Comparison of Selected Indicators of Higher Education Financing in Slovakia in Disruptive Times

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Abstract: Universities are scientific-pedagogical institutions where teaching and research take place, and outputs of tertiary education are qualified graduates for the needs of social practice in the labour market. In Slovakia, the subsidy for wages and insurance premiums is the largest part of the financial subsidy provided from the state budget for universities, which is earmarked. Since 2011, this subsidy has been derived from the performance of a specific university, which is quantitatively expressed based on the number of students, the implemented teaching and outputs of publication and project activities. The main aim of this paper is to evaluate the development of selected indicators in the context of the financing of higher education institutions in Slovakia. Research data were collected from various sources; data available in the DataCube database and from the schedules of subsidies of the Ministry of Education of the Slovak Republic for universities. Data on universities, their financing and university teachers’ salary conditions were evaluated using methods of time series analysis with the prediction of development in the future. Findings indicated changes associated with the efficiency in the utilization of monetary assets at universities. Analyses also include current years, which are referred to as disruptive times and are characterized by global economic problems.

1. INTRODUCTION

Education is important for the whole society as well as for the lives of its members. Nowadays the university role is associated with three major areas: education, research, and active involvement in regional development. The university academic environment is based on pedagogues and scientific workers who are supported by the administrative section. University teachers must meet the demanding criteria of a good teacher with high-quality scientific outputs (Bhai & Horoi, 2019).

The prerequisite for the development of society is investment in human capital, which will be used for training and improving the qualifications of employees. There will be a decrease in the number of Slovak residents in productive age in the near future, while the rate of economic activity of inhabitants will increase. Currently, the biggest investments are made by companies in the digital skills of employees, and therefore the greatest demand will be for experts in the field of IT (ManpowerGroup, 2017). Tools of e-learning represent a flexible, financially acceptable, and well-organized form of employee and service development (Vančová & Kovačičová, 2018).

In advanced market economies, three basic models of higher education financing are applied. The first system, the so-called Anglo-American system is based on principles of the market mechanism; the Swedish tax-subsidy system is based on the redistributive function of the tax system, therefore higher education funding depends on the state; third – the Australian system

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assumes the student’s participation in financing the study costs. In Slovakia, the higher education financing system is a model of multi-source financing, while the state’s financial participation and principles for multiple sources of financing are clearly defined.

The main source of funding for a public university is subsidies from the state budget. The Ministry of Education of Slovakia provides subsidies to public universities for the realization of accredited study programs, for research, development, or artistic activities, for the development of the university and the social support of students. To cover the necessary expenses, the public university also uses other sources (Beličková & Geško, 2006). The return on investment in education is usually long-term. Economic and social development is conditioned by an increase in spending from public budgets. In addition to determining the adequate amount of funds (e.g., through financial regulations) necessary to ensure the provision of educational services, it also includes the issue of their redistribution, allocation, and use (Koróny & Hronec, 2012).

Šipikal et al. (2015) present an analysis of the share of public subsidies and EU resources in the financing of Slovak universities in the period 2007 - 2014, with a focus on financing through the EU’s cohesion policy. In the number of published articles registered in the SCOPUS database, universities have significantly improved in the program period 2007-2014 (the number of articles has more than doubled). Daňo (2022) presents the main changes in the financing of Slovak universities from 2022; changes include the introduction of performance contracts. Furthermore, the new system of periodic evaluation of scientific outputs of university employees, a novel approach to the study programs accreditation, the reform of university management, and the intention to concentrate excellent educational and research capacities.

2. DATA AND METHODS

The basis for this paper was data collected from various sources: the Database DataCube (2023), the schedules of subsidies of The Ministry of Education, Science, Research and Sport of the Slovak Republic (2023), Statistical Yearbook – Universities (2023) and results of financial analyses. Data on indicators aimed at the educational process, data on the financing of universities in Slovakia, and university teachers’ salaries were evaluated using methods of time series analysis with the development prediction. Analysis and results interpretation were conducted through descriptive methods of mathematical statistics using graphic presentation of results. The subsidies on the salaries of university teachers were evaluated using the base index, which shows the development of changes in the period 2008-2023. Trend functions were used to estimate the development of the given indicators.

3. RESULTS AND DISCUSSION

3.1 Selected Indicators of University Education in Slovakia

After graduation from secondary school students can continue their studies at university in accredited study programs. Slovak universities provide higher education in first (bachelor’s) degree, second (master’s) degree, and third (Ph.D.) degree. The basic division of universities in Slovakia is as follows:

• public universities (public institutions established by law, number 20),
• state universities (military, police, medical, number 3),
• private universities (legal entities established with the approval of the government, number 10),
• foreign universities - education, but also the rights and obligations of students, are governed by the laws of the country where they are based (not included in Figure 1).
The development of the number of faculties and universities in Slovakia proved that this sector is still in the process of change (Figure 1). Data show the increase in the number of faculties (period 2005 – 2012) that stopped in the year 2013. The same process is evident in the number of universities, and in the period 2013 – 2021, there was a moderate decrease.
In Figure 2 there is presented the development in the number of university teachers within the period 2005 – 2021. In the category of teachers overall, the process of development is approximated by a quadratic function, while the model assumes a decrease in the number of teachers in the following period as well. This trend relates to the decrease in the number of students at universities (Figure 3) and to changes in the financing of universities, which is based on the evaluation of teachers’ performance. Estimate of the number of teachers (overall):

\[ y = -12.675x^2 + 175.64x + 10,175; \quad R^2 = 0.7911 \]  

(1)

The development of the number of professors and associate professors is approximated by an increasing linear function. This situation relates to the increase in the qualification structure of pedagogues, which is necessary for accreditation and personnel guarantees of study programs. Estimate of the number of professors and associated professors at Slovak universities:

\[ y = 44.635x + 3,574; \quad R^2 = 0.7373 \]  

(2)

Data shows that the number of university students was decreasing from 2009 until 2018 and then there was a slight increase. The number of students is also influenced by another factor, which is the possibility of studying at universities abroad (Figure 3). The departure of high school students to foreign universities often means that the graduates will not return to work in Slovakia after completing their studies.

### 3.2 Financing of Universities and Wages of University Teachers in Slovakia

Financing of public universities through The Ministry of Education, Science, Research and Sport of the Slovak Republic (2023) is realised based on Act no. 131/2002 Coll. about universities. The main factors for determining the amount of subsidy for universities are the educational, research, or artistic capacity of the university, furthermore, outputs in the field of science or art, the evaluation of the research, development, artistic and other creative activities of the university, and classification type of the university.
Figure 5. Comparing indices of subsidies for university teachers’ salaries

Source: The Ministry of Education, Science, Research and Sport of the Slovak Republic (2023), own processing

Note: MW – minimum wage, AV – average wage, UT – university teachers, SR – Slovak Republic

Figure 6. Comparison of minimum wage, average wage, and average wage of university teachers in the Slovak Republic (2009 – 2021)

Source: Average wage 2023; Minimum Wage 2023; Statistical Yearbook – Universities, 2023; own processing

Figure 4 shows the subsidies for university teachers’ salaries in absolute values in the period 2009 - 2023. The modifications are also related to the total number of teachers at universities, which also changed. A significant decrease in subsidies occurred between the years 2010 and 2011. In the graph there are visible two significant increases in subsidies: the first one between 2019 and 2020, and the second one between 2022 and 2023. The indices comparing two consecutive years (Figure 5) show either positive or negative changes in the provided subsidy for the salaries of university teachers. In the context of economic changes, the monetary crisis in 2009 is also reflected in the reduction of subsidies for universities. At the end of the analyzed period, the impact of the COVID-19 pandemic is visible, which caused a reduction in university subsidies (2021-2022).
In Slovakia, salary conditions are based on valid laws. The minimum wage means the lowest possible wage that must be paid for full-time work (approximately 4% of working people in Slovakia). In Slovak economic conditions, the minimum wage for 2023 is €700; in 2022, the minimum wage was €646. The minimum wage for 2024 is expected to be around €770. In the states of the European Union, the highest minimum wage is in Luxembourg and the lowest in Bulgaria. Some European countries do not have it in place (Minimum Wage, 2023). The term average wage means the arithmetic average of all wages in Slovakia. Approximately 70% of people earn less than the average wage in the national economy. Average salary data is important for calculating the future pension of each employee (Average wage, 2023).

The salaries of university teachers are determined by tables that consider the teacher’s level of education and years of work. Figure 6 shows the development of the minimum and average salary in Slovakia and their comparison with the average salary of a university teacher. Mathematical models for all three types of wages have confirmed an increasing trend. The current energy crisis, significant increase in prices of goods and services, and rising inflation caused that in 2022 the total average wage in Slovakia fell the most in the last 12 years, by 4.5 percent after taking high inflation into account.

Education and research are two main activities at universities. The economic function of education is visible in its participation in the process of social reproduction and the formation of qualifications of the labour force (Žižková et al., 1989). The importance of education places new demands on the system of financing and organization of public educational services. The support of economic growth in the knowledge-based economy includes investments in innovation and research, investments in higher education and technological development (Hudáková, 2017; Paličková, 2014). The regional importance of the university is evaluated via university effects in the given locality, which includes the impact on the creation of new and innovative businesses (Hrivnák & Fázíková, 2017).

4. CONCLUSION

The main goal of education is to prepare qualified graduates for the labour market. The economic function of education is determined by the mutual relations between the economy and education. Also, for this reason, emphasis is being placed on the cooperation of educational institutions with enterprises and companies, which express themselves regarding the requirements for professional knowledge and competences of university graduates.

The quality of universities depends on university teachers, who need suitable conditions for educational and research work and adequate financial evaluation of their work. High demands are placed on teachers for the actuality and expertise of teaching, and a high rank in publications and projects, which are criteria for measuring the effectiveness and performance of teachers at the university. In the Slovak Republic, there are extreme cases where university teachers do not have sufficient salaries to be able to obtain a mortgage for their housing. Inadequate financial evaluation is reflected in the beginning shortage of teachers in primary and secondary schools.

The importance of universities in supporting the development of regions will increase in the future, especially from the point of view of innovation and research. Therefore, it is very important to pay attention to the way universities are financed. Social and economic shocks are reflected in the funding of universities, as demonstrated by the analyzed data (2009 economic crisis, COVID-19 pandemic).
5. FUTURE DIRECTIONS

Slovak universities have historical roots and provide tertiary education in various fields of study. The paper contains important results for university education in the context of the financial conditions of the educational process and its participants - university teachers. It is necessary to increase the attractiveness of the teaching profession and its financial evaluation. Sufficient financial remuneration for teachers is an important motivating factor for the young generation of educators. The next important fact is the feminization of education because salaries are not high enough for the main breadwinner.

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