

# Financing of Basic Education in the Czech Republic – Macroeconomic Context

Martin KRÁL<sup>1\*</sup>, Adéla MAREŠOVÁ<sup>1</sup> and Anna Maria OLSZAŃSKA<sup>2</sup>

<sup>1</sup> University of Hradec Králové, Hradec Králové, Czech Republic; martin.kral.2@uhk.cz; adela.maresova@uhk.cz

<sup>2</sup> Wrocław University of Economics, Wrocław, Poland; anna.olszanska@ue.wroc.pl

\* Corresponding author: martin.kral.2@uhk.cz

**Abstract:** In the last few years, there has been a significant increase in expenditure on primary education in the Czech Republic, where they account for about 10% of all government expenditures. The aim of this paper is to analyze whether this increase in expenditure on education and raising the salaries of teachers depends on the economic situation and selected macroeconomic indicators, or whether this increase is independent of these indicators. In the context of the development of monitored indicators since 2011, it has been found that the increase in total expenditure on primary education is due to a combination of the growth of the number of teachers and their salaries and the economic situation (GDP) is virtually independent. It should be pointed out again that increasing expenditure on education without changing the quality of teaching is only a consumer expenditure and not an investment that increases the added value of young people on the labor market. Therefore, it is necessary to appeal to the overall change of the system and increase the qualifications of teachers who will transmit information and knowledge in a way that future generations will appreciate.

**Keywords:** education; expenditures; public finance; salary; pupil-teacher ratio

**JEL Classification:** H41; I28

## 1. Introduction

Especially at present, education is one of the most important sectors of the public sector, which is financed from the public budgets. One of the general assumptions is that the level and quality of the achieved education positively affects the economic, cultural, and social development of the country (Kadnikova & Kolesov, 2019; Macris et al., 2011; Szarowska, 2016). International studies (Bracke et al., 2014; Kondirolli & Sunder, 2022; Weare, 2007) also prove that the achieved education positively affects the life of an individual not only from an economic point of view but also from a psychological. These people are characterized by positive self-evaluation in the areas of health and show a higher interest in politics and interpersonal solidarity (Szarowska, 2016).

An important topic in the field of educational policy is also the idea of lifelong learning, which has already been discussed in the 1970s. From the beginning, it has been, and will probably still be associated with three phenomena, which are “maintaining economic development of society, the concept of human resources as an engine of economic

development, and creating conditions for human resources" (Glastra et al., 2004; Pham & Klamka, 2013; Sung & Freebody, 2017). Economics and education relations appear to be mutually influencing (Hedvicakova & Svobodova, 2018a; 2018b). Economic growth is conditioned by the high-quality education of people, as well as quality education of people requires increasing resources, which must be secured by a functioning economy (Chikoko & Mthembu, 2020; Ismanto, 2016).

Thus, the level of the economy directly affects the level of education and, on the contrary, education plays an important role in the technological and organic development of the economy of the state. Currently, there is a right to speak of the irreplaceability of human capital, whose culture and readiness are paid by the professional public (Kholiavko et al., 2022). At the beginning of the 21st century, we record modern trends in the labor market. It is difficult to transform the structure of employment and at the same time there is a growing requirement for well-prepared human resources. The acquired knowledge and information become the main production factor. Each country provides a different type of knowledge and skills related to the overall structure of the national economy (Sun, 1999).

Education presents part of the educational system that provides people's education. The education system of the Czech Republic is represented by schools, school facilities, and human resources operating in these institutions (Průcha, 2015). The educational system can be characterized as a system with a pleasant education level of education. The educational system of the Czech Republic represents the function of socialization, educational, educational, qualifying, integrative, selective, protective, control, and innovative (Kalous & Veselý, 2006).

Compulsory school attendance in the Czech Republic begins at the age of 6 years of age and lasts 9 school years. Preprime education is provided to children aged 2 to 6 years, while the last year of preschool education is compulsory. The educational process is implemented in kindergartens for these pupils. The primary and lower level of secondary education is carried out in primary schools. 9 years are divided into the first and second levels. Lower secondary education can also be provided by multi-year grammar schools and conservatories. Higher secondary education is provided by secondary schools by both general and debt. The tertiary level of education is realized through higher vocational schools and universities, while high-teaching education is carried out within the bachelor, master's, and doctoral study programs (European Commission, 2023).

## 2. Methodology

As mentioned above, there is a bilateral dependence between the quality of education and the level of the economy. This paper aims to find out whether the investment in education (its financial support) only follows the trend of other macroeconomic indicators or whether the government supports basic education beyond this trend. The empirical part of the article is based on data analysis published by official national and international institutions. This analysis can be divided into two partial parts.

In the first part, there is an international comparison of indicators concerning basic education in the countries of the Visegrad Group (Czech Republic, Poland, Slovakia, Hungary) and OECD. To obtain a basic overview, there is a comparison of education expenditure to GDP. The relevant

data between 2001–2020 from the World Bank are used. Furthermore, there is an international comparison of indicators “Number of pupils per teacher at elementary school” and “average annual salary of teachers”. This comparison is based on OECD data for 2020. These are indicators that are used to assess the significance and sometimes efficiency of education. It is assumed that higher education expenditure is a source of the higher added value of human work in the future. At the same time, it is assumed that the lower number of pupils per teacher leads to the higher efficiency of the sources directed to the increase in education and qualifications of each individual.

The second part of the analysis is devoted to the Czech Republic and the development of partial values of indicators relating to primary education (number of pupils, schools, teachers, education expenditures, average wages of teachers). These indicators are presented in the context of the development of basic macroeconomic indicators (inflation, GDP growth, average wages, and government expenditures as a whole). The data for the period 2011–2021 is used, which is a compilation of data collected by different institutions – the Ministry of Finance, the Ministry of Education, the Czech Statistical Office, and the Czech National Bank. The link between the monitored indicators is identified by the correlation analysis. Pearson correlation coefficients are presented, and the level of  $\alpha = 0.05$  and  $0.01$  is used to determine the significance of the correlation.

### 3. Results

#### 3.1. *International Insight*

Organizations of basic education may differ significantly within individual countries. For the most part, it depends on the deployment of elementary schools (for example, whether municipalities with fewer people provide basic education or part of it, even for the youngest children). Schools in smaller municipalities are not so large that they can compete with their capacity to large elementary schools in large cities. At the same time, there may be relatively fundamental differences in the wage evaluation of pedagogical staff between countries.

There may also be significant differences in terms of class occupancy. While smaller schools may have a relatively low number of pupils in the classes, this number is usually much higher for larger schools. For example, in the Czech Republic, the number of pupils in the class should be ranging from 10 (small schools that only operate the first level of primary education) up to 30 (maximum number of pupils in the classroom for all schools) (Decree of 22 June 2018, Amended Decree No. 48/2005 Coll., On Basic Education and Some Essentials of Compulsory Education, as Amended, 2018).

Due to the different numbers of pupils in the class, the number of pupils per teacher also differs. It is therefore clear that in terms of wage costs, it is more effective to have a higher number of pupils in the class. In most cases, the remuneration of teachers is not followed by the number of pupils who teaches but is determined by the so-called tariff salary. The difficulty of pedagogical activity can be taken into account, for example, in the form of rewards, which are, however, a variable component of salary. The independence of the average salary of the teacher and the number of pupils per teacher is proven by the graph below (Pearson's correlation coefficient in this case reaches only 0.144).

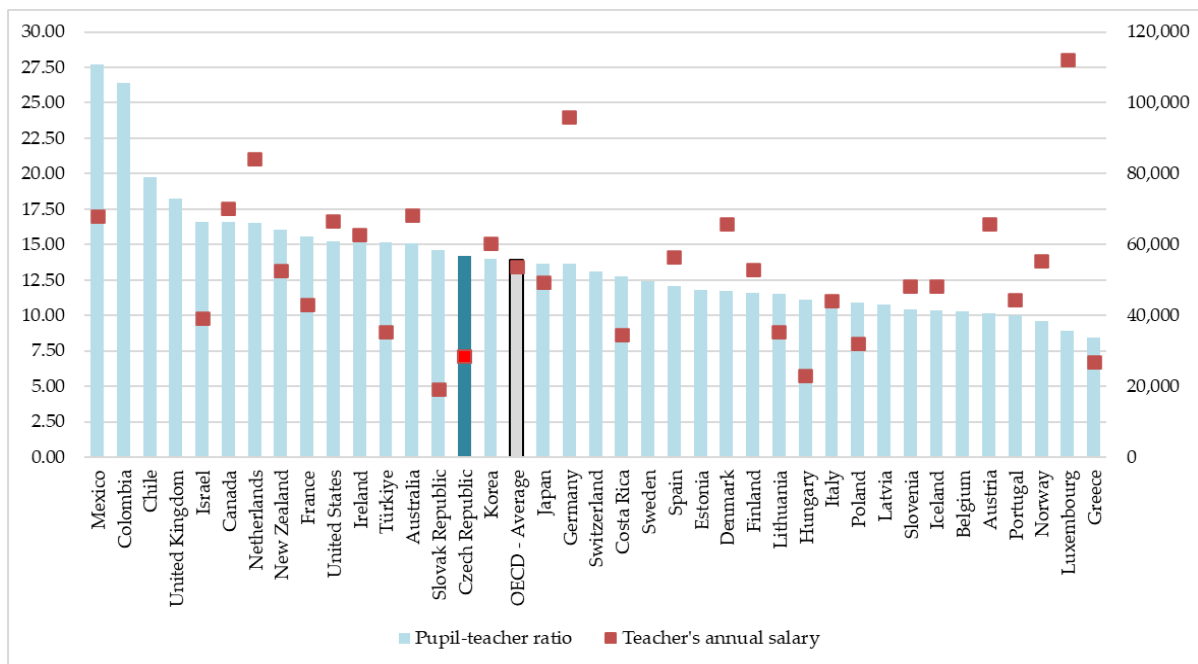


Figure 1. Number of pupils per teacher and wage of teachers, own processing according to OECD data (OECD, 2022, 2022)

The Czech Republic reaches similar values in these indicators to other Visegrad Group countries. From the point of view of the "number of pupils per teacher", it can be stated that together with Slovakia is very close to the average of all OECD countries (13.94). In the Czech Republic, 14.21 pupils per year per teacher in 2020, and Slovakia, it is 14.62 pupils. On the contrary, Poland and Hungary have more teachers in the converted to pupils - per teacher in Poland is an average of 10.88 pupils, and in Hungary, it is 11.11 pupils. However, teachers' salaries are different in these four very similar countries. The Polish teacher earns an average of \$ 32,039 per year, approximately \$ 13,000 more than the annual salary of a teacher in Slovakia. If we compare the expenditure of the state on education to GDP, it turns out that this share is very similar to all V4 countries and has been between 3.52 and 5.79% in the long term (see Figure 2). For the sake of completeness, it is necessary to add that in the Czech Republic there was a steep growth in elementary education in 2016 and 2017 due to the introduction of so-called inclusive education (inclusion of all pupils with specific educational needs into regular schools).

### 3.2. Basic Education in the Macroeconomic Context in the Czech Republic

In the case of the Czech Republic, the number of teachers has increased over the past ten years. While in 2011 only 58,815 teachers taught at primary schools, in 2021 71,325 teachers worked at elementary schools, which is an increase of 21.27%.

The growing trend in the number of teachers is also the cause of a significant decline in the number of pupils per teacher. In addition, this decline is supported by a demographic factor – a different number of children born in individual years, which changed by up to 10% (ČSÚ, 2022) during the period under review. However, the work of the teacher at elementary school is stable and largely independent of short-term demographic changes. Therefore, in the future, short-term fluctuations in the number of pupils per teacher will fall. In terms of economic impacts, this is not negligible at all.

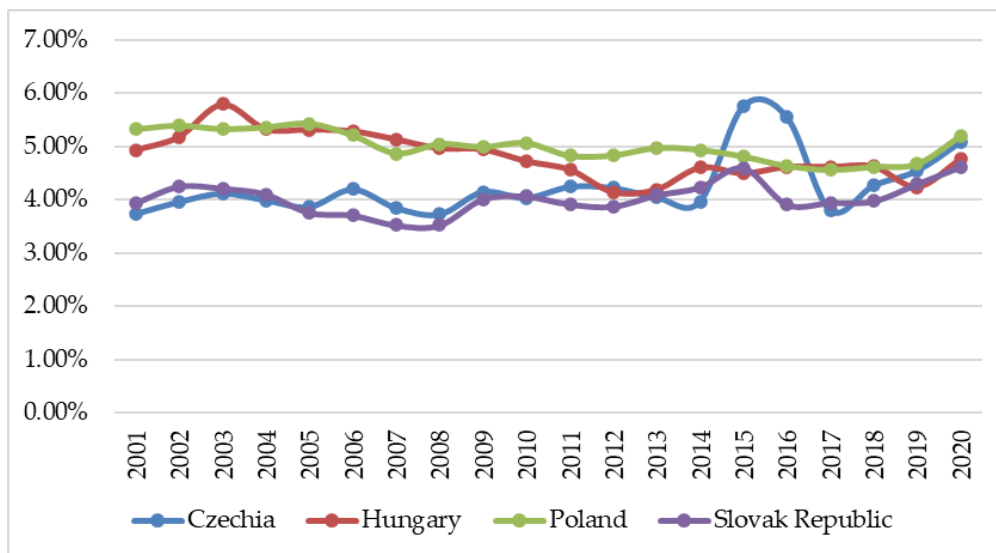


Figure 2. Education spending on GDP with V4 countries. Own processing according to (World Bank, 2022)

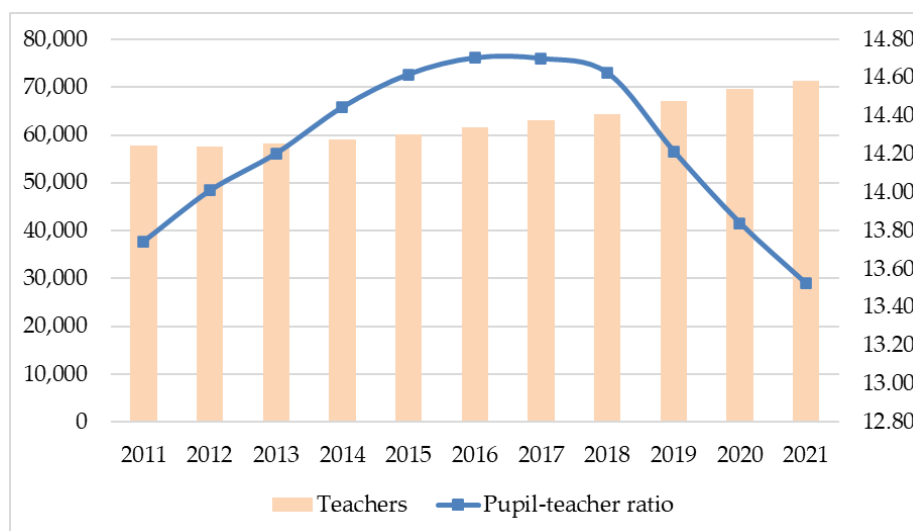


Figure 3. Development of the number of teachers in primary schools and the number of pupils per teacher between 2011–2021. Own processing according to (ČSÚ, 2023a; MŠMT, 2023)

The growing trend in the number of teachers is also the cause of a significant decline in the number of pupils per teacher. In addition, this decline is supported by a demographic factor – a different number of children born in individual years, which changed by up to 10% (ČSÚ, 2022) during the period under review. However, the work of the teacher at elementary school is stable and largely independent of short-term demographic changes. Therefore, in the future, short-term fluctuations in the number of pupils per teacher will fall. In terms of economic impacts, this is not negligible at all.

A growing number of teachers requires an increase in wages, while wages make up most of the expenditure designed to finance education. As a result of economic growth and the tendency to increase the prestige of teachers, politicians often emphasized the need to increase teachers' salaries. However, increasing salaries in combination with the increasing number of teachers has a multiplication effect, and expenditures into education are beginning to have the potential for exponential growth.

This growth is not bad in principle, as it could achieve the primary goal of raising salaries in education as an investment - gaining above-average quality and capable teachers who can desire to educate further generations of people and increase their added value on the labor market. In this context, it is necessary to take into account the overall macroeconomic context - there is an increase in wage expenditures (and thus also expenditure to primary education) regardless of other macroeconomic indicators, or is this growth of expenditure only copy GDP or inflation growth? The answer may be provided by the following graph, from which, with some exceptions, the growth of all three monitored sizes – inflation, state budget expenditure, and GDP is evident, with some exceptions.

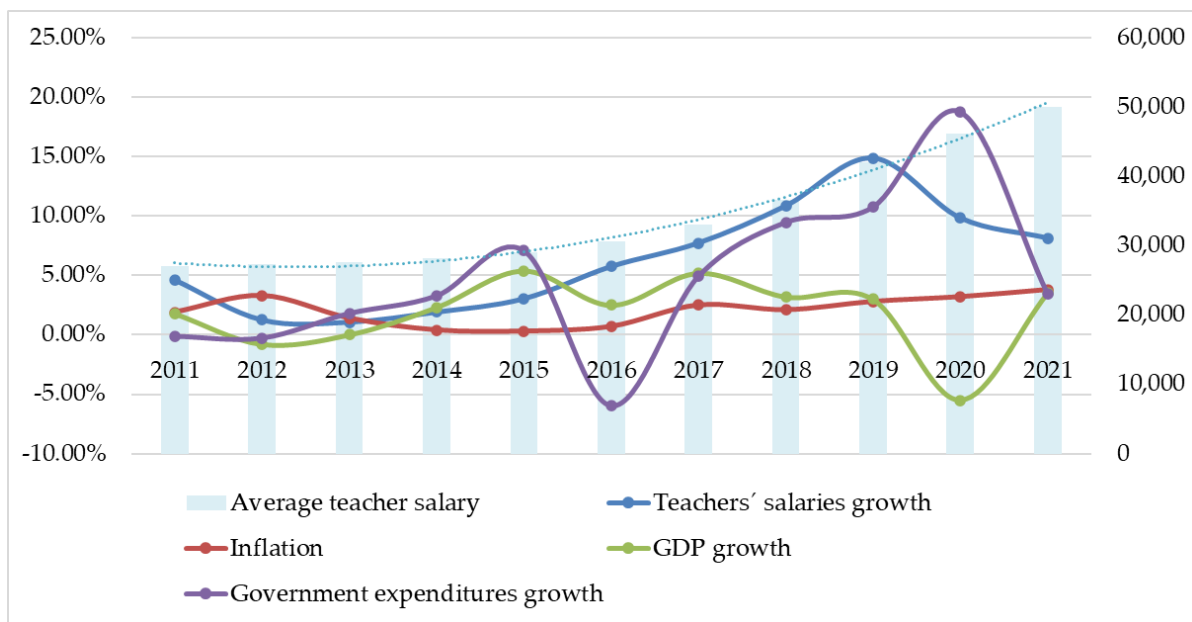


Figure 4. Development of the average salary of teachers at primary schools, teachers' wage growth, inflation, GDP growth, and growth in state budget expenditure in 2011–2021. Own processing according to (ČSÚ, 2023b, 2023c, 2023a; MŠMT, 2023)

Practically all monitored macroeconomic indicators show a very high degree of correlation with education expenditure (see Table 1). The only exception in positive dependence is GDP growth. We can interpret this fact in such a way that the expenditure on education, including the growth of teachers, is independent of economic growth. This is not a surprising finding - basic education is one of the primary economic estates that the state provides to its citizens (children) regardless of the economic situation.

However, the warning signal is elsewhere: no significant link between GDP growth and other indicators was found during the period under review. In practice, this means that, despite the improving economic situation (GDP growth), there are no demographic changes that would be reflected in the future, for example, in a steadily growing number of pupils. The decreasing number of pupils subsequently (under otherwise the same conditions) would lead to a reduction in the number of pupils per teacher, which can gradually approach some developed countries (e. g. Germany, Norway, Luxembourg). However, this would only be a partial success. In recent years, it has also assumed maintaining the current number of pupils. If the birth rate is reduced and thus a few years later the number of pupils, then there

may be disproportionately high expenditure on pedagogical staff who will have a half-empty class. Despite high education, he made it impossible to continue the growing trend in remuneration of the quality that the whole education system so much needs.

Table 1. Correlations

Data 2011-2021	Scholls	Classes	Pupils	Teachers	Expenditures (basic)	Expenditures (education)	Expenditures (total)	GDP growth	Inflation	Average teacher	Average wage (CZ)
Scholls	1	.99**	.91**	.99**	.98**	.97**	.94**	-0.09	.63*	.98**	.99**
Classes	.99**	1	.96**	.99**	.96**	.95**	.93**	-0.04	0.53	.96**	.98**
Pupils	.91**	.96**	1	.92**	.87**	.84**	.81**	0.08	0.37	.86**	.91**
Teachers	.99**	.99**	.92**	1	.99**	.98**	.96**	-0.12	.61*	.99**	.99**
Expenditures (basic education)	.98**	.96**	.87**	.99**	1	.99**	.97**	0.17	.66*	.99**	.99**
Expenditures (education)	.97**	.95**	.84**	.98**	.99**	1	.97**	0.20	.70*	.99**	.99**
Expenditures (total)	.94**	.93**	.81**	.96**	.97**	.97**	1	0.25	.63*	.98**	.95**
GDP growth	-0.09	-0.04	0.08	-0.12	-0.17	-0.12	-0.25	1	-0.35	-0.18	-0.11
Inflation	.63*	0.53	0.37	.61*	.66*	.70*	.63*	0.35	1	.67*	.65*
Average teacher salary	.98**	.96**	.86**	.99**	.99**	.99**	.98**	0.18	.67*	1	.99**
Average wage (CZ)	.99**	.98**	.91**	.99**	.99**	.99**	.95**	0.11	.65*	.99**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

#### 4. Discussion and Conclusion

A very discussed topic in the Czech Republic is to increase spending on education. The arguments for increasing these expenditures and salaries of pedagogical staff are mainly for improving the quality of education (Benesova et al., 2015). The amount of teachers' salary is one of the factors for many secondary school graduates to decide whether to remain in education and the teacher's career will start (Figlio, 1997). It is not surprising that higher salaries have the potential to attract young people to education, which can pass on further generations' knowledge in such a way that economic exploration is an investment in the future.

The following can be stated based on the analysis performed:

- The Czech Republic has an average number of pupils per teacher compared to other OECD countries, but the salary of teachers is about half compared to these countries.
- Expenditure on education has increased significantly in recent years, this growth was caused by increasing the number of pedagogical staff and growing their wages.
- The economic situation (GDP growth) had virtually no effect on the number of pupils in the period under review.
- Although the growing number of teachers and their wages significantly increase education, without further changes in the education system (e. g. improving the quality

of teaching, taking into account modern technologies and trends), these expenditures do not become an investment that would increase the added value of the pupils and the potential of their application future.

In connection with the above findings, it is necessary to take into account the quality of education as a whole before further increased increase in education. Increasing wages or the number of teachers in itself cannot contribute to a higher quality of education, as some politicians mistakenly believe. Wage increases are only consumer expenditure and a tool in which the teacher's position can be promoted to socially popular and desired. But only a change in the approach to education and a quality way of education, which can be implemented by quality educators, can provide the much-needed compulsory basis of education and turn this consumption expenditure into an investment.

Acknowledgments: The work was supported by the internal project "SPEV – Economic Impacts under the Industry 4.0 / Society 5.0 Concept", 2023, University of Hradec Králové, Faculty of Informatics and Management, Czech Republic.

Conflict of interest: none.

## References

- Benesova, I., Sanova, P., & Laputkova, A. (2015). Public Expenditures on Education—Comparison of Eu States. In I. Krejci, M. Flegl, & M. Houska (Eds.), *Efficiency and Responsibility in Education 2015* (pp. 25–33). Czech University Life Sciences Prague.
- Bracke, P., van de Straat, V., & Missinne, S. (2014). Education, Mental Health, and Education-Labor Market Misfit. *Journal of Health and Social Behavior*, *55*(4), 442–459. <https://doi.org/10.1177/0022146514557332>
- Chikoko, V., & Mthembu, P. (2020). Financing primary and secondary education in sub-Saharan Africa: A systematic review of literature. *South African Journal of Education*, *40*(4), 2046. <https://doi.org/10.15700/saje.v40n4a2046>
- ČSÚ. (2022). *Obyvatelstvo*. [https://www.czso.cz/csu/czso/obyvatelstvo\\_lide](https://www.czso.cz/csu/czso/obyvatelstvo_lide)
- ČSÚ. (2023a). *Česká republika od roku 1989 v číslech—Aktualizováno 9. 12. 2022*. <https://www.czso.cz/csu/czso/ceska-republika-od-roku-1989-v-cislech-aktualizovano-9122022>
- ČSÚ. (2023b). *Inflace—Druhy, definice, tabulky. Inflace - druhy, definice, tabulky*. [https://www.czso.cz/csu/czso/mira\\_inflace](https://www.czso.cz/csu/czso/mira_inflace)
- ČSÚ. (2023c). *Předběžný odhad HDP - 4. Čtvrtletí 2022*. <https://www.czso.cz/csu/czso/cri/predbezny-odhad-hdp-4-ctvrtleti-2022>
- Decree of 22 June 2018, amended Decree No. 48/2005 Coll., *On Basic Education and some essentials of compulsory education, as amended*, (2018). <https://www.epravo.cz/mz/vyhlaska-ze-dne-22-cervna-2018-ktou-se-meni-vyhlaska-c-482005-sb-o-zakladnim-vzdelavani-a-nekterych-nalezitostech-plneni-povinne-skolni-dochazky-ve-zneni-pozdejsich-predpisu-22181.html>
- European Commission. (2023). *Eurydice*. <https://eurydice.eacea.ec.europa.eu/cs/national-education-systems/czech-republic/ceska-republika>
- Figlio, D. N. (1997). Teacher salaries and teacher quality. *Economics Letters*, *55*(2), 267–271. [https://doi.org/10.1016/S0165-1765\(97\)00070-0](https://doi.org/10.1016/S0165-1765(97)00070-0)
- Glastra, F. J., Hake, B. J., & Schedler, P. E. (2004). Lifelong learning as transitional learning. *Adult Education Quarterly*, *54*(4), 291–307. <https://doi.org/10.1177/0741713604266143>
- Hedvicakova, M., & Svobodova, L. (2018a). Solutions for Higher Competence in Financial Literacy of Pupils at Secondary School in the Czech Republic. In S. A. Al-Sharhan, A. C. Simintiras, Y. K. Dwivedi, M. Janssen, M. Mäntymäki, L. Tahat, I. Moughrabi, T. M. Ali, & N. P. Rana (Eds.), *Challenges and Opportunities in the Digital Era* (Vol. 11195, pp. 387–396). Springer International Publishing. [https://doi.org/10.1007/978-3-030-02131-3\\_35](https://doi.org/10.1007/978-3-030-02131-3_35)
- Hedvicakova, M., & Svobodova, L. (2018b). Web Portals Used in Financial Education as a Support of Financial Literacy. *Advanced Science Letters*, *24*(4), 2948–2952. <https://doi.org/10.1166/asl.2018.11102>



- Ismanto, B. (2016). Evaluation on Financing Collaboration In Improving the Quality of Primary Education. In A. Komariah, A. G. Abdullah, A. B. D. Nandiyanto, T. C. Kurniatun, R. Anggorowati, I. Gunawan, W. M. Wijaya, & H. S. Nurlatifah (Eds.), *Proceedings of the 6th International Conference on Educational, Management, Administration and Leadership (6th Icema 2016)* (Vol. 14, pp. 8–12). Atlantis Press.
- Kadnikova, T., & Kolesov, A. (2019). Financing of Education in Russia: Different Budgets Levels Allocation. In L. G. Chova, A. L. Martinez, & I. C. Torres (Eds.), *12th International Conference of Education, Research and Innovation (iceri 2019)* (pp. 4483–4488). Iated-Int Assoc Technology Education & Development.
- Kalous, J., & Veselý, A. (2006). *Teorie a nástroje vzdělávací politiky*. Karolinum.
- Kholiavko, N., Popelo, O., Melnychenko, A., Derhaliuk, M., & Grynevych, L. (2022). The role of higher education in the digital economy development. *Revista Tempos E Espacos Educacao*, 15(34), 1–14. <https://doi.org/10.20952/revtee.v15i34.16773>
- Kondirolli, F., & Sunder, N. (2022). Mental health effects of education. *Health Economics*, 31, 22–39. <https://doi.org/10.1002/hec.4565>
- Macris, M., Mihaela, C., & Daniela, L. (2011). The Evolution of Education Expenditures and Their Share in the Gross Domestic Product of the States Members of the European Union. In K. S. Soliman (Ed.), *Innovation and Knowledge Management: A Global Competitive Advantage, Vols 1-4* (pp. 458-+). Int Business Information Management Assoc-Ibima.
- MŠMT. (2023). *Statistická ročenka školství – Zaměstnanci a mzdové prostředky*. MŠMT ČR. <https://www.msmt.cz/vzdelavani/skolstvi-v-cr/statistika-skolstvi/statistickeroceny-skolstvi-zamestnanci-a-mzdove-prostredky>
- OECD. (2022). *Teachers—Students per teaching staff—OECD Data*. <http://data.oecd.org/teachers/students-per-teaching-staff.htm>
- OECD. (2022). *Teachers—Teachers' salaries—OECD Data*. <http://data.oecd.org/teachers/teachers-salaries.htm>
- Pham, M. C., & Klamma, R. (2013). Data Warehousing for Lifelong Learning Analytics. *Bulletin of the Technical Committee on Learning Technology*, 15(2), 6–9.
- Průcha, J. (2015). *Přehled pedagogiky*. Portál.
- Sun, P. C. (1999). Face to the primary school computer education of 21 century. In G. Cumming, T. Okamoto, & L. Gomez (Eds.), *Advanced Research in Computers and Communications in Education, Vol 1: New Human Abilities for the Networked Society* (Vol. 55, pp. 663–666). I O S Press.
- Sung, J., & Freebody, S. (2017). Lifelong learning in Singapore: Where are we? *Asia Pacific Journal of Education*, 37(4), 615–628. <https://doi.org/10.1080/02188791.2017.1386090>
- Szarowska, I. (2016). Quality of Public Finance and Government Expenditure in the Czech Republic. In I. Paleckova & I. Szarowska (Eds.), *Proceedings of the 15th International Conference on Finance and Banking* (pp. 375–384). Silesian Univ Opava, School Business Administration Karvina.
- Weare, K. (2007). Linking education and mental health—A European priority. *Health Education*, 107(3), 245–249. <https://doi.org/10.1108/09654280710742546>
- World Bank. (2022). *Government expenditure on education, total (% of GDP)*. <https://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?view=map>