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The Effect of Government Expenditure on Human Capital in the Czech Republic

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Abstract

In current thinking, human capital is referred to as a driver of national economies. It encompasses all of the knowledge, talents, skills, abilities, experience, intelligence, and training of a country's workforce. National governments are fully aware of this, and they are seeking to stimulate human capital and encourage its development. A number of studies have shown that public investment for developing human capital is claimed to be the highest performing investment for achieving better economic performance. The aim of this paper is to verify whether government investment in areas that develop human capital can indeed aid its development in the Czech Republic. Using the least squares method, the paper studies whether the Human Development Index showed correlation to individual types of government expenditure between 1995 and 2018. The analysis revealed that in the Czech Republic, spending on recreation, culture, and religion had the largest influence on developing human capital for the period under review. Expenditure on education and health, which most studies cite as the main tools for cultivating human capital, placed only third or fourth regarding their contribution to developing human capital.

Keywords

Human Development Index, Economic Growth, COFOG, Public Expenditures, Creative Labor, Creative Economy.

JEL Classification

A11, C32, H42, H50

Introduction

Human capital, as measured by level of education, is commonly considered to be one of the key variables supporting economic growth (Frank, 1960; Mincer, 1984; Casey & Christ, 2005; Westlund et. al., 2010). Investment in human capital is considered to be one of the most important types of investment, providing the highest rate of return in terms of output. Growth models such as those by Romer (1972) and Lucas (1988) – in the wake of Razin (1972), and Uzawa (1965) – emphasize investment in human capital as an important factor contributing to long-term growth.

Florida (2002, 2005) introduced a new theory of regional economic growth based on the role of the creative class, composed of creative and innovative workers and characterized by high levels of productivity. According to Florida, national economies with workers showing a higher level of creativity grow the fastest. Creating a creative workforce is now considered a collective process, having overturned the romantic view of creative genius – once considered a gift from the gods and thus uninfluenced by the surrounding social context.

Providing people with educational, health-oriented, cultural, and athletic activities is one of the main ways to improve the quality of human resources. For many years, numerous studies and public policies around the world have been concerned with cultivating human capital in relation to the economy and its performance via education, culture, health, and other sectors. However, this relationship takes different forms in different countries and regions. In addition, studies initially used approaches that were sociological and primarily theoretical. Only relatively recently have these sectors been studied formally from an economic or statistical perspective. For the same reason, cultural sector-specific policies have been a subject of debate for roughly the last 10 to 15 years as policies for generating significant economic momentum and supporting the growth of macroeconomic indicators.

The Human Development Index emphasizes that countries are implementing policies that encourage the use of national economic wealth to increase their population's capital. The intended result is for these national resources to be channeled into human development projects that will provide real national development. This paper takes this assumption and uses it to explore the impact of government spending on cultivating human capital. Specifically, this paper's main objective is to analyze the impact of government spending on human development in the Czech Republic for the period of 1995 to 2018.

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Literature Review

In the 21st century, human capital has become a natural part of a production factors. It is no longer only land, labor, and capital but also the collective unique abilities of individuals – both innate and acquired – that result in the production of goods and services. Additionally, these may be suitably expanded and cultured (Srédl, 2009; Olopade et al., 2020).

The original concept of capital as being exclusively physical (e.g., Solow, Samuelson, and Nicks) has been gradually extended since the mid-20th century by representatives of the so-called Chicago school to include the concept of human capital (e.g., Becker, Schultz, Friedman, and Mincer). Subsequently, the theory of human capital was developed in relation to economic growth and the economics of the workforce. Answers were sought as to whether developing human wealth contributed to the growth of national wealth, what the return on investment in human capital was, how education affected the distribution of income in society, etc.

In his book The Economic Value of Education, Theodore Schultz (1963) was one of the very first to address the concept of human capital in a way that assessed its contributions. This term gained greater importance in the late 1980s and early 1990s, and there has been a shift in contemporary economic analysis from the perception of capital as being physical to its being perceived as the productive quality of human beings, i.e., their quality. New growth theories have emphasized that through education, learning, and skill creation, people can become more productive, contributing significantly to the process of economic growth (Barro, 1996; Faggian et al., 2019). Economic growth studies have examined the experience of Japan and the newly industrialized countries of East Asia, Europe, and North America and emphasized the role of human capital to a greater extent than before. This new emphasis on human capital has been strengthened by certain international financial institutions' analytical work on the education sector (Westlund et al., 2010; Weckroth et al., 2016; Patel et al., 2019).

The Organization for Economic Co-operation and Development (OECD) defines human capital *as "the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being"* (OECD, 2001).

Emerging evidence is rapidly increasing to support the role and importance of investment in human capital via education, health, culture, and sports within the economic development process targeting sustainable growth and development. It has been found that a population's physical and mental condition contributes to economic growth no matter which nation is concerned. It is important to stress that the importance of the education system, health care, and other economic sectors in cultivating human capital is crucial to any labor market (Alam, 2012; Florida, 2002, 2005; Hugging et al., 2015; Okafor et al, 2017).

Success in a modern, knowledge-based economy requires individuals to have a wide range of skills, motivations, and abilities. These characteristics are built into the populations of nations, regions, or cities and can generally be described as human capital. The next question is how to define and quantify human capital. Richard Florida, who focused on expanding the notion of human capital based on education, claimed that society's economic performance depends primarily on individuals' creativity (Florida, 2002, 2005). From the perspective of the knowledge-based economy, human capital is currently made up not only of education but also of a skill set acquired through cultural goods (Bourdieu, 2005; Hofstede, 1980), cultivating human physical potential via health or sports (Lee, 2007; Lee et al., 2013; Bailey et al., 2013), and many other means.

Grossman (1972) demonstrated that education and health are actually forms of human capital. According to Bloom and Canning, the population's education and health are the basis of economic growth and development and are one of the key determinants of economic performance at both the micro and macro levels. This stems from the fact that education and health are both a direct part of human well-being and a form of human capital that enhances an individual's abilities (Bloom et al., 2003). Schultz (1992) confirmed that a population's condition is a decisive production factor and stressed the intrinsic value of investment in education and health. Health investments offer a high return on economic growth. This means that increasing healthcare spending not only has a major impact on decreasing possible treatment costs in the field of preventing patient neglect but also on increasing human productivity growth by improving the population's condition.

Pierre Bourdieu (2005), who analyzed different degrees of social, economic, and cultural capital, also shares these conclusions about culture's impact on economic performance. Another contribution to this area was made by social psychologist Geert Hofstede (1980), who defined culture as the "collective programming of the mind of individuals" and a "shared system of meanings" that affects the population's mental and physical well-being and is ultimately reflected in their work performance.

Huggins and Thompson (2015) claim that *"…culture is part of local development systems combining economic performance with social well-being."* Other authors define the role of local cultural characteristics as "the local people's climate" (Florida, 2005), "the regional self" (Syssner, 2009), and "the established values of society" (Horlings, 2015). Common to all these concepts is that they refer to a locally shared system of rules and values that ultimately affects the economic performance of individual countries.

Yesufu (2000) examined the link between investment in human capital and economic growth in Nigeria. More specifically, this study examined the causal link between investment in human capital and economic growth for 1975 to 2005 using the integrated error correction model (ECM) technique. The study's results showed directional causality between investment in human capital and economic growth. It is therefore recommended that the government increase its budget for sectors cultivating human capital and intensify joint efforts on the part of all stakeholders – all levels of government, NGOs, and the organized private sector – to improve education and health facilities for sustainable economic growth.

Chete and Adeoye (2002), used regression analysis to study the empirical mechanics by which human capital affects economic growth in Nigeria. The authors demonstrated a positive impact, but stressed that though the various governments of Nigeria had always expected human capital would positively impact economic growth, the capital spending on education and health was too low for the outcome to be considered significant.

Gangal and Gupta (2013) investigated how government spending on "cultivation" services impacted India's economic growth using time series data from 1998 to 2012. The study used co-integration and the assessment of Granger causality. The outcome indicated a stable long-term relationship between public spending and economic growth, and it was found that public spending had both positive and significant impact on economic growth.

Musa and Jelilov (2016) also used the OLS method to investigate the impact of government spending on economic growth in Nigeria for 1981 to 2012. The study showed that government spending significantly and positively affected economic growth. Omodero (2018) expanded on this study for Nigeria from 1999 to 2016, but focused on how government spending on education, health, and defense and security affected GDP. Based on the results of this study, she suggested redirecting government resources towards education and health care, which could truly help boost the country's economic growth. According to Alam (2012), a 1% increase in the quality of human capital should be reflected in Pakistan's economic development by as much as 2.38%.

Methods

The aim of this paper is to analyze the impact of individual components of public expenditure on human capital in the Czech Republic. Particular attention has been paid to the impact of expenditure on economic sectors that, based on the literature review, cultivate human capital; this public spending should thus be reflected in the country's human capital development.

The analysis used a time series of 24 years, from 1995 to 2018. The variables used in the analysis are the Human Development Index (hereinafter referred to as HDI) and the Classification of the Functions of Government in the Czech Republic (hereinafter referred to as CZ-COFOG). This period is the longest time series available for the monitored data.

To pursue the above research objective, the following null hypothesis was formulated:
H_0: There is no significant relationship between recurrent government expenditure and the HDI in the Czech Republic.

The CZ-COFOG classification categorizes individual government institutions' functions with regards to their expenditure. Data on government expenditure were obtained from the Eurostat website (Eurostat, 2019). The data analyzed are contained in Table 1 in the Annexes. All analyzed variables were expressed in terms of a growth rates (Table 2 in the Annexes).

The CZ-COFOG classification is mainly used to determine government provided expenditure according to function that benefits both individual households (individual consumption) and collective expenditure (collective consumption). COFOG expenditure is often divided into two groups. Productive government spending usually includes that which contributes to improving human capital (especially education and health) and promoting technological progress, infrastructure, and communication. Non-productive government expenditure is primarily considered to be social expenditure and transfers (Mazúrová & Kollár, 2015; Halásková & Halásková, 2018; Muslim et al., 2019). Afonso et al. (2005) note that these unproductive costs can slow economic growth by reducing incentives to work, reducing investment in human capital, and crowding out private investment. On the other hand, social spending provides an appropriate institutional environment. Other authors – such as Devarajan, Swaroop and Zou (1996), and Agénor et al. (2010) – have also confirmed its negative impact on economic growth.

In this article, human development is defined by three components (life expectancy, gross enrollment, and GNI per capita); the UNDP defines these as basic indicators of human development and quantifies them with the help of the Human Development Index, see Figure 1. The Human Development Index is a statistical tool that is used to generally assess a nation's social situation as well as its economic results, including further impact. The country's social and economic dimension focuses on people's health, educational achievements, and living standards. The HDI is one of the best tools for monitoring a country's level of development, because it combines all the major social and economic indicators responsible for a nation's economic development. The Human Development Index uses values from zero to one, where higher values represent better human capital development for a given country (UNDP, 2018).

The data was analyzed using Gretl. Correlation analysis and ordinary least squares regression (OLS) were used to achieve our objective.

Correlation analysis was also used to assess the strength and direction of the linear association between government expenditure and the HDI. Correlation analysis is a fundamental method that was used to verify the existence of a relationship between the examined variables. In the general sense of the word, the term "correlation" means a degree of association of two variables. If a correlation is demonstrated between variables, it means that certain values of one variable tend to occur together with certain values of the other variable. The degree of this tendency can range from a non-existent correlation to an absolute correlation. Correlation analysis is a method of determining the intensity of potential dependencies of two quantitative variables, resp. the tightness of their relationship. The result of the analysis is the determination of the degree of dependence, which is realized by calculating the values of different types of correlation coefficients. Testing for a relationship between sample pairs of data was done using the Pearson's correlation coefficient. Generally, correlation coefficients fall between -1 and +1 inclusive. A negative value indicates a reverse relationship and vice versa. A correlation coefficient closer to +1 or -1 indicates strong positive or negative linear association respectively, and correlation is considered moderate when it falls at or around -0.5 or +0.5 (Montgomery et al., 2015).

Pearson's correlation coefficient is calculated directly from the measured pair values of the variables X and Y and, like the arithmetic mean and standard deviation, is greatly influenced by the outliers. The selection coefficient of correlation (Pearson's) can be calculated according to the formula (Hendl, 2009):

$$r(x,y) = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})\sum_{i=1}^{n}(y_i - \bar{y})^2}}, \quad (1)$$

where

x, y are quantitative characters and n is the number of observations.

The following rules can be used to evaluate the strength of the correlation relationship: (Hendl, 2009):

- insignificant correlation at | rs | = <0; 0,1>
- weak correlation at | rs | = (0,1; 0.4>
- mean correlation at | rs | = (0,4; 0.7>
- strong correlation at | rs | = (0,7; 0.9>
- very strong correlation at | rs | = (0,9; 1>

Finally, determining how much of one variable's behavior was able to be explained by other variables required the use of regression analysis. Ordinary least squares regression was used to model the variables. Regression establishes a linear equation or a relationship between one variable, called the response or dependent variable, and two or more variables, called the predictor or independent variables, where the independent variables explain the variation in the response variable. A multiple linear regression model incorporates coefficients called regression parameters and variables in the form of an equation.

The formula for ordinary least squares regression can be expressed as follows (King et al., 2018):

$$y = \alpha + \beta 1*x1 + \beta 2*x2 + \cdots + \beta n*xn + \varepsilon \quad (2)$$

The y parameter is the dependent variable; the x parameters are the independent variables. Alpha (α) determines the distance of the intersection of the regression line with the y-axis from the origin of the coordinates (the value of the regression function for x = 0). Beta (β) are regression coefficients that indicate how much a dependent variable changes when the value of an independent variable is increased by one. The index n denotes the number of independent variables. The symbol ε denotes residual variance. This is a graphical representation of the distance of points from a line. For a successful interpretation of multiple regression analysis, the data must satisfy the prerequisites to ensure unbiased analysis results (King et al., 2018).

The estimation of HDI levels in relation to the size of government expenditures using multidimensional linear regression is then:

$$HDI = \alpha + \beta 1*GenPS + \beta 2*Def + \beta 3*POS + \beta 4*EA + \beta 5*EP + \beta 6*Hous + \beta 7*Health + \beta 8*RCR + \beta 9*Edu + \beta 10*SP + \varepsilon \quad (3)$$

where HDI is the Human Development Index value,
GenPS is expenditure on general public services,
Def is expenditure on defense,
POS is expenditure on public order and safety,
EA is expenditure on economic affairs,
EP is expenditure on environmental protection,
Hous is expenditure on housing and community amenities,

Health is expenditure on health care,
RCR is expenditure on recreation, culture, and religion,
Edu is expenditure on education, and
SP is expenditure on social protection.

Before being applied, it was necessary for the estimated econometric model to be verified and evaluated. For this purpose, the typical assumptions that econometrics applies to regression errors are used, i.e., the error term ϵi is expressed as follows:

- E(ϵi) = 0. The error term has a zero mean.
- var(ϵi) = E(ϵi2) = σ2. There is constant variance of the error term (homoscedasticity).
- cov(ϵi; ϵj) = 0 for i ≠ j. The error terms are uncorrelated.
- ϵi, the error term, is normally distributed.
- Xi is fixed; it is not a random variable.

The results of the previous estimate for the p-value and the coefficient of determination can be used for basic statistical verification. The p-value gives information about the significance level "α," at which the null hypothesis (H0) is rejected on account of the parameter's statistical insignificance. Generally, if the p-value is less than the selected α, we reject the null hypothesis (H0) about the parameter's statistical insignificance, i.e., the analyzed parameter is statistically significant at the given level of significance. The determination coefficient (R2), a corrected (adjusted) determination coefficient, provides information about how tight the correlation is. The resulting R2 value can be interpreted as a percentage, indicating what percentage of the change in the explained variable depends on changes in the explanatory variables.

To verify the explanatory power of the regression model, a graph of actual and predicted values of human capital development based on the development of influencing variables was also used. Based on the graphical tightness of the actual and predicted values the accuracy of the resulting regression analysis can be verified.

Results

Table 2 shows the results of the Pearson´s correlation coefficient among analyzed variables. It determines the closeness of the correlation relationship between the monitored variables. The values highlighted in red were judged statistically significant. Statistically significant dependence was demonstrated for virtually all the selected quantities, with rates being stronger or weaker. In relation to the Human Development Index, these variables are mainly expenditures on health, education, recreation, culture, and religion and social protection. All these expenditures showed very strong bilateral dependence exceeding 0,97. Expenditures on general public services, political stability, also show a very strong dependence with the Human Development Index variable. These areas of public spending correlate with a dependent variable of more than 90 percent. Strong correlation (between 0,7 and 0,9) was demonstrated on expenditure on defense, economic affairs, environmental protection and expenditure on housing and community amenities. The lowest value of the correlation coefficient in relation to the Human Development Index was demonstrated for public defense expenditure.

Table 2. Correlation analysis results.

	HDI	GenPS	Def	POS	EA	EP	Hous	Health	RCR	Edu	SP
HDI	1,0000	0,8975	0,7653	0,8758	0,8491	0,8187	0,8740	0,9872	0,9718	0,9742	0,9874
GenPS	0,8975	1,0000	0,8162	0,8931	0,7956	0,8357	0,7419	0,9102	0,8914	0,8987	0,9070
Def	0,7653	0,8162	1,0000	0,9162	0,8440	0,8153	0,7442	0,88398	0,8744	0,8899	0,8864
POS	0,8758	0,8931	0,9162	1,0000	0,8664	0,8406	0,8698	0,9900	0,9882	0,9856	0,9871
EA	0,8491	0,7956	0,844	0,8664	1,0000	0,7447	0,7475	0,8636	0,8589	0,8813	0,8634
EP	0,8187	0,8357	0,8153	0,8406	0,7447	1,0000	0,7318	0,8476	0,8247	0,8624	0,8433
Hous	0,874	0,7419	0,7442	0,8698	0,7475	0,7318	1,0000	0,8733	0,8968	0,8865	0,8592
Health	0,9872	0,9102	0,88398	0,99	0,8636	0,8476	0,8733	1,0000	0,9917	0,9882	0,9967
RCR	0,9718	0,8914	0,8744	0,9882	0,8589	0,8247	0,8968	0,9917	1,0000	0,9892	0,9863
Edu	0,9742	0,8987	0,8899	0,9856	0,8813	0,8624	0,8865	0,9882	0,9892	1,0000	0,9892
SP	0,9874	0,907	0,8864	0,9871	0,8634	0,8433	0,8592	0,9967	0,9863	0,9892	1,0000

The heat map of the correlation coefficient, created in the program Gretl, is shown in Figure 1. Although Gretl rounds off the correlation coefficient values and the heat map does not display data as accurately as that in Table 2, the heat map's advantage is in its use of tight color clustering to make the closeness of the variable relationships immediately visible.

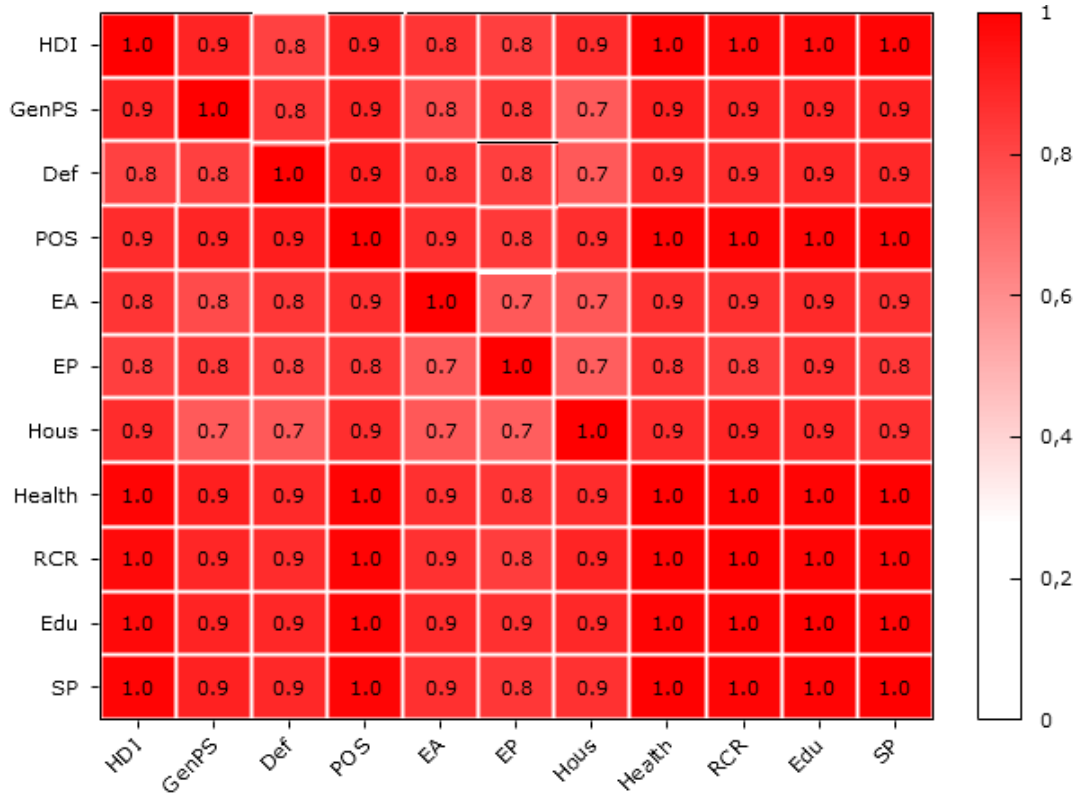

Fig. 1. Correlation heat map.

Stationarity testing using the Dieckey Fuller Unit Root Test was performed before the regression analysis. The null hypothesis states that a variable is non-stationary if the p-value is less than or equal to the significance level. If the variable is not stationary, it must be stationary. For variables that are expressed in units other than percentages, logarithmization is performed and retested. If the variable is still non-stationary, a difference is added. The only non-stationary variable was expenditure on economic affairs. For this non-stationary variable, which was expressed in monetary units, a logarithimization was performed, which was converted into a stationary form by the variable.

Assessing the data's normality is a prerequisite for many statistical tests, especially parametric statistical tests where data normality is an underlying assumption. The Shapiro-Wilk test was used to check if the data had normal distribution.

The Breusch-Pagan test was used to verify the homoscedasticity of the analyzed data. The test confirmed that the data are homoskedastic.

The null hypothesis of zero autocorrelation in the residuals against the alternative that the residuals are positively autocorrelated at the 5% level of significance. The Durbin Watson test statistic was used for that purpose. The Durbin Watson test statistic value was 2,462075. If the test statistic value lies between dL (0,375) and dU (0,2417), the test is inconclusive. In this context, it is possible to err on the side of conservatism and not reject the null hypothesis about zero autocorrelation.

It is important to mention that the results of the analysis are valid for the selected country and time series. The results of such models cannot be generalized for a larger population, other countries or another time period.

Ordinary least squares regression was employed to determine the extent to which the selected independent variables affect and explain the changes in the selected dependent variable via their interaction through the linear model. The Human Development Index is the dependent variable and the individual government expenditures are the independent variables used in the regression model. The multiple regression results are shown in Table 3.

The table's results show that for the period under review, human capital development was influenced mainly by spending on recreation, culture, and religion (at a 0.01 significance level), subsequently also by spending on housing and community amenities, environmental protection and expenditure on public order and safety (at a 0.05 significance level), with public expenditure education and health following (both at a significance level of 0.1).

Expenditure on both general public services as well as defense and economic affairs had no significant impact on human capital development in the Czech Republic for the period under review. The regression model's coefficient of determination is 0.99. Thus, the regression model explains 99% of the dependent variable's variability, and its predicative ability can be described as high.

Table 3. Multiple regression analysis results.

OLS, Using Observations from 1995 to 2018 (T = 23)
Dependent Variable: HDI

	Coefficient	Standard Error	T-Statistic	P-Value	
Const	0,0242693	0,00564557	24,299	0,0009	***
GenPS	3,88611e-06	6,90773e-06	0,5626	0,5833	
Def	−2,28118e-05	4,19414e-05	−0,5439	0,5957	
POS	5,95535e-05	7,21621e-05	0,8253	0,0450	**
EA	−1,07109e-06	4,60646e-06	−0,2325	0,8198	
EP	−5,49551e-05	3,33729e-05	−1,647	0,1236	
Hous	7,15532e-05	3,86683e-05	2,067	0,0476	**
Health	6,49301e-06	3,67380e-05	1,767	0,0906	*
RCR	0,00020563	0,000109497	2,655	3,59e-05	***
Edu	1,03050e-05	3,57856e-05	1,891	0,0723	*
SP	1,08764e-05	1,92298e-05	0,5656	0,5813	

*** Correlation is significant at 0.01 (2-tailed).
** Correlation is significant at 0.05 (2-tailed).
* Correlation is significant at 0.1 (2-tailed).

With emphasis on the various COFOG expenditures' effect on the HDI, the results show that, with the exception of expenditure on environmental protection, the statistically significant expenditures have a positive effect on human capital. In relative terms, an increase of public spending on recreation, culture and religion by one percent will increase human development by 0,0002 percentage point if the other variables remained unchanged. Similarly, a one percent increase in spending on housing and community amenities can lead to a significant improvement in human development equally 0,00007 percentage point and a one percent increase in spending on public order and safety can lead to the growth of human development by 0,00006 percentage point. Expenditures on education and health care have the statistically least significant effect. A one percent increase in expenditure on these areas will cause the development of human capital by 0,00001, respectively 0,000006 percentage points.

Figure 2 shows how the actual, predictive HDI model of the Czech Republic evolved over the reporting period. The path of the figure's curves illustrate only the quality of the regression model. In particular, the first half of the reporting period showed no significant deviations for the forecasted or actual values. Thus, the predicted values are in very high agreement with the real ones. This only demonstrates the high degree of accuracy of the resulting regression model.

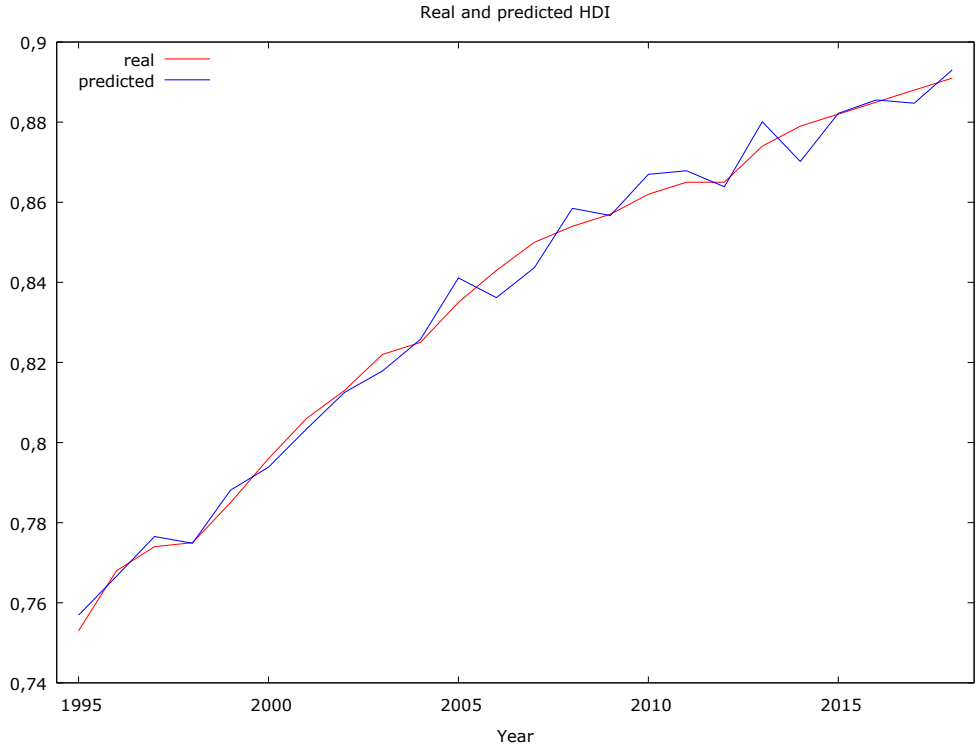

Fig. 2. Real and predicted HDI values

Discussion

Human capital's impact on a country's economic performance has been demonstrated by a number of studies, and humans – along with all of their abilities – are currently perceived to be one of the primary economic drivers. For this reason, economies around the world are trying to expand people's capabilities, skills, and performance as much as possible, thus contributing to the development of human capital with hope; (e.g., Chete et al., 2002; Yesufu, 2000; Gangal et al., 2013; Lahirushan et al., 2015).

In their studies, most authors have focused on the impact of education and health on human capital. Education and health can be described as economic sectors that undoubtedly cultivate and improve human performance (e.g., Yesufu, 2000; Bloom et al., 2003; Kwendo et al., 2015; Musa et al., 2016). During the period under review, education and health contributed to human development in the Czech Republic, though not as fundamentally as in the above authors' analyses. In the Czech Republic, education and health were in third or fourth place as factors helping develop human capital for the period under review.

This regression analysis carried out in the Czech Republic basically concurs with the authors who claim that culture has a major influence on developing capital (e.g., Bucci et al., 2011; Bourdieu, 2005). According to these authors, people using cultural goods and services have the ability to think outside the box, which this paper's author feels may contribute to accelerating the abilities and skills acquired during the educational process and to raising individuals' creativity much more than the knowledge base or the population's physical condition are able to do alone (Florida, 2002, 2005; Bourdieu, 2005; Hofstede, 1980).

Conclusion

In the twenty-first century, classical production factors – such as capital, land, and labor – are supplemented by human capital, of which labor is the conveyor. It is the combination of knowledge, talents, skills, abilities, experience, creativity, and many other components that give human capital its final form. It gives workers a competitive advantage in the labor market as well as allowing economic sectors to provide competitive advantage for the national economy overall. Thus, not only individuals but also national governments are interested in developing human capital, and they spend a significant amount of public money to achieve this.

There are no simple instructions on how to develop human capital. Some empirical studies have shown that educational activities have significant impact, some demonstrate health care's significant impact, and others favor the influence of culture. This analysis showed that all of the above services for cultivating human capital had a positive effect. In the case of the Czech Republic, recreational, cultural, and religious services were of greatest import. To put it simply, government spending in this area was the most profitable investment in terms of developing human capital for the period under review. However, as has been mentioned several times, human capital is the sum of many different components. Therefore, it needs to be influenced by a full spectrum of supporting sub-economies, which complement each other and accelerate each other's effects. Public expenditure – and not only in the areas of education, health care, and culture – has made a contribution towards developing human capital in the Czech Republic during the monitored period.

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ANNEXES

Table 1. HDI and COFOG dataset.

Year	HDI	GenPS	Def	POS	EA	EP	Hous	Health	RCR	Edu	SP
1995	0,75	1766	774	854	8590	519	510	3099	628	2402	5061
1996	0,77	1947	882	967	3814	632	676	3780	791	2498	6060
1997	0,77	2066	958	1053	4286	567	660	3540	722	2510	6510
1998	0,78	2093	907	1004	5214	602	818	3906	800	2688	7023
1999	0,79	2226	1066	1163	4674	513	731	4059	759	2576	7381
2000	0,80	2415	1147	1253	4511	584	819	4546	867	2943	8296
2001	0,81	2754	1294	1417	6456	652	952	5329	984	3428	9305
2002	0,81	3690	1543	1753	7210	779	649	6356	1200	4290	11542
2003	0,82	4002	1724	1855	10007	936	1043	6536	1251	4626	11567
2004	0,83	4372	1217	1932	6639	979	1343	6917	1331	4601	11534
2005	0,84	5686	1651	2255	6942	1186	1465	7585	1477	5233	12863
2006	0,84	5336	1422	2537	8049	1327	1497	8642	1840	6085	14524
2007	0,85	5918	1523	2666	8792	1324	1344	9357	1951	6483	16482
2008	0,85	6906	1660	3050	10780	1465	1463	11173	2303	7557	19196
2009	0,86	6897	1510	2968	10795	1018	1497	11593	2418	7512	19509
2010	0,86	6978	1540	3065	10354	1552	1462	12198	2404	7928	20717
2011	0,87	7224	1458	2906	10553	2104	1444	12603	2335	8305	21661
2012	0,87	10245	1304	2766	9910	2139	1143	12473	2202	8123	21501
2013	0,87	7469	1210	2752	9239	1596	1303	12062	2148	8059	21365
2014	0,88	7411	1096	2649	9827	1629	1336	11893	2141	8011	20483
2015	0,88	7247	1551	3092	10993	1831	1124	12747	2242	8297	21127
2016	0,89	7446	1280	3063	10493	1308	1043	13135	2282	7875	21710
2017	0,89	8154	1555	3392	11181	1556	1136	14340	2536	7892	22922
2018	0,89	9323	1822	3920	12484	1796	1627	15791	3105	9640	24955

Table 2. HDI and COFOG growth rates.

Year	HDI growth rate	GenPS growth rate	Def growth rate	POS growth rate	EA growth rate	EP growth rate	Hous growth rate	Health growth rate	RCR growth rate	Edu growth rate	SP growth rate
1995	-	-	-	-	-	-	-	-	-	-	-
1996	1,99	10,21	14,01	13,20	-55,60	21,83	32,67	21,96	25,82	3,99	19,75
1997	0,78	6,14	8,64	8,91	12,38	-10,19	-2,46	-6,34	-8,65	0,49	7,42
1998	0,13	1,32	-5,32	-4,66	21,64	6,15	24,05	10,35	10,79	7,11	7,88
1999	1,29	6,35	17,47	15,88	-10,36	-14,86	-10,60	3,92	-5,19	-4,16	5,10
2000	1,40	8,47	7,63	7,72	-3,48	13,81	11,92	12,01	14,26	14,24	12,41
2001	1,26	14,05	12,77	13,09	43,12	11,71	16,27	17,22	13,58	16,46	12,16
2002	0,87	33,98	19,24	23,74	11,68	19,56	-31,84	19,26	21,86	25,17	24,05
2003	1,11	8,46	11,78	5,81	38,79	20,11	60,72	2,84	4,24	7,82	0,21
2004	0,36	9,24	-29,40	4,13	-33,65	4,62	28,79	5,83	6,44	-0,53	-0,29
2005	1,21	30,06	35,65	16,75	4,56	21,11	9,07	9,66	10,98	13,72	11,52
2006	0,96	-6,15	-13,90	12,48	15,95	11,88	2,23	13,92	24,56	16,29	12,92
2007	0,83	10,91	7,13	5,09	9,22	-0,24	-10,22	8,28	6,01	6,54	13,48
2008	0,47	16,70	8,96	14,41	22,62	10,68	8,87	19,41	18,05	16,57	16,47
2009	0,35	-0,12	-9,03	-2,68	0,14	-30,49	2,28	3,75	5,01	-0,59	1,63
2010	0,58	1,16	1,98	3,25	-4,09	52,40	-2,33	5,22	-0,59	5,53	6,19
2011	0,35	3,53	-5,29	-5,18	1,92	35,58	-1,20	3,32	-2,85	4,76	4,56
2012	0,00	41,81	-10,56	-4,80	-6,09	1,66	-20,89	-1,04	-5,70	-2,19	-0,74
2013	1,04	-27,10	-7,20	-0,52	-6,77	-25,38	13,99	-3,29	-2,48	-0,78	-0,63
2014	0,57	-0,77	-9,43	-3,74	6,37	2,06	2,56	-1,40	-0,33	-0,60	-4,13
2015	0,34	-2,22	41,47	16,71	11,86	12,43	-15,84	7,18	4,75	3,56	3,14
2016	0,34	2,74	-17,49	-0,93	-4,55	-28,56	-7,25	3,04	1,78	-5,08	2,76
2017	0,34	9,51	21,50	10,75	6,56	18,95	8,93	9,17	11,13	0,21	5,58
2018	0,34	14,33	17,21	15,55	11,65	15,41	43,26	10,12	22,42	22,15	8,87