Expenditure On Education And Health As A Determinant Of Economic Growth In Hungary: VAR Approach

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Abstract

This research was conducted to describe, analyze, and explore the correlation and influence between government expenditure on education, current health expenditure, and growth of economic in Hungary. We use secondary data sourced from the World Bank as a reference with a range from 2000 to 2021. Variables used are government expenditure on education, current health expenditure, and GDP growth as the implementation of economic growth which is then analyzed using the quantitative VAR. The results of this study indicate that increased economic growth is positively correlated with government spending on education. Meanwhile, economic growth has a negative relationship to current health spending. This result can be a reference that the Hungarian government can continue to implement positive policies that have been implemented to allocate government spending for education so that optimal results are maintained. In addition, the Hungarian government needs to make policies that support spending in the health sector so that it has a beneficial impact on growth of economic. Another way is to periodically check the quality of health services, and so on is also important so that health can make a full positive contribution to economic growth for sustainable development.

Background

Education is important, but the majority of the focus is on making sure that everyone attends school, regardless of what they learn (Hanushek & Woessmann, 2020). Personally, health and education have a positive impact on productivity. This implies that the better the quality of a person's education and health will increase his productivity. In addition, high community productivity will help support economic growth (Mehmood, Siddique, & Ali, 2022). Education does not only affect the intensity and scope of one's activities, but also influences the rate of sustainable economic growth regionally and nationally (Baidybekova, Sauranbay, & Yermekbayeva, 2022).

Education has a very large role for economic growth in a country. In Nigeria, government spending devoted to education has a beneficial impact on economic growth in the country (Okerekeoti & Chinedu, 2022). In Brazil, economic growth will have a beneficial effect on health spending. In India and China, health spending is in line with the resulting impact on CO_2 emissions which has a detrimental effect on growth of economic and development. On the other hand, growth of economic in South Africa does not have a sustainable beneficial effect and impact on health spending (Li, Chang, Wang, & Zhou, 2022). In addition, the results are the

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same that education is one of the factors that influence growth of economic in Saudi Arabian (Singh, Singh, A., Alam, & Agrawal, 2022).

During the COVID-19 period, there was an economic slowdown caused by the phenomenon of health inequality in various countries. This can occur due to the influence of the uneven distribution of resources, the existence of social stratification that affects access to health services for some people, especially those with lower economic status (Panneer, et all., 2022). This proves that health is an important factor to drive economic growth. Stimulating output through the interaction of knowledge and technology will have an impact on economic growth, so government investment in higher education is considered important (Tang & Lai, 2022).

In order to create and direct toward sustainable development, healthcare institutions must continuously set performance indicators so that the effectiveness of the management system will increase (Moldovan, Blaga, P. Moldovan, & Bataga, 2022). In addition, research (Abu Bakar, et. all, 2022) claims that strong investments in health, education and basic public services are very important for a nation. This is what Nigeria is trying to do to achieve success. Research (Puspitasari & Sarfiah, 2019) reveals that both government spending in the education and health sectors have an effect and impact on Indonesia's economic growth.

Referring to the results of research (Haini, 2020) which states that investment in education and health has a beneficial effect on growth of economic in China. However, the effect of investment in education is greater than investment in health in providing a role for economic growth. One contributing factor is the limited health care system due to some underlying problems. The findings differ from studies (Pratiwi & Malik, 2022) that claim that economic expansion has a beneficial impact on poverty rates in the province of Bali, Indonesia. Meanwhile, education and health have the same negative correlation with the level of poverty.

Besides that, there are indications of a detrimental impact and effect of higher education on economic expansion. This is influenced by the increase in unemployment for highly educated workers (Maneejuk & Yamaka, 2021). This is also reinforced by the finding that growth of economic had a beneficial but not significant effect on poverty in Indonesia. Health and education are negatively correlated with poverty levels. However, the negative effect of education is not significant (Efendi, Indartono, & Sukidjo, 2019). This study aims to explore the correlation of government spending or expenditure on education and health, and growth of economic in Indonesia, which reflects its impact on sustainable development.

Research method

This study uses secondary data from World Bank sources with a range of 2000-2021 in Hungary. GDP growth will be used as a variable that reflects the country's economic growth. Other variables that will be used in this study are goverment expenditure on education and health sector. Furthermore, these variables will be studied and analyzed using the VAR (vector autoregresive) method. which is econometrically as follows:

$$GDP_t = \beta_0 + \beta_1 EDU_{t1} + \beta_2 HLH_{t2} + e_t$$
$$EDU_t = \beta_0 + \beta_1 GDP_{t1} + \beta_2 HLH_{t2} + e_t$$
$$HLH_t = \beta_0 + \beta_1 EDU_{t1} + \beta_2 GDP_{t2} + e_t$$

Information:
GDP   = Economic Growth (in percent)
EDU   = Government expenditure on education (% of GDP)
HLH   = Current Health Expenditure (% of GDP)

β   = Konstanta
e   = Error term
t   = Time Period

To understand the meaning of the variables used in this study is presented in table 1.

Table 1. Description Variables

Variabel	Deskripsi	Sumber	Unit Analisis
GDP	Annual growth rate of the GDP in constant local currency, at market rates. Based on an aggregate of fixed 2015 USD pricing. GDP is calculated as the sum of all product taxes, subsidies, and manufacturers' gross value added, which are not included in the cost of items.	World Bank	Percent
EDU	The general government's expenditures on education (current, capital, and transfers) are calculated as a percentage of GDP. It consists of costs covered by money received from outside the government. General government is the umbrella term for local, regional, and federal governments.	World Bank	Percent
HLH	Currently reported proportion of GDP for health spending. The annual utilization of medical goods and services is taken into consideration in the current estimates of health care costs. This measure excludes capital health investments in IT, machinery, and vaccine supplies for crises or outbreaks.	World Bank	Percent

Results and Discussion
Table 2 displays the unit root test on GDP, EDU, and HLH variables.

Table 2. Unit Root Test on GDP, EDU, and HLH.

Variabel	Unit Root	Statistics for the	Probability	Description

		ADF Test		
GDP	First Diff	-6.149232	0.0001	Stationer
EDU	First Diff	-3.942013	0.0084	Stationer
HLH	First Diff	-3.681438	0.0143	Stationer

The unit root test is intended to find out which variables are stationary at a certain level. Thus, in table 2 it can be seen that all stationary variables at the first level differ with a probability value of less than 0.05.

Table 3. Lag Optimum Test

Lag	LogL.	LR	FPE	AIC	SC	HQ
0	-63.73865	NA	0.225775	7.025121	7.174243	7.050359
1	-42.35045	33.77085*	0.062452*	5.721100*	6.317588*	5.822049*

The optimum lag is carried out with the aim of seeing and ensuring the lag used in further testing. Based on table 3 result of the lag optimum test, the lag that will be used is lag 1.

Table 4. Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Probability
None	0.447402	17.48948	29.79707	0.6039
At most 1	0.257704	6.813232	15.49471	0.5995
At most 2	0.077350	1.449101	3.841466	0.2287

Trace test indicates no cointegration at the 0.05 level

Table 4 cointegration test results. This test was conducted to determine whether further analysis would use the VAR/VECM method with proven cointegrated results or not. Based on the above results, cointegration is not integrated which is known through the trace test information. In addition, these results are also proven by a probability value of more than 0.05 so that further testing will be carried out using the VAR analysis model.

Table 5. VAR Analysis

	GDP	EDU	HLH
GDP(-1)	0.444521	0.017856	-0.018463
	(0.24566)	(0.02389)	(0.02872)
	[1.80950]	[0.74742]	[-0.64275]
EDU(-1)	-0.324518	0.886691	0.320516
	(2.03280)	(0.19768)	(0.23769)
	[-0.15964]	[4.48540]	[1.34845]
HLH(-1)	-0.231059	-0.106699	0.618868
	(1.88759)	(0.18356)	(0.22071)
	[-0.12241]	[-0.58127]	[2.80395]
C	4.675732	1.245524	1.231823
	(11.2289)	(1.09198)	(1.31298)
	[0.41640]	[1.14061]	[0.93819]

t-table value 1,72913.

Table 5 results of the VAR analysis. Furthermore, t-statistic can be compared with the t-table value to find out whether it has a significant relationship or not. So it can be seen that EDU(-1) and EDU have a significant effect on the t-statistic value [4.48540]. These results illustrate that the increase in government spending on education in the previous period can affect the current period. There is also a significant relationship between HLH(-1) and HLH with t-statistic [2.80395]. This relationship also proves that the increase in current health expenditure over the past time period will have an impact or correlation on the current period.

In addition, to strengthen the results of the analysis of the significance relationship can be seen and known by a comparison of t-statistic which is greater than the coefficient value. Through this step, GDP(-1) and GDP have a significant positive correlation with the t-statistic value [1.80950] and the coefficient value (0.24566). The results are the same between GDP(-1) and EDU with positive significance, t-statistic [0.74742] and coefficient value (0.02389). This positive relationship indicates that the economic growth that occurs will give a good signal to government expenditure on education. However, the results differ between GDP(-1) and HLH by showing that the relationship that occurs is significantly negative, t-statistic [-0.64275] and coefficient value (0.02872). This indicates that the increase in growth of economic has a negative effect on current health expenditure.

On the other hand, EDU(-1) and HLH have a significant positive relationship with the t-statistic value [1.34845] and the coefficient value (0.23769). These results explain that an increase in government expenditure on education has a beneficial effect and increases the current health expenditure. However, the opposite relationship between HLH(-1) and EDU has a significant negative relationship. It can be seen that the increase in current health expenditure in the previous period had a negative effect on government expenditure on education.
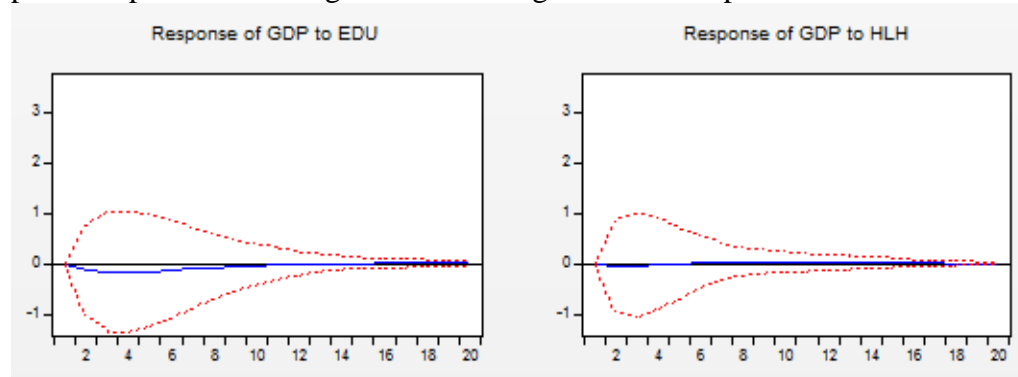

Figure 1. Impulse Response

IRF is carried out to determine the level of shock between variables in the study. Based on the graph in figure 1 above, the response of GDP to shocks that occurred in EDU in the first period to the 10th period was still fluctuating. In the following period up to the 20th period, the chart looks stable so it can be concluded that fluctuations began to decrease and GDP returned to balance. Furthermore, the GDP response to HLH fluctuated due to shocks at the beginning of the period up to the 5th period. The fluctuating response begins to decrease in the 6th period and so on which shows stability.

Table 6. Granger Causality Test

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Null Hypothesis:	Obs	F-Statistic	Prob.
EDU does not Granger Cause GDP	19	0.08810	0.7704
GDP does not Granger Cause EDU		0.87018	0.3648
HLH does not Granger Cause GDP	19	0.07686	0.7851
GDP does not Granger Cause HLH		0.04492	0.8348
HLH does not Granger Cause EDU	19	0.04492	0.8348
EDU does not Granger Cause HLH		1.50771	0.2372

The stages in the Granger test are to determine the direction of the relationship between variables. In addition, it can also be described as a causal relationship. Based on the table above, all variables do not experience a causal relationship and have no significant effect. This result is obtained because all variables have a probability value of > 0.05.

Conclusion

The state will make every effort to increase economic growth as a measure of sustainable development. Education and health are one of the factors that need to be supported to improve their quality so that government expenditure on education becomes the capital to achieve this. The things that were obtained of this research indicate that increased economic of growth has a beneficial correlation with government expendture on education. Therefore, the Hungary government can continue to carry out the positive policies that have been implemented to allocate government expenditure on education so that optimal results are maintained. In addition, the findings are inversely proportional where economic growth has a negative relationship to current health expenditure. To overcome this, the Hungary government needs to create policies that support spending in the health sector, this can help in having a positive and beneficial effect on economic growth. Apart from that, periodic checking of the quality of health services, and so on is also important. In the future, this research can be expanded in more depth and detail by using several other precise and accurate estimation techniques.

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