Human Capital and regional disparities in Slovakia

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Abstract

The accumulation of the human capital stock plays a key role to explain the macroeconomic performance across regions. Appropriate human resources are important to determine whether regions are able to participate in the innovation process. The paper deals with some indicators to proxy the human capital stock both at the national and regional level. To get an impression on the location of innovation areas in Slovakia, the spatial distribution of knowledge is also examined. The paper analyses the regional structure and changes of educational qualifications and R&D expenditure. Furthermore, it sets out that human capital is a new resource, which has more and more important role in shaping of territorial processes.

Key words: Human capital, regional disparities, educational characteristics, R&D expenditure.
JEL Classification: I20, O30, O40

1 Introduction

Efforts in the research and development (R&D), innovation processes and an accumulation of human capital both at the national or regional level, have been linked in the economic literature (growth theory, new endogenous growth theory and new economic geography) with higher growth rates, competitiveness and many other factors. Human capital accumulation is a cornerstone in models of endogenous growth; see the seminal papers of Lucas [1] and Romer [2]. Some authors have treated human capital as an input to the production process like any other factors. Its accumulation leads to increased capital deepening and a period of accelerated growth [3]. Others like Aghion and Howitt [4] have emphasized the critical role for the discovery and adaption of new ideas and innovations. According to that view, human capital is essential to transform ideas and innovations into new processes and products. Ultimately it is the quality of human resources in terms of knowledge and skills that constitutes the foundation of competitiveness based on creativity. Thurow [5] suggests that knowledge and skills now stand alone as the only source of comparative advantage. It is a generally accepted view that the wide spread of knowledge-based activities is playing an increasingly important role in the competitiveness of the respective countries and regions.

Along with the theoretical studies, European Commission built up broad institutional and information support on R&D policy and launched regional innovation strategy projects in several waves, enabling to get empirical results. European Union, aspiring to become the most advanced knowledge-driven economy. This commitment urges the member counties, particularly Slovakia, to take action in order to corroborate research and development. The renewed Lisbon strategy (2005) proclaims strong emphasis on the need to invest more in human capital and R&D. Despite these facts, at practical level it has not been reflected yet in the increasing emphasis on

the volume of financial resources allocated to R & D and higher education in Slovakia. We are even faced with the opposite development in the last years.
This paper provides an analysis of some measures of human capital available at the level of Slovak NUTS1 and NUTS2. It focuses on the level of formal educational qualifications and the positions of R&D within the respective regions.

2 Characteristics of human capital in Slovakia

As might be expected, given the elasticity in the concept of human capital, there are many different ways it can be measured. Typical measures include the years of schooling or the percentage of the labour force with secondary or tertiary education or rates of enrolment [7]. The level of formal educational qualifications is a commonly used proxy for the stock of human capital. The educational attainment of the adult population is one of the main indicators of the skills available in the economy. The indicator shows the percentage of the adult population (25-64 years old) that has completed upper secondary education, defined in the International Standard Classification of Education (ISCED 1997) as Level 3 and above, and including tertiary qualifications at bachelor's degree and above (Level 5A/6). The indicator aims to measure the share of the population that is likely to have the minimum necessary qualifications to actively participate in social and economic life. Another common approach is to take R&D expenditure as a proxy for human capital and innovation.

2.1 The educational attainment and R&D intensity in Slovakia

Over the last ten-year period, the number of people following all levels of education and specifically a tertiary level education had been broadly increasing in Slovakia. The proportion of 25-64-year-olds with upper secondary qualifications exceeded almost 90% in 2008 (as shown in Figure 1). Slovakia achieved one of the EU objectives by 2010 – more than 80% of the population aged 25–64 years with at least upper secondary education. Despite these facts, the proportion of 25-64-year-olds with tertiary qualifications is not sufficient in Slovakia.

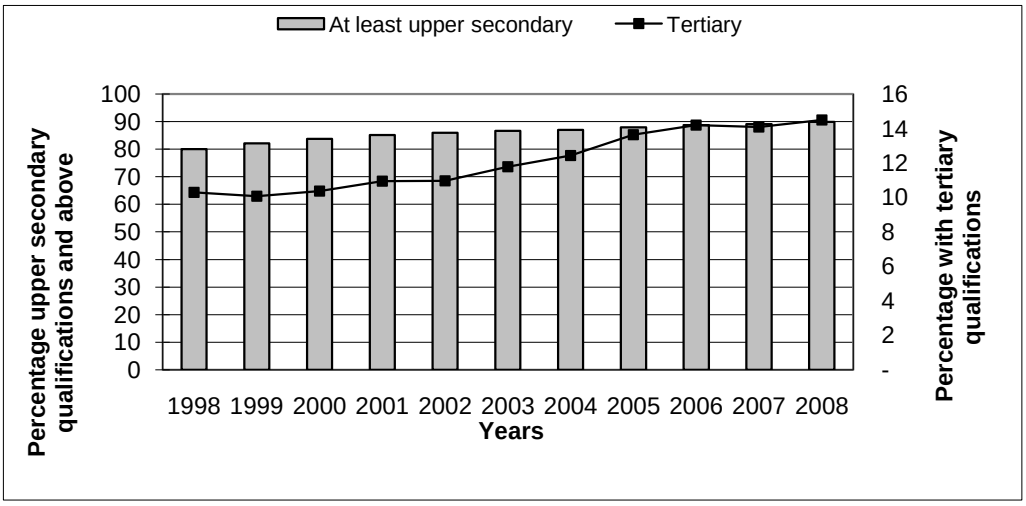


Figure 1: Proportion of adults aged 25–64 years with an educational attainment of at least upper secondary level and tertiary level in Slovakia, 1998–2008
Source: Eurostat

Under the influence of the Lisbon strategy (2000), the Barcelona '3 %' objective (2002) for more investment in research in Europe (with increased private sector funding) and the renewed Lisbon strategy (2005), Slovakia has set targets for R&D investment. It is planned to increase a total expenditure on science and technology to the level of about 1,8 % of GDP in 2015 [6]. However this objective seems to be not real. Event yet we are faced with the opposite development in the last years: such as the large decline R & D intensity from 1,08% of GDP in 1997 to 0,46 % in 2007. While the GDP has been continuously increasing since 2000, the decrease of the share of R&D reached its nadir in 2007, as shown in Figure 2. In 2007 R & D expenditure made 0,46 %, still lagging far behind both the Slovakia figures of the late 1990s and the present figures of the European Union (the EU-27 average 1,85 % of GDP in 2007).

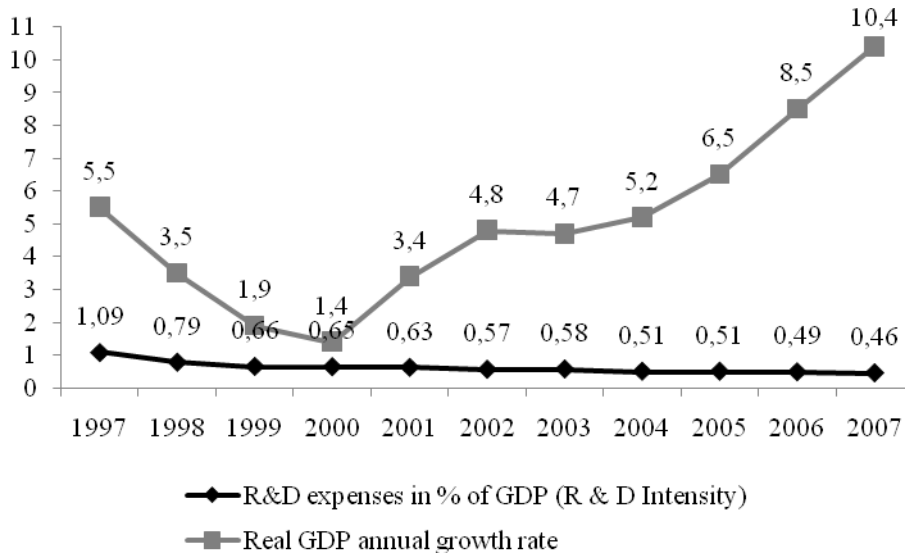
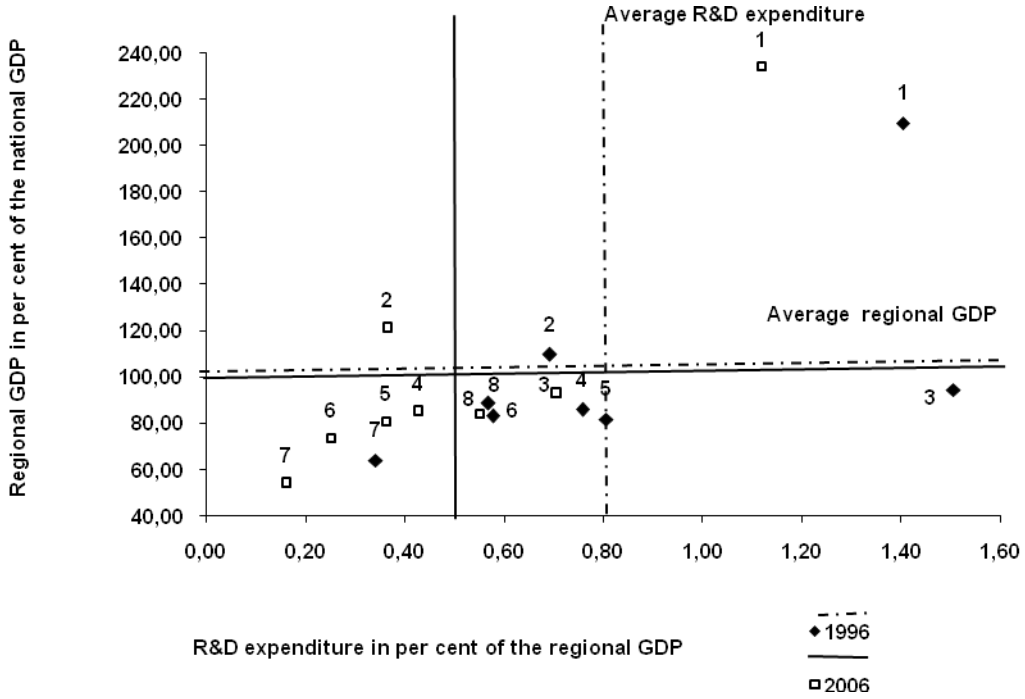


Figure 2: R&D Intensity and GDP annual growth rate in Slovakia, 1997 – 2007
Source: Statistical Office of the Slovak Republic

2.2 Regional disparities of research and development among Slovak Regions

In our survey we were able to reflect the positions of R & D within the respective regions and so we can relate to the deepest crisis of the Slovak R & D capacities and performance. We use the two-dimension scaling of the regional R & D performance within the regional GDP and economic development level (specific regional GDP). Also, it has important messages for the R & D and regional policy (**Chyba! Nenašiel sa žiaden zdroj odkazov. Table 1**). If we feature the two indices on the two axes of a coordinate system, the four fields represent four basically different groups of regions, as regards their R & D potential. The horizontal axis of the system demonstrates the R&D performance of the respective regions compared to the region GDPs, while the vertical axis was used to show the specific economic performance of the respective region compared to the national average.



* The identification numbers of the regions are in Columns 1 of Table 1.

Figure 3: Regional development level and the level of R & D, 1996, 2006

Source: Statistical Office of the Slovak Republic

There are two possible solutions to set a dividing axis. The first is to compare the value of both factors to their average; the other is the use of a theoretical division line. We used the latter in our analysis. In the case of the R&D performance, the value of 1.0% within the GDP was the limit above which a county has relatively favourable R&D performance or potential by the Slovak standards. Below the 1.0% level, the R&D positions of the respective county are moderate or weak. In the case of the specific GDP values, we set the value of 100 as the limit above which a county has strong, below which weak it has positions. The coordinate system thus features the following four groups:

− strong economic potential and favourable R&D capacities (upper right field);
− weak economic potential and favourable R&D capacities (lower right field);
− strong economic potential and moderate R&D capacities (upper left field);
− weak economic potential and moderate R&D capacities (lower left field).

Table 1: Regional development level and the level of R&D, 1996, 2006

REGION	1 996			2006		
	R&D expenditure in per cent of the regional GDP	Regional GDP in per cent of the national GDP	L: low H: high	R&D expenditure in per cent of the regional GDP	Regional GDP in per cent of the national GDP	L: low H: high
Bratislava Self-Governing Region (1)	1,4	210	HH	1,12	234	HH
Trnava Self-Governing Region (2)	0,69	110	LH	0,37	122	LH
Trenčín Self-Governing Region (3)	1,51	94	HL	0,7	93	HL
Nitria Self-Governing Region (4)	0,76	86	LL	0,43	86	LL
Žilina Self-Governing Region (5)	0,81	82	LL	0,36	81	LL
Banská Bystrica Self-Governing Region (6)	0,58	83	LL	0,25	74	LL
Prešov Self-Governing Region (7)	0,34	64	LL	0,16	55	LL
Košice Self-Governing Region (8)	0,57	89	LL	0,55	84	LL

* The numbers in the brackets are the identification numbers of the Regions used in

Source: calculation by the authors based on the data from Statistical Office of the Slovak Republic

The applied two-dimensional scaling shows a rather homogeneous picture of the economic development and R&D positions of the Slovakia Regions (

Table 2). Three-quarters of the counties can be found in field 4, both in 1996 and 2006. The figure also shows that in these regions the stagnation or moderate growth of the R&D performance, a decline of the economic potential compared to the average is typical. This tendency will remain typical in the coming years, despite the increasing spatial disparities of the economic development measured with the GDP and the catching-up programmes of regional development policy. It comes from the fact that the foreign direct investments arriving at the more advanced regions in the middle of the 1990s implement at least the supplementary investments necessary to secure the competitiveness of the counties, whereas the counties with a shortage of capital received less capital injections compared to the more developed counties in the last years (with the exception of the multinational retail networks).

Table 2: R &D potential and the types of economic development

III. Strong economy, moderate R&D Trnava Self-Governing Region (2)	**I. Strong economy, intensive R&D** Bratislava Self-Governing Region (1)
IV. Weak economy, moderate R&D Nitra Self-Governing Region (4) Žilina Self-Governing Region (5) Banská Bystrica Self-Governing Region (6) Prešov Self-Governing Region (7) Košice Self-Governing Region (8)	**II. Weak economy, intensive R&D** Trenčín Self-Governing Region (3)

Source: Table 1

In the Slovak circumstances it is only Bratislava that belongs to the 'strong economy–favourable R&D performance' category. The good R&D potential is unfortunately coupled with weak economic performance in Trenčín Self-Governing Region, as the good R&D performance is incapable of improving the economic performance to a level that increases the overall relative economic positions of the respective region. In the case of Trnava Self-Governing Region we can see a disharmony between the R&D capacity and the relatively advanced economic performance. It is not surprising that the regional development program of Trnava Self-Governing Region treat the development of the innovation milieu as a selected priority and region has worked out their regional innovation strategies. As a summary we can say that in the short run the good R&D capacities did not affect the growth of the region GDP values in Slovakia, and vice versa, the outstanding economic performance – by Slovak standards – is not founded by the increase of the R&D capacities.

3 Conclusion

Human capital has traditionally been regarded as one of the key factors behind economic growth. However, despite the strong theoretical support for this claim, empirical evidence has been not very convincing, probably because of the low quality of the data. Because human capital is a multidimensional phenomenon, suitable proxies are not easy to find. This paper focused on educational attainment, since this information is readily available. However, these variables approximate only particular elements and neglect other aspects of human capital resources, like training on the job, specific knowledge or the previous working experience. As a consequence, they might blur the actual impact of human capital. However, while studies tend to focus on the education level of the population, an indicator focusing on the education level of the workforce is arguably more important in determining potential innovation and ingenuity in the state, since this indicator would represent people that are actively taking measures to work or potentially innovate. The education level of a labor force seems to be more important indicator of economic innovation and general economic health.

As might be expected, given the elasticity in the concept of innovation, there are many different ways it can be measured. A common approach is to take R&D expenditure as a proxy for innovation. It is clear that successful innovation does not just depend on R&D but on the presence of a whole set of complementary assets. It also depends on the utilization of a whole set of complementary assets including work practices, organizational behavior, the development of

soft structures (e.g. supply chain management and customer relationships), and market assessment and strategic decision-making.
Educational stock, as a measurement of the quantity, availability, and even quality of an area's human resources and R&D expenditure as a proxy for innovation.are only one of the possible ways of assessing the impact of human capital on economic growth and future work will raise the question of the need to look for alternative measures of human capital in economic analyses.

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