introduced in 2014)	126.14
Special allowance for next six months (introduced in 2014)	63.07

***** Allowance for (regular) school attendance till 2013.

Note: Healthcare allowance was cancelled in 2013.

Source: <www.upsvar.sk>.

Low adequacy, low child-sensitivity and lacking regular adjustment makes the optimisation of the minimum income scheme through a microsimulation of reform proposals a relevant policy-related exercise. Modelling the changes is a difficult task, however. The multi-layer structure, consisting of differentiated amounts of basic benefit and several additional allowances with specific requirements, together with quite complex processes of eligibility assessment and calculation of net amounts places high demands on the choice of an object of microsimulation. Emphasising one aspect or relationship carries the risk that interconnections will remain uncovered and will work behind the scene.

Despite the risk of simplification, we focus on the following *three reform proposals*. Firstly, in the lights of existing findings, we analyse

an increase of the amount of benefit in material need. Rather than focusing on allowances, we pay attention to benefit in material need because it is a basic measure which – according to theoretical arguments – should be provided without any additional requirements and at a sufficient level. In order to obtain a better view of its consequences, we examine a series of smaller increases.

Secondly, we look at a reform of the equivalence scale inherent in the sums of benefit in material need. In general terms, an equivalence scale is used to differentiate amounts of benefits (or legal entitlements) according to the composition of households (defined mainly by a number of household members and their age). The differentiation reflects the fact that the needs of a household grow with each additional member but not in the proportional way (due to so-called economies of scale in consumption).[46] We test two new measures: "old OECD equivalence scale" and "modified OECD equivalence scale". The old OECD scale assigns a value of 1 to the first household member, of 0.7 to each additional member, and of 0.5 to each child. The modified OECD equivalence scale assigns a value of 1 to the first household member, of 0.5 to each additional member, and of 0.3 to each child. Both scales increase the weight of a child in household, compared to the existing structure of benefit in material need. The reason for this analytical decision is clear: to quantify consequences of increasing child-sensitivity of benefit in material need which is seen as an inadequate.

Thirdly, we pay attention to the eligibility conditions for granting benefit in material need. The Act on Assistance in Material Need (§ 4) defines a list of incomes or their parts that are not taken into account when considering entitlements to the benefit. The list includes, for example, 25% of earnings from work, 25% of old-age pension, 25% of maternal benefits, total sum of child benefit and childcare allowance, or 25% of activation allowance. Changes in the list could lead to a new distribution of entitlements and, thus, to a modified seize and structure of the population of the minimum income benefit recipients. There are several candidates for microsimulation exercise. Instead of simulating changes in one of

[46] <https://www.oecd.org/eco/.../OECD-Note-EquivalenceScales.pdf>.

the elements listed in the act, we focus on the parental benefit which is not included in the list of incomes. The parental benefit, which is overwhelmingly received by mothers, is paid at a quite low level (203.20 € per month in 2016). If the second income in a household (partner's earning from work or income from social transfers) is low or is missing at all, household face risk of material deprivation and poverty. It could qualify for the assistance in material need but it depends on its composition and total income. Situations may arise where low-income household does not qualify for the minimum income support because its total income exceeds the qualifying threshold by a small amount. It may apply to lone parents with two or three children, families with children where one partner receives parental benefit and another one has lost a job, without entitlement to unemployment benefit. In these cases, it seems to be reasonable to ease access to the minimum income scheme for households balancing above the eligibility threshold by relaxing the eligibility criteria. Concretely, by putting part of parental benefit (50%) on the list of incomes that are not taken into account when assessing eligibility for the benefit in material need.

To sum up, there are three reform proposals we examine using EUROMOD:

- increasing adequacy of benefit in material need,
- increasing child-sensitivity of benefit in material need, and
- facilitating access to the minimum income protection for low-income households receiving the parental benefit.

Methodological and data issues related to the simulation of the three proposals are discussed in the following section.

5.2 Methods and data

Microsimulation of changes in the minimum income scheme requires a series of methodological decisions. All calculations are carried out in EUROMOD. It is a tax-benefit microsimulation model which contains detailed information on settings and parameters of social security schemes and tax systems and enables research on the effects of policies and policy

reforms on incomes, poverty, inequality, social inclusion and work incentives (Sutherland et al, 2008: 4). It can be used for comparative purposes as well as for analyses of a single country. EUROMOD relies on household micro-data from the EU Survey on Income and Living Conditions (hereinafter EU SILC) which include detailed data on incomes and their components. *The basic output from EUROMOD is the micro-level change in household disposable income as a result of changes in cash benefits or taxes.* It enables to compute four main policy-relevant estimates (ibid):

- estimates of aggregate effects on the government budget,
- impact on poverty and inequality,
- differential effects on groups of socioeconomic interest, and
- indicators of work incentives.

In our calculations, we are interested in three types of results. Firstly, we calculate the effects of proposed reforms on the government budget. *Strengthening* reduction capacity of the minimum income scheme requires *increased* financial sources. An idea that it could be achieved without any additional funding (by, for example, pure activation or tightening eligibility criteria) is false. On the other hand, it is necessary to check for the volume of induced additional spending because the budget for the poor cannot rise indefinitely. Our goal is to identify various spending levels at which reasonable outcomes can be achieved.

To capture effects in terms of poverty and inequality we employ several indicators. Gini coefficient and "median to fifth percentile ratio" are used to measure income inequality. The Gini coefficient measures the deviation of the distribution of income among individuals from a perfectly equal distribution. It is based on a comparison of cumulative proportions of the population against cumulative proportions of income they receive. It ranges between 0 (absolute equality) and 1 (absolute inequality). The "median to fifth percentile ratio" compares median income to the level of the fifth percentile of income distribution. This indicator does not capture the nature of entire income distribution but focuses on changing relationship in its bottom part.

For poverty measurement, we use especially the at-risk-of-poverty rate which is a basic measure of income poverty incidence. It is a standard headcount index which measures the proportion of the population living below the poverty threshold, defined as a 60% of median equivalised disposable income. In addition to the at-risk-of-poverty rate which is a basic, standard measure of income poverty incidence, we rely on a broader set of poverty indicators.

The relative median at-risk-of-poverty gap belongs to the group of the EU poverty indicators and expresses the extent to which individuals fall below the poverty line. It is defined as the difference between the median equivalised disposable income of people below the at-risk-of-poverty threshold, and the at-risk-of-poverty threshold expressed as a percentage of the threshold. This measure is expected to capture the so-called poverty gap and its potential changes induced by tested reform proposals.

A useful perspective is offered by indicators belonging to the Foster-Greer-Thorbecke (FGT hereinafter) family of poverty measures. General formula of the FGT index, based on normalised poverty gap, can be written as follows:

$$FGT = \frac{1}{N}\sum_{i=1}^{p}\left(\frac{z - y_i}{z}\right)^{\alpha}$$

where z is poverty threshold, y_i is income of individual *i*, p is a number of people below the poverty threshold, N is a number of people in the country. By substituting different values of parameter α one can obtain different poverty measures. For α = 0, the FGT_0 indicator represents a headcount ratio. For α = 1, the FGT_1 indicator measure poverty gap. For α = 2, the FGT_2 indicator represents a squared poverty gap, sometimes called as poverty severity, which averages the squares of poverty gaps relative to the poverty line. As parameter α can be thought of as a measure of the index's sensitivity to poverty (Haughton & Khandker, 2009: 72), by increasing its value, more weight is given to poorer individuals.

Finally, we use a specific indicator which is not part of commonly used indicators of poverty. The "subsistence minimum gap" indicator relates

to the specific context of the minimum income scheme in Slovakia and represents a system-specific modification of the "relative median at-risk-of-poverty" indicator. It measures a poverty gap among the recipients of the minimum income benefit. The "subsistence minimum gap" is defined as the difference between the median income of people receiving a benefit in material need and the subsistence minimum, expressed as share of the subsistence minimum. We suppose that this measure is more sensitive to the changes in the population of the minimum income benefit recipients induced by the reform proposals we are testing, compared to the standard the relative median at-risk-of-poverty gap.

All mentioned indicators are used in the same way: they identify an extent of inequality and income poverty before and after the reform proposals are applied to the EU SILC survey sample. The effects of the proposals are then interpreted in terms of the differences between values "before" and "after". Such approach suffers from some limitations. It is a static evaluation which doesn't take into account behavioural effects. Behavioural responses to the changing conditions may represent an important factor mediating the move from the initial conditions to their change. However, given the current state of debates in Slovakia, our aim is to draw basic contours for future thinking of more detailed reforms in the field.

In addition to the aggregate effects on the government budget and impact on poverty and inequality, we calculate effects on different relevant groups. We are interested in how the situation of households of various compositions is changing.

Microsimulations rely on the EU SILC data and the concept of disposable equivalent income. Disposable income is obtained from a gross income which is calculated from the following income components (with variable labels in the EU SILC user dataset in brackets)[47]:

- Gross cash or near-cash employee income (PY010G);
- Gross non-cash employee income (PY020G or PY021G);

[47] <http://ec.europa.eu/eurostat/web/income-and-living-conditions/methodology/main-concepts-definitions>.

- Gross cash profits or losses from self-employment (including royalties) (PY050G);
- Pension from individual private plans (PY080G);
- Social benefits, which include unemployment benefits (PY090G), old-age benefits (PY100G), survivors' benefits (PY110G), sickness benefits (PY120G), disability benefits (PY130G) and education-related allowances (PY140G);
- Income from rental of a property or land (HY040G);
- Social benefits, which include family/children-related allowances (HY050G); housing allowances (HY070G) and social exclusion not elsewhere classified (HY060G);
- Regular inter-household cash transfers received (HY080G);
- Interests, dividends, profit from capital investments in unincorporated business (HY090G);
- Income received by people aged under 16 (HY110G).

Disposable income is computed as a total gross income minus tax and social insurance contributions (HY140G), regular taxes on wealth (HY120G), and regular inter-household cash transfers paid (HY090G). The reform proposals are then applied to the distribution of disposable income.

5.3 Microsimulation of reform proposals: results and discussion

The three reform proposals cover different aspects of the minimum income scheme. The first (increase in benefit amounts) and second (changes in equivalence scale) proposals directly relate to the issue of adequacy. The third one says more about accessibility (relaxing eligibility conditions). In the end, it is also a matter of adequacy: in the sense, it contributes to the income levels of low-income families receiving parental benefit. Microsimulation of the proposals is described step by step, beginning with the core issue – an increasing amount of benefit in material need.

5.3.1 Reform proposal no. 1 – an increasing amount of benefit in material need

In order to capture a sensitivity of selected indicators to change, increase in the amount of benefit in material need is examined in a number of steps – by adding small sums (one euro) to the valid amount of the benefit. For the same reasons we also opted for testing a reduction in the amount of benefit in material need. Thus, the interval of new sums ranges from +30 (increasing the amount of the benefit by EUR 30) and -30 (decreasing the amount of the benefit by EUR 30). As a result, we can observe how a number of recipients, expenditures level, the incidence of income poverty and inequality are changing in relation to changing amount of benefit in material need.

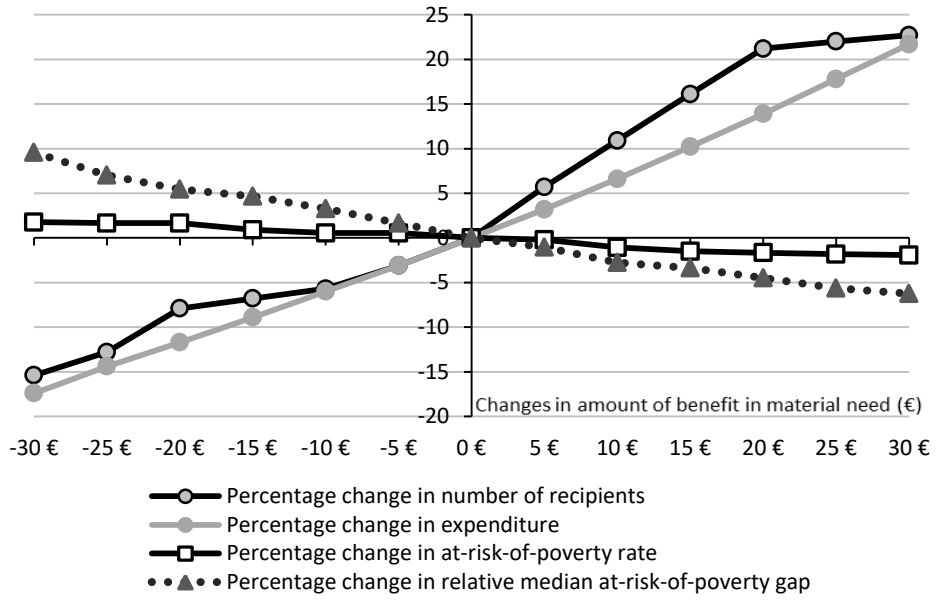
First of all, we look at two macro-characteristics of the minimum income scheme (number of recipients and expenditures on the programme) and two outcome indicators (poverty and poverty gap). Figure 5.1 shows a percentage change in the values of the indicators. The percentage change expresses how the value of the indicator changes if the amount of the benefit is increased by a given sum. We can see that in addition to expected and a natural linear increase in expenditures, raising the level of the benefit is accompanied by growing number of its recipients. Concretely, the increase in the amount of benefit in material need by 15 € leads to the ten percent increase in the expenditure level. Expenditures then represent 15 234 977 € in absolute terms. Increasing the amount by 30 € means that expenditures will grow by more than twenty percent. In this situation expenditures will equal to 16 823 776 €. The growth of recipients is not as linear as growth of expenditures. While adding 5 € to the benefit evokes six percent growth of recipients number and adding 10 € leads to twelve percent growth, increasing the amount of the benefit by more than 20 € brings more slightly growth curve. Thus, the number of the minimum income benefit recipients does not increase at the same pace. A crossing specific point, the growth decelerates.

At the same time, raising the level of the benefit leads to an improvement in terms of poverty. Reduction of income poverty is, however, rather weak. Increase by 5 € means that income poverty will decrease by 0.21%.

Increase by 15 € reduces income poverty by 1.5%. Raising the amount of the benefit by 30 €, accompanied by more than twenty percent growth of expenditures, decreases income poverty approximately by 2%. In this context, Figure 5.1 offers a heuristically important pattern of relationship between percentage growth of expenditures and related reduction of income poverty. The quite low sensitivity of income poverty to higher levels of benefit in material need and higher levels of expenditures on the minimum income scheme relates to the definition of at-risk-of-poverty rate which we use. As the poverty threshold is here defined as 60% of national median (equivalised) income, the at-risk-of-poverty rate is a headcount indicator that takes into account the whole income distribution. Moreover, changes in the bottom part of the income distribution may affect the median income only to a limited extent. In other words, the minimum income scheme helps the most deprived and poor people in society and therefore its increased adequacy may not affect the situation of all people below the at-risk-of-poverty line.

F i g u r e 5.1

Effects of changing amount of benefit in material need (x axis) on percentage change in number of recipients, expenditures, poverty rate and poverty gap (y axis) – total population



Source: Authors, based on EUROMOD.

A more informative picture can be obtained by looking at the so-called depth of income poverty, i.e. poverty gap (the relative median at-risk-of-poverty gap) which expresses a "position" of the average income of poor people in relation to the poverty threshold. As Figure 5.1 shows, reduction of poverty gap is stronger than the reduction of income poverty. It means that investments in the minimum income scheme help poor people to get closer to the poverty line. More investments, more gap is reduced. The increase in the amount of the benefit by 5 € will close the gap by 1%. Increase by 15 € will bring decreasing poverty gap by 3.4%. Raising spending by more than twenty percent – i.e. raising the amount of the benefit by 30 € – will narrow the gap by 6.2%. Thus, taking into account different definitions of these two measures, we can conclude that higher levels of benefit in material need are more effective in reducing poverty gap, compared to income poverty.

Looking at the left side of Figure 5.1 the story goes on in the opposite direction. One fact should be emphasised, however. The changes on the left do not represent mirror images of the changes on the right side. For example, while adding 30 € to benefit in material need leads to increase in expenditures by 21.7%, subtracting 30 € results in reduction of expenditures by 17.4%. Similar applies to the number of recipients and income poverty rate. Percentage change in poverty gap represents a specific case. Lowering of the benefit level results in more significant percentage change in comparison to its increase. It means that with a given amount of the benefit it is easier to widen poverty gap (by subtracting given amount) than to narrow it (by adding given amount).

Changes in the amount of benefit in material need also affect the so-called "subsistence minimum gap", i.e. the distance of median income of the recipients of the benefit from the sums of subsistence minimum. The Subsistence minimum gap is calculated for each of types of households (due to the fact that the minimum subsistence amount relates to household composition). And pace of change in the subsistence minimum gap differ from one composition to another. However, generally – increasing the sums of benefit in material need helps to narrow the minimum subsistence gap.

Up till now, we been describing the effects on income poverty. But what about income inequality? Here, the effects are much more modest,

as Table 5.4 shows. Percentage change in the Gini coefficient, induced by addition or subtraction of amounts, doesn't exceed the value of 0.4%. It is the result of the fact that changes occur in the bottom of the income ladder and the Gini coefficient "works" with whole income distribution. In order to capture a changing position of the bottom part of the income distribution we can employ several indicators. One of them is offered by Table 5.4. The "Median to fifth percentile" ratio measures the distance between median income and income equal to the fifth percentile. The fifth percentile defines a category of poor people at the very bottom of the income distribution. This category comprises 5% of the population with the lowest income. We can see that the changes of the distance between median income and the threshold below which the poorest 5% persons live are more "visible" than changes in values of the Gini coefficient. Increasing the amount of the benefit by 30 € will reduce the ratio by 1.45%. Subtracting the same amount from the benefit would lead to increase in the ratio by 1.45%. We can conclude that changing the sums of the benefit in material need has a stronger effect in terms of income poverty, compared to income inequality. Values of the FGT indicators confirm this fact.

Table 5.4

Effects of changing amounts of benefit in material need on percentage change in inequality and poverty – total population

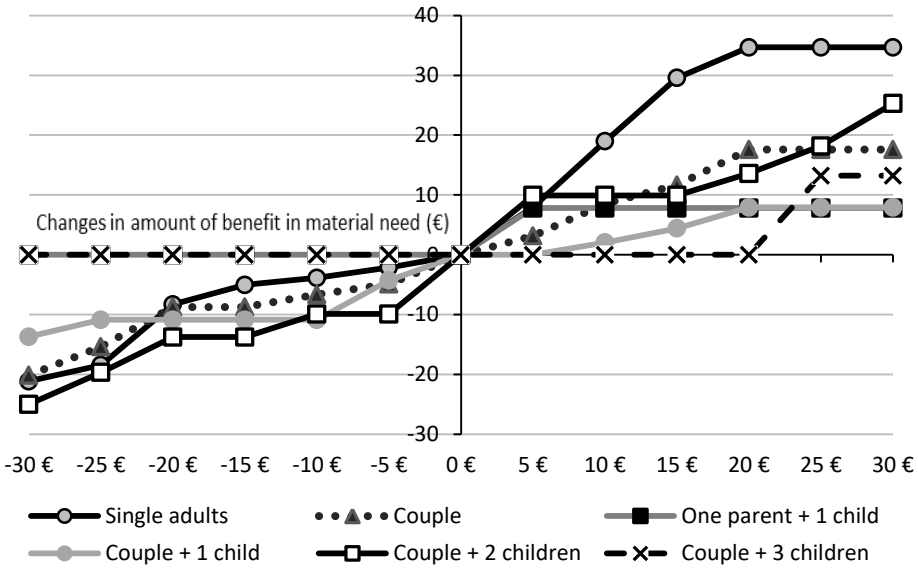
Change in benefit amount	% change in Gini coefficient	% change in "median to fifth percentile" ratio	% change in FGT_0	% change in FGT_1	% change in FGT_2
-30 €	0.29	1.45	6.22	16.54	34.36
-25 €	0.25	1.10	4.21	13.99	28.71
-20 €	0.20	1.10	3.37	11.26	22.93
-15 €	0.15	1.10	1.87	8.49	17.11
-10 €	0.10	0.72	1.87	5.74	11.48
-5 €	0.05	0.00	0.00	2.70	5.35
0 €	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
5 €	-0.05	-0.36	0.00	-2.83	-5.33
10 €	-0.11	-1.10	-0.72	-5.88	-10.92
15 €	-0.17	-1.45	-2.16	-9.21	-16.57
20 €	-0.24	-1.45	-2.53	-12.45	-21.79
25 €	-0.31	-1.45	-5.39	-15.60	-26.77
30 €	-0.38	-1.45	-9.40	-18.55	-31.48

Source: Authors, based on EUROMOD.

The population of the minimum income scheme beneficiaries consists of various types of households which differ by their composition. Our hypothesis is that effects of changes in the amount of the benefit differ for different household constellations. One important example of such heterogeneity is represented by effects on numbers of recipients. Figure 5.2 shows that various household types have a different sensitivity to changes in the amount of the benefit when we look at their numbers. To begin with, the number of large families (couple with three or more children) seems to have very low sensitivity with respect to changing sums of benefit in material need. The number of recipients starts to grow only if the increase in the benefit amount exceeds 20 €. The decrease of the amount does not induce any change in the number of large families.

F i g u r e 5.2

Effects of changing amounts of benefit in material need on percentage change in number of recipients – different household types



Source: Authors, based on EUROMOD.

The similar is true for one parent families. The difference between large families and one parent families is that the number of one parent families shows a higher degree of responsiveness to the "initial" increase

in the amount of the benefit. Then, however, the trajectory remains flat. It is interesting that both large families and families with one parent show no responsiveness to a decrease of the benefit amount. It means that any reduction of the benefit level (within given interval) doesn't induce decline of the number of beneficiaries in this two categories. In order to explain this trend we need to sketch a mechanism which operates behind the scene: how does decrease of benefit in material need translate into decrease of the number of recipients? The amount of benefit in material need, which is paid to recipient, is calculated as a difference between the sum of all legally defined entitlements (sum of legally defined benefit and allowances depending on household composition, age, ability to participate in activation works, etc.) and disposable household income. If the level of benefit in material need will decrease, the sum of theoretical entitlements will decrease as well. Result is, ceteris paribus, a reduced difference between the sum of entitlements and disposable income. This difference may become so small for some households that they don't receive any benefit in material need at all.

It is obvious that this mechanism doesn't work in case of large and one parent families. It is reasonable to suppose that this is due to their very vulnerable conditions of these households. Households with three or more children and one parent households are at the highest risk of poverty and material deprivation in Slovakia. When household income is very low or is lacking at all, the decrease of the benefit's amount doesn't induce the mechanism we have described above (the difference between the sum of legal entitlements and disposable income is still sufficient to receive benefit in material need).

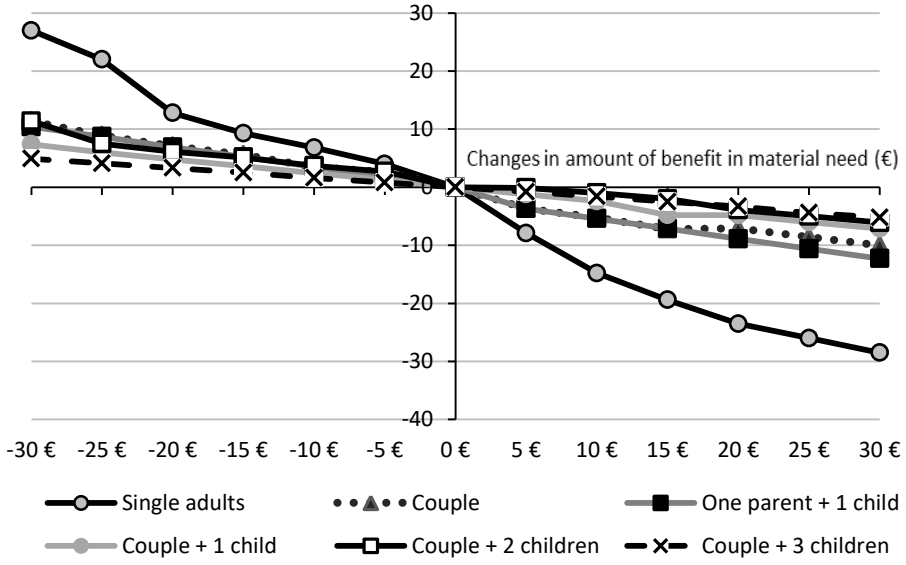
Quite a high responsiveness to changes in the amount of the benefit can be found among single adults. They show the steepest growth in the number of recipients as result of increase in the benefit amount. If the amount increases by 20 €, the number of single adults receiving benefit in material will increase by 35%. Couples with two children and childless couples also show a higher sensitivity to changes in the benefit, especially for more significant changes of the amount (increase or decrease by more than 15 €).

Household composition is an important mediating factor also in relation to income poverty and income poverty gap. While almost all types

of households show quite uniform trajectory of percentage changes in poverty gap, there is one exemption, as Figure 5.3 indicates. Single adults respond to changes in the amount of benefit in material need in a specific way. Raising the level of the benefit leads to a more significant reduction of poverty gap. It is noteworthy that only small increases are sufficient to induce stronger reduction of poverty gap: adding 5 € to the benefit reduces poverty gap by nearly ten percent, adding 10 € is translated into reduction by app. 15%. Specific position of single adult households is also confirmed by the steeper trajectory of percentage change due to the decrease of the level of benefit in material need.

Figure 5.3

Effects of changing amounts of benefit in material need on percentage change in relative median at-risk-of-poverty gap – different household types



Source: Authors, based on EUROMOD.

5.3.2 Reform proposal no. 2 – changing equivalence scale

An ability of equivalence scale to structure adequately the sums of benefit in material need according to composition of household is a key feature of the minimum income scheme. The need for reform of the equivalence scale, that is inherent in the sums of benefit in material need,

derives from its very low sensitivity to number of children in household. There are at least four equivalence scales, details of which are described in Table 5.5.[48] The differences are captured by so-called scale elasticity which refers to the power by which benefit amounts (households' needs) change with household size and composition. The highest elasticity is inherent in the "old OECD equivalence scale" which assigns a value of 1 to the first household member, of 0.7 to each additional member, and of 0.5 to each child. The second highest equivalence scale is incorporated in the "modified OECD equivalence scale" which assigns a value of 1 to the first household member, of 0.5 to each additional member, and of 0.3 to each child. The so-called "square root equivalence scale" is based on simple elasticity: amount of income (household income, amount of benefit) is divided by the square root of household size. Such a scale doesn't take into consideration the age of household members and their different needs. Per capita income is an example of very simple, intuitive scale which plays the role of benchmark in the table. Our microsimulation focuses on implementation of two scales: "old OECD equivalence scale" and "modified OECD equivalence scale". The scales have the highest elasticity and belong to the most used scales.

Table 5.5

Equivalence scales and corresponding elasticities

	Old OECD scale	Modified OECD scale	Square root scale	Per capita income
1 adult	1	1	1	1
2 adults	1.7	1.5	1.4	2
2 adults, 1 child	2.2	1.8	1.7	3
2 adults, 2 children	2.7	2.1	2.0	4
2 adults, 3 children	3.2	2.4	2.2	5
Elasticity	0.73	0.53	0.50	1

Note: Equivalence elasticity refers to the power by which economic needs change with household size. The equivalence elasticity ranges from 0 (when unadjusted household income is taken as the income measure) to 1 (when per capita household income is used). The smaller the values of this elasticity, the higher the economies of scale in consumption.

Source: Forster & d'Ercole (2012: 33).

[48] For more detailed comparison see, for example, Cahnfreau & Burchardt (2008).

We suppose that an introduction of new scales affects parameters of the minimum income scheme (number of recipients and level of expenditures), as well as incidence and depth of income poverty. In general, changes in differentiation of sums of benefit in material need lead to decline in population of benefit recipients and expenditures level. Introducing the old OECD scale would mean decrease of the number of recipients by 25%. Expenditures would decline by 13%. Application of the modified OECD equivalence scales to the sums of benefit in material need would lead to larger savings: the number of recipients would decrease by 30%, expenditures would decrease by 22%. These reductions are at the expense of childless households and households with smaller number of children.

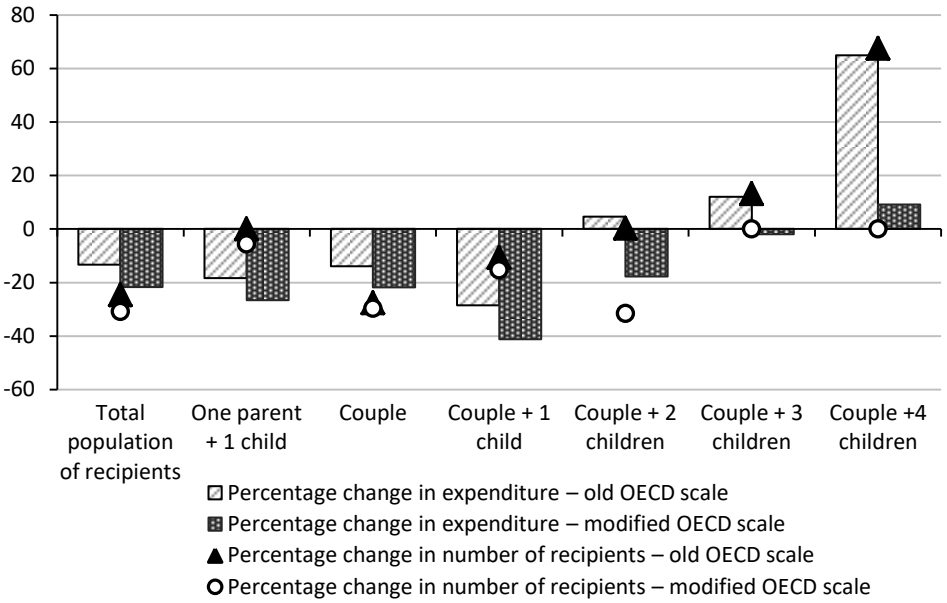
Looking at the effects on different household constellations, we can see some similarities and differences. First of all, both equivalence scales has the strongest impact on the number of recipients among childless couples. If the old OECD scale is implemented, the number of childless couples would decrease by 28%, in case of the modified OECD scale it would decrease by 30%. In other respects the scales differ markedly. As expected, they differ in their impacts on the number of recipients among households with two and more children. It is due to the differences in values which they assigned to child.[49] The old OECD scale would significantly increase the number of households with three children (by 13%) and, especially, the number of household with four children (by 68%). In this context it should be noted that the absolute numbers of these households are low. Thus, the increase expressed in percentage terms should be interpreted with caution. The modified OECD scale has not such an impact on the number of households with several children. The scales also differ in their effects on the number of couples with two children: while the old OECD scale would maintain the status quo, the modified OECD scale would reduce their representation by one 32%.

[49] Weight assigned to a child affects the total amount of benefit in material need. Changes in the total amount of benefit in material need may affect the number of recipients because the total sum of entitlements is modified. One explanation of the relationship (mechanism) has been described earlier in the text.

In relation to the budget requirements, the modified OECD scale would lead to more savings. Households with four children represent the only type of household for which the increase in expenditures is expected (if the modified OECD scale is applied). In line with the findings, the old OECD scale would lead to increase in expenditures for households with two or more children.

F i g u r e 5.4

Effects of implementing new equivalence scales to sums of benefit in material need – percentage change in number of recipients and level of expenditures



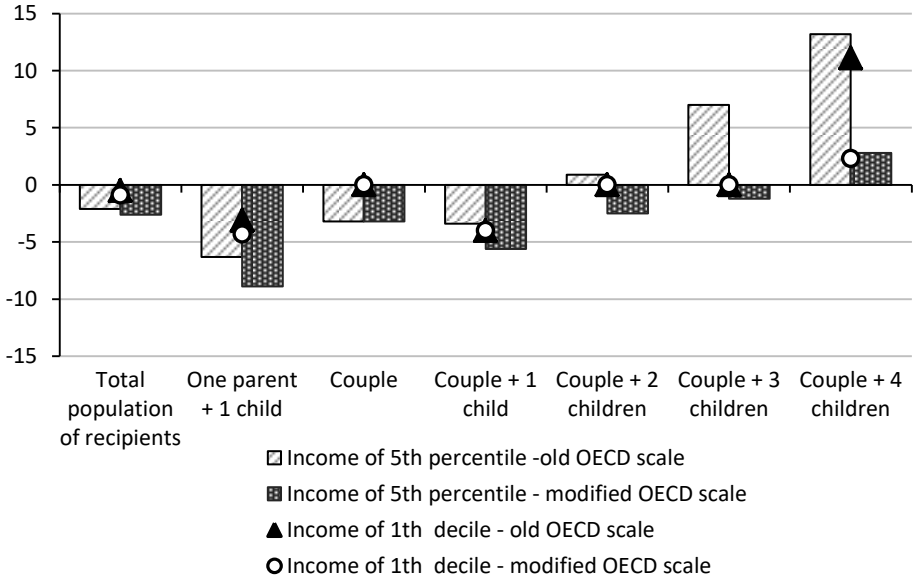
Source: Authors, based on EUROMOD.

Changing differentiation of the sums of benefit in material need is expected to change income situation in the bottom of income ladder. In addition, together with changing structure of recipients is expected to change the extent and profile of poverty. Effects on incomes are shown in Figure 5.5. Instead of interpreting changes in the average incomes we, firstly, pay attention to lower strata of income distribution, namely to the 1st income decile and 5th income percentile. We want to know whether income situation of low-income households will improve or not.

Application of the old OECD equivalence scale to the sums of benefit in material need leads to very small changes in the first decile (decrease by 0.5%) and the fifth percentile (decrease by 2%). Similarly, using the modified scale the income in first decile decreases by 1% and in the fifth percentile by 2.6%. The extent and direction of change in incomes depends on type of household. The most significant decrease can be found among one parent families with one child. Here, the income level in the fifth percentile drops by 6 (with the old OECD scale) or, respectively, by 9 percent (with the modified OECD scale). On the other hand, using the old OECD scale the income of households with three and four children in the fifth percentile improves markedly. Implementation of the modified OECD scale would improve their situation to a lesser extent.

F i g u r e 5.5

Effects of implementing new equivalence scales to sums of benefit in material need – percentage change in income in 1st decile and 5th percentile



Source: Authors, based on EUROMOD.

What about effects on poverty? At general level, the use of the two equivalence scales – accompanied by savings in financial resources – induces a slight deterioration of income conditions, as Table 5.6 shows.

The at-risk-of-poverty rate would increases by 1.3% or 2.9%. The relative median at-risk-of-poverty gap would jump by 4.7% or 12.9% respectively. There are marked increase in poverty and poverty gap for couples and couples with one child. Poverty gap of households with one parent and child would soar dramatically. Positive development would occur only among couple with two and more children under the condition that the old OECD scale is used. In this case, the poverty rate would fall by 12% and poverty gap would narrow by 18%.

T a b l e 5.6

Effects of implementing new equivalence scales to sums of benefit in material need – percentage change in poverty and poverty gap

	Old OECD equivalence scale		**Modified OECD equivalence scale**	
	% change in income poverty	*% change in poverty gap*	*% change in income poverty*	*% change in poverty gap*
Total population	1.3	4.7	2.9	12.9
One parent and child	n.a.	162.3	n.a.	229.6
Couple	13.4	14.3	15.3	15.9
Couple and child	14.2	12.8	17.1	20.8
Couple and two children	-4.6	-3.9	0.0	1.2
Couple and three children	-11.7	-18.1	0.0	2.9

Note: Microsimulation results for poverty rate among households of one parent with child couldn't be calculated. Households of two parents and four children are not included in the table due to the same reason.

Source: Authors, based on EUROMOD.

Effort to examine the use of new equivalence scales was driven by the fact that existing structure of the sums of benefit in material need is insufficient. Low sensitivity to the number of household members and, especially, to the number of children is striking. But the equivalence scales we tested seem not to be appropriate candidates for the reforms. They are widely used in the comparative analyses of poverty and income distribution, but their use as a structuring baseline for differentiation of the minimum income sums have some limits. They include absence of general positive trend and deterioration of conditions of several categories of households.

5.3.3 Reform proposal no. 3 – facilitating an access to the minimum income scheme for households receiving parental benefit

The third reform proposal focuses on increase of disposable income for households that receive parental benefit. The idea is to include part of the parental benefit amount (50%) to the list of incomes that are not taken into account when the eligibility of claimants is assessed. This step is expected to ease an access of low income recipients of parental benefits to the minimum income scheme.

We can see in Figure 5.6 that it would lead to the four percent growth in the number of recipients and to the six percent increase in the level of expenditures. How does it work? Income situation in the bottom parts of income distribution remains more or less unchanged. The 1st decile shows increase by 0.2% only, income in the fifth percentile doesn't change at all. Income poverty rate and poverty gap decrease by less than one percent.

T a b l e 5.7

Effects of facilitating access to the minimum income scheme for households receiving parental benefit – percentage change in incomes in the 1st decile and 5th percentile

	% change in income in the 1st decile	% change in income in the 5th percentile
Total population	0.2	0.0
One parent and child	6.7	0.0
Couple and child	2.2	2.1
Couple and two children	0.0	5.5
Couple and three children	0.0	11.7

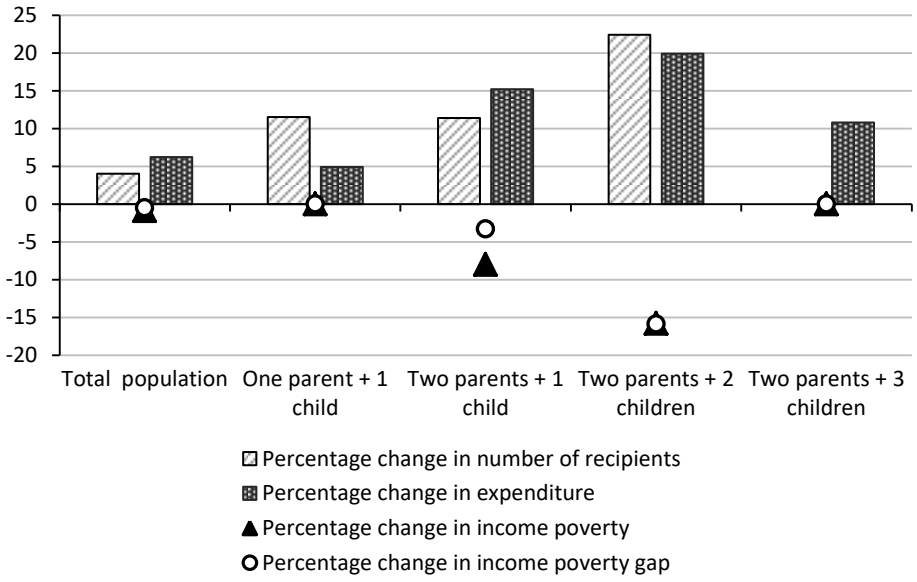
Source: Authors, based on EUROMOD.

There are some groups, however, where the situation appears to be improving. Couples with two and three children would benefit from the reform in the form of increased income in the fifth percentile. But more confused picture emerges when it comes to income poverty and poverty gap. While poverty rate and poverty gap among households of two parents and three children remain unaffected, the position of households of two parents and two children improve significantly. A marked reduction

in poverty and poverty gap among one parent families with child can be attributed to increasing income in the first decile. On the other hand one parent households with very low income (in the fifth percentile) don't benefit from the change.

Figure 5.6

Effects of facilitating access to the minimum income scheme for households receiving parental benefit – percentage change in number of recipients, expenditures, poverty and poverty gap



Source: Authors, based on EUROMOD.

5.4 Conclusion

The minimum income scheme represent a residual social safety net which retains its design for more than decade. During this period several parameters of the scheme as well as its outcomes have become an object of strong criticism. Our chapter is based on the assumption that the minimum income scheme was seen mainly as a source of disincentives, moral hazard, opportunistic behaviour and disuse. As result, existing analyses and policy reforms paid attention especially to those mechanisms in the scheme which were expected to strengthen motivation to leave the system and enter the labour market. The idea that the minimum income scheme

should guarantee some kind of generally acceptable – although minimal – level of living was left out of account by policy makers and the most of public policy analysts. Our paper starts with these imbalance and focuses on microsimulation of changes in the minimum income scheme which could affect its adequacy.

Three reform proposals were examined by the tax-benefit microsimulation model EUROMOD: changes in the sums of benefit in material need, changes in the equivalence scale inherent in the amounts of benefit in material needs, and facilitating access to the minimum income scheme for low-income recipients of parental benefit. Microsimulation of changes in the minimum income scheme has led to several important findings that can help to feed in discussions on its future reform.

First of all, raising the level of expenditures and the number of recipients as result of increase in the amount of the benefit is not offset by very positive trends in income poverty and poverty gap. Reduction of income poverty is rather weak. Increase by 5 € means that income poverty will decrease by 0.21%. Increase by 15 € reduces income poverty by 1.5%. Raising the amount of the benefit by 30 €, accompanied by more than twenty percent growth of expenditures, decreases income poverty approximately by 2%. As we mentioned in the text, it can be attributed to the conceptual basis of the indicators we use. A stronger effects can be identified in relation to poverty gap. We have showed that investments in the minimum income scheme help poor people to get closer to the poverty line. Thus, higher levels of benefit in material need are more effective in reducing poverty gap, compared to income poverty. Similar argument holds true for so-called minimum subsistence gap which expresses a distance between median income of recipients and the subsistence minimum sums. On the other hand effects on income inequality are much more modest.

We have confirmed the hypothesis that responsiveness to changes in the amount of the benefit differ according to the household composition. Low sensitivity can be found among large families and one parent families. High sensitivity was confirmed in relation to single adults, couples with two children and childless couples. The composition of household

plays also an important role in mediating effects of changes in the sums on poverty gap.

The second reform proposal focuses on the use of new equivalence scales. As we have showed, the two candidates we selected for the study – the old OECD equivalence scale and the modified OECD scale – are not very appropriate for the reform of the sums differentiation. Their application doesn't lead to significant improvements with regards to poverty, poverty gap, subsistence minimum gap or income inequality.

Finally, allowing recipients of parental benefit to claim for benefit in material need by reducing their disposable income gives also relatively mixed results. We don't obtained evidence that such step would help low-income recipients of parental benefit. On the other hand, the microsimulation shows that there are some specific sub-groups (defined by household composition) which can benefit from this reform.

To sum up, we strongly recommend to begin discussion on increasing the sums of benefit in material need. Effects will depend on the pace of increasing and other parameters, but there is an evidence that it will help. We recommend also reform of inherent equivalence scale, but its alternation should be selected carefully. The old OECD equivalence scale seems to be a better candidate for the starting point where the discussions should start. Finally, existing characteristics of the minimum income scheme makes the position of low income parents very vulnerable. It is necessary to search for specific strategies which would help them to reduce depth of poverty and deprivation. Introducing parental benefit to the list of incomes that are not taken into consideration when assessing eligibility seems to bring unclear results.

Our results require a few other final remarks. As we have already mentioned, the minimum income scheme has a multilayer structure which contains a complex system of interdependencies. It is therefore difficult to disentangle underlying interactions and processes. In addition, there is no one, basic – socially accepted – minimum level[50] which could serve as an administrative (absolute) poverty line. To have such line would be useful

[50] Differentiated according to composition of household.

for the evaluation purposes. The subsistence minimum serves as an eligibility criterion (threshold). It doesn't, however, play any role in determining the amount of the benefit. The amount is defined as a difference between total amount of entitlements and actual income. Total amount of entitlements include the benefit plus all allowances for which eligibility conditions were met. In this context, evaluation of potential reforms of the minimum income scheme is quite complicated task which is prone to simplification-related errors. We suppose that simpler design would significantly contribute to the fulfilment of its basic functions and possibilities to evaluate its results.

Finally, our thoughts are framed by the idea of adequacy. In this context, a misunderstanding can arise because analysis of low levels of social transfers is usually related to the term of generosity. The two notions differ. While generosity refers to low or high level of social transfers, adequacy refers to the use of certain commonly accepted benchmark, criterion (which has its own content validity). This criterion is then basis for assessing adequacy. Our aim is to show the functioning of the minimum income level in terms of adequacy – i.e. to compare its outputs and outcomes with existing standards. As we use the at-risk-of-poverty line and (to lesser extent) the subsistence minimum, we talk about adequacy.

6 IN-WORK POVERTY: THE PERSPECTIVE OF SLOVAKIA AND CENTRAL EUROPE

Pavol Baboš

Soon after eight Eastern European countries joined the European Union in 2004, two more followed and today there are eleven post-communist states in the EU. As these countries continuously integrated into the Union, the interest of economists, sociologists, and other social scientists in these countries also grew. However, research on in-work poverty focusing on Central Eastern Europe (CEE) remains rather scarce.

During the communist party rule, up until 1989, measuring poverty and examining it in a scientific way was nearly, if not completely, impossible (Džambazovič & Gerbery, 2004). During the 1990s, poverty studies emerged and there were several case studies based on one-time surveys. However, there was a lack of systematic collection of internationally comparable data in Central Eastern Europe. Additionally, before 1989, the economies of Central Eastern Europe were heavily oriented towards industry and manufacturing and many of them only finished the economic transition in the late 1990s. This is noteworthy as in-work poverty is rather a "post-industrial phenomenon, linked first and foremost to the growth of low-paid insecure employment in the service sector" (Marx & Nolan, 2012, p. 9).

Accession of the CEE states' to the European Union forced authorities to focus attention on data collection. The launch of the EU Study on Income and Living Conditions (SILC) allowed researchers to systematically study poverty-related issues in the region, including a comparison to Western Europe. However, while the number of publications on general poverty (including material deprivation) in CEE has grown, in-work poverty seemed to be under the radar.

This chapter has two main goals. First, it attempts to bring a compact picture of in-work poverty (IWP) in Slovakia, along with an overview

of the IWP mobility. Second, this chapter provides a more detailed description of the situation in Central Eastern Europe. In the second section, devoted to the CEE region, we also examine the development and possible impact of selected institutional and policy arrangements on IWP. However, it is important to note at the beginning, that this chapter does not provide a detailed econometric analysis that would calculate the impact of institutions and policies on the IWP rates in a precise way. Before we proceed any further, it is important to clarify the key terms, so that readers who have not read previous chapters know what is meant by terms like in-work poverty, at-risk-of-poverty and similar terms.

6.1 Mechanisms of becoming the working poor

We accept a common definition of in-work poverty as the status of a person in a paid job, living in a poor household. A household is below the poverty threshold if its equivalised income falls below 60% of the national median income. This is a broadly accepted definition in the EU and its official documents.

Generally, there are two broad, obvious reasons why a working person's household might be below the poverty threshold. The first reason relates to income. Either a working member (or members) of the household earns too little, or one (or more) of the working members lose their income. The second set of reasons for a working person to find himself/herself in a poor household, relates to the composition of the household.

We will show that there are some differences in the IWP level among CEE countries, and that these are more profound between countries than over time. In order to explain these differences, it is necessary to understand the basic mechanisms of becoming a member of the working poor. Additionally, states usually set up various policies to get working people above the poverty line. We will look at the selected policies as well.

Although most of these mechanisms and institutions are explained in a rather detailed way elsewhere (Andreß & Lohmann, 2008; Fraser, Gutiérrez & Peña-Casas, 2011; Marx & Nolan, 2012), we will also very briefly review them for two reasons. First, the reader of this chapter

should be able to understand it without the need to read other sources. Second, these mechanisms point us to the most important policies and institutions to review in this chapter.

Modern welfare states, including Central Eastern European ones, developed various public schemes (family policies, labour market policies, tax policies or social policies) to compensate for the loss of income and/or a person's smooth return to the labour market. Standard examples are unemployment benefits and family benefits schemes that are designed to replace the loss of income and thus increase the overall household income. In the empirical section below, we will describe the most important of them, such as: expenditures on unemployment benefits, strength of trade unions, and minimum wage.

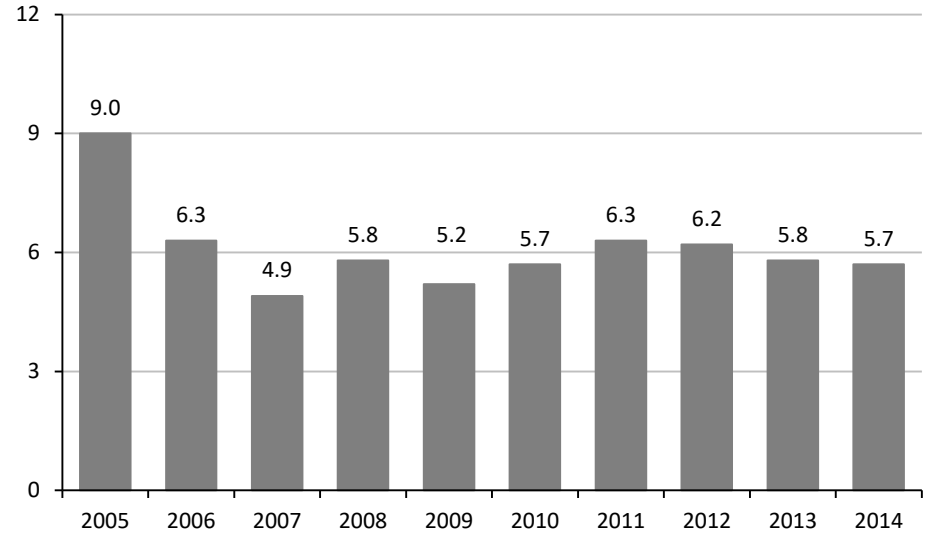
6.2 In-work poverty in Slovakia

The in-work poverty level in Slovakia has recently been rather stable. The earliest available data provided by Eurostat is from 2005, which is the only year the IWP level considerably exceeded the figure of 6% and reached 9%. However, the next year (2006) it dropped to 6.3% and has been fluctuating around this level since then. The latest figure available at the time of writing showed the IWP level at 5.7% (in 2014). Figure 6.1 documents the IWP development between 2005 and 2014. In comparison to other European countries, this figure is relatively low. A detailed comparison with Central Eastern Europe follows the Slovak case description.

In the next step we examined to what extent there is mobility into and out of working poor status. We used the 2011-2014 Slovakian longitudinal dataset of the Statistics on Income and Living Conditions (EU-SILC). Table 6.1 shows the number and relative frequencies of people according to their IWP status. Table 6.1 shows mobility between the years of 2013 and 2014 for all economically active respondents surveyed in both years.

Figure 6.1

In-work Poverty Level in Slovakia



Source: Eurostat (2016).

Table 6.1

Mobility into and out of In-work poverty between 2013 and 2014

	Non-poor 2013	Poor 2013	Total
Non-poor 2014	4,119	148	4,267
% overall	*91.45*	*3.29*	*94.74*
Poor 2014	119	118	237
% overall	*2.64*	*2.62*	*5.26*
Total	4,238	266	4,504
% overall	*94.09*	*5.91*	*100.00*

Source: EU-SILC (2014), author's calculations.

Altogether, 91.45% of the working population remained out of poverty in both years. On the other hand, there were 2.62% of working people who were under the poverty threshold in 2013 and remained in the same category in 2014. Slightly more, 3.29% of the working population was poor in 2013 and managed to get out of poverty in 2014, while 2.64% of working adults were not poor in 2013, but fell into poverty in 2014. These

findings suggest that, at least between 2013 and 2014, the mobility into and out of IWP was rather high, as less than a third of people stricken by IWP remained under the threshold for both years.

To get a clearer picture of how persistent the IWP is once a person falls below the threshold, we investigated the mobility pattern between 2011 and 2014. This analysis takes into account only those respondents included in the survey the entire period, and who worked for the entire period. In other words, we only examined the working population present in the survey for all four years. Table 6.2 shows the pattern. Each line presents a combination of the poor and non-poor status the respondents had in the corresponding year. The last two columns show the number and frequency of people who experienced the combination.

Table 6.2

Mobility pattern for IWP between 2011 and 2014

2011	2012	2013	2014	N (1,306)	%
N	N	N	N	1,162	88.97
P	N	N	N	17	1.30
N	P	N	N	31	2.37
N	N	P	N	18	1.38
N	N	N	P	15	1.15
P	P	N	N	5	0.38
P	N	P	N	6	0.46
P	N	N	P	5	0.38
N	P	P	N	3	0.23
N	P	N	P	6	0.46
N	N	P	P	6	0.46
N	P	P	P	5	0.38
P	N	P	P	2	0.15
P	P	N	P	4	0.31
P	P	P	N	4	0.31
P	P	P	P	17	1.30

Source: EU-SILC, author's calculation.

Again we see that almost 89% of the working population did not fall below the AROP threshold. In addition to this, most people who experienced the IWP did so only once during the 4 year period. Table 6.3 summarises the IWP duration for the same sample.

Table 6.3

IWP Duration between 2011 and 2014

No of years IWP	N	%
0	1 162	88.97
1	81	6.20
2	31	2.37
3	15	1.15
4	17	1.30

Source: EU-SILC, author's calculation.

In the course of 4 years, in-work poverty became a reality for more than 11% of the working population, out of which 6.2% experienced it only once. On the other hand, 1.3% of the working population remained below the AROP threshold for the entire period of four years.

Before proceeding with the comparison of Slovakia to other CEE countries, it is necessary to state that the calculations above are to some extent an 'optimistic' reflection of reality. This is because it takes into account only people who were in a paid job for the entire time. Many cases of IWP are excluded if the exit from IWP was to another status combining poverty and non-activity. Therefore, the figures in Table 6.2 and Table 6.3 should be seen as conservative estimates.

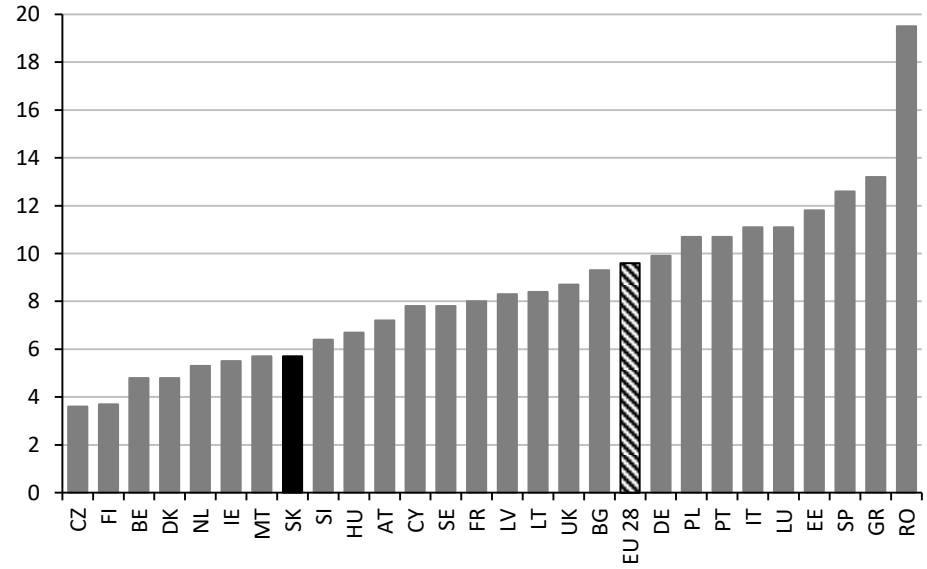
6.3 In-work poverty development in Central Eastern Europe

When starting the comparison of countries, one of the first questions that comes to mind is what in-work poverty looks like in Central Eastern Europe, especially when compared to its Western partners in the Union. Despite the fact that Central Eastern Europe is often presented as a single bloc of countries in welfare and political-economic academic literature (Amable, 2003; Kogan, Goebel & Noelke, 2008), it is certainly not the case when looking at in-work poverty. Figure 6.2 presents the level of in-work at-risk-of-poverty rates in the EU as of 2014. New Member States have slightly higher in-work poverty rates than Old Member States. As for individual countries, Romania has the highest IW AROP rate in the European

Union, exceeding 19%, with Greece (13.2%) and Spain (12.6%) following. On the other end of the ranking, the Czech Republic is the best performer with 3.6%, followed by Finland (3.7%) and Belgium (4.8%).

F i g u r e 6.2

In-work at-risk-of-poverty rate, full-time workers aged 18-64, 2014



Source: Eurostat (2016).

In addition to a static picture of in-work poverty in 2014, we also present an overview of the IWP rates of development over time. Figure 6.3 shows the IWP rates of development in Central Eastern Europe from 2005 to 2014, the most recent which was available at the time of writing.

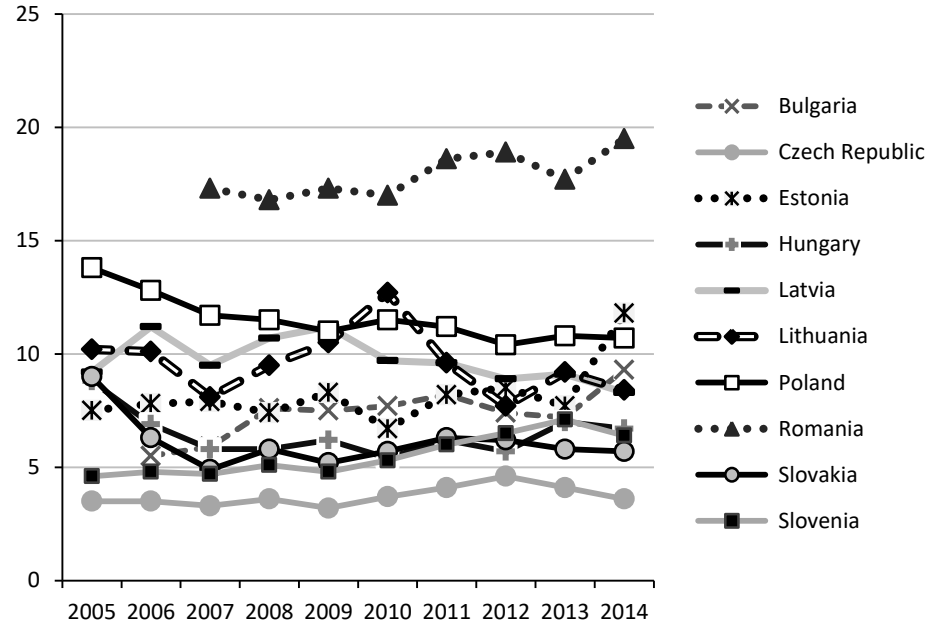
The New Member States can be divided into three groups. The first group is represented by Slovakia, Poland, Hungary and Lithuania, countries that managed to decrease the IWP rates since 2014 (despite a slight upswing in Lithuania in 2010). The second group consists of Slovenia, Bulgaria, Romania and Estonia, four states where the IWP rate increased. Finally, in Latvia and the Czech Republic, the level of in-work poverty is almost the same (within 1 p.p.) as in 2005.

Taking a closer look at individual cases, we could argue that the stability is greater than just 2 out of 10 countries. Estonia and Romania kept its

IWP rates in a rather narrow band except for the last year observed. On the other hand, in the case of Slovakia and Poland one can talk about a drop in the IWP rates only in 2005-2007, and then the level of in-work poverty remains rather stable. Therefore, it is fair to argue that the overall picture of IWP in Central Eastern Europe is relatively static over time. One can see a slight upward shift in Latvia and Bulgaria, but there is hardly any sharp change during, or after, the economic crisis of 2008-2009.

Figure 6.3

Development of In-work At-risk-of-poverty rates in Central Eastern Europe, as % of the total working population



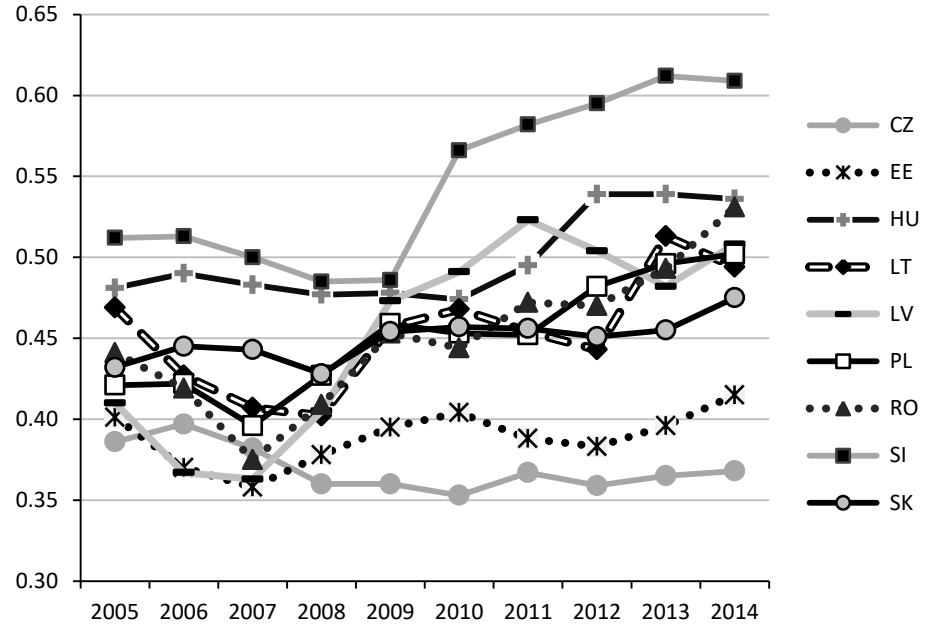
Source: Eurostat (2016).

6.4 Explaining new Europe's differences

We selected several factors that are considered the most important in the fight against in-work poverty. Those are the strength of trade unions, the minimum wage, and unemployment benefits. This section describes the development of selected indicators, corresponding to the given factors, since 2005.

F i g u r e 6.4

Development of Minimum Wages, as share of national average



Source: OECD (2016).

Minimum wage is considered to be one of the most important factors affecting the IWP rates, as it directly influences the income of low-skilled, low-paid workers. Figure 6.4 presents the development of minimum wage in Central Eastern Europe between 2005 and 2014, as a share of national median wage. We selected national median wage instead of average, because median wage is also used to calculate poverty status (for nominal minimum wages in euros see Table 6.4).

The minimum wage levels in selected countries varied between 39% (the Czech Republic) and 51% (Slovenia) of median wage in 2005. Differences among countries increased in ten years to 2015. Slovenia maintained its position as the country with the highest minimum wage, at the level of 61% of the national median wage. The Czech Republic also kept its position at the bottom, with a minimum wage of 37% of the national median. Generally, most of the countries show a rather stable development of their minimum wages. Apart from Slovenia, only Poland

presents a case of notable minimum wage increase, from 42% in 2005 to 50% in 2015.

Table 6.4

Overview of minimum wages in ten New Member States, in euros, 2005-2015

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BG	77	82	92	112	123	123	123	138	159	174	184
CZ	263	278	293	293	293	293	293	293	293	312	337
EE	128	128	128	128	128	128	278	290	320	355	390
HU	184	202	211	223	231	237	252	300	316	327	339
LV	114	128	171	228	256	256	285	285	285	320	360
LT	145	159	203	232	232	232	232	232	290	290	300
PL	203	215	224	269	305	315	331	359	382	402	418
RO	70	74	88	112	135	135	151	157	157	191	219
SK	216	229	252	269	296	308	317	327	338	352	380
SI	490	512	522	539	589	597	748	763	784	789	791

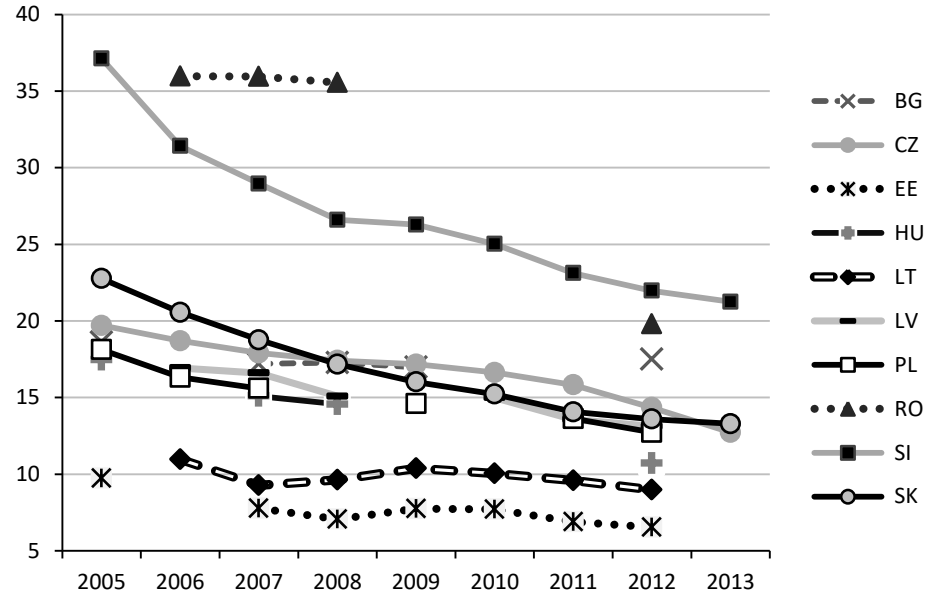
Source: WSI Minimum Wage Database by Hans Boeckler Foundation (2016).

Interestingly, the Czech Republic is a country with the lowest level of minimum wage and simultaneously the lowest IWP rates. While it is true that Slovenia is among the top three performers in in-work poverty, Slovakia recently had the second lowest IWP rates with a minimum wage level below the CEE average in the last five years. Thus, the minimum wage development in CEE countries indicates that we cannot explain the variance in the IWP rates solely by minimum wage levels.

Trade union strength should be another important factor contributing to lower in-work poverty. Usually the trade union's strength is based upon its coverage or membership. Based on the data availability, we take the trade union's density (net union membership as a proportion of wage and salary earners in employment) as an indicator of unions' strength in CEE countries (as reported by Visser, 2015). Figure 6.5 presents how union density has developed in Central Eastern Europe since 2005.

Figure 6.5

Trade Union Density, Net Union Membership as a Proportion of Wage and Salary



Source: Visser (2015).

Although there are several missing values, trade union density is definitely in decline in Central Eastern Europe, with no single country reporting an increase. Romania, Slovakia and Slovenia present cases with the steepest decline – union density shrank by more than a half of the figures in the period between 2005 and 2013 (last year data was available). The Baltic States and Poland recorded more stable development of union density with only a relatively slow decline. However, figures in those countries were already low, especially in Estonia (below 10%) and Lithuania (fluctuating around 10%). The Baltic States, Hungary and Poland thus represent the bottom half of countries with union density below the group average.

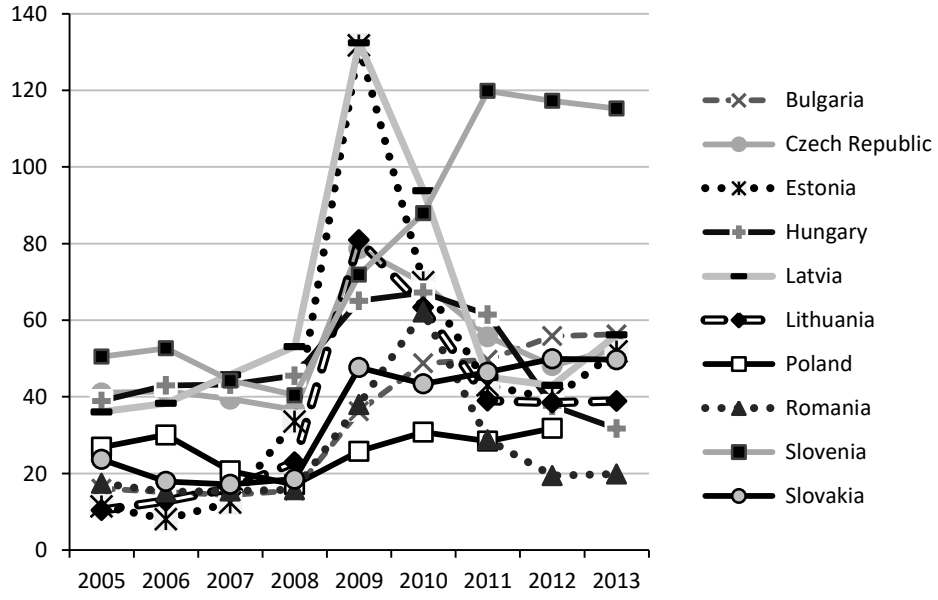
As was the case with minimum wage, countries with the highest rates of IWP are not the same as countries with the lowest levels (or the steepest drop) of trade union strength. Romania, as far as data is available, was a country with the strongest unions in CEE before the crisis, and yet the highest IWP levels. Bulgaria also reported rather high rates of union

density and simultaneously high rates of the IWP. We calculated Spearman's rho,[51] to see whether there is a relationship between rankings of countries' union density and in-work poverty. Correlation analysis showed no relevant associations. Therefore we must conclude that union strength alone does not help to explain variation in the IWP rates of Central Eastern European countries.

Unemployment benefits play an important role in maintaining household income after a household member becomes unemployed. In the case of households made up of more than one working person, this is an important measure to prevent the household from falling below the poverty line. Figure 6.6 presents the unemployment benefits expenditures in CEE countries since 2005, in euros per inhabitant, adjusted by purchasing power.

Figure 6.6

Development of Unemployment Benefits, Purchasing Power Standard, per inhabitant



Source: Eurostat (2016).

[51] Spearman's rho is a correlation coefficient for rank order data, as we are interested in whether a country with higher union density also ranks higher in the IWP.

During the crisis, unemployment expenditures rocketed in almost every state except for Poland. This is mostly due to the fact that Poland was the only CEE country that avoided a recession during the global financial crisis. Obviously, Latvia, Lithuania and Estonia witnessed the steepest hike as their economies were the worse hit in the region. More important than the increase during the crisis is what happened in its aftermath. We can observe that Slovenia, Bulgaria and Slovakia maintained relatively higher unemployment benefits even after 2010, while the Baltic States' and Romania's unemployment benefit expenditures dropped again. In the case of the Baltics, this can be explained by a simultaneous decrease in unemployment; however, this does not apply to Romania. The unemployment level in Romania was relatively stable during 2009-2014 (from 6.5% to 6.8%, with a peak of 7.2% in 2011). Therefore, the drop in expenditures is attributable to changes in the system of unemployment benefits.

Figures on unemployment benefits expenditure suggest that there might be a relationship with the IWP rates. In order to further explore the possible association, we calculated correlations coefficients between the two factors separately in the years 2011, 2012 and 2013. The values of coefficients were -0.902, -0.552 and -0.406, respectively. This suggests that countries ranked higher in unemployment benefits expenditures, relative to the group, also ranked better in IWP (had less working poor). Additionally, it seems the relationship became weaker over time.

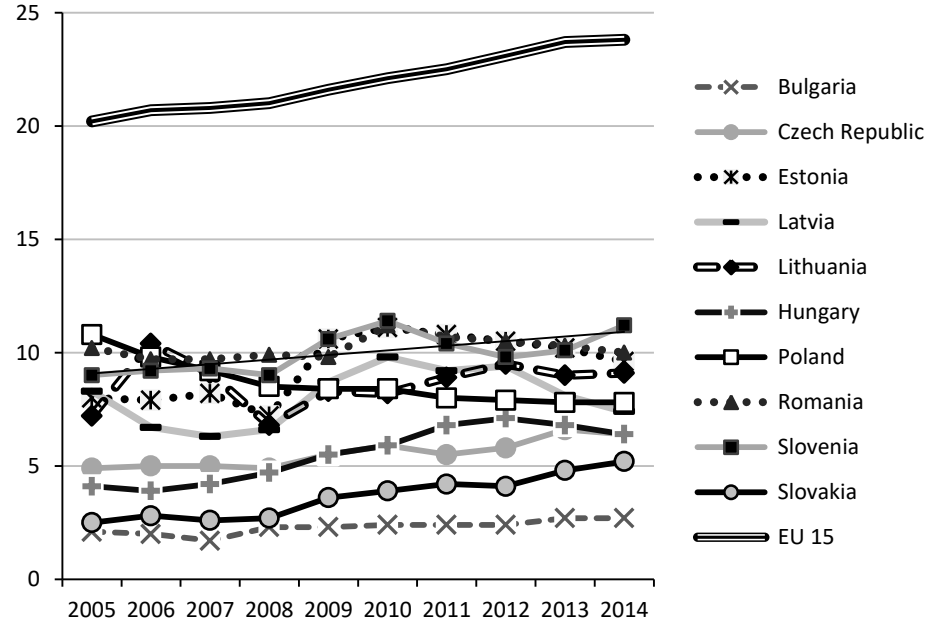
Lastly, we look also at the structure of employment, particularly what role is played by part-time employment. This is an important factor in IWP research as part-time employment usually means lower paid work, compared to full-time. Households with only part-time workers are then usually at a higher risk of IWP, than households with full-time workers. Figure 6.7 shows the development of part-time employment in CEE countries since 2005.

The proportion of part-time employment was rather stable over the observed time period. Bulgaria, Slovakia and the Czech Republic were the three countries with the lowest part-timers, while Estonia, Romania and Slovenia were the three countries with the highest share of part-timers. This pattern is not in line with the countries' position in the IWP ranking.

Additionally, we can see that all ten post-communist EU members have a lower share of part-time employment than the Old Member States' average. This might be due to the fact that the post-communist labour markets have different structures and policies supporting part-time employment that are not well developed. On the other hand, it is difficult to see any relationship between the share of part-time employment in a country and the IWP rate.

Figure 6.7

Part-time Employment as % Share of all Employment



Source: Eurostat (2016).

6.5 Discussion and conclusion

This chapter studies in-work poverty in Central Eastern Europe. There were three main goals to reach. First, describe the problem of IWP in Slovakia, including mobility into and out of in-work poverty. The second goal was to present an overall and systematic comparison of the IWP development in the EU's post-communist countries and, third, describe the context and development of the main institutional and policy-related

factors that usually impacts in-work poverty. However, we admit that many individual level characteristics influence the IWP status and we have not studied the structure of post-communist societies in this regard.

The findings show that the ten post-communist countries, at least in relation to in-work poverty, present a rather heterogeneous region. They differ in relation to the overall IWP rate, with the Czech Republic having one of the lowest IWP rates in the EU, with Romania being the last in the EU ranking.

Two institutional factors, trade union density and minimum wage arrangements showed weak or no relationship with the IWP levels. We showed that the position of trade unions' were becoming continuously weaker in Central Eastern Europe. This is nothing new and it only confirms the findings from other studies, especially Crowley and Ost (2001) for comparison with Western Europe. The Unions' inability to mobilise workers in CEE is also a known fact. Bernaciak (2010) argues that this is especially the case in privatised sectors, where unions lack power in negotiating vis-à-vis employers in both wage and non-wage issues. According to Hanzi-Weiss, Vidovic and Saunossi (2011), trade unions in Romania and Slovenia focused mainly on wage negotiations. Concerning minimum wage arrangements, there seems to be no relationship between the level of minimum wage and the IWP level. A possible reason for this, is that a relatively small proportion of workers (below 5% of all employees) earn the minimum wage in countries like Slovakia, Hungary or the Czech Republic (OECD 2015). However, the figure might be higher in other post-communist non-OECD members, and therefore it is possible that it is the combination of the level of minimum wage and the proportion of workers receiving minimum wage which is important for combating IWP.

Unemployment benefits expenditures proved to be related with in-work poverty level in an expected way. Increased expenditures were associated with lower levels of IWP. This is good news as it provides policy-makers with some tools with which to decrease IWP rates by choice. Our finding is also in line with Cerami (2008), although his research focused on poverty in general. Cerami calculated that social transfers substantially reduced poverty in almost all countries. Only in Bulgaria, Latvia, and Romania has the poverty reduction rate been lower than 30 per cent. At the same

time, these countries are among the most problematic ones in terms of economic recovery, also recently introducing rather "market oriented welfare institutions" (2008: 14). It is not surprising that the same countries record above average IWP rates in the CEE region.

Admittedly, two important points were not analysed in detail in this chapter. Firstly, one should not forget that the IWP levels are to a certain extent dependent on the general poverty levels. Bearing in mind that Romania has the highest AROP rates; it is hardly surprising that the IWP is the highest as well. Secondly, in-work poverty is to a large extent dependent on individual characteristics of household members (economic status, working hours, household composition, etc.). This chapter has not studied this set of factors, and in order to assess the impact of the interaction of individual characteristics and various contextual factors on IWP a more complex statistical analysis is needed.

In-work poverty in Central Eastern Europe affects hundreds of thousands people. Apart from the attention of social scientists, governments very rarely set up policies to tackle the problem, and if so, they are related to the general fight against poverty (Hanzi-Weiss et al., 2011). Safuta (2011) indicates that avoidance of the IWP problems might be related to a lack of recognition of structural problems in labour markets. The argument is that poverty is often contextualised in relation to unemployment and/or ethnic minority issues. Therefore, it is not uncommon to blame poor people for being too lazy, or not educated enough to participate in the labour market. In other words, the problem is structured to lie on individual levels. On the other hand, this narrative does not hold with in-work poverty, since the persons affected are working by definition. Therefore, admitting that IWP is a problem worth addressing requires the government to admit that the market forces are not operating properly and that there is a structural problem on the labour market.

7 VZAM_MICROSIM_1.1 – RESULTS FROM A NOWCASTING VARIANT OF THE MODEL WITH ASSESSMENT OF THE PREDICTIONS[52]

Miroslav Štefánik, Tomáš Miklošovič

In this chapter, we introduce the methodology of a microsimulation model VZAM_microsim_1.1. VZAM_microsim is being developed to forecast labour supply and analyse skills mismatch on the Slovak labour market. The model employs the European Union Labour Force Survey (EU-LFS) microdata published by EUROSTAT (2015a). VZAM_microsim_1.1 was redesigned from a previous version of VZAM (Workie et al., 2012), which was based on semi-aggregated EU-LFS data, following the methodology of CEDEFOP´s forecasts of Skills Supply and Demand in Europe (CEDEFOP, 2009). VZAM_microsim_1.1 originally takes the EU-LFS 2014 data as the base file and starts the simulation from 2015 to 2025. Results of this model are presented in the second chapter of this book. In this chapter, we will present figures from the nowcasting variant of VZAM_microsim_1.1, where the base file comes from the EU-LFS for 2011 and the simulation starts from 2012 to 2015. By confronting the results of the model with the real EU-LFS data for this period, we may assess the reliability of our simulations.

VZAM_microsim_1.1 predicts the dynamics of the supply side of the labour market. It is linked with a macroeconomic model designed to predict the dynamics of the demand side of the labour market. The macroeconomic model is based on a CGE methodology. This is described in more detail in the second chapter of this book, or further in Miklošovič et al. (2015).

In the following text, we first describe the new modular structure of the redesigned VZAM_microsim_1.1 by modules and particular processes.

[52] The research leading to these results has received support under the European Commission's 7th Framework Programme (FP7/2013-2017) under grant agreement n 312691, InGRID – Inclusive Growth Research Infrastructure Diffusion.

Results of a nowcasting variant of the model are presented in the second section of this chapter. Here, we focus on predictions for supply of labour distinguishing 6 economic statuses and predictions of replacement demand in economic sectors. We conclude with an assessment of the reliability of the VZAM_microsim 1.1 predictions.

7.1 Description of VZAM_microsim, version 1.1

The VZAM model was originally developed to forecast the future structure of supply of labour on the Slovak labour market, in terms of economic sectors, occupations and educational groups. In its previous versions, it followed the methodological approach of traditional manpower forecasting models[53] (Workie et al., 2012). On the demand side, an equilibrium based macroeconomic model (CGE) was used to produce projections of employment in economic sectors – expansion demand (Miklošovič et al., 2015).

These relatively autonomous models are linked via two channels. In the initial phase, VZAM_microsim produces predictions about the total labour supply for the entire prediction period. In the second step, the CGE macroeconomic model takes the labour supply predictions as one of the inputs and predicts employment in economic sectors by qualification level. The predictions which are produced, are subsequently used in VZAM_microsim to restrict allocation of individuals into employment in economic sectors by qualification level.

Originally, the supply side of VZAM adopted the concept of a stock-flow model to anticipate future developments in the educational structure of the population. Replacement demand was modelled in a separate module employing semi-aggregated LFS data. It was originally designed based on the architecture of the EU-wide model developed under the co-operation of CEDEFOP (CEDEFOP, 2012). We adopt the original purpose of the model and try to introduce a methodological improvement in switching from semi-aggregate EU-LFS data to microdata. Here we describe

[53] For an overview of manpower forecasting models, see: Hughes (1993); Heijke (1994); OECD (1994); Heijke et al. (1998) and Neugat & Schömann (eds) (2002).

an example of how the supply side in this approach could be translated into a microsimulation model.

In translating VZAM into a microsimulation model we use LIAM 2,[54] software developed for building- up microsimulation models (Bryon, Dekkers, de Menten, 2015). In designing particular processes in VZAM_ microsim we were inspired by the MIDAS model, originally developed for Belgium (Dekkers et al., 2010).

Unlike MIDAS, which is based on the EU-SILC, our microsimulation model relies on a more detailed picture of the structure of the supply of labour drawn from the EU-LFS. The original dataset is inflated, using population weights, to produce an individual level file of the size of the Slovak population, representing its structure in terms of gender, age, region, educational level and field.

Individuals´ attributes originally imported in the model are:

- Gender
- Age (in years)
- 5 levels of education

(Primary, Lower secondary, Upper secondary, Post-secondary and Tertiary)

- 20 fields of education
- 5 types of economic statuses in current period (t) and t-1

(Employed, Unemployed, Student, Retired, Disabled, other inactive)

- 18 economic sectors in current period (t) and t-1 for persons in employment

(NACE 1-digit, summarizing sectors R-U into the 18th sector)

- 3 qualification levels[55] based on ISCO occupational groups in current period (t) and t-1 for persons in employment

(ISCO 1-digit aggregated in: qualification level 1 = ISCO 1-ISCO 3; qualification level 2 = ISCO 4-ISCO 8; qualification level 3 = ISCO 9)

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[54] <http://liam2.plan.be/>.

[55] This is a new attribute in comparison to the previous version of VZAM_microsim 1.

Information on these variables is further re-coded and processed in the model. Individuals in the original file are subject to processes defined in the model. Attributes of individuals may change as a result of a process. Processes repeat in each of the simulation periods- years. All of them are defined in four, relatively autonomous, consequently executable modules. The scheme below displays the modules of the model in their sequential order.

S c h e m e 7.1

Modules of VZAM-microsim 1.1

DEMO (Demography)	EDU (Educational attainment)	EA (Economic activity)	EMPL (Employment)
Provides simulations of basic demographic processes producing endogenous demographic projections.	Simulates educational attainment of the population.	Simulates economic status of individuals based on their life situation, history and individual characteristics. Distinguished statuses are: economically active, student, retired, disabled and other inactive.	Provides simulations of the matching processes linking individuals to jobs (based on the number of jobs in sectors predicted by the CGE model). Divides economically active into employed and unemployed.

Source: Authors.

7.1.1 Module DEMO

The demographic module DEMO, shelters demographic processes related to the dynamics of the Slovak population. Due to anonymization purposes, the original EU-LFS microdata was provided in five-year age groups. For this reason, the first process is related to the disaggregation of these five-year age groups into one year age groups. The disaggregation is done assuming random choice assignment from a five-year age group to a one-year age group using proportions from the official population

statistics[56] for the year of the EU-LFS base file collection (2014, resp. 2011[57]). To provide a clearer idea about how age is assigned based on the information about the five-year age group, an example of the script transforming the first age group (0-4 years old) to one year age groups follows:

```
age: if(ageg==2,
            choice([0, 1, 2, 3, 4],
            [0.1932, 0.1941, 0.1969, 0.2136, 0.2022]).
```

This process is unique because it only runs in the initial period of 2014 and thus complements the attribute age in the original EU-LFS base file (inflated).

Ageing

After age is disaggregated into one-year age groups in the LFS 2014 file, processes running annually during the entire forecasted period (2015-2025) can be simulated. First, is ageing. This is a deterministic process described by the function:

```
age: age + 1
```

Birth

Birth is simulated using age-specific fertility tables.[58] Here we rely on a national source of data using the predictions produced by the Slovak

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[56] Data based on 2011 Census updated by reporting on births and deaths. Published by the Statistical Office of the Slovak Republic: <https://slovak.statistics.sk/wps/portal/ext/Databases/slovstat/!ut/p/b1/jZDLDoIwEEW_xS_oLQ-Ly2KkVAnSahG7MSwMIRFwYfx-gbAyEZzdJOdk7lxiSUFsW77rqnzVXVs-ht2ub4rJIAwpRxDmDiRLNT0oBXH0euDaA_gxHF9-qneQZ54JvfcoPH_yZ4DB50qpU5LnELkTQbpUIDUGiNjkbwWPPZYAQSJ8SB4bvVGuC-7-l3_mwIJ_IXZE5hKMwFxFS0-mcdfcybMxxhSos2q1-gCPpTwW/dl4/d5/L0lDUmlTUSEhL3dHa0FKRnNBLzRKVXFDQSEhL2Vu/>.

[57] Here we describe the structure of VZAM_microsim_1.1 which imports the EU-LFS 2014 micro data as the base file. The results presented in the third section are from the nowcasting variant of the model running on EU-LFS 2011 data.

[58] Two alternative sources of age-specific fertility and mortality tables can be used for Slovakia:
EUROPOP 2013 published by EUROSTAT: <http://ec.europa.eu/eurostat/data/database>.
Slovak National Demographic Projections published by the Demographic Research Centre: <http://www.infostat.sk/vdc/en/index.php?option=com_wrapper&view=wrapper&Itemid=43>.

Demographic Research Centre.[59] Females between 15 and 50 years of age give birth in the proportions provided in the age-specific fertility tables. Within a one-year age group, giving birth is distributed randomly; no other individual characteristics are taken into account. For example, the mother's level of education could play a role here, but is not accounted for in this version of the model, despite the fact that the architecture of the model and the software tool used would technically allow such a distinction.

In the cases where women gave birth, a new row is added to the database for the new-born.[60]

Death

Analogously death is distributed randomly within a one-year age group based on age-specific mortality tables.[61] Age-specific mortality tables align the proportions within the age group for males and females separately. Therefore, in the model, gender is also taken into account in simulating mortality. This is standard in demographic predictions. Here the architecture of the model, and the software tool used, also allow for potential further precision, distinguishing other relevant individual characteristics, such as region or education level which might influence mortality. These avenues are not explored in this version of the model.

Cases where simulated death occurs from the simulation model, are being removed from the database.

Migration

Migration related functions are missing in the demographic module of the current version of the model. There are several reasons for this decision.

---

[59] Despite the fact that Eurostat also provides age-specific fertility rates under the EUROPOP 2013 projections, here we have preferred the national source because of more realistic assumptions.

[60] With attributes: age = 0, Gender = chosen randomly, field and level of education = NA, status = student, nace = NA.

[61] Also here, two alternative sources of age-specific mortality tables can be used for Slovakia:
EUROPOP 2013 published by EUROSTAT: <http://ec.europa.eu/eurostat/data/database>.
Slovak National Demographic Projections published by the Demographic Research Centre: <http://www.infostat.sk/vdc/en/index.php?option=com_wrapper&view=wrapper&Itemid=34>.

First, current immigration into Slovakia is marginal and one of the lowest within the EU, so the model may produce relatively realistic figures for the mid-term period even without taking migration into account. Because of the expected demographic development, migration should start to play a role. One of the ambitions of the model is to show, and eventually quantify, the need for labour to be "imported" into the country. This presents another reason for abstracting from migration.

7.1.2 Module EDU

VZAM_microsim_1.1 works with a strongly simplified module on educational attainment of the population. International applicability of the model was a priority here. For this reason, we decided to rely on LFS data and avoid employing more detailed but internationally incomparable, nationally specific statistics on numbers of students by type level and field of study. The current setting of the EDU module is also partly limited by the rationale of the scenario. Performed simulations would like to show where skill mismatches would become the bulgiest, if the structure of education provided remains unchanged.

With respect to international applicability and preserving the educational structure, we have adopted the following simplifying assumptions. All individuals, regardless of the level of education they achieved, remain students until the age of 20. When they reach the age of 20, the individuals´ education level is assigned randomly, regardless of other individual characteristics. This random assignment keeps the overall proportions of particular levels of education the same as the educational assignment of the 30-34 year old age group. The 30-34 year old age group, is the youngest age group whose educational attainment seems to be dominantly finalised, based on the EU-LFS data.[62] A similar procedure is followed for fields of education within each of the educational levels.

Module EDU, thus, has two consequent processes. First, the process of educational level assignment and second, the process of assigning field

[62] The main model (based on EU-LFS 2014 microdata) uses the proportions from 2014. For the nowcasting variant of the model (based on EU-LFS 2011 microdata) we have used observations for this age group from EU-LFS 2011. A revised version of the ISCED classification of education was applied in the 2014 EU-LFS microdata.

of education within each of the educational levels. Analogously, as in simulating educational levels, assignment to a field of education is also random, keeping the proportions of fields within each of the educational levels based on the 30-34 age group.

7.1.3 Module EA

"EA" is an abbreviation for economic activity. In fact, this module distinguishes several types of economic statuses:

- Economically active
- Students
- Retired
- Disabled
- Other inactive

At the beginning of each period, economic status is set to unknown. In cases when it is favourable, economic status from the previous period is used to model economic status in the current period. The order of the statuses assigned also plays a role. Age-related statuses are modelled first, starting with students and the retired.

Students

As already mentioned, each individual before they reach 20 years of age, is a student and therefore, economically inactive. From the age of 21, individuals deterministically move to a pool of the potentially economically active. This pool is subject to processes defined later in the model (early retirement, disability, other economic inactivity). If they do not fulfil the conditions for being assigned to one of the subsequent statuses, they are assigned as economically active.

Retired

The retired are those who reached the age of retirement and were not assigned to a special group of the working retired. Retirement age in Slovakia is based on the valid legislation, and is supposed to grow along with

the mean life expectancy.[63] Retirement age is gender specific. In addition to reaching retirement age, individuals´ may also exit to retirement earlier, two years before reaching legal retirement age. Existing Slovak legislation enables such an option, and a separate process also covers it in the model. Early retirement is assigned based on a modelled probability of early retirement estimated on the EU-LFS 2011-2014 microdata using the economic sector, status in the previous period and other individual characteristics as explanatory variables. The complete results of the probit model used to count the early retirement score can be found in the online annexe.[64] We use the estimated coefficients to compute the early retirement score for each individual in the model. Based on this score, individuals are sorted and selected for early retirement until the proportion of early retired, in the age group relative to retirement age,[65] is the same as in the 2011 Census. In other words, the overall proportion of the early retired is aligned, based on age relative to retirement age (retirement age -1, and -2), after being sorted by the early retirement score.

The working retired are also identified in the model, related processes are described in the section on the economically active.

Disabled

Disability is defined based on the probability of being disabled which is a product of a probit estimation on EU-LFS 2011-2014 microdata.[66] Furthermore, the proportions of disabled are aligned based on its real occurrence in 2011-2014 EU-LFS distinguishing five-year age groups.

The principle applied here, is thus similar to the one used in the case of early retirement. Alignment after sorting is applied, with the difference that the alignment proportions come from EU-LFS data instead of the 2011 Census data. Alignment proportions are counted per five-year age groups, instead of for one-year age groups.

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[63] It was implemented into the model as an exogenous variable based on a study of the Slovak Council for Budget Responsibility: <http://www.rozpoctovarada.sk/svk/rozpocet/300/vypocet-dochodkoveho-veku>.

[64] Annex 1: <http://ekonom.sav.sk/uploads/work/economic_statuses_score_estimations.txt>.

[65] Retirement age – n, where retirement age changes during the simulation period and n = (1, 2).

[66] <http://ekonom.sav.sk/uploads/work/economic_statuses_score_estimations.txt>.

Other inactivity

This category is supposed to cover all other forms of economic inactivity. Explicitly it works with maternity leaves using a deterministic function of a maternity leave. Each woman takes maternity leave for a period of three years after giving birth. This is the maximum maternity leave supported by Slovak legislation and remains the most widespread pattern of behaviour.

Maternity is complemented with other forms of economic inactivity which are modelled, analogously to disability and the working retired, with alignment after sorting. The economic inactivity score is estimated based on a probability model and the total number of economically inactive is aligned to fit the overall proportion of this group in the reference population. The alignment tables are not age specific. The results of the estimation of the probability of being inactive can be found in the online annexe.[67]

Economic activity

In each period, individuals are considered to be economically active, if they do not fulfil the conditions necessary to be assigned to one of the above-listed forms of economic inactivity. If an individual is not a student, retired, disabled or in another form of inactivity; he is assumed to be economically active.

Moreover, out of retired, the model identifies cases when working after reaching retirement age appears. This is based on a separate function constructed like in the case of early retirement. It is done by counting the working retirement score using a probit model estimated on EU-LFS 2011-2014 microdata, also taking into account the sector of previous employment and other individual characteristics (complete results of the estimation can be found in the online annexe[68]). In the second step, the proportions of those working after reaching retirement age are aligned relative to (individuals´ age minus retirement age) based on the occurrence of early retirement from the 2011 Census.

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[67] <http://ekonom.sav.sk/uploads/work/economic_statuses_score_estimations.txt>.

[68] Annex 4: <http://ekonom.sav.sk/uploads/work/economic_statuses_score_estimations.txt>.

Economic status is reconstructed anew in each period. For its reconstruction, information about the previous status is taken into account, where it is feasible. In simulating the economic status, we are trying to copy reality as much as possible to provide realistic information about the expected future development of the supply of labour in Slovakia. In the next step, the economically active are divided between employed and unemployed based on a matching function, within a consequent EMPL module. In reconstructing the matching processes, the ambition is not so much to stick to reality as it is to provide information which is a result of theoretically defined scenarios which rely on reasonable assumptions.

7.1.4 Module EMPL

The EMPL module simulates employment of those who were assigned as economically active. This group is divided between employed and unemployed based on the results of matching individuals to jobs. Matching is done for each labour market segment separately. A labour market segment is defined as a combination of the economic sector and qualification level.[69] Based on the assignment to a specific labour market segment, resulting from the matching process, individuals´ attributes (economic sector and qualification level) change in the simulated period.

There are two matching processes defined in the model. Each of the matching processes relies on different assumptions. Their outcome presents two polarised, theoretical scenarios. In the first "restricted employment" scenario, the matching process is done by keeping the educational proportions of employed within each of the labour market segments in the period 2011-2014. In the second "complete employment" scenario, demand for labour is satisfied to the full extent filling all of the jobs generated based on the macroeconomic model. Figures provided by the two scenarios thus border the interval in which possible employment should be developing.

In the case of both scenarios, information about employment in a particular labour market segment is inherited from previous periods. This assures a high share of reproduction, keeps the model close to reality

[69] 18 economic sectors and 3 qualification levels, identified as individuals´ attributes.

(because that is the "modus operandi" in most employment contracts), but restricts voluntary inter-sectoral migration.

Thus, within the model, individuals´ only leave employment in their labour market segment in cases of:

- replacement due to retirement, disability or other inactivity (maternity leave, etc.);
- if overall employment in their segment is shrinking.

  (In this case, within the period, individuals are first assigned as unemployed and eventually reassigned to a different segment based on one of the results of two alternative matching procedures.).

Strict employment scenario

In the case of economic sectors with a positive increase in labour demand,[70] workers are being complemented out of the pool of the unemployed and graduates. In the case of the strict employment scenario, individuals suitable for the labour market segment are selected in two steps. First, a pool of possibly suitable candidates is selected aligning the structure of this pool based on the educational structure[71] of employed in the sector during the initial period.[72] In the second step, individuals are picked for employment out of the pre-selected pool based on the probit score counted based on the estimated probability of being employed in that particular economic sector.[73]

If a graduate or an unemployed individual is possibly employable in more than one economic sector, he chooses the one with a higher average

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[70] Expansion demand + Replacement demand > 0.

[71] Distinguishing a combination of 5 educational levels and ISCED 97 2-digit classification of fields of education in the nowcasting model and ISCED 11 2-digit classification of fields of education in the main model. This is because of data availability, as the new ISCED 11 classification was adopted in EU-LFS in 2014.

[72] In the case of the nowcasting model, the initial period is 2011. In the case of the main model, the reference period is 2014.

[73] In estimating the probability of being employed in a particular sector we use individual characteristics, such as gender, age-group, education, region, as well as past employment experience of individuals. Complete results of probit estimates for all 18 economic sectors can be found in the online annex at: <http://ekonom.sav.sk/uploads/work/economic_sector_employment_score_estimations.txt>.

wage. It is assured by ordering the economic sectors in the matching process based on average hourly wage. Preference between qualification level is enabled only within the economic sector which prefers a higher qualification level (level 1 is the highest).

Table 7.1

Economic sectors in the order as prioritised by the model

Order in matching	Code in the model	NACE code	Label
1	10	J	Informatics
2	11	K	Financial services
3	4	D	Electricity
4	13	M	Professional activities
5	2	B	Mining
6	6	F	Construction
7	8	H	Transportation
8	3	C	Manufacturing
9	12	L	Real estate activities
10	16	P	Education
11	18	R/U	Other service activities
12	5	E	Water & Waste
13	17	Q	Health
14	15	O	Public administration
15	1	A	Agriculture
16	7	G	Wholesale & Retail
17	9	I	Accommodation
18	14	N	Administrative and support service activities

Source: Authors.

Complete (unrestricted) employment scenario

In complete employment scenario, matching is done applying only the second step of the above-described, matching mechanism. In the case of a labour market segment with positive change in labour demand, additional workers are complemented out of the pool of unemployed and graduates without any strict restrictions regarding their education. Individuals are sorted based on the same probit score, estimating the probability of being employed in the particular sector.

In this scenario, either employees are totally flexible in adjusting their formal education by lifelong learning, or employers are totally flexible regarding their requirements for newly hired employees. In other words, no skills mismatch between the demand and supply of labour is allowed.

7.2 Results of the nowcasting variant of VZAM_microsim_1.1

In this section, we present results for the VZAM_microsim_1.1 now casting variant. This variant of the model inputs data for 2011 and runs the simulation for the period from 2012 to 2015. Thus, our results can be confronted with real figures from EU-LFS from the period of 2012-2015. Such confrontation provides us with a picture about the reliability of the results of the main model. Results of the main model, for the period up to 2025, are published in the second chapter of this book.

7.2.1 Economic status

In the case of economic inactivity statuses of individuals, the correspondence to reality is of high importance because the logic of our approach requires a realistic picture about the supply of labour. In the case of the total numbers of students, retired, disabled and inactive, the correspondence of model predictions to reality is satisfactory. Looking only at the year 2014,[74] the highest difference between reality (EU-LFS) and our simulations can be observed for the numbers of unemployed (-6.4%). The number of unemployed is a result of the unrestricted, complete employment scenario which is subject to the assumptions related to this scenario. The comparison of the economic statuses related to inactivity (students, retired, disabled and inactive) is more relevant. Here the differences remain below 3%.

Looking at the development of the simulations correspondence to the real EU-LFS figures, again the difference is highest in the case of unemployed in the later stages of the simulation period (2014 and 2015). The number of disabled is predicted with a relatively higher difference for 2012 (6.0%). The disabled present, in absolute terms, the smallest identified group. This has contributed to the high difference expressed in relative terms. This difference declines in the later periods. Numbers of persons

[74] We use the 2014 figures because that is the most recent data from the Eurostat release. The 2015 figures are counted from national LFS microdata released by the Slovak Statistical Office, which may be subject to small differences because of different weighting and cleaning standards.

in other identified groups are simulated with an acceptable correspondence to reality, with differences remaining below 4% during the entire 2012-2015 period.

Table 7.2

Results of the VZAM_microsim_1.1 predictions for 2014 and EU-LFS data for Slovakia in 2014

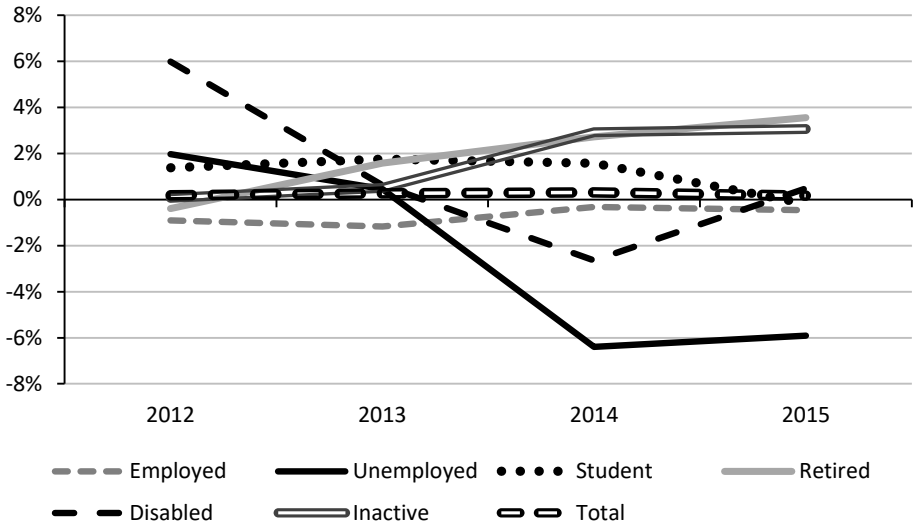
2014	VZPS	MODEL	Difference in persons	Difference in %
Employed	2 363 052	2 370 613	-7 561	-0.3
Unemployed	358 858	383 398	-24 540	-6.4
Student	1 290 031	1 270 049	19 982	1.6
Retired	996 326	969 931	26 395	2.7
Disabled	164 342	168 800	-4 458	-2.6
Inactive	243 339	236 440	6 899	2.9
Total	5 415 949	5 399 231	16 718	0.3

Note: Results for the complete (unrestricted) employment scenario.

Source: EU-LFS 2014, VZAM_microsim_1.1 (nowcasting variant).

Figure 7.1

Development of the difference between the real EU-LFS number of persons and VZAM_microsim_1.1 simulation results



Note: Results for the complete (unrestricted) employment scenario.

Source: EU-LFS 2014, VZAM_microsim_1.1 (nowcasting variant).

In the case of economic inactivity statuses, the figures are the same for both scenarios (strict and full employment) because the scenarios are applied in the matching process and thus influence only the process of simulating employment. The correspondence to reality is of secondary importance for the groups of employed and unemployed, because the simulated figures provide information about hypothetical development under assumptions adopted by the scenarios. Nevertheless, in the case of nowcasting, the complete (unrestricted) employment scenario seems to provide figures closer to reality. A possible interpretation for this would be that the additional assumption of total flexibility in the hiring process behind the full employment scenario is realistic, or that skills mismatches do not play such an important role when considering a relatively short period of 4 years.

Regarding some long-term trends in the development of identified economic statuses, the number of students is expected to decline in the period up to 2025, which is in line with other studies (Herich, 2012, 2013a, 2013b) (Lichner & Štefánik, 2015). In contrast, the number of retired is expected to grow. These changes are mainly driven by demographic change.

A slight growth is also expected in the case of disabled persons and persons in other forms of economic inactivity. Here it is a result of the relative increase of older age-groups in the population and is also in line with existing studies (Radvanský & Lichner, 2014).

7.2.2 Replacement demand

Another of the indicators that can possibly be constructed from the simulated results, is related to replacement demand in particular sectors. Replacement demand can be seen *as a job opening arising because of persons leaving the workforce* (CEDEFOP, 2012, p. 65). In a microsimulation model, individuals can be observed with all their predefined attributes and also attributes´ related history. Thanks to this, the numbers of individuals employed in the economic sector during the previous period, and the retired or disabled in the current period can be extracted.

In quantifying the replacement demand, we are strictly looking only at those who enter retirement or disability.[75] This is because we assume that these statuses are dominantly related to permanent exits from the labour force. This is in contrast to other inactivity, of which maternity leaves form a substantial part. For individuals in other forms of economic inactivity, we expect a later return to the labour force.

This change in the definition presents a divergence from the established methodology applied, for example: Willems and de Grip (1993), CEDEFOP (2012) or from Slovakia, in Mikološovič, Radvanský and Hvozdíková (2015). The microsimulation framework of our model enables more precise identification of exits from the labour force.

When looking only at exits to retirement and disability, the replacement rate is a share of those employed in the sector in the previous period and then exiting for retirement or disability to the current period on the total employment in the sector. Values of the average replacement rate vary between sectors from 3.3% in Mining, or 2.9% in Agriculture to 0.2 in Informatics. Based on the EU-LFS, the average retirement rate was 1.2% in 2014.

At first glance, the predictions of replacement demand produced by VZAM_microsim_1.1, differ substantially from the EU-LFS based figures. The reasons behind are various, but first, one should be aware that these differences are counted out of small shares, which means that even in the case of a substantial divergence of the modelled retirement rate from the reality, the final bias in terms of total employment is only marginal. The highest relative difference from real figures can be observed in the case of the Real estate activities sector. In terms of total employment in the economic sector, the bias caused here presents only 1.7%. Moreover, real estate activities present a small sector, with the numbers of employees exiting to retirement only a marginal slice of employment in the sector; a sample-based survey may run into trouble when covering such a small

[75] In assessing the reliability of our results related to replacement, we do not account for exits from employment because of death, because these are not covered by the EU-LSF. Such replacement could therefore not be confronted with the reality observed in EU-LFS. Because in this chapter we only account for exists to retirement or disability (and do not consider exits because of dying), the replacement rates presented here differ from those presented in the second chapter on mid-term predictions of the model.

subgroup. This was also our case, when the EU-LFS sample did not include anyone leaving to retirement or disability out of this sector in 2014. Observed differences become clearer if we consider that the numbers reported from EU-LFS, as well as those employed in VZAM_microsim_ 1.1, are based on sampling weights. Sampling contributes substantially to the error related to simulated replacement rates. A blunter picture can be drawn by plotting the development of real replacement rates in sectors based on the EU-LFS data.

T a b l e 7.3

Replacement demand due to exits to retirement or disability in 2014, by sector

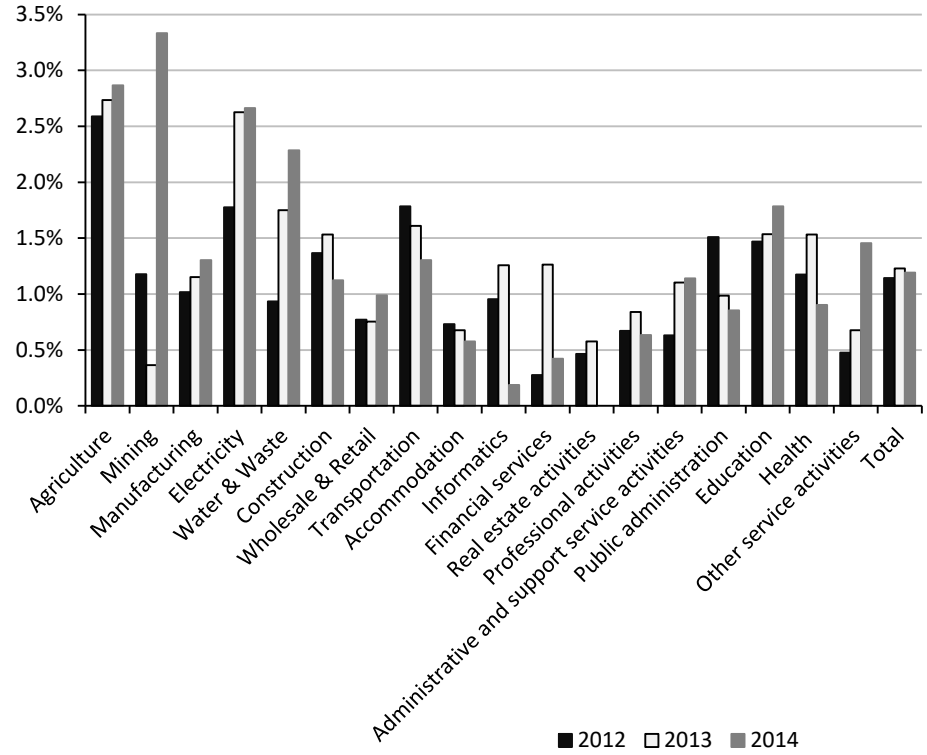
Economic sector	EU-LFS: total employ-ment	EU-LFS: replace-ment	EU-LFS: replace-ment rate	VZAM: total employ-ment	VZAM: retire-ment +disa-bility	VZAM: replace-ment rate	Difference in re-placement in the no. of persons	Difference in replace-ment in p.p. of total employment
Agriculture	82 642	2 368	2.9%	82 642	1 511	1.8%	857	1.0%
Mining	9 578	319	3.3%	10 584	152	1.4%	167	1.7%
Manufacturing	550 423	7 174	1.3%	550 423	7 776	1.4%	-602	-0.1%
Electricity	26 530	706	2.7%	26 530	550	2.1%	156	0.6%
Water & Waste	27 657	632	2.3%	27 673	518	1.9%	114	0.4%
Construction	223 244	2 509	1.1%	226 104	4 128	1.8%	-1 619	-0.7%
Wholesale & Retail	284 191	2 809	1.0%	284 191	2 526	0.9%	283	0.1%
Transportation	152 038	1 981	1.3%	152 512	1 897	1.2%	84	0.1%
Accommodation	119 172	688	0.6%	119 172	1 184	1.0%	-496	-0.4%
Informatics	56 624	105	0.2%	56 640	523	0.9%	-418	-0.7%
Financial services	50 838	214	0.4%	53 155	301	0.6%	-87	-0.2%
Real estate activities	14 736	-	0.0%	15 605	281	1.8%	-281	-1.9%
Professional activities	76 428	484	0.6%	76 428	799	1.0%	-315	-0.4%
Administrative and support service activities	60 929	694	1.1%	60 930	795	1.3%	-101	-0.2%
Public administration	210 951	1 802	0.9%	210 951	2 057	1.0%	-255	-0.1%
Education	166 846	2 975	1.8%	166 847	3 230	1.9%	-255	-0.2%
Health	175 534	1 583	0.9%	175 534	1 519	0.9%	64	0.0%
Other service activities	74 691	1 088	1.5%	74 692	932	1.2%	156	0.2%
Total	2 363 052	28 133	1.2%	2 370 613	30 679	1.3%	-2 546	-0.1%

Note: Results for the complete (unrestricted) employment scenario; Replacement = Employed in the sector during the previous period and retired or disabled in the current period.

Source: EU-LFS 2013, VZAM_microsim_1 (nowcasting variant, complete employment scenario).

F i g u r e 7.2

The development of replacement rate by economic sectors



Note: Replacement = Employed in the sector during the previous period and retired or disabled in the current period.

Source: EU-LFS 2011-2014.

As may be observed from the figure, in some sectors changes in the replacement rate observed in time are substantial. There is no reason to expect the replacement rates to be so volatile. Moreover, observed volatility is higher in smaller sectors with fewer individuals in the EU-LFS sample of employed, suggesting problems related to low numbers of observations.

When looking at the unweighted numbers of observations in the EU-LFS sample used as the numerator in the calculation of the replacement rate, the limitations of the sample become apparent. Sampling related problems may thus substantially influence the correspondence of the simulation results to reality, as both simulation source data, and the observed reality, are subject to sampling error. Despite this shortcoming, when expressed

in terms of total employment in the sectors, simulation error remains marginal grasping the main sectoral differences sufficiently.

Table 7.4

Numbers of unweighted observations used in the calculation of the replacement rate

	2011	2012	2013	2014
Agriculture	49	42	48	50
Mining	0	3	1	7
Manufacturing	153	128	136	159
Electricity	8	10	15	16
Water & Waste	15	6	12	15
Construction	65	74	88	58
Wholesale & Retail	45	51	54	60
Transportation	34	59	56	40
Accommodation	11	17	19	14
Informatics	3	12	15	2
Financial services	3	3	14	4
Real estate activities	8	2	3	0
Professional activities	11	10	12	11
Administrative and support service activities	10	9	15	16
Public administration	83	61	47	40
Education	59	58	60	72
Health	44	45	60	34
Other service activities	13	8	11	23
Total	614	598	666	621

Note: Replacement = Employed in the sector during the previous period and retired or disabled in the current period.

Source: EU-LFS 2011-2014.

7.3 Discussion and overall assessment of the simulations´ reliability

VZAM_microsim version 1.1 presents a second[76] version of a micro-simulation model employing EU-LFS microdata to simulate future skills mismatches on the Slovak labour market. The current design of the model focuses on simulating the development of the supply of labour, by defining

[76] First version VZAM_microsim 1 did not consider the occupational structure with three qualification levels.

processes leading to various types of economic inactivity. The base file used for the main simulation is EU-LFS microdata for 2014. The results of the main simulation are presented in the second chapter of this book. In this chapter, we present results of a nowcasting variant of VZAM_ microsim_1.1, where EU-LFS microdata for 2011 are used as the base file. By confronting the simulation results of the nowcasting variant with real figures from EU-LFS for the period of 2011-2015, we are able to draw a picture about the reliability of our results. In this publication, only figures on the development of labour supply, expansion and replacement demand for labour are presented. The design of the model allows for constructing indicators of skills mismatch comparing by the simulations from the two contrast scenarios. These will be published in the future.

VZAM_microsim_1.1 provided reliable simulations of the development of various types of economic activity statuses. Confronting the results with real data for the period of 4 years, showed that predictions of aggregate figures on the number of persons in 6 identified economic statuses, dominantly remain under 4 percent. One exception is the figure for the number of unemployed which is subject to the assumptions behind two variant scenarios. We may put some trust in our results regarding the total number of the economically active, which is one of the crucial indicators presented.

Following on the numbers of individuals who leave employment for retirement or disability, we are constructing a revised rate of replacement demand for labour in sectors. Our methodology enables more precise identification of various types of exits from the labour force. Thanks to that, we are only focusing on exits from the labour force to retirement or disability, which we consider to be of a rather permanent nature. In constructing the replacement rate, we ignore exits to other forms of inactivity, such as maternity leaves, as we consider these to be rather temporary.

Confronting our results for replacement demand with real figures observed in EU-LFS is limited by the sample size of EU-LFS.[77] Especially

[77] The size of EU-LFS sample is high in comparison to other sampling surveys, but unsatisfactory for the purpose of following replacement demand on detailed sectoral level. Administrative data could serve this purpose more adequately.

in less numerous economic sectors, the replacement rate observed on the real EU-LFS data becomes more volatile. Despite this complication, the methodology applied is able to grasp the main dynamics in the development of replacement demand for labour in economic sectors. The level of error related to the values of this indicator stays in acceptable limits. In comparison to the methodology traditionally applied for this purpose (Willems & de Grip, 1993), the microsimulation approach enables more precise distinction of various economic statuses, identifying narrower time periods, under more transparent assumptions.

7.3.1 Considering future improvements of the model

There are several ways how VZAM_microsim can be improved in the future. In this version, the priority was more on international comparability, than on complexity of the model. VZAM_microsim_1.1 can be quite easily adjusted to any of the countries covered by the EU-LFS survey. A significant increase in the precision of the results could be gained from switching from survey data to administrative data, or 2011 CENSUS data. The main challenges for the future remain in:

- refining the model in various areas where inspiration can be found in EU-SILC based models, for example:
  - implementing households as an entity,
  - sophisticating the simulation of pre-career educational attainment using administrative data,
  - simulating economic activity based on the change of real income and potential income out of work and social benefits,
  - implementing migration
- making the matching process dynamic by allowing adjustments of employers´ preferences in hiring new employees based on the available supply
- incorporating lifelong learning, work experience and re-skilling
- allowing iterations between the microsimulation model and macroeconomic equilibrium model.

Despite these remaining challenges, several advantages of applying microsimulation methodology can be stressed in comparison to previous versions of VZAM (Workie et al., 2012) (Lubyová & Štefánik et al., 2015).

Linking the forecast of the inflow to the LM (graduates) with the demographic part of the prediction

The sole fact that demography is endogenous in this version of VZAM, enables designing scenarios based on different demographic assumptions. On top of that, a direct link to the educational process can be designed. Demographic predictions are highly accurate in comparison to predicting other social processes. Educational system predictions can be built on this accuracy, employing administrative data to the number of students. It would enable educational projections distinguishing narrower categories in terms of level and field of education. Moreover, designing variant scenarios in applying alternative educational policies becomes possible. The model would show variant implications for all endogenous processes defined in the model, in the case of VZAM, it would be skills mismatch on the labour market.

Economic (labour market) status can be modelled in a chain of consequent decisions

The decision whether to be economically active or not, is usually a result of several consequent sub-decisions. These can be modelled on an individual level, taking into account individual characteristics as well as supra-individual variables referring to the situation in the economy and the labour market. The individual´s history presents a strong explanatory variable as well.

The concept of a structural probit model[78] can be employed, taking into account the tax-benefit system of the country, its possible changes (variant scenarios) and the related labour market consequences.

[78] As applied for example, in: Breunig and Mercante (2010).

Replacement demand can be based on cross section or panel data with annual change

Willems and de Grip (1993) introduced a cohort component method based approach in modelling replacement demand, which was since adopted in several applications (CEDEFOP, 2012). Switching from cohort-component approach to a microsimulation approach allows for possible several methodological improvements. Exits to retirement, disability or inactivity can be distinguished and modelled based on more transparent assumptions. Mortality and migration could become endogenous in the model.

Replacement demand figures can be produced annually and verified in a nowcasting scheme as is done in this paper.

Matching process can be grasped in a more intuitive and more precise way

In constructing skills mismatch indicators, existing manpower requirement models either rely on a simple labour supply-demand matching mechanism, or avoid matching at all, producing time-change type of indicators. Also here, switching to a microsimulation approach enables new options. If the educational categories distinguished within the model are detailed enough, basically if they include some information about the field of education, matching based on a detailed conversion table (education to the sector, or education to sector X occupation) can be done. Such conversion tables can be constructed either based on an objective definition for each of the categories or, as in the case of VZAM_microsim_1.1, based on the empirical incidence of educational subgroups within economic sectors or occupations.

On top of that, variant scenarios of the matching process can be designed. For example, based on contra-extreme assumptions, as it was done in the case of VZAM_microsim_1.1.

ZHRNUTIE

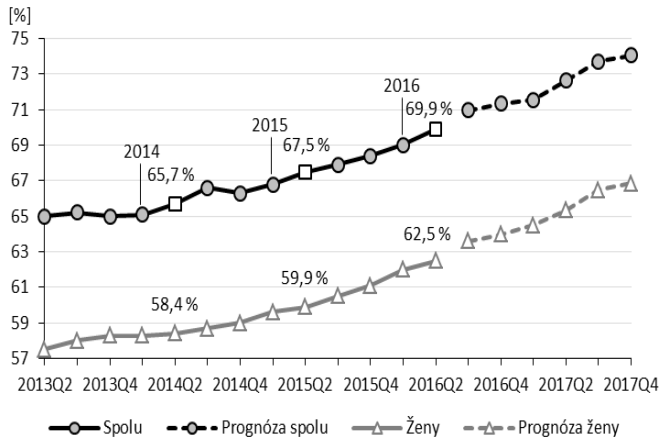
1. *Vývoj trhu práce v kľúčových ukazovateľoch*

Veronika Hvozdíková – Ivana Studená

Slovenský trh práce zaznamenal v agregátnych indikátoroch v roku 2015 a v prevažnej časti roka 2016 pozitívny vývoj. Tento pozitívny trend bol očakávaný (Lubyová, Štefánik et al., 2015), ale jeho potvrdenie prinieslo v roku 2016 úľavu po niekoľkých rokoch útlmu a po dlho očakávanom oživení trhu práce, ktorý nastúpil až v roku 2014. V roku 2016 miera nezamestnanosti dokonca prekonala psychologickú „predkrízovú" hranicu z roku 2008, keď miera nezamestnanosti v treťom štvrťroku 2016 klesla pod dvojmiestnu úroveň, na 9,5 %. Pozitívny trend v celkovom smerovaní trhu práce je prognózovaný aj na roky 2016 a 2017 (graf 1.1).

G r a f 1.1

Vývoj miery zamestnanosti (%) a prognóza

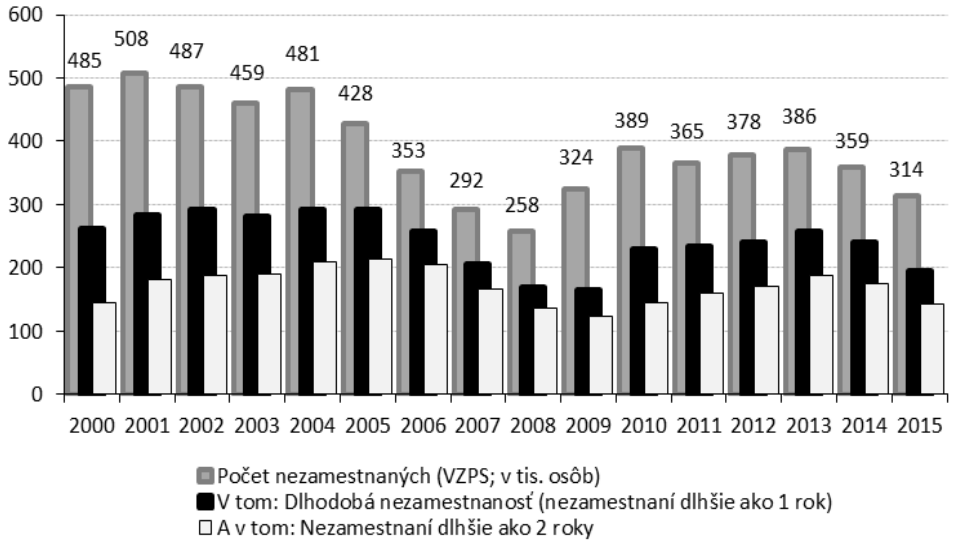


V rámci dosahovania cieľov Stratégie 2020 sa väčšina krajín EÚ v agregátnych indikátoroch iba priblížila ku predkrízovým hodnotám z roku 2008, podobne ako Slovensko. Je zrejmé, že Slovensko ako aj ostatné krajiny stále zaostávajú v dosahovaní cieľov Stratégie 2020, keďže obdobie, v ktorom by bolo potrebné dosiahnuť výrazné zlepšenie v miere zamestnanosti a iných ukazovateľoch, sa skrátilo na zostávajúce štyri roky.

Pozitívne smerovanie trhu práce na Slovensku je v súlade s celkovým zlepšením európskeho trhu práce. V kontexte porovnania kvality výkonu slovenského trhu práce sa však pozícia Slovenska voči ostatným členským štátom výrazne nezlepšila. To znamená, že Slovensko sa zásadnejšie neposunulo v problematických oblastiach trhu práce v porovnaní s ostatnými krajinami EÚ. Postavenie niektorých zraniteľných skupín s ohľadom na zamestnateľnosť ostáva najpálčivejším problémom slovenského trhu práce. To dokumentuje napríklad vysoký podiel dlhodobo nezamestnaných na celkovej nezamestnanosti (graf 1.2).

G r a f 1.2

Celková a dlhodobá nezamestnanosť (počet nezamestnaných; v tis. osôb)

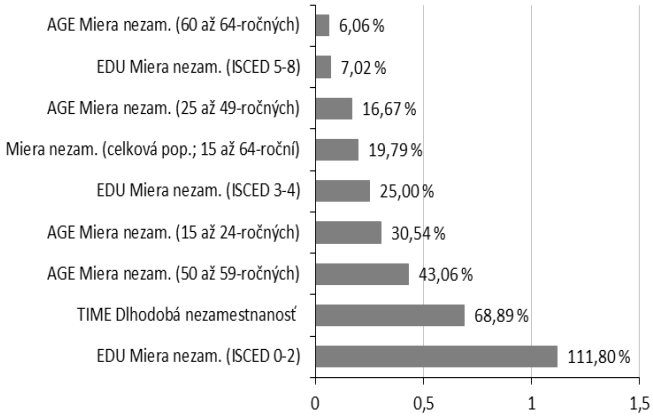


Najväčším problémom pri zaradení na trh práce čelia nezamestnaní s nízkou úrovňou vzdelania. Slovensko je v miere nezamestnanosti osôb s najnižším stupňom vzdelania dlhodobo na čele krajín EÚ. Miera nezamestnanosti ľudí s nízkym vzdelaním (36,6 % v roku 2015) ostáva viac ako dvojnásobne vyššia v porovnaní s priemerom krajín EÚ pre túto skupinu (17,4 % v roku 2015). Počet ľudí s nižším než stredoškolským vzdelaním je na Slovensku menší v porovnaní s ostatnými krajinami EÚ (vo vzdelanostnej štruktúre obyvateľstva malo 85,4 % stredoškolské vzdelanie, čo je tretia najväčšia hodnota medzi krajinami EÚ), čo však neznižuje spoločenskú závažnosť problému nezamestnanosti osôb s nižším

vzdelaním. Porovnanie mier nezamestnanosti v jednotlivých skupinách podľa veku, stupňa vzdelania a miery dlhodobej nezamestnanosti s priemerom krajín EÚ (graf 1.3) poukazuje aj na malý pokrok v zlepšovaní vyhliadok dlhodobo nezamestnaných.

G r a f 1.3

Odchýlka v miere nezamestnanosti vo vybraných skupinách v SR od priemeru krajín EÚ v danej skupine (v %)



Stále znepokojivá je pomerne vysoká miera nezamestnanosti mladých ľudí v porovnaní s inými krajinami EÚ. Miera nezamestnanosti 15 – 24-ročných síce klesla v roku 2015 na 26,5 %, teda o 3,2 percentuálneho bodu, to je však stále výrazne nad priemerom EÚ (20,4 % v 2015). Iniciatíva Európskej komisie „Záruka pre mladých“ uvedená do praxe v roku 2013, ktorú Slovensko začalo realizovať v roku 2014, predstavuje hlavnú schému opatrení pre zlepšenie vyhliadok mladých ľudí na získanie dobrého zamestnania alebo ďalšieho vzdelávania. Niektoré opatrenia boli na Slovensku realizované už v predošlých rokoch a do „Záruky pre mladých“ boli v roku 2014 zaradené, ako je tomu v prípade programu Absolventská prax (od roku 2004). Vyhodnotenia týchto opatrení budú vyžadovať dlhšie časové obdobie ich implementácie. Avšak z rozsiahlej literatúry venovanej hodnoteniam aktívnych opatrení na trhu práce vieme, že opatrenia, ktoré sú finančne nenáročné a doba ich trvania pre účastníkov je kratšia, majú pozitívny dopad na účastníkov, čo naznačuje aj vyhodnotenie Absolventskej praxe v ďalšej časti tejto publikácie.

Podľa agregátnych štatistík je teda formálne vzdelanie stále pozitívnym faktorom, ktorý zvyšuje pravdepodobnosť získania zamestnania. Zároveň nemôžeme vylúčiť, že dochádza ku vytláčaniu nižšie kvalifikovaných z ich pracovných príležitostí, teda že uchádzači s vyšším stupňom vzdelania

prijímajú pracovné miesta, na ktoré by stačil nižší stupeň vzdelania. Ďalšou oblasťou, ktorá vyžaduje pozornosť, je nezamestnanosť vyšších vekových kategórií. Jednou z ďalších možností ako adresne zlepšovať vyhliadky skupín s problematickou zamestnateľnosťou je, v súlade so Stratégiou 2020, väčší dôraz na nástroje pre podporu rozvoja zručností v rámci stratégie celoživotného vzdelávania. Je zrejmé, že trh práce kladie čoraz väčšie nároky na rozvoj zručností v rôznych obdobiach pracovného života. Preto je dôležité hľadať riešenia pre podporu autentického rozvoja zručností a kvalifikácií pre celé spektrum generácií ako aj pre riešenie špecifických problémov jednotlivcov, ktorí potrebujú nájsť uplatnenie na trhu práce.

2. *Strednodobá prognóza slovenského trhu práce s dôrazom na zmeny povolania*

Ivan Lichner – Tomáš Miklošovič – Marek Radvanský – Miroslav Štefánik

Prognóza vývoja na slovenskom trhu práce bola vytvorená kombináciou makroekonomického modelu všeobecnej rovnováhy v ekonomike a mikrosimulačného modelu štruktúry ponukovej strany slovenského trhu práce. Pri relatívne konzervatívnych očakávaniach budúceho makroekonomického vývoja model prognózuje vývoj zamestnanosti v 18 sektoroch, pre 3 kvalifikačné stupne (definované na základe povolania), počas rokov 2016 až 2025. Pri prognózovaní budúcej potreby pracovnej sily rozlišujeme dva typy dopytu po práci:

Expanzný dopyt – vyplývajúci z nárastu alebo poklesu celkovej zamestnanosti v sektore, zo vzniku alebo zániku pracovných pozícií.

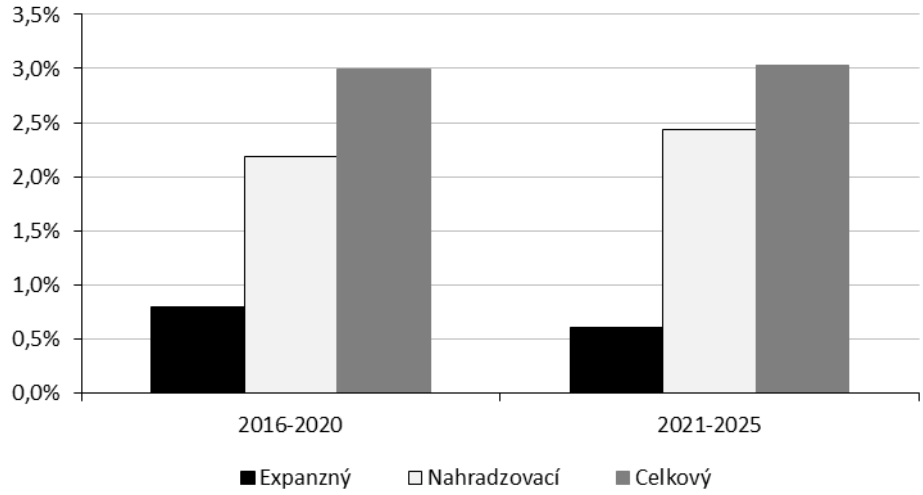
Nahradzovací dopyt – vznikajúci pri odchode pracovníka z existujúcej pracovnej pozície do dôchodku, invalidity alebo v dôsledku úmrtia.

Prognóza očakáva pozitívne hodnoty expanzného dopytu počas celého prognózovaného obdobia, pričom po roku 2020 je očakávaný jeho mierny pokles. Počas rokov 2016 – 2020 bude v priemere vytvorená dodatočná zamestnanosť na úrovni približne 0,8 % ročne, v období 2021 – 2025 priemerný dopyt po práci spôsobený ekonomickým rastom SR klesne pod 0,6 % ročne. Očakávaný expanzný dopyt bude však iba zlomkom očakávaného

nahradzovacieho dopytu, ktorý bude naopak s postupom času narastať. Do roku 2020 očakávame priemernú medziročnú potrebu nahradenia 2,2 % zamestnaných, v období 2021 – 2025 očakávame nárast na úrovni okolo 2,4 % z celkovej zamestnanosti.

G r a f 2.1

Expanzný, nahradzovací a celkový dopyt po práci ako podiel na celkovej zamestnanosti (ročný priemer)

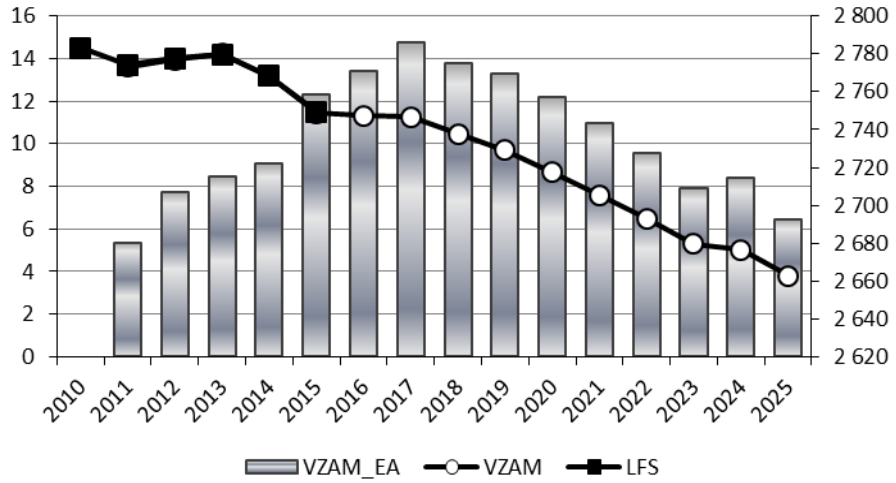


Ak vezmeme do úvahy oba, expanzný aj nahradzovací dopyt, medziročne bude slovenský trh práce potrebovať obsadiť voľné pracovné miesta na úrovni približne troch percent existujúcej zamestnanosti. To predstavuje viac ako 70 tisíc pracovníkov, čo je podstatne viac ako očakávaný medziročný prítok absolventov škôl. Tento rozdiel bude potrebné nahradiť z iných zdrojov. V horizonte desiatich rokov to bude možné jednak z radov nezamestnaných, zvyšovaním miery ekonomickej aktivity alebo migráciou. V dlhodobom horizonte by bolo udržateľným riešením zvýšenie pôrodnosti. S najväčšou pravdepodobnosťou však trend poklesu ekonomicky aktívneho obyvateľstva nebude dostatočne kompenzovaný a ďalší rast ekonomiky bude z dlhodobého hľadiska výrazne limitovaný ponukou práce, teda nedostatkom voľných pracovníkov.

Za predpokladu, že by bol očakávaný dopyt saturovaný nezamestnanými, by bolo možné očakávať pokles miery nezamestnanosti tempom, ako ho indikuje graf 2.2.

G r a f 2.2

Očakávaný vývoj miery nezamestnanosti v rámci scenára neobmedzeného zamestnávania (ľavá os) a počtu ekonomicky aktívneho obyvateľstva (pravá os)



Graf 2.2 zobrazuje vývoj miery nezamestnanosti v hypotetickom scenári, kde zamestnávatelia obsadzujú voľné pracovné pozície bez ohľadu na kvalifikáciu uchádzačov. V modelovom scenári tak nedochádza ku kvalifikačnému nesúladu a voľné pracovné miesta sú obsadzované najmä nezamestnanými. V takejto situácii by miera nezamestnanosti rýchlo klesala, ako dôsledok poklesu ponuky práce. Takýto vývoj je v skutočnosti málo reálny, najmä pre nevhodnú kvalifikačnú štruktúru súčasných nezamestnaných, vysoký podiel dlhodobo nezamestnaných, nízku dostupnosť nástrojov aktívnych opatrení trhu práce, či slabšiu účasť na celoživotnom vzdelávaní.

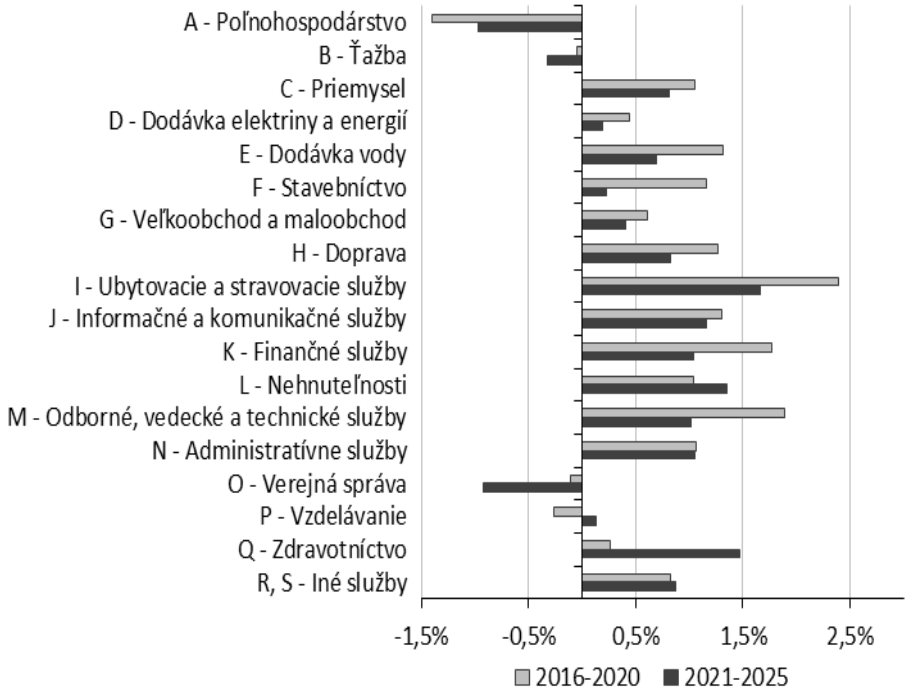
Expanzný a nahradzovací dopyt sa výrazne líšia, ak sledujeme jednotlivé sektory ekonomickej činnosti. Napríklad v poľnohospodárstve prognóza indikuje negatívny expanzný dopyt (zamestnanosť v sektore sa bude v absolútnom vyjadrení zmenšovať), ale zároveň je možné očakávať jeden z najvyšších nahradzovacích dopytov hlavne vzhľadom na vysoký podiel starších zamestnancov v sektore. V konečnom dôsledku tak bude poľnohospodárstvo naďalej absorbovať absolventov poľnohospodárskych odborov, aj napriek celkovému poklesu zamestnanosti v tomto sektore. Opačným príkladom je sektor informačných technológií, kde je nahradzovací

dopyt jeden z najnižších, čo je dôsledkom relatívne mladšej vekovej štruktúry zamestnancov v tomto sektore. Napriek tomu je tu expanzný dopyt relatívne vyšší, keď sa v priemere očakáva viac ako jednopercentný nárast zamestnanosti ročne počas celého prognózovaného obdobia.

Pri pohľade na trh práce ako celok očakávame pozitívne nárasty počtu pracovných pozícii, ktoré po roku 2020 mierne poklesnú. Podstatne väčšiu časť dopytu po práci však bude predstavovať nahrádzanie súčasných pracovníkov v už existujúcich pozíciách.

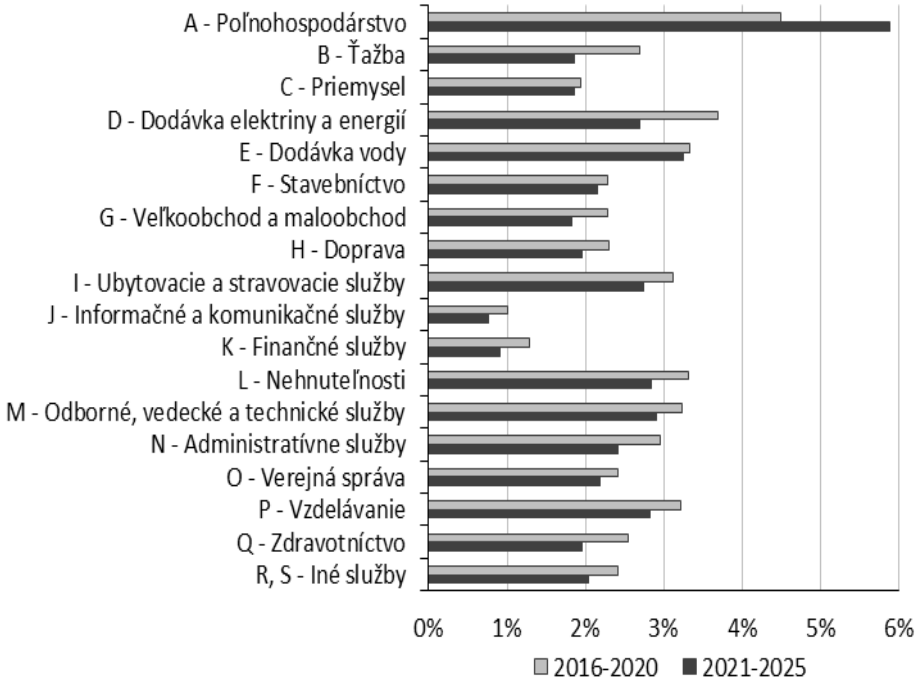
G r a f 2.3

Expanzný dopyt podľa sektorov ekonomickej činnosti, priemerná medziročná zmena ako % z celkovej zamestnanosti v predchádzajúcom roku



G r a f 2.4

Nahradzovací dopyt podľa sektorov ekonomickej činnosti, priemerná medziročná zmena ako % z celkovej zamestnanosti v predchádzajúcom roku



3. *Beveridžova krivka, dynamika trhu práce a krátkodobá prognóza indikátorov trhu práce*

Eva Rublíková – Martina Lubyová

V tretej kapitole analyzujeme empirický vzťah medzi nezamestnanosťou a voľnými pracovnými miestami na Slovensku, ktorý je z literatúry známy ako Beveridžova krivka (*Beveridge curve*). Zaoberáme sa časovým obdobím rokov 2001 až 2016, ktoré bolo charakteristické dvomi konjunktúrami, prerušené obdobím ekonomickej krízy. Na trhu práce sa tieto obdobia premietli počas rokov 2001 – 2007 a 2012 – 2016, kedy rástli počty voľných pracovných miest a nezamestnanosť klesala. Vývoj nezamestnanosti reagoval na vývoj pracovných miest s oneskorením až o 8 mesiacov. Krízové obdobie sa teda na trhu práce prejavilo najmä počas rokov 2008 až 2013, čo je v súlade so zisteniami MOP, že efekty krízy sa na trhu práce prejavujú o 3 až 4 roky dlhšie než v reálnej ekonomike.

Oživenie trhu práce nastalo až počas uplynulých dvoch rokov, keď začali rásť počty voľných pracovných miest a nezamestnanosť výraznejšie poklesla ku hranici 10 %. Rok 2015 bol unikátny tým, že firmy ponúkali výrazne viac voľných pracovných miest (takmer trikrát viac než v predchádzajúcom roku). Beveridžova krivka však sa po prekonaní krízy po roku 2009 posunula smerom, ktorý naznačuje nižšiu efektívnosť zlaďovacieho procesu na trhu práce. Tvar krivky po roku 2009 naznačuje nižšiu elasticitu miery nezamestnanosti voči miere voľných pracovných miest než v predchádzajúcich obdobiach.

Analýzou dynamiky nezamestnaných a voľných pracovných miest sme ukázali, že nástupy krízy na trh práce bolo možné predpovedať aj z meniacej sa dynamiky tokov (prírastkov a úbytkov) nezamestnaných a voľných pracovných miest.

Pomocou tzv. zlaďovacej funkcie (*matching function*) sme skúmali vzťah miery úbytkov z nezamestnanosti a miery voľných pracovných miest v SR. Analýza sezónne ošetrených časových radov tokov po aplikácii Hodrick-Prescottovho filtra ukázala, že dlhodobá elasticita (za celé skúmané obdobie 2001 – 2016) miery úbytkov z nezamestnanosti voči miere voľných pracovných miest je približne 0,2 (táto hodnota je menšia než napríklad hodnota 0,3, ktorú získal Pissarides (1986), avšak jeho odhady zahŕňali len mužskú populáciu). Podobne nízku citlivosť voči miere voľných pracovných miest má aj miera prítokov do nezamestnanosti. Slovenský odhad elasticity, aj keď je pomerne nízky, sa teda nevymyká bežným hodnotám.

Zlaďovacia funkcia v SR však vykazovala počas skúmaného obdobia 2001 – 2016 negatívny časový trend, t. j. efektivita zlaďovacieho procesu medzi nezamestnanými a voľnými pracovnými miestami dlhodobo klesala. Tento negatívny trend môže súvisieť so zvýšenou rigiditou trhu práce (napr. v dôsledku zvýšenej pracovnoprávnej ochrany zamestnancov) a s narastajúcimi štrukturálnymi problémami (dlhodobá nezamestnanosť, nesúlad charakteristík dopytu a ponuky práce). Dĺžka trvania nezamestnanosti za celé skúmané obdobie dosahovala v priemere 1 rok.

V závere kapitoly poskytujeme krátkodobé prognózy vývoja trhu práce v SR založené na Box-Jenkinsovej transformácii časových radov a využití

ARIMA modelov (ktoré sa ukázali ako optimálne na základe diagnostiky autokorelačných funkcií). Tieto prognózy naznačujú, že pozitívny vývoj slovenského trhu práce bude začiatkom roku 2017 pokračovať.

Ďalší pokles miery nezamestnanosti však môže byť zbrzdený existenciou veľkého jadra dlhodobo nezamestnaných. Ďalšie úspechy pri znižovaní miery nezamestnanosti budú teda v budúcnosti čoraz viac závisieť ani nie tak od počtu voľných pracovných miest, ale najmä od riešenia štrukturálnych problémov – najmä dlhodobej nezamestnanosti a efektívnosti pri zamestnávaní konkrétnych ťažko umiestniteľných skupín – napríklad ľudí s nízkym stupňom vzdelania ISCED 0-2 (ktorých miera zamestnanosti je u nás najnižšia v celej EÚ), znižovania nezamestnanosti v tzv. najmenej rozvinutých okresoch Slovenska a pod.

4. Dlhodobé efekty Absolventskej praxe

Miroslav Štefánik – Katarína Karasová – Ivana Studená

Absolventská prax (AP), poskytovaná podľa §51 zákona č. 5/2004 Z. z. o službách zamestnanosti a o zmene a doplnení niektorých zákonov v znení neskorších predpisov, patrí medzi najstaršie spomedzi poskytovaných opatrení aktívnej politiky trhu práce na Slovensku. Relatívne nedávno sa dostala do koša opatrení „Záruky pre mladých“, kde sa ocitla s podstatne sofistikovanejšími, ale aj nákladnejšími opatreniami. Viacero slovenských štúdií sledujúcich účinnosť AP poukazuje na, síce malý, ale pozitívny príspevok k zamestnanosti tých, ktorí AP absolvovali (Harvan, 2011; Štefánik et. al., 2014; Bořík et. al., 2015). Nízka nákladnosť AP, v kombinácii s pozitívnym účinkom na zamestnanosť, z nej robí jedno z najatraktívnejších opatrení aktívnej politiky trhu práce na Slovensku. Existujúce štúdie sledujú účinnosť opatrenia v horizonte do dvoch rokov. V rámci tejto štúdie sme sa zamerali na efekty AP v dlhodobom horizonte, až do päť a pol roka po ukončení účasti na opatrení. Zároveň si kladieme otázku, aká je optimálna dĺžka účasti na AP.

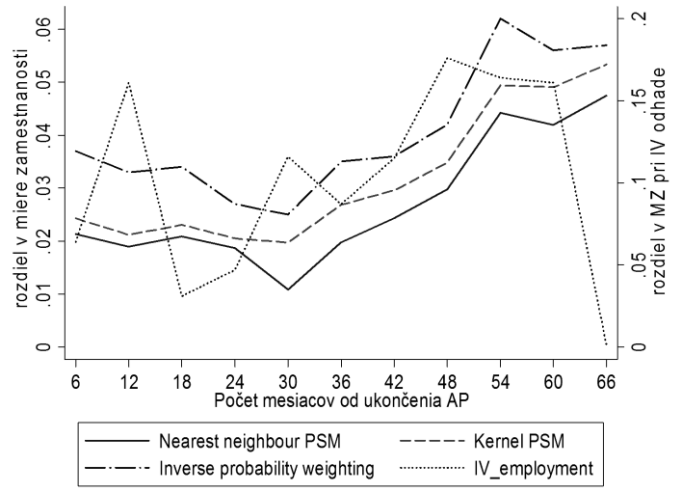
Sledujeme výsledky účastníkov AP z obdobia rokov 2007 a 2008. Počas tohto obdobia bola AP poskytovaná uchádzačom o zamestnanie (UoZ) do 25 rokov. Na základe písomnej dohody medzi absolventom školy

a úradom práce, sociálnych vecí a rodiny a na základe uzatvorenej písomnej dohody medzi úradom práce, sociálnych vecí a rodiny a zamestnávateľom, účastníci AP vykonávali absolventskú prax u zamestnávateľa 20 hodín týždenne, za ktorú im úrad práce, sociálnych vecí a rodiny poskytoval príspevok na vykonávanie absolventskej praxe (do 30. 4. 2008 vo výške 56 eur mesačne).

Účelom AP je poskytnúť absolventom škôl kontakt s pracoviskom a možnosť zbierať prvé pracovné skúsenosti. Tento typ opatrení je v krajinách EÚ bežný. Vďaka tomu je dostupná široká paleta štúdií vyhodnocujúcich účinnosť porovnateľných opatrení. Vďaka skúsenostiam zo zahraničia môžeme očakávať zvýšenú účinnosť tohto opatrenia v horizonte dlhšom ako dva roky.

G r a f 4.1

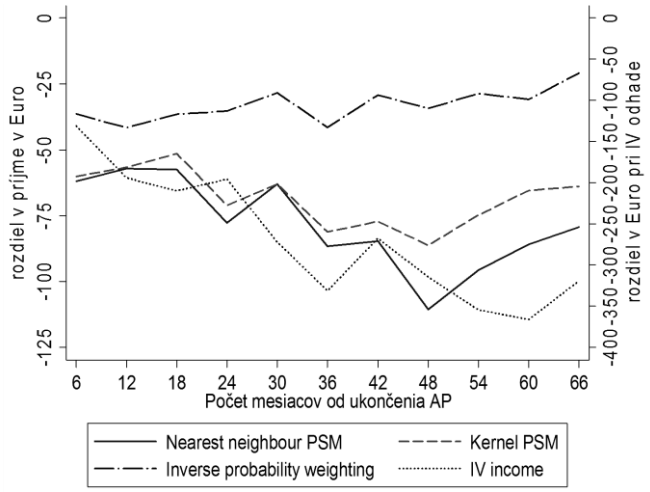
Účinnosť Absolventskej praxe z hľadiska zamestnanosti účastníkov



Pre kvantifikáciu účinnosti AP sme sledovali zamestnanosť a príjem účastníkov AP počas 66 mesiacov od ukončenia ich účasti na AP. Výsledky pozorované pre účastníkov sme vyhodnocovali štyrmi rôznymi technikami kontrafaktuálneho vyhodnotenia účinnosti. Výsledky všetkých použitých metód sa zhodujú v základných zisteniach. Účasť na AP zvyšuje šancu účastníkov zamestnať sa v období po absolvovaní AP. Zároveň môžeme pozorovať negatívny príjmový efekt AP, keď príjem účastníkov AP je v priemere nižší ako príjem porovnateľnej skupiny absolventov bez účasti na AP.

G r a f 4.2

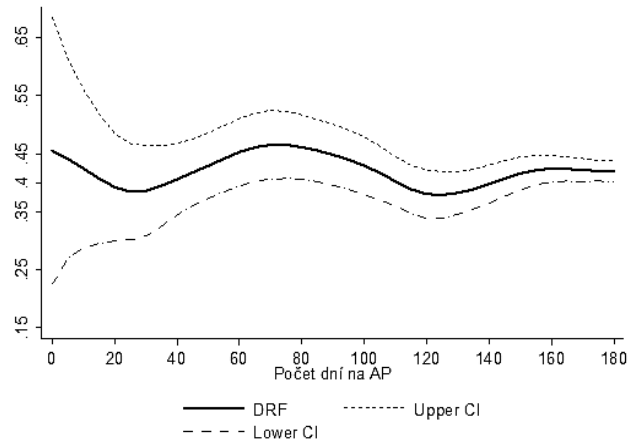
Účinnosť Absolventskej praxe z hľadiska príjmu účastníkov



Účastníci AP, v dôsledku účasti na AP, sú ochotní nastúpiť na pracovné pozície s nižším ohodnotením, čo má pozitívny efekt na ich zamestnanosť. Tento rozdiel sa v prípade našej kohorty účastníkov prejaví výraznejšie po 30 mesiaci od ukončenia účasti na AP. Zvýšenie účinnosti opatrenia môže byť spojené aj s externými faktormi, ako bol napríklad dopad celosvetovej ekonomickej krízy na slovenský trh práce.

G r a f 4.3

Funkcia účinnosti na zamestnanosť (54 mesiacov po ukončení účasti na AP)



Pri otázke ideálnej dĺžky účasti na AP sme použili techniku *generalized propensity score matching*, pomocou ktorej je možné vykresliť funkciu účinnosti opatrenia v závislosti od dĺžky účasti na ňom. Maximum funkcie je možné pozorovať pri účasti dlhej 70 dní. Odhad tohto maxima je však málo spoľahlivý, dôvodom je menej pozorovaní a predčasné ukončenia z dôvodu nástupu do zamestnania.

Funkcia účinnosti však zostáva stabilná už od 160 dní účasti na opatrení. Toto naznačuje možný priestor pre experimentovanie so skracovaním dĺžky účasti na opatrení.

AP je klasickým a jednoduchým typom opatrenia aktívnej politiky trhu práce, ktorého účelom je poskytnúť možnosť získať pracovné skúsenosti pre absolventov škôl. Tento typ opatrení relatívne často prináša pozitívny efekt na zamestnanosť, čo dokumentujú viaceré skúsenosti zo zahraničia, aj Slovenska. Výhodou slovenskej verzie AP je jej nízka nákladnosť a relatívna dostupnosť. Kvantifikácie účinnosti z tejto štúdie by bolo užitočné konfrontovať s porovnateľnými kvantifikáciami účinnosti novších, sofistikovanejších a drahších, opatrení poskytovaných v rámci „Záruky pre mladých" na Slovensku.

5. *Mikrosimulácie zmien v garancii minimálneho sociálneho príjmu*

Daniel Gerbery – Tomáš Miklošovič

V drvivej väčšine vyspelých krajín existuje verejne financovaná podpora ľudí ohrozených chudobou, depriváciou a sociálnym vylúčením. Najčastejšie ide o tzv. programy podpory minimálneho príjmu, ktoré sú určené pre domácnosti s nízkymi alebo absentujúcimi príjmami. V súvislosti so štrukturálnymi premenami na trhu práce sa z týchto pôvodne reziduálnych častí sociálnej ochrany stávajú dôležité súčasti stratégií sociálneho začlenenia.

Každý takýto systém v sebe nevyhnutne obsahuje napätie medzi dvoma cieľmi, ktoré by mal súčasne sledovať. Na jednej strane by program garancie minimálneho príjmu mal zabezpečovať takú úroveň príjmov, ktorá by – na minimálnej úrovni – umožnila akceptovateľný a dôstojný životný štandard, zabraňujúci vzniku sociálneho vylúčenia a deprivácie. Na druhej strane by mal pôsobiť motivujúco smerom k trhu práce – teda vytvárať také podmienky, ktoré nevytvárajú zbytočné bariéry pre hľadanie si pracovného uplatnenia. *Pomoc v hmotnej núdzi*, čo je systém podpory minimálneho príjmu na Slovensku, je dlhodobo typický tým, že uvedené dva aspekty sú v príkrej nerovnováhe. V centre pozornosti, a to dlhodobo, je otázka

demotivácie vytváranej sociálnymi transfermi pre chudobných, problém „štedrosti“ sociálnych dávok a neochoty pracovať či dokonca „závislosti na dávkach“. V tejto situácii je preto dôležité pozrieť sa aj na druhú stranu mince, a to na otázku adekvátnosti podpory chudobných domácností, ktorá je, až na pár výnimiek, dlhodobo mimo pozornosti verejnej politiky.

Kapitola prináša analýzu dopadov troch zmien v nastavení Pomoci v hmotnej núdzi, ktorá je založená na mikrosimuláciách v programe EUROMOD. EUROMOD je mikrosimulačný model obsahujúci podrobné informácie o parametroch sociálnej ochrany a daňových systémoch, ktorý pracuje s mikrodátami z EU SILC a ktorého hlavným výstupom sú zmeny v príjmoch domácností ako výsledky zmien v daniach a sociálnych transferoch. EUROMOD umožňuje získať štyri hlavné typy odhadov: odhady agregovaných efektov reforiem na rozpočet, odhady dopadov reforiem v oblasti chudoby a nerovností, či sociálneho začlenenia, odhady dopadov na rôzne sociálno-ekonomické skupiny a indikátory motivácie k práci.

Východiskom analýz je konštatovanie nízkej adekvátnosti príjmov garantovaných Pomocou v hmotnej núdzi, nízkou senzitivitou dávok na počet detí v rodine a chýbajúca flexibilita. Pozornosť sme zamerali na analýzu troch reforiem:

- zvýšenie súm dávky v hmotnej núdzi,
- zavedenie novej diferenciácie súm dávky v hmotnej núdzi (novej škály ekvivalencie),
- zaradenie 50 % rodičovského príspevku na zoznam príjmov, ktoré sa neberú do úvahy pri posudzovaní nárokov na pomoc v hmotnej núdzi.

Pri uvedených troch typoch zmien sme sledovali ich dopady na rozpočet (úroveň výdavkov), rozsah a štruktúru cieľovej populácie, výskyt príjmovej chudoby, príjmovej situácie na spodných priečkach príjmovej štruktúry, hĺbky príjmovej chudoby a príjmovej nerovnosti.

Výsledky analýz ukazujú, že zvýšenie súm dávky v hmotnej núdzi vedie k nárastu počtu poberateľov (a samozrejme k zvýšeniu výdavkov), čo je však kompenzované len slabým znížením príjmovej chudoby. Zvýšenie dávky o 5 eur by viedlo k poklesu chudoby len o 0,21 %. Zvýšenie dávky o 15 eur by znamenalo pokles príjmovej chudoby o 1,5 %. V prípade

zvýšenia sumy o 30 eur by sa chudoba na Slovensku znížila o 2 %. Túto relatívne slabú odozvu možno pripočítať aj konštrukcii indikátora „riziko príjmovej chudoby“, podľa ktorého sú za chudobných považované tie osoby, ktorých ekvivalentný disponibilný príjem je nižší než 60 % mediánového ekvivalentného príjmu. Silnejšie efekty možno sledovať z hľadiska takzvanej hĺbky chudoby – pri indikátore „relatívny prepad mediánu príjmov v riziku chudoby“ (*relative median at-risk-of-poverty gap*), ktorý vyjadruje rozdiel medzi mediánom príjmov osôb v riziku chudoby a hranicou chudoby. Ukazuje sa, že zvýšenie súm, a teda aj výdavkov, sa prejavuje vo výraznom znižovaní medzery medzi príjmami chudobných a hranicou chudoby. To isté možno pozorovať, ak v tomto vzťahu nahradíme hranicu chudoby, definovanú ako 60 % mediánu príjmu v krajine, životným minimom. Aj tu platí, že zvýšenie súm vedie k znižovaniu rozdielu medzi mediánom príjmov chudobných ľudí a hranicou chudoby (v tomto prípade životným minimom). Na druhej strane, dopad zvyšovania dávky v hmotnej núdzi na príjmovú nerovnosť je veľmi slabý. Reakcia na zmeny vo výške dávky v hmotnej núdzi sa mení podľa typu domácnosti. Nižšiu mieru senzitivity vykazujú domácnosti s vyšším počtom detí a jednorodičovské domácností. Vyššiu mieru senzitivity majú zase domácnosti s dvoma dospelými osobami a dvoma deťmi a bezdetné páry.

Druhá zmena, ktorej dopady sme skúmali, sa týkala spôsobu, akým sú diferencované sumy dávky v hmotnej núdzi. Pokúsili sme sa zistiť, čo by znamenalo, ak by sme na dávky v hmotnej núdzi aplikovali dve nové ekvivalenčné škály – tzv. starú OECD škálu a tzv. modifikovanú OECD škálu. Obe škály sú senzitívnejšie na počet detí v domácnosti. Znamená to, že (v porovnaní s existujúcim stavom) prítomnosť závislých detí má silnejšiu váhu. Ukázalo sa však, že ani jedna z testovaných škál nie je úplne vhodným kandidátom na kritérium, ktoré by malo slúžiť na diferenciáciu súm dávky v hmotnej núdzi. Ani v jednom prípade nedošlo k zásadnému a, čo je rovnako dôležité, všeobecnému zlepšeniu v oblasti príjmovej chudoby alebo nerovnosti. Pre prípadné úvahy o novej diferenciácií súm – čo je téma, ktorej sa slovenská verejná politika v najbližšej budúcnosti nevyhne – považujeme za užitočné začať s pohľadom na tzv. starú OECD škálu, ktorá vedie k akceptovateľnejším výsledkom.

Nakoniec, uľahčenie prístupu nízkopríjmových domácností poberajúcich rodičovský príspevok k pomoci v hmotnej núdzi – prostredníctvom zaradenia časti rodičovského príspevku do zoznamu príjmov, ktoré sa neberú do úvahy pri posudzovaní nárokov – vedie k zmiešaným výsledkom. Na jednej strane chýba všeobecný pozitívny trend, ktorý by legitimizoval zvýšenie výdavkov a zvýšenie počtu poberateľov dávky v hmotnej núdzi. Na druhej strane sú tu určité typy domácností, pre ktoré by takýto krok znamenal signifikantné zlepšenie situácie.

6. *Pracujúca chudoba: Slovensko a stredná Európa*

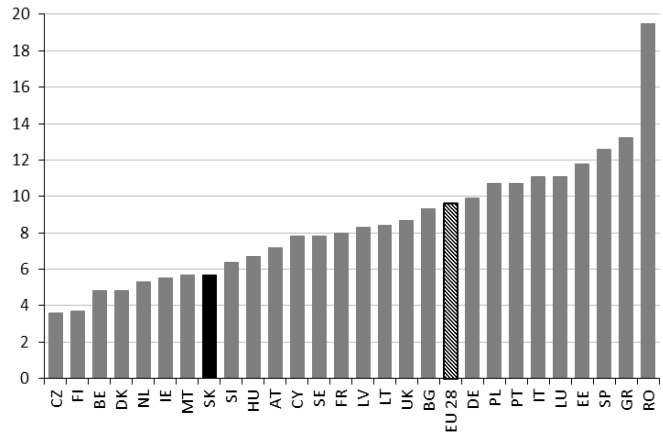
Pavol Baboš

Výskum *pracujúcej chudoby* patrí k relatívne málo rozvinutej oblasti výskumu na Slovensku, najmä pokiaľ ide o porovnanie so západnými krajinami EÚ. Jedným z dôvodov môže byť to, že výskum chudoby vo všeobecnosti na Slovensku zaostával za západnými krajinami, čo sa týka počtu výskumníkov a publikácií v danej oblasti. V období pred rokom 1989 bolo exaktné meranie a systematické skúmanie chudoby takmer, ak vôbec, nemožné (Džambazovič a Gerbery, 2004). V 90. rokoch sa objavili prvé štúdie zamerané na problém chudoby, reprezentované najmä prípadovými štúdiami a štúdiami založenými na jednorazovom výberovom zisťovaní. V strednej a východnej Európe však chýbal systematický zber medzinárodne porovnateľných údajov.

Zabúdať netreba ani na fakt, že hospodárstva strednej a východnej Európy boli pred rokom 1989 značne orientované na priemysel a výrobné odvetvia a ekonomická transformácia bola zavŕšená iba v druhej polovici 90. rokov. Toto je dôležité z hľadiska kontextualizácie problému pracujúcej chudoby ako fenoménu, ktorý je charakteristický pre post-industriálnu ekonomiku, spojenú s rastom zamestnanosti v službách, väčšinou za nízke mzdy a bez tradičnej zamestnaneckej ochrany (Marx a Nolan, 2012).

G r a f 6.1

Podiel pracujúcej chudoby (pracujúci na plný pracovný úväzok vo veku 18 až 64 rokov žijúci v domácnostiach pod hranicou chudoby v %; 2014)



Priemer EÚ 28 bol v roku 2014 na úrovni 9,6 %. Necelá desatina ľudí spomedzi pracujúcich na plný pracovný úväzok vo veku 18 až 64 rokov žila v domácnosti pod hranicou chudoby. Najnižší počet pracujúcich chudobných má Česká republika a Fínsko, a to menej ako 4 %. Naopak, výrazne najvyšší podiel pracujúcej chudoby je v Rumunsku, konkrétne 19,5 % v roku 2014. Slovensko sa nachádza v prvej tretine krajín s najnižším podielom pracujúcej chudoby, a to na úrovni 5,7 %. Ako tiež vidno, na oboch koncoch rebríčka, ako aj v strede, sú krajiny západnej aj východnej Európy. Nedá sa preto povedať, žeby postkomunistické krajiny tvorili homogénny blok s ohľadom na pracujúci chudobu, ani žeby ich komunistická minulosť dnes výrazne vplývala na úroveň pracujúcej chudoby a oddeľovala ich tak od krajín západnej Európy.

Tabuľky nižšie ukazujú mobilitu z a do stavu chudoby medzi rokmi 2013 a 2014 (tab. 6.1) a trvanie stavu pracujúcej chudoby medzi rokmi 2011 a 2014 (tab. 6.2). Celkovo sa ukazuje, že v rokoch 2013 a 2014 sa asi 91,5 % pracujúcich udržalo nad hranicou chudoby. Na druhej strane, približne 2,6 % pracujúcich bolo pod hranicou chudoby v roku 2013 a nedostalo sa nad ňu ani v roku 2014. Množstvo pracujúcich, ktorí sa dokázali medzi skúmanými rokmi dostať nad hranicu chudoby, respektíve pod ňu spadnúť, bolo 2,6 % a 3,3 %. Tieto výsledky naznačujú, že mobilita z a do stavu pracujúcej chudoby je relatívne vysoká, keďže počet ľudí, ktorí sa medzi dvomi stavmi pohyboval, bol dvojnásobný oproti množstvu ľudí, ktorí v oboch rokoch ostali pod hranicou chudoby.

T a b u ľ k a 6.1

Mobilita do a zo stavu pracujúcej chudoby medzi rokmi 2013 a 2014

	Mimo pracujúcej chudoby 2013	Pracujúca chudoba 2013
Mimo pracujúcej chudoby 2014	4 119	148
% celkovo	*91,45*	*3,29*
Pracujúca chudoba 2014	119	118
% celkovo	*2,64*	*2,62*

T a b u ľ k a 6.2

Trvanie pracujúcej chudoby medzi rokmi 2011 a 2014

Počet rokov	Počet respondentov	Podiel (%)
0	1 162	88,97
1	81	6,20
2	31	2,37
3	15	1,15
4	17	1,30

Druhá tabuľka ukazuje množstvo a podiel pracujúcich ľudí, ktorých údaje boli sledované počas rokov 2011 až 2014 a počet rokov, počas ktorých sa ich domácnosť ocitla pod hranicou chudoby. Z nej je zrejmé, že takmer 90 % pracujúcich sa za celé obdobie nedostalo pod hranicu chudoby. Zo zvyšných vyše 10 % pracujúcich sa pod hranicou chudoby ocitla väčšina, 6,2 % zo všetkých sledovaných, iba na jeden rok. Extrémnu situáciu v rámci sledovaného fenoménu, a teda stav pracujúcej chudoby počas celých štyroch rokov, sme zaznamenali u približne 1,3 % pracujúcich.

7. VZAM_microsim_1.1 – výsledky variantu modelu na údajoch z roku 2011 a zhodnotenie predikcií v porovnaní s reálnym vývojom

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VZAM_microsim_1.1 je súčasťou modelu VZAM, ktorého výsledky sú prezentované v druhej kapitole tejto knihy. VZAM_microsim_1.1 prognózuje vývoj ponukovej strany slovenského trhu práce pomocou mikrosimulačného prístupu. To znamená, že do modelu vstupujú individuálne údaje o populácii Slovenska, tak ako boli zachytené v rámci *Výberového zisťovania pracovných síl* (VZPS). Následne sú v jednotlivých časových obdobiach simulované procesy: demografické, dosahovania vzdelania,

rozhodnutia týkajúce sa ekonomického statusu a zamestnávania sa v povolaniach a sektoroch ekonomických činností. V prípade hlavných výsledkov modelu VZAM prezentovaných v druhej kapitole tejto knihy bol vstupným súborom súbor VZPS z roku 2014. V tejto kapitole sú prezentované výsledky variantu modelu, v ktorom boli ako vstupný súbor použité individuálne údaje z VZPS z roku 2011. Takto získané výsledky VZAM_microsim_1.1 môžeme vďaka tomu konfrontovať s reálnym vývojom zaznamenaným v neskorších kolách VZPS, do roku 2015. Týmto porovnaním sa usilujeme o poskytnutie obrazu o spoľahlivosti mikrosimulačných predikcií.

VZAM_microsim_1.1 sleduje nasledujúce znaky jednotlivcov: pohlavie, vek, stupeň vzdelania, odbor vzdelania, ekonomický status, u zamestnaných naviac aj sektor ekonomickej činnosti a kvalifikačný stupeň (definovaný vykonávaným povolaním). Tieto znaky sú v rámci simulácií reprodukované v budúcich obdobiach na základe modelom definovaných procesov. Procesy je možné zoskupiť do nasledujúcich modulov modelu.

DEMO (Demografia)	EDU (Dosahovanie vzdelania)	EA (Ekonomická aktivita)	EMPL (Zamestnávanie)
Simuluje základné demografické procesy: starnutie, pôrodnosť a úmrtnosť.	Simuluje dosahovanie stupňa a odboru vzdelania.	Simuluje ekonomický status jednotlivcov v každom období na základe statusu z minulého obdobia a ďalších znakov. Identifikované statusy sú: ekonomicky aktívny, študent, dôchodca, invalid, iná forma ekonomickej neaktivity.	Pri ekonomicky aktívnych rozhodne, či a v akom sektore a kvalifikačnej úrovni budú zamestnaní.

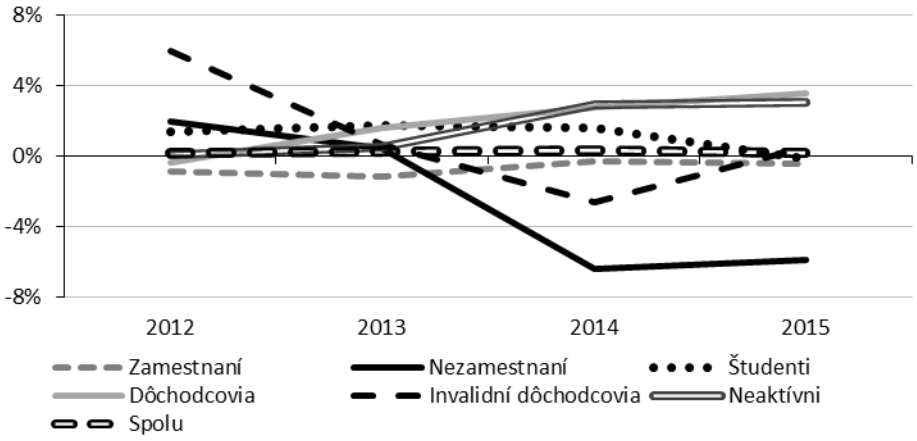
T a b u ľ k a 7.1

Rozdiely medzi Výberovým zisťovaním pracovných síl a projekciami VZAM_microsim_1.1 za rok 2014

	Počet osôb podľa VZPS	VZAM_ microsim_1.1	Rozdiel v osobách	Rozdiel v %
Zamestnaní	2 363 052	2 370 613	- 7 561	-0,3
Nezamestnaní	358 858	383 398	- 24 540	-6,4
Študenti	1 290 031	1 270 049	19 982	1,6
Dôchodcovia	996 326	969 931	26 395	2,7
Invalidní dôchodcovia	164 342	168 800	- 4 458	-2,6
Neaktívni	243 339	236 440	6 899	2,9
Spolu	5 415 949	5 399 231	16 718	0,3

G r a f 7.1

Rozdiel medzi predikciami a VZPS v % pre obdobie 2012 – 2015



Predikcie ekonomického statusu v konfrontácii s číslami z VZPS obstáli veľmi dobre. Odchýlka prekročila 5 % iba v prípade predikcie počtu nezamestnaných, keď model prognózoval mierne nižší počet nezamestnaných v porovnaní s realitou sledovanou VZPS. VZPS je však tiež spojené s výberovou chybou, keďže ide o výberové zisťovanie. Na jeho obmedzenia sme narazili, keď sme vyhodnocovali zhodu prognózovaného nahradzovacieho dopytu s realitou. Prognózované hodnoty spoľahlivo zachytávajú hlavné rozdiely v hodnotách nahradzovacieho dopytu medzi sektormi ekonomických činností. Spoľahlivejšie predikcie získavame pre početnejšie sektory ekonomických činností.

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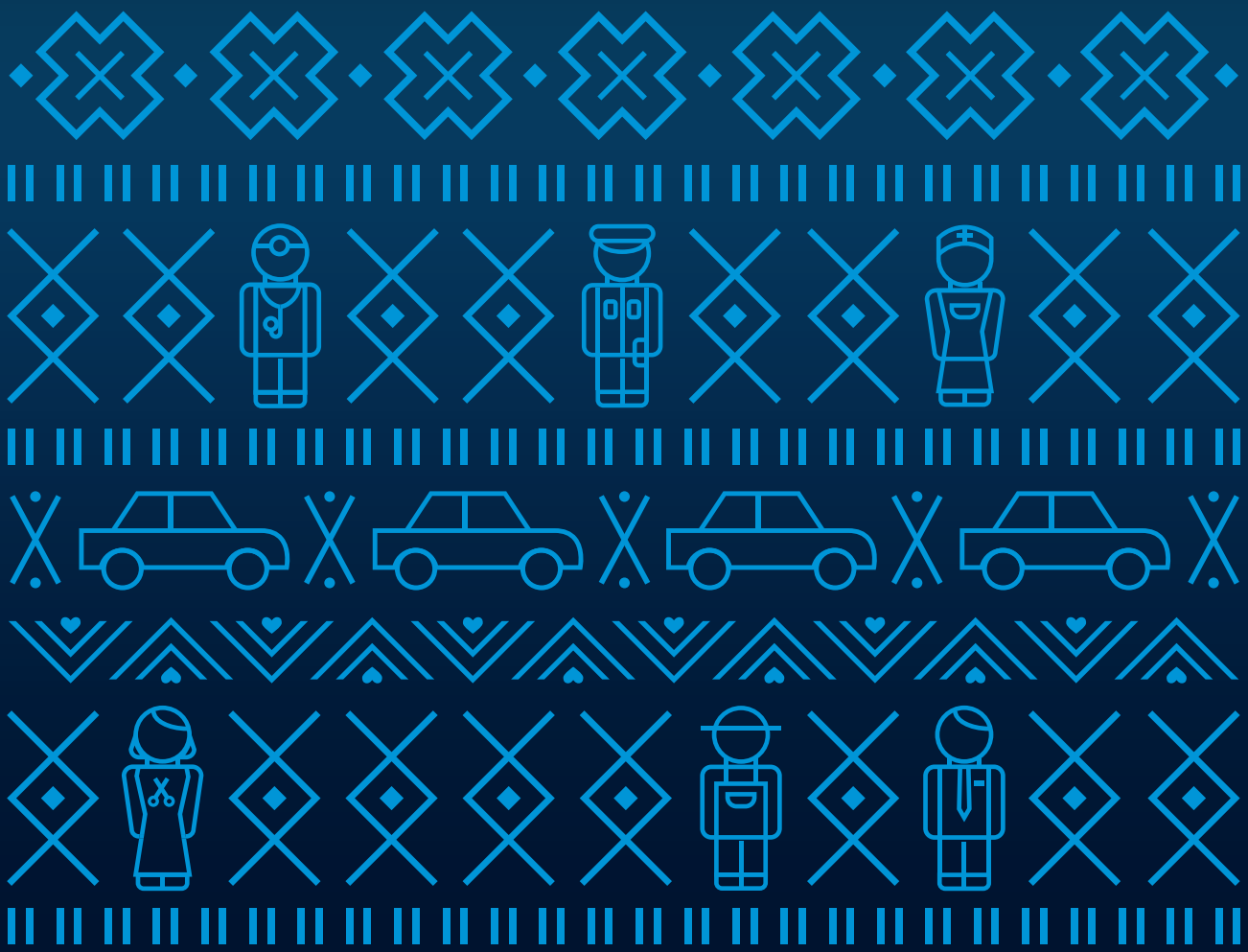

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