Public Health Investment, Technology Inclusion, and Economic Recovery in the Covid-19 Pandemic

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Abstract : This study investigates the impact of technology and health investment on economic growth using secondary data from bank banks with the quantitative method of Smooth Transition Autoregressive (STAR) model. We have found that investment in human capital and technology can drive economic growth.

Keywords:: Health Investment,Technology, Covid 19

JEL Classification : C0, J0, J24

1 INTRODUCTION

Investments in the health sector and the design of health financing policies are linked to economic growth. The interaction between health and the economy is very close because economic growth cannot be separated from human resources, which play an active role in the economy.The accumulation of physical capital and health together contribute to determining long-term economic growth (Tandon et al., 2020; Torre et al., 2019). Health is an important asset for humans when a health epidemic such as the Covid-19 pandemic in 2020 is an obstacle to the development of various economic sectors which in turn suppress economic growth and lead to an economic crisis. Health is very important because health is a major factor in human performance (Higginson et al., 2020).

The development of the health system is vital in the economy. Because health is the main factor for humans to work well, humans cannot work properly without adequate health, and their performance will be impaired (Zhou et al., 2020; Cavagnero & Bilger, 2010). Health is an important factor in human life. Health enables humans to live well and work well. Alignment of health and economic policies is needed to improve human resources quality that will encourage economic growth as a capital for economic recovery after the Covid-19 outbreak.

Health is an important part of human capital or human capital. Health can increase worker productivity by increasing their physical capacities, such as strength and endurance, and increasing mental abilities, such as cognitive function and reasoning abilities (Flynn et al., 2014; Snell et al., 2016). Population health leads to economic growth. Population health in population productivity because health is the main reason people can work well and work well, which in turn provides productive human capital to spur economic growth (Lange & Vollmer, 2017).

Health is an instrument to increase human income, which collectively drives economic growth (Cole, 2019; Wang & Granados. 2019). Health is very influential on people's welfare and people's purchasing power because when people get sick easily it will be difficult to work properly and in the end, people's income will decrease(Kennelly et al., 2020; Tiirinki et al., 2020). Health significantly affects prospective lifespan and life cycle behaviour (Asdaq et al., 2020; Jenkins et al., 2020). Health investment is one of the human capital investments where health is an important component in human quality (Singh & Misra, 2020). Health substantially affects human productivity (Lackie & Murphy, 2020; Mujan et al., 2019).

Human capital is a determinant of economic growth where health is part of that human capital. (Zala et 2020; Tisdell, 2020). The individual and collective health of a population affect a country's economic development and performance (Sahn, 2014; Andrei et al., 2018). Health and economic growth are relevant to an investment in education, family planning, and economic productivity (Zuniga et al., 2013; Visaria & Ved, 2016).

2 LITERATURE REVIEW

Physical capital and health are the human capital that plays an important role in driving economic growth. Health performance and economic performance are interrelated. There is a strong relationship between economic growth, consumption, and health spending (Wang et al., 2018; Chen & Chen, 2020). Rich countries have healthier populations. Malnutrition and infant mortality adversely affect life expectancy. National income directly affects the health system's development, for example, through insurance protection and public spending on health, a form of government investment in public health. Human resources are an important factor in economic growth related to improving human quality. Undoubtedly, improving human quality will be difficult without government support in public health investment (Pickering et al., 2014).

Human capital is human capital in an intangible form in experience, health, knowledge, expertise and skills in completing work to earn income (Perez et al., 2020).

Knowledge growth encourages sustainable development in the amount of capital used per worker so that human

resources are more efficient. Increasing knowledge and skills increase social work effectiveness and productivity (Sasongko et al., 2020). Technological progress is the driving force behind long-term economic growth. Technological progress comes from the development of human science. With efficient human resources, it will increase human resources' productivity, which in turn can drive economic growth (Yunxian & Wenjing, 2019; Bawono, 2017).

One model that includes innovation and technology in the model of economic growth is the Schumpeterian model. The Schumpeterian model is a model of economic growth that provides technology or design. The Schumpeterian theory is a club convergence theory. There are different degrees of convergence; a country moves towards the same borders as its technology partners (Berg et al., 2015; Gros, 2014).

3 RESEARCH OBJECTIVE AND METHODOLOGY

In writing this study, the scope of research will be discussed, namely analyzing the influence of the health investment variable (X1), Technology and Innovation (X2) on GDP (Y1) which is used as the basis for forecasting to obtain an alternative economy. Activities that can be done now and in the future. With the research period 2000-2019.

This research's type of data is quantitative data, while the data source in this study is secondary data. Secondary data is data obtained from library materials, while primary data is data obtained directly from the source (Saddhono, et, al, 2019).

The population in statistics includes all members of certain groups who are the object of research or collect information for data-based decision making (McEvoy, 2018). This study's population is Indonesia's GDP, All Health Investments in Indonesia that are recorded and not recorded by the World Bank, All investments in technology and innovation in Indonesia that are recorded and not recorded by the World Bank. A portion of the population is called a sample (McEvoy, 2018). This study's sample is Indonesia's GDP; the world bank records all health investment in Indonesia; the world bank records all technology investment and innovation in Indonesia. To obtain representative data (samples), as a basis for determining this sample, the authors do several ways, including:

a) Library research, namely by studying the literature related to the proposed title and lecture materials on the issues discussed to serve as a theoretical basis.

b) Documentation is a method of collecting data by examining and reviewing documents published by the company. Documentation studies were carried out by collecting all secondary data from world banks.

This research is a hotel industry business research where the data analysis used is business analysis. Data analysis in business research is a method for determining what the business is currently doing (its activities) and what data is needed to support these activities (Evans, 2019). In analyzing nonlinear time series forecasting statistical data, this study uses non-linear (dynamic) Threshold Autoregressive (TAR) time-series data analysis. The model adopted research from Bawono et al. (2019), which focuses on behaviour data or behavioural data analysis.

The threshold model allows the variable change process to behave differently when the variable's value exceeds a certain threshold. The threshold model can simulate the possible data movements in the past (Chen et al., 2012). The autoregressive threshold (TAR) model is a nonlinear time series or time series autoregressive (AR) model with a segmented model so that between different segments it is possible to have different AR (autoregressive) models (Weigend, 2018). The Smooth Transition Autoregressive (STAR) model is applied to time series data to improve the automatic threshold model (TAR, to allow a higher degree of flexibility in model parameters through better transitions.

This study adopts a research framework from Lange & Vollmer, 2017 to analyze the effect of human health as human capital on economic growth according to the Schumpeterian theory, which we translate into a mathematical model as follows:

$$\beta Y_{t} = \beta HI_{t-1} + \beta IT_{t-1} + e_{t-1}$$

Where βY_{t} is the current GDP (t0 or t) which is influenced by βHI_{t-1} as the level of investment in health services by the government for the community in the previous period (t-1), IT as technology development and community innovation as the success rate of efforts to educate people in the past (t-1) and other factors e_{t-1}.

4 RESULTS AND DISCUSSION

Human Capital is a physical and psychological form of human beings and human knowledge that can boost productivity. Human Capital has an important role in improving a country's economy. Health is an important means of maintaining and supporting human capital as a whole, and health becomes a part of human capital itself. Good human resources will encourage knowledge, which in turn creates technology that boosts human productivity. In the end, it will boost the economy as a whole which is manifested in GDP.

Nonlinear Statistical Analysis Time Series Forecasting

Gross Domestic Product in the realm of technology investment and innovation as well as health investment in Indonesia. Based on the method presented in the method, we estimate the investment in health, innovation and technology, and GDP with the threshold variable: GDP (-3) as follows:

Threshold Variable (linear portion)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HI	-5.36E + 11	6.03E + 14	-0.000888	0.9993
C	-1.63E + 15	1.83E + 18	-0.000891	0.9993

Threshold Variable (nonlinear part)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HI	5.39E + 11	6.03E + 14	0.000893	0.9993
C	1.64E + 15	1.83E + 18	0.000893	0.9993

Non-Threshold Variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IT	19.40795	6.355413	3.053767	0.0110

Slope

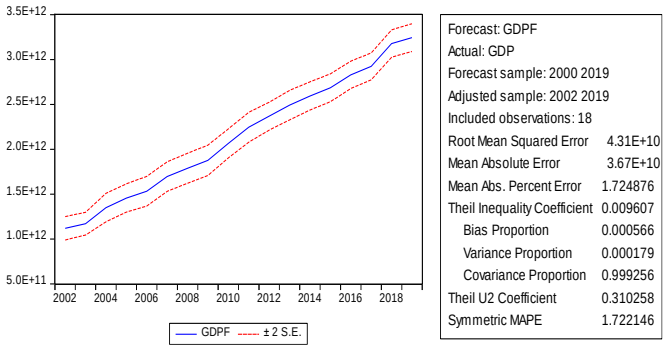
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Slope	1.92E-13	1.16E-12	0.165205	0.8718

Threshold

Variable	Coefficient	Std. Error	t-Statistic	Prob.
THRESHOLD	-3,10E + 13	5,96E + 15	-0,005203	0,9959

R-squared	0.994305
Mean dependent var	2.14E+12
Adjusted R-squared	0.991199
S.D. dependent var	6.82E+11
S.E. of regression	6.39E+10
Akaike info criterion	52.88587
Sum squared resid	4.50E+22
Schwarz criterion	53.23213
Log likelihood	-468.9729
Hannan-Quinn criter.	52.93362
F-statistic	320.0871
Durbin-Watson stat	1.440398
Prob(F-statistic)	0.000000

With the following Forcast graphic depiction:



Source: Author Computing

With an R-squared level: 0.994305, it shows a fairly strong level of influence between government investment for improving the health of Indonesians and the development of technology and innovation in Indonesian society on economic growth as reflected in GDP. This gives a signal that Human Capital is in the form of health, welfare, which is reflected in the level of public consumption and efforts to educate the community, which is reflected in the development of technology and innovation in Indonesian society which greatly affects economic growth. This is a strong signal that improving the quality of Indonesia's human resources can accelerate Indonesia's economic recovery after the corona virus pandemic ends.

5 CONCLUSION

Human resources are important capital for economic recovery after the Covid-19 pandemic, especially the improvement of affordable health services that can be enjoyed by the Indonesian people optimally through public health investments made by the Indonesian government, Improved social safety nets to maintain the welfare of the Indonesian people as reflected in public consumption. Affordable and quality education to encourage technological improvement and innovation in Indonesian society.

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