FACULTY OF ECONOMICS, TECHNICAL UNIVERSITY OF LIBEREC

Proceedings of the 17th International Conference

LIBEREC ECONOMIC FORUM

2025

Petr DOUCEK, Milos MARYSKA

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10.15240/tul/009/lef-2025-03

MOTTO: New Horizons in Economics and Business

Liberec Economic Forum 2025: Proceedings of the 17th International Conference
Publisher: Technical University of Liberec, ISBN 978-80-7494-747-6

Petr DOUCEK[a], Milos MARYSKA[b*]

[a]Prague University of Economics and Business, Faculty of Informatics and Statistics
W. Churchill sq 4, 130 00 Prague, Czech Republic
doucek@vse.cz, ORCID 0000-0002-5647-661X

[b*]Prague University of Economics and Business, Faculty of Informatics and Statistics
W. Churchill sq 4, 130 00 Prague, Czech Republic
milos.maryska@vse.cz, ORCID 0000-0003-2783-4657 *(corresponding author)*

Comparison of Tertiary Education Financing in the Czech Republic with Selected EU Countries

Abstract

This article deals with a comparative analysis of tertiary education financing in the Czech Republic and selected European countries in the period 2012-2021. It uses harmonised Eurostat data, which have been converted into purchasing power units (PPS) to ensure international comparability. It focuses on key indicators - total and public expenditure on education, its share in GDP, expenditure per student and student-teacher ratio. The results show significant differences between countries. Germany and Sweden stand out with high investment and a favourable student-teacher ratio. Turkey, despite lower GDP, devotes a significant share of public funds to tertiary education but faces teacher overload. The Czech Republic is below average in international comparison, both in absolute expenditure and in relation to GDP. Nevertheless, there has been an improvement in expenditure per student and a reduction in the student-teacher ratio in recent years. Finally, the study emphasises the need for a strategic approach to tertiary education financing. The Czech Republic needs to increase public investment and stabilise academic staff if it wants to move towards advanced European systems and ensure the long-term competitiveness of its education sector.

Key Words: Tertiary Education, Public Expenditure, International Comparison, Student-Teacher Ratio, Eurostat

JEL Classification: **I22, H52, O57**

Introduction

Education is one of the key pillars for the development of a knowledge-based economy and sustainable national competitiveness. Tertiary education has a special role to play in this context, not only providing professional knowledge and skills, but also promoting research, innovation and social progress. However, the effectiveness and sustainability of the higher education system depends on a range of factors, from the level and structure of financial investment to the quality and availability of academic staff.

DOI: 10.15240/tul/009/lef-2025-03

Given the increasing pressure on public budgets and changing demographic and social conditions, the allocation of resources to tertiary education is a subject of professional and political debate across Europe. In this context, the Czech Republic faces challenges related to the long-term lower expenditure on education relative to GDP and the tight structure of the academic labour market. Comparisons with selected European countries can provide valuable insights into the relative position of the Czech Republic and identify strengths and weaknesses in the development of tertiary education. This paper focuses on a systematic comparison of selected indicators of tertiary education in the Czech Republic, surrounding Central European countries, Sweden as a country with a high standard of living and a country with a different development trajectory - Turkey, which from the perspective of economic indicators is very interesting for comparison. Unfortunately, it was not possible to make a comparison with the EU28 countries in the paper as the time series of average values for each year was not complete.

1. Methods of Research

To ensure the scientific validity of the analysis, a quantitative approach based on secondary processing of structural data from harmonised European statistics was chosen. All datasets used come from a single source (Eurostat, 2025a; Eurostat, 2025b) to ensure methodological consistency and comparability across countries. The indicators observed relate exclusively to tertiary education (ISCED 5-8) and include both financial and personnel dimensions. The analysis is based on harmonised Eurostat data for the period 2012 to 2021 and focuses mainly on financial expenditure, its structure and the capacity of academic staff. The aim is to contribute to a better understanding of the Czech Republic's position in the European context and to provide a basis for an informed debate on the strategic direction of tertiary education. From a data perspective, data extraction was carried out for the following thematic areas, which we consider key for comparing the situation in tertiary education with other selected countries.

1. total expenditure on education,
2. the structure of public and private expenditure, both in total and per student,
3. share of tertiary education spending in total GDP,
4. statistics on teaching and academic staff

The next step was to harmonise the units and convert the indicators into a format that allows direct comparison between countries - for example, by converting absolute per capita or per student expenditure, or by expressing them as a percentage of gross domestic product (GDP). For all indicators, the time dimension was retained in order to track developments over the period under review, and the values were converted to the Purchasing Power Standard (PPS, defined in the following paragraph). Data expressed in financial units are in EUR PPS (Purchasing Power Standard). PPS is the purchasing power standard. It is an artificial currency unit. Theoretically, one PPS can buy the same amount of goods and services in each country. However, price differences across borders mean that different amounts of national currency units are needed for the same goods and services depending on the country. PPS are derived by dividing any economic aggregate of a country in national currency by its respective purchasing power parities. (Eurostat, 2025) Descriptive statistical analysis was performed on the adjusted and harmonized

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data. It included calculation of basic characteristics of the distribution (arithmetic mean, median, quartiles, standard deviation) and detection of trends using time series. To illustrate differences between countries and trends over time, results were presented using graphical and tabular outputs.

The processing was carried out using Microsoft Excel tools and the Python programming language, especially the Pandas and Matplotlib libraries.

2. Results and Discussion

Based on revised data on annual spending on tertiary education in eight European countries for the period 2012 to 2021, there are significant differences in the level of investment between countries. The figures are expressed in PPS EUR per student and include both public and private sources of funding. As mentioned in the Introduction of this paper, we do not purposely provide EU27 or EU28 averages in the analyses because the quality of the data available in the data sources is not sufficient. The following facts have led to this conclusion:

1. Average values are not filled in for all years included in the analysis,
2. The number of countries in the EU changes over time and this is not sufficiently reflected in the data.

2.1 Total Tertiary Educational Expenditure

The first analysis focuses on Total Tertiary Educational Expenditure in EUR PPS and aims to compare the value of this indicator between the countries included in the comparison. By far the highest average is **Germany**, with an average annual investment of over €39,500, which is on a steady upward trend. This figure confirms the strong support for the tertiary education system in the context of a mature and stable economic framework over the period under review. In second place is **Turkey**, with a significantly lower but still high average of around EUR 23 600. The significant increase in spending in the initial period in Turkey is followed by a gradual increase during the period under review, which is accompanied by a slight oscillation around the aforementioned rising average.

This development can be interpreted as a strategic orientation of the country towards strengthening higher education as a tool for modernisation and social upliftment. In terms of the Central European region, **Poland** has the highest average value, with average annual expenditure exceeding €10,000. This indicates relatively strong support for the higher education sector compared to other countries in the region. **Austria** and **Sweden** show a similar level of spending, slightly above EUR 6 000 per year, with both countries showing a stable and slightly increasing trend over the period under review.

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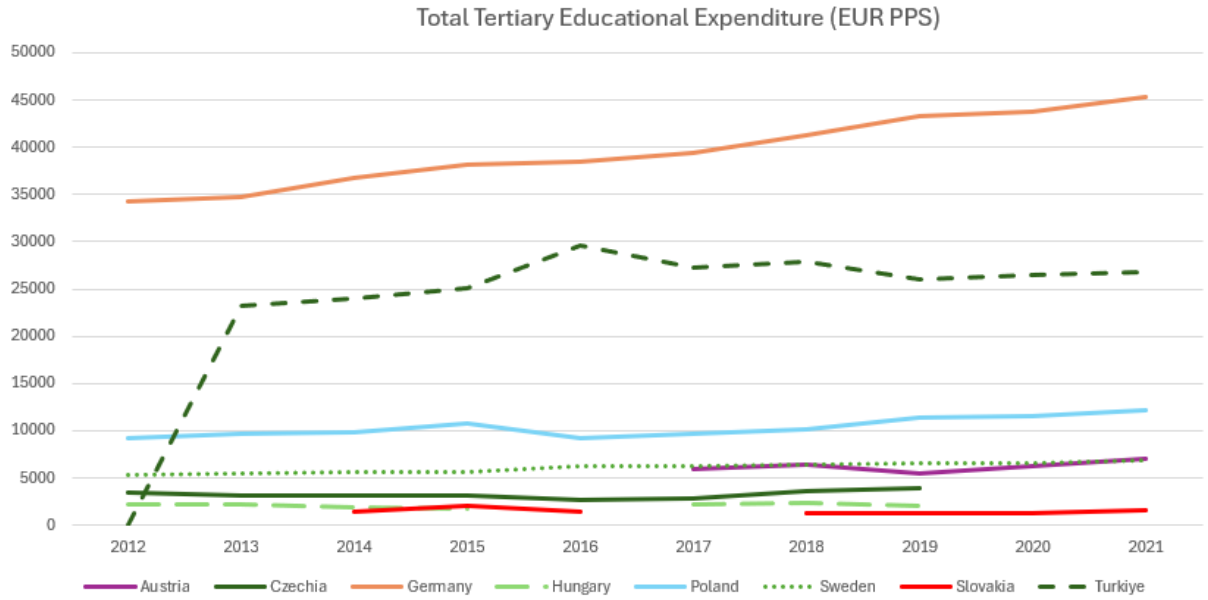
Fig. 1: Total Tertiary Educational Expenditure (EUR PPS)



Source: authors, data from (EUROSTAT, 2025a)

The Czech Republic, **Hungary** and **Slovakia** are at the lower end of the spectrum in this analysis. The Czech Republic has slightly fluctuating values between EUR 2 600 and EUR 3 900, with no significant upward trend. Hungary and Slovakia record significantly lower values, often accompanied by gaps in the data, which makes reliable interpretation difficult. These countries thus remain below average in terms of investment in tertiary education compared to most of the countries analysed.

The results confirm considerable variation in the approach of European countries to higher education funding. While some countries allocate high levels of resources steadily and over the long term, others lag behind or show irregular trends, which may reflect, for example, different policy priorities or different levels of private co-funding, which are analysed in the following text.

2.2 Public Tertiary Educational Expenditure

The following analysis focuses on public spending on tertiary education. Public expenditure is a key component of tertiary education funding and its evolution reflects the level of government commitment to higher education policy. The data analysed confirms that there is considerable variation across European countries not only in the overall level of investment but also in the weight that public funding carries in this expenditure.

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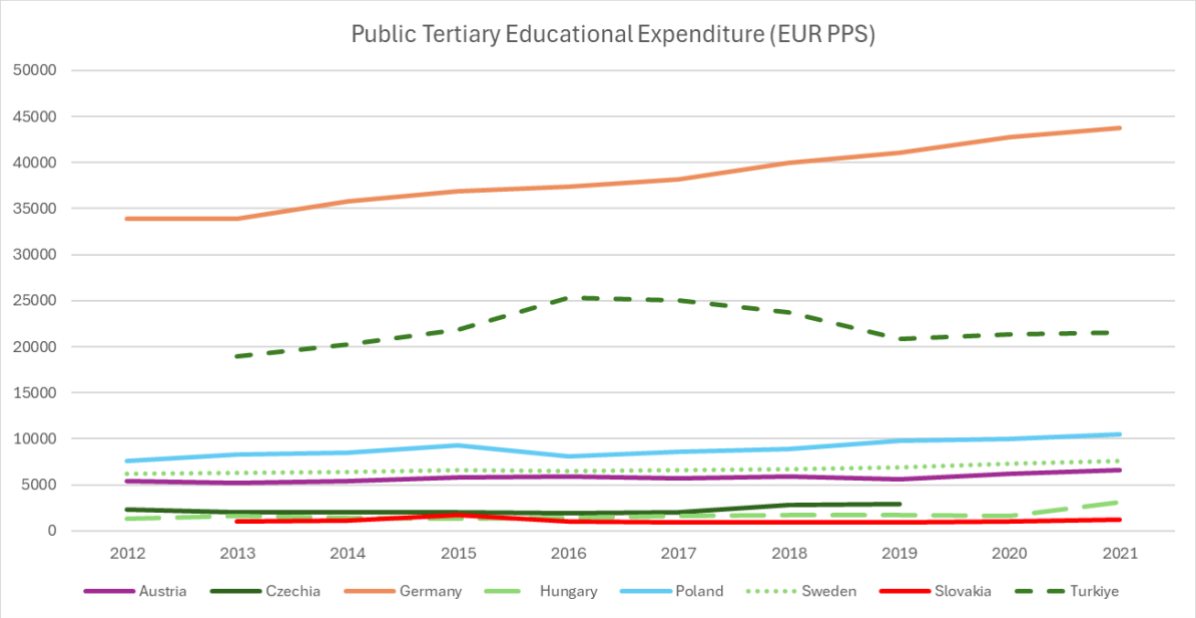
Fig. 2: Public Tertiary Educational Expenditure (EUR PPS)



Source: authors, data from (EUROSTAT, 2025a)

The highest average public spending over the period was recorded in **Germany**, at around **€38 360 per student per year**. This level is only 3% below the average value of total expenditure, confirming that the German higher education system is predominantly publicly funded. A similarly high share of public expenditure was observed in **Turkey**, where the average value is around **€22,100**, i.e. around 93% of the total expenditure from the previous analysis. This confirms that even in emerging economies the state plays a crucial role in supporting higher education.

In the **Central European context, Poland** has the best profile, with an average public expenditure of almost **€8,950**, equivalent to around 86% of the total. This figure suggests a solid level of public support combined with a likely lower share of private co-financing. **Sweden** has an average public expenditure of **EUR 6 720**, accounting for more than 90% of total expenditure, which can be described as a model based on education provided through publicly subsidised education.

Austria is also in a similar range at EUR **5 770**, with a minimal difference to total expenditure. Thus, in both cases, the public sector dominates the financing of tertiary education. In the case of **the Czech Republic**, **Hungary** and **Slovakia,** the observed expenditure structure is different and complicated by the frequent occurrence of incomplete data. Nevertheless, the available data show that public expenditure accounts for the vast majority of total spending in the Czech Republic, although the absolute level remains low. Public funding in these countries is not even half the German or Swedish level, even when converted to PPP (News, 2018; Eurostat, 2025c). A comparison of **total** and **public** expenditure shows that in most of the countries analysed, public resources account for the vast majority of tertiary education funding - most often between 85-95%.

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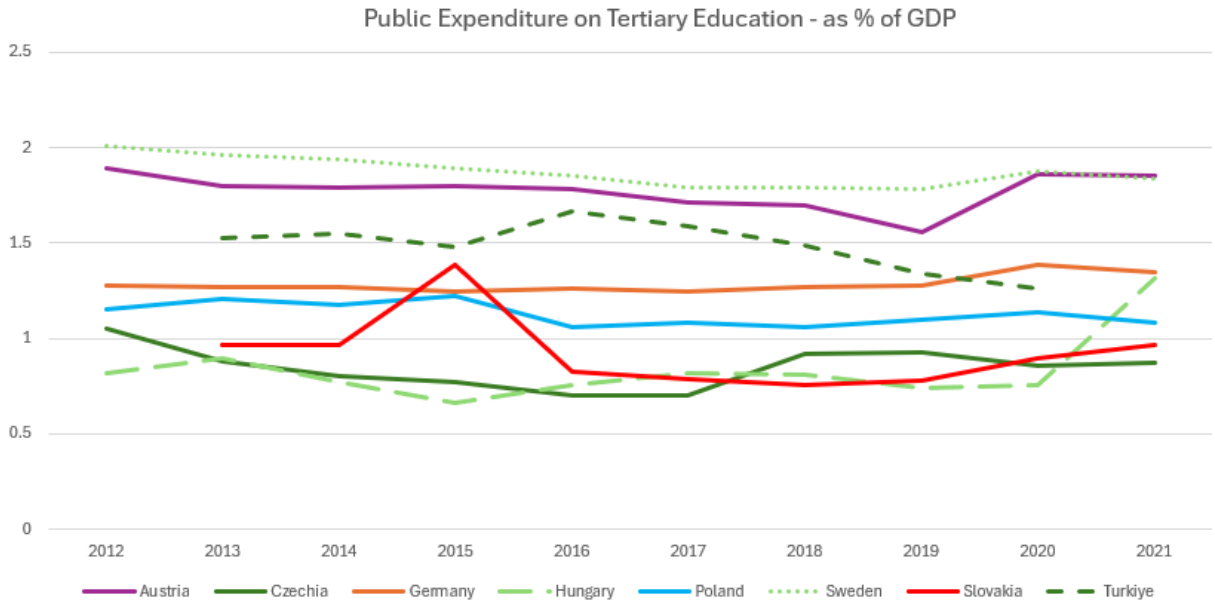
Exceptions may be countries with a stronger private sector or with higher levels of household or business co-financing, which would be the subject of further analysis.

2.3 Public Expenditure on Tertiary Education as % of GDP

Another interesting perspective is the share of tertiary education spending in GDP. Relative tertiary education spending, expressed as a percentage of GDP, shows the share of national product that countries allocate to the higher education sector. This metric allows comparisons between countries regardless of their economic size or price level. The data show that **Sweden** and **Austria** systematically allocate the highest share of public support of their GDP to tertiary education. **Sweden** averages **1.87%**, while **Austria** follows with an average of **1.77%**. In both cases, this is a stable and consistent long-term support for public education, confirming the Swedish and Austrian socially oriented public service model. **Turkey** ranks third with **1.49% of GDP**, which, given its lower GDP per capita, confirms a particularly strong focus on tertiary education development. This figure builds on previous findings of high absolute and public expenditure and underlines the strategic importance of the tertiary sector in Turkish national policy. **Germany is** below these countries with an average share of **1.29% of GDP**, but still represents an above-average level of public funding relative to its strong economic base. It is important to stress here that Germany's absolute spending is by far the highest in the sample, so the lower relative share is due to the size of the economy rather than a lack of support.

Fig. 3: Public Expenditure on Tertiary Education as % of GDP



Source: authors, data from (EUROSTAT, 2025a)

Poland invests an average of **1.13% of GDP** in tertiary education, which puts it slightly below the European average of around 1.27% of GDP. In contrast, **the Czech Republic**,

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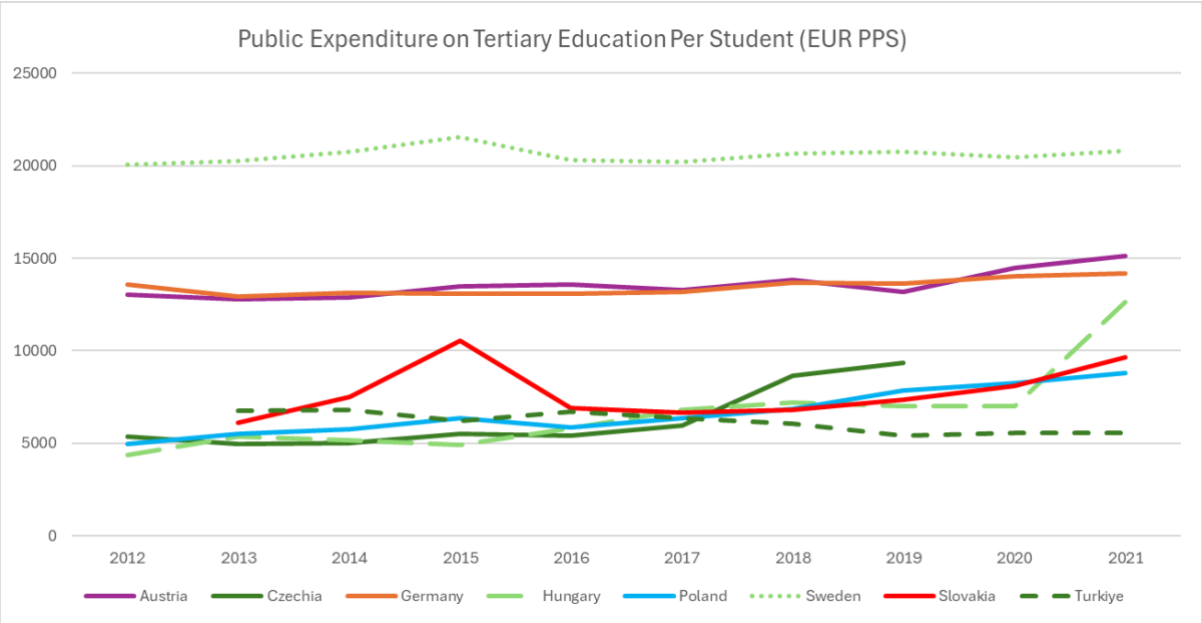
Hungary and **Slovakia** have been below 1% of GDP for a long time. The **Czech Republic** has recorded values below 0.8% in some years, with a short-term increase around 2018, but this has not been sustained. **Hungary** shows an erratic trend, with the lowest values in 2015 (0.66%) and a spike only in 2021 (1.32%). **Slovakia**, in turn, is one of the countries with the lowest and most volatile expenditure shares, often between 0.7% and 0.9% of GDP. If we compare the results as a share of GDP with absolute expenditure, we can see that while **Germany** and **Turkey** have very high absolute and public expenditure, their relative share of GDP is lower than that of Sweden and Austria. This means that economically strong countries can invest more in absolute terms without having a significant impact on the structure of public expenditure. In contrast, countries with lower GDP per capita, such as Turkey, have high shares of GDP even with relatively lower absolute amounts. For the **Czech Republic** and **Slovakia**, the weak public involvement in financing higher education is confirmed, both in relative and absolute terms. The low share in GDP is complemented by low expenditure in PPS EUR, indicating a long-term structural underfunding of the tertiary sector.

2.4 Public Expenditure on Tertiary Education Per Student

The indicator of expenditure per student in purchasing power parity (PPS) allows to look at the efficiency and intensity of tertiary education financing from the perspective of the individual beneficiary - i.e. the student. This metric also removes the impact of differing price levels between countries and makes international comparisons more accurate.

Fig. 4: Public Expenditure on Tertiary Education Per Student (EUR PPS)



Source: authors, data from (EUROSTAT, 2025a)

Sweden has been the highest performer over the long term, investing on average more than **€20 500 PPS** per student per year. This result confirms the strong public

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commitment to equity of access and high quality higher education. **Austria** (**€13,570**) and **Germany** (**€13,450**) are in second and third place, with both countries showing stable investment levels throughout the period under review. In these cases, relatively high public expenditure per GDP is matched by well above-average support per student. **Slovakia**, despite having a lower share of public expenditure in GDP and lower absolute expenditure in comparison, achieved a surprisingly solid level of average aid per student - almost **€7 750 PPS**. However, this figure shows high volatility over time, which may be due to fluctuating student numbers or funding shortfalls. **Poland** invested an average of **€6 660 PPS** per student, placing it among the countries with moderate support for tertiary education.

Based on the previous data, the **Czech Republic**, **Hungary** and **Turkey** lag behind most of the countries surveyed in this indicator, despite some upward fluctuations between 2018 and 2021. In particular, for **Turkey**, it can be seen that despite the high share of public expenditure in GDP and relatively large total amounts, expenditure per student in the PPS is lower, which may be related to demographic pressure and the high number of students in the system. **The Czech Republic** has shown an increase in spending per student in recent years (e.g. more than €9,300 in 2019). An interesting perspective complementing this analysis may be the wage perspective broken down into men and women and the trend of their development in relation to total expenditure (Nedomova, 2017).

2.5 Ratio of Students to Teachers on Tertiary Education

The last analysis is Ratio of Students to Teachers on Tertiary Education. The ratio of students to teachers is a key indicator of the quality of higher education. Lower values usually indicate better conditions for individual access, higher teaching capacity and potentially higher teaching quality.

The data analysed shows that **Sweden** has maintained **the lowest student-teacher ratio** over the long term, averaging **10.3 to 1**. This result confirms a consistent investment policy in human resources and supports previous conclusions about high expenditure per student. The structure of higher education and investment in tertiary education in Sweden, which, as mentioned above, is primarily publicly funded, can also be discussed.

In second place is **Germany** with an average ratio **of 11.76 to 1**, also very favourable. This figure is consistent with high public and total expenditure and underlines the comprehensive quality of the German tertiary system. Other countries with relatively low academic workload include **Slovakia** (**12.23 : 1**) and **Hungary** (**12.31 : 1**).

Poland is on the higher end with an average **of 13.83:1**, but still remains below internationally accepted limits. In contrast, **Austria** shows higher values (above 14 : 1), with a slight increase in recent years. This trend contrasts with its otherwise above-average spending levels, and may signal a tension between investment and student growth.

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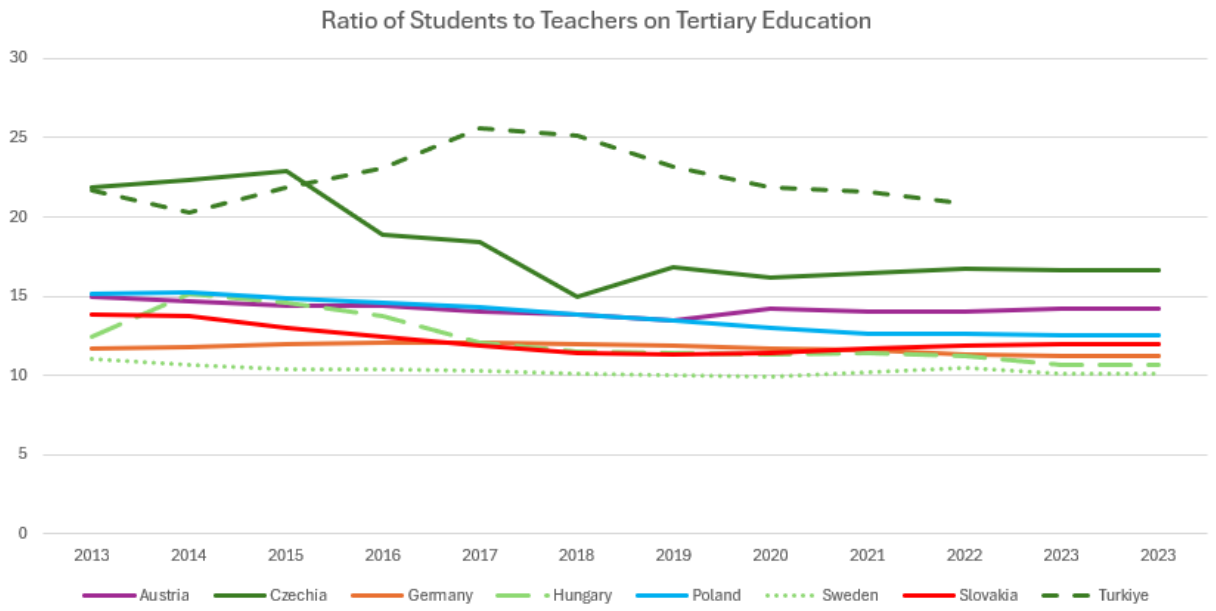
Fig. 5: Ratio of Students to Teachers on Tertiary Education



Source: authors, data from (EUROSTAT, 2025b)

The Czech Republic shows a specific development. In 2013-2015, the ratio was above 22:1, which meant one of the highest teacher workloads in the countries analysed. Since 2016, there has been a significant decline, stabilising in the range of 15-17 students per teacher. However, the average over the whole period is still relatively high, at around **17 : 1**, indicating a long-term shortage of academic staff in relation to the number of students. An alternative explanation may be the large number of domestic and foreign students studying in Czech taking advantage of the funding system where public tertiary education is free.

Turkey scores the highest of all countries surveyed. In some years, the ratio exceeds 25:1 (e.g. 2017-2018), which represents a significant overstaffing. Despite partial improvements in recent years (e.g. 20.8 : 1 in 2022), the average remains the highest of the whole sample, which is related to the high demand for tertiary education and the rapid increase in the number of students. This conclusion is a good stimulus for further detailed analysis.

Conclusion

The results of the analysis show major differences in the approach to financing and staffing of tertiary education between European countries and Turkey. Although some countries show high spending in absolute terms, their relative share of GDP may be lower than in countries with less economic strength. This is borne out, for example, by Germany, which, despite having the highest absolute expenditure per student and high public investment, allocates a relatively smaller share of GDP to tertiary education than Sweden

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or Turkey. This implies that the assessment of spending must always be interpreted both in absolute terms and in the context of a country's economic performance.

Sweden has not only invested heavily in tertiary education for a long time, but has also achieved a low student-teacher ratio. The result is a stable system that provides a quality learning environment supported by robust public financial support. In stark contrast, Turkey's rapid expansion of the tertiary sector has led to an exceptionally high teacher workload. Despite a high share of public spending in GDP and considerable investment at the system level, there is a lack of balance between quantitative growth and quality of education. The Czech Republic deserves special attention. Although there has been some increase in spending per student and an improvement in the student-teacher ratio in recent years, the level of public spending remains below the European average both in absolute terms and relative to GDP. The student-teacher ratio, although down from its former extremely high levels, is still higher than in Germany, Austria or Sweden. This suggests that the Czech tertiary education system is still underinvested and staff stretched, and that improving it would require a coordinated increase in funding and capacity.

A rather surprising result came from the analysis of Slovakia, where lower systemic expenditure was identified, but at the same time relatively high expenditure per student and a favourable student-teacher ratio. This discrepancy may be due to specific demographics, curriculum structure or reporting methodology, which presents scope for deeper qualitative investigation. Overall, countries with long-term stable and high public investment - such as Sweden or Germany - are able to ensure favourable conditions for teaching and staff stability. Conversely, countries with low investment, or those that focus primarily on expanding access to education without adequate increases in staff capacity, face higher levels of academic overload and less individualisation of teaching.

Future policy decisions in tertiary education should therefore be based on three main principles: sufficient and stable funding, a balance between quantity (number of students) and quality (of curricula and teachers), and long-term support for human resources. Without these, it will not be possible to ensure the sustainable development of the higher education sector, which is essential for the competitiveness of European economies and their ability to respond to global challenges.

If the Czech Republic really wants to move closer to the European leaders, it must stop seeing investment in tertiary education as a cost and start seeing it as a strategic investment in future prosperity. Increasing public spending, stabilising staff capacity and reducing academic overload are necessary steps if Czech universities are to compete in the 21st century.

Acknowledgment

This part is optional. It may contain references to your projects and sources financial support.

DOI: 10.15240/tul/009/lef-2025-03

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