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Effects Of Human Capital And Technology Oneconomic Growth In The Asean Region

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ABSTRACT

Fast and quality economic growth can be achieved with the following factors:increase in capital accumulation, and human resources. Today, many countries areadapt to the acceleration of domestic production by utilizing the role oftechnology. This study aims to see the impact of the influence of human capital andthe role of technology on economic growth by taking a theoretical approachneoclassical and new growth . The method used is using panel data from 10ASEAN member countries in the period 1971-2017. The main variables in this studyare human capital and technology, by including other variables such as growthpopulation, capital growth and depreciation as control variables. The results of this studyshows that of all variables show a significant effect oneconomic growth in the ASEAN region, while the feasibility of the model showsthat the new growth model approach is better than the neoclassical model whichshown by the coefficient of determination of 87% in the new growth model and 21% inneoclassical model.

Keywords: *Economic Growth, Human Capital, Population Growth, Depreciation,Technology Use, Depreciation, ASEAN*

Background

People are the determining factor in inclusive economic growth,Humans can determine how the projection will be obtained. In conceptmacro economy, humans are included in the production input in the acceleration processeconomic growth, in this case human capital has a key role ineconomic growth and of course from this human capital can create accelerationeffective economic growth with the use of technology. Human capital hasimportant influence on economic growth through two mechanisms. First,direct human participation as a factor of production so that the accumulation of human capital willdirectly results in output growth. Second, human resources cancontribute to improving technical progress, in this way the level of human capitalaffect productivity growth. The discussion about human capital becomes an issueinteresting to world economists by stating that the accumulation of human capitalbe the key to long-term economic growth as described byMankiw (1992), Barro (2003), Romer (1999).

Massive use of technology in the production process of output can be a factorkey to effective economic growth. Technology can shape efficiencyeconomy and increasing productivity from various sectors such as industry andtrading. Over the past few decades, the progress and development of the technological agetoday has a variety of different meanings

and explanations. Technology is a processthat increase added value, the process uses or produces aproduct, the resulting product is not separate from other existing products and thereforebecome an integral part of a system (Miarson, 2007). Technology has been able to penetratespace and time limits, such as in buying and selling transactions that are increasingly efficient and effective.Technology is a concept related to knowledge and use (R&D). Therefore, humans as users and creators of a technology need to beproductive human beings and innovation as a form of response in the face of demandsquality long-term economic growth.

Different views on the concept of economic growth involving variablesThe main aspects of human capital and technology cause difficulties in using the second conceptthese factors are mainly in determining the measurement, but some literaturerevealing human capital and technology in driving economic growth Increate productive human capital so that it can obtain high economic valueHigher levels of course need to be obtained through education, experience, and training Rastogi (2002).Romer (1999) states that human capital is a fundamental source ofeconomic productivity. Similarly, Frank & Bemanke (2007) argue that humanCapital is a combination of education, experience, training, skills, habits,health, energy and initiatives that affect human productivity. To dateThere has been a lot of research that has focused on the role of the level of education foraccelerate the use of technology that leads to economic growth asproposed by Kruger (2001), Hanushek (2000) and Benhabib (2005).

Literature Review

From various views in the literature that discusses human capital andtechnology on economic growth, both within a group of countries or individuallycountries stated by other researchers, then through this research there aredifferences by comparing the two fundamental approaches to economic growthlong-term neoclassical and new growth models in looking at the role of human capital andtechnology to economic growth in the ASEAN region which includes 10 countriesmember. Seeing that the ASEAN Region has various potential production inputssuch as population, capital accumulation, human capital , and this area is one of theone of the largest technology users in Asia so this region was chosen as the object of research

Method

Based on previous research topics that take into account human factorscapital and technology and their effect on economic growth, it is necessary to determinethe right variables with complete data availability in various ASEAN member countriesto get the desired result. Each variable used in this studycompiled based on the results of scientific studies of previous studies with mutuallyrelated to each other. Explanation of variable description is explained in the table.

Table 1
Variable Description

Variable	Description	Size	Unit
GY	Economic Growth	GDP Growth Rate Constant	%
H	Human Capital Growth	Human Capital Index	Index
N	Population Increase	Population Growth Rate	%
GG	Technological Development	Total Growth Factor	%
GSK	Increase in Capital value	Investment Value Growth	%
DELTA	Capital Depreciation	Capital Depreciation Rate	%

The type of data used in this research is secondary data withusing a panel data approach. This secondary data was obtained from various kinds of dataInstitutions that provide the necessary data sources such as Penn world 9.0, World Bank,IMF, ASEAN Statistics. The scope of this research includes 10 member countries (Cross section)ASEAN with the period 1971-2017 (time series). Panel data application is implementedby looking at the rules and standards of econometrics. In this study there are 2 models which is used to compare the neoclassical and new growth models inmeasuring the effects of human capital and technology on economic growth.The use of the neoclassical model refers to the model used by Mankiw(1999) as well as some other literature such as Rui Zhao (2019), Kasun (2019) adaptedthus becoming:

$$GYit = \beta 0 + \beta_1 N_{it} + \beta_2 GSK_{it} + \varepsilon_{it} \qquad (1)$$

Meanwhile, the model with the new growth approach refers to a model thatintroduced by Romer (1989; 1994) and added with some literature such as Alatas(2016), Wibowo (2019), Prasetyo (2008) so that this new growth model approachcan be simply adjusted as follows:

$$y = + H + N + G + SK + DELTA_{it} + _{it} \qquad (2)$$

Result and Discussion

To get answers related to economic growthas described above, it is necessary to test the model withThe goal is to get the best results from the neoclassical and new growth approaches. Data analysisPanels were performed using several standard econometric tests. Until the resultobtained from the neoclassical model approach using the random effect methodshows that the variables of population growth and capital growth havea very significant influence on overall economic growth.

Table 2.

Regression Result with Neoclassical Approach

Variable	*Coefficient*	*Prob.*	*Sign*
C	0.238780	0.6801	-
N	1.042148	0.0000	S
GSK	0.504667	0.0000	S
R-Square		0.212933	
Prob (F-Stat)		0.000000	
Sign		S	

Then to see the influence of human capital and technology on economic growth,then tested with the new growth model approach. In this approachThe method used based on the test results is the Fixed effect method . From resultThis test shows that the variables H, N, GG, GSK, DELTA have the effect ofsignificant impact on economic growth in the ASEAN Region.

Table 3.
Regression Result with New Growth Approach

Variable	*Coefficient*	*Prob.*	*Sign*
C	4.831948	0.0000	-
H	0.565518	0.0993	S
N	0.813710	0.0000	S
GG	0.971972	0.0000	S
GSK	0.677701	0.0000	S
DELTA	-131.8164	0.0000	S
R-Square		0.871821	
Prob (F-Stat)		0.000000	
Sign		S	

Based on the results obtained in the neoclassical modeling that the variablepopulation growth (N) has a significant effect on the relationship or correlationpositive factors that can encourage economic growth in ASEAN member countries.Positive relationship between population growth and economic growth in harmonywith Solow's opinion which states that population growth can be an input factorproduction. These findings are also in line with the previous literature conducted by Zhao (2020) where population growth has a positive impact on state incomewhich can have long term effects. Thus the size of the growth Population determines the economic growth of a country

The relationship between capital growth and economic growth, the results of estimates thatcarried out shows that there is a positive correlation and has a significant impacton economic growth in the long term, it can be said thatwhen capital growth increases, it will affect growtheconomy in ten ASEAN member countries. The neoclassical framework states

that:that there is an important role in determining labor capital inputs and capital inputsproduction, so that every increase in capital has a very significant effecton state productivity or state income, so that in the long term it canhave a major influence on economic growth in each ASEAN member country

The new growth model approach is carried out to see the results of the main variables, namelygrowth in technology and human capital as well as other variables, namely population growth,capital growth, and depreciation on economic growth in the ASEAN Region.From the estimation results above, it shows that overall the variables have a relationshippositive and significant, in this case the correlation between human capital and economic growthhas a significant influence on economic growth and haspositive relationship. according to what is explained by Romer and Lucas theory thatcorrelation between human capital and economic growth in developing countries is relatedpositively. Likewise with the human capital of ASEAN member countries.population growth variable has a positive and significant effect on the countryASEAN member in 1971-2017. Human resources in new growth have beenseparate between human resources in quantity and quality, quantity for labor work and quality are obtained from human capital in the form of investment in human resources,have a long-term impact on economic growth.

On the other hand, technological growth has a significant influence and has apositive with economic growth in the ASEAN region. This can be interpreted thatthe high use of technology can stimulate rapid economic growth,seen from the capital input side as stated by Romer: 1989 that withfixed capital inputs and fixed labor inputs coupled with the use of technologyit will bring up the effectiveness of labor and capital with a higher productivity outputincrease. So it can be interpreted that the use of technology today hasquite an important role, in line with previous research revealed byPrasetyo: 2008 revealed that technological input in the country's productivity processhas an important role, where between the use of technology and economic growthhas a very significant influence and has a positive relationship with growtheconomy. In this study, it was explained that technology is able to answer challengesera regarding the effectiveness and efficiency of time on the production of a country, withconstant amount of input can obtain a high output.

Capital growth as one of the input factors of production shows significant resultsand is positively related, the results of this estimate show that increased capital canbecome the main reason for providing R&D in every country to give birth to new innovations thatcan make high productivity (Romer: 1989). With this additional capital, the outputproductivity can increase and can have a long-term effect oneconomic growth. In line with that, the previous literature presented by Faizaland Widodo (2013) also show that by adding capital input, the outputoutput will increase. Then the depreciation variable shows a negative and significant correlation to growtheconomics, this is in accordance with the theory expressed by Solow that depreciation willreduce the amount of output in each country

CONCLUSSION

Changing views on long-term economic growth haveconsiderable influence. Where there is a difference between the input and output factors of productionneoclassical and new growth, in the neoclassical view population growth andcapital growth will bring changes to economic growth, whilein the view of new growth including technology and human capital variables asthe part that stands alone in the sense that it is not constant, which means every growththese two variables can significantly affect the process of economic growth.

The use of variables for neoclassical modeling using population growth (N)and capital growth (GSK) has a significant influence and is positively correlatedon economic growth, while the population growth variable (N), human capital(H), the use of technology (G) has a significant impact on economic growth anddepreciation (DELTA) has a negative correlation with economic growth in the regionASEAN.

From the estimation results of neoclassical and new growth, the neoclassical model obtains a feasibility valuemodel of 0.2129 or 21.29% of long-term economic growth. Whereasnew growth has a model feasibility value of 0.8718 or 87.18% of growtheconomy in the long term in the ASEAN region. From this simple model we cansee that the new growth model can answer the current challenges where the role ofHuman capital and technology have a key role in the process of economic growth long term effectively and efficiently globally, especially in the ASEAN members.

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