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Analysis of Digital Education Interactions, Education Openness, Islamic Human Development Index (I-HDI) and Indonesia's GDE Growth

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ABSTRACT

This study aims to determine the impact of the digital education, education openness, I-HDI and education on Indonesia's GDE growth. Research data was collected in the form of a time series from the BPS and BI websites. The data is quarterly interpolated and analyzed using the VAR VECM method to find the impact of the digital education, education openness, I-HDI and investment in the short and longterm periods. The findings show There is a causal relationship between IHDI and the digital education, digital education and GDE, GDE and IHDI, IHDI and GDE, GDE and education, education openness and GDE. 2) There is a positive and significant relationship between the digital education, education openness, IHDI and education on the growth of Indonesia's Gross Domestic Education in the long term, while in the short term all variables have no significant effect on Indonesia's GDE growth. In the long term, a strong and dominant variable influencing GDE growth is investment. 3) The largest composition that contributes to the Gross Domestic Education (GDE) variable is the digital education (32%) and IHDI (27.4%).

Keywords: GDE, digital education, education openness, IHDI, education

A. INTRODUCTION

Education growth is a country's education problem in the long run. Education growth measures the achievement of the development of an edication from one period to the next. From one period to another the ability of a country to produce goods and services will increase due to the factors of production which always increase in quantity and quality. One measure of education development is education growth. Education growth is a process of increasing output per capita continuously in the long run. This education growth is one indicator of the success of development, thus the higher the education growth, the higher the social welfare, although there are other indicators.

From the data above, several research gaps were found showing that the increase in the digital education, HDI and investment actually had an impact on the decline in Indonesia's GDP. This contradicts the theory which says that if the digital education, HDI and investment increase will contribute positively to education growth.

Pradhan and Cheng CY's research shows that the digital economy is considered the main driver of economic growth in both developed and developing countries. Edi Wahyu Wibowo's research regarding the contribution of the digital economy to GDP shows that digital variables have a significant and positive effect on GDP. However, another expert (Albiman) has suggested that the digital economy can be detrimental to economic growth, especially if there is no economic transition. Research by Jinzhu Zhang, Getha, Nurafni reveals that the digital economy has a significant positive effect on their economic growth. However, the effect is only significant in the long term, not in the short term (Getha)

Zeren and Ari explained that a country that intensively conducts international trade means being able to export goods that have a comparative advantage and import goods needed to encourage a long-term production process that will bring the country to a positive and sustainable pace of economic growth and development. In contrast to the findings of research conducted by Bibi et al. (2014) and Ali & Abdullah (2015) which state that in the long run there is a negative and significant relationship between trade liberalization and economic growth. Syarifuddin (2015) explained that economic growth and trade openness had no relation to the State of Panama in 1980-2015. Furthermore Simorangkir (2008) explains that there is a negative relationship caused by trade openness to economic growth in Indonesia due to the weak level of competition in the domestic industry from products that come from outside. Ichivani's research (2019) also explains that liberalization from the trade side will negatively affect economic output in Indonesia.

Wibowo said that for some developing countries, openness has a negative impact on economic growth but will have a positive impact for developed countries which have optimized their openness to trade. According to Rahmi Nuraini P.P's research, economic openness has a positive and significant effect on ASEAN economic growth, while Wibowo's research reveals that the openness variable has no effect on the GDP variable. Trade openness can negatively impact economic growth for countries that specialize in the production of low quality products (Haussmann, Hwang, & Rodrik)

Research by Masta Sembiring (2015), economic growth has a positive effect on HDI. In the long term the relationship between HDI and economic growth tends to be stable but in the short term it tends to decline. Research MB Hendrie Anto. The findings show that the ranking composition between I-HDI and HDI is slightly different. On the one hand, a number of countries enjoy better I-HDI ratings compared to HDI. On the other hand, several countries experienced a marked downgrade. The high score group on I-HDI is still dominated by Middle Eastern countries and in essence is still dominated by African countries.

In the long term there is a negative relationship of FDI with Indonesia's economic growth, and there is a positive relationship in the short term (Sri Amanda Pitriyani), Research Anh Tung Dao (2014); investment has a positive and significant correlation to economic growth in 71 developed and developing countries.Various empirical evidences show that foreign investment is more efficient in increasing the economic growth of developing to developed countries compared to domestic investment. The increase in foreign investment results in a corresponding increase in economic growth, this is due to the inflow of capital as well as taxes for the host country.

This research is necessary because there are some differences in the results of research between digital economy, economic openness, IHDI and invesment on the rate of economic growth and little empirical research on the effect of digital economy, economic openness, IHDI and invesment on economic growth. The VAR VECM method was used in this scientific study. This method is appropriate for testing quartely time series data and can see the long-run stability of digital economy, economic openness, IHDI and invesment variables on economic growth.

B. LITERATURE REVIEW

1. Economic Growth

A country that increases its output can be defined as economic growth, which is characterized by an increase in the number of goods and services as measured by the value of its Gross Domestic Product. Based on current and constant prices, this output value is a percentage measure of economic growth. A change in GDP value reveals a particular period of output quantity with the concept of economic growth in one period

2. Classical and Neoclassical Economic Growth Theories

Classical economic growth theory regarding the optimal population has explained the link that exists between the number of employees and the level of output, or GDP, where the best circumstances of growth will occur when total production grows as the number of workers increases. As a refinement of these classical theories, Solow's neoclassical growth theory assumes that the level of technology and the rate of depreciation are constant, as well as a constant rate of population growth, and that there is no export-import, no government sector, and that the entire society in the region has jobs. According to Romer, the technology factor is also an endogenous component of economic growth since individuals may possess and use technology without paying expenditures. Schumpeter also argued that entrepreneurship truly defines a region's economic progress. He went on to say that among business individuals who have the capability and creative stability to execute innovations and fresh and new ideas in terms of production, varied procedures, and management. According to Harrod-Domar, increasing capital investment is crucial since it increases production (Jhingan, 1996).

3. Digital Education

The digital education as we know it today generally places more emphasis on transactions or buying and selling processes and markets that occur in cyberspace or the internet. The definition of digital education is the use of the internet in social and education activities. Technology in the digital education includes (1) Infrastructure (boardbrand lines, routers); (2) Accessing devices (PC, smartphone); (3) Applications (Google, Sales force and (4) Digital functions (IoTinternet, data analysis, cloud computing) Meanwhile, according to Thomas Mesenbourg (2001), the digital education has three main components, namely: (1) e-business infrastructure is total education infrastructure used to support electronic business processes in conducting electronic commerce, (2) Electronic business (e-business) is any process carried out by business organizations through the internet network; and (3)

Electronic commerce (e-commerce) are values goods and services transacted online (Mesenbourg, 2001)

According to Musafak, the digital economy is an economy based on electronic goods and services produced by electronic businesses and traded through electronic commerce. That is, businesses with electronic production and management processes and those that interact with partners and customers and conduct transactions via Internet and Web technologies. Musafak also explained that the definition of the Digital Economy version of the Encarta Dictionary is "Business transactions on the Internet: the marketplace that exists on the Internet". The definition of Digital Economy focuses more on transactions and markets that occur in the internet world. A broader understanding than just transactions or markets is the New Economy which according to PC Magazine is "The impact of information technology on the economy". Its meaning emphasizes the application of information technology in the economic field. The digital economy is an economic sector that includes goods and services when their development, production, sales or supply depend on digital technology. (Musafak, 2012).

4. Education Openness

Education openness is a policy measure to regulate the flow of capital internationally, both in the form of limiting or easing international relations between countries. The implementation of education policy aims to achieve better education development and movement. In education openness there are two currents of international movement. First, trade openness or trade openness which regulates the movement of the flow of goods and services. Second, to manage international flows is financial openness. (Yanikkaya, 2003).

According to research from Nowbutsing, openness is a means to promote growth through research and development as well as broader market access. Zeren and Ari further explained that countries with incentives to carry out international trade in the sense of being able to export goods that have a comparative advantage and import goods needed encourage a long-term production process that will bring the country to a positive pace of economic growth and development and sustainable. (Rahmi Nuraini P.P and Y. Bagio Mudakir, 2019) According to Salvatore, that an open economy will have an impact on increasing market share, increasing efficiency, increasing competitiveness, capital accumulation and wider employment absorption, so that it will positive impact on economic growth. However, not all countries that adhere to an open economy can achieve the expected level of economic growth. This is also influenced by how a country can maximize its driving factors.

5. IHDI

The quality of human development according to the Islamic view is known as the Islamic Human Development Index (IHDI) which is one of the measurement tools in an Islamic perspective to see the level of human welfare in meeting their needs both in this world and in the hereafter. IHDI was originally built based on indicators that reflect the five dimensions of Maqashid Syari'ah imam asy-Syatibi which are the dimensions of caring for basic human needs. Maintenance of religion (hifdzu ad-dien), maintenance of the soul (hifdzu an-nafs), maintenance of reason (hifdzu al-'aql), maintenance of offspring (hifdzu an-nasl), and maintenance of property (hifdzu al-māl) These basic human needs absolutely must be met as a whole and cannot be separated from these five dimensions so that the goals of complete human development are achieved or in Islamic economics it is commonly known as falah. (Fauzia, 2018)

Hendri Anto MB in his research stated that in measuring the Islamic Human Development Index (I-HDI) in general added aspects of achieving the index from the Al-Ghazali Maqhasid Syariah approach. (Anto, 2011) Besides Al-Ghazali, Ibnu Ashur, Dusuki and Abozaid, Al - Syatibi, Alhabsi and Hassan, Chapra, and Choudhury have put forward the concept of Islamic development using the Maqasid Shari'ah approach. Especially for Islamic thinkers and classical scholars Al-Ghazali and Al-Syatibi summarized in five main safeguards in life or by the term al-kulliyah al-khamsah, namely protecting religion (hifdzu ad-dìn), protecting the soul (hifdzu an-nafs), protecting sense (hifdzu al-'aql), guarding offspring (hifdzu an-nasl) and guarding wealth (hifdzu al-mãl). From these five dimensions, an index of each representative indicator is compiled. Index ad-din which represents the dimension of religion, index an-nafs which represents the dimension of long and healthy life, index al-'aql which represents the dimension of knowledge, index an-nasl which represents the dimension of family and heredity, and index al-māl which represents the dimension income.

6. Invesment

In development education theory it is known that education is very closely related to education growth, and even has a positive reciprocal relationship. This reciprocal relationship occurs because on the one hand, the higher the education growth of a country, the greater the share of income that can be saved, so that the education created will be even greater. In this case, investment is a function of education growth. On the other hand, the

greater the investment of a country, the greater the level of education growth that can be achieved. Thus, growth is a function of investment.

Neo-Classical theory emphasizes the importance of savings as a source of investment. Investment is seen as one of the main drivers of economic growth and development. The faster investment develops than the rate of population growth, the faster the volume of average capital stock per worker grows. The higher the ratio of capital per worker tends to be higher production capacity per worker. Neo-classical figures, Sollow and Swan focus on how population growth, capital accumulation, technological progress and output interact in the process of economic growth. (Arsyad, 2010)

C. METHOD

The method used in this study is a quantitative research method with a Vector Autoregressive (VAR) VECM model. This VAR method was first proposed by Sims in around 1980 (Gujarati, 2003). This model was chosen because it is thought to be capable of capturing economic events in this study. The extent of the influence of the short-term and long-term relationship between digital economy, economic openness, IHDI, investmen and GDP as indicators of Indonesian economic development from 2005 to 2020 may be examined using the VAR VECM approach. The data utilized are timeseries data taken from BPS and BI statistics reports, with data interpolated into quarterly intervals. This approach is appropriate for assessing quarterly time series data and determining variable stability over time. EViews 10 was utilized to do the cointegration test with the VAR VECM technique.

The testing stages of the VAR VECM method for this analysis test are:

1. Stationary test as a proof of the stability of each variable used with the value of Augmented Dickey-Fuller as the value of the test criteria;
2. Test to determine the optimal lag length to determine the length of the period duration of a variable that is influenced by the previous period variable and other variables;
3. The cointegration test is used to get the possibility of a long-term equilibrium relationship between variables. This test is carried out as a further test from the stationary test. This test is using Johansen's cointegration test;

4. Granger causality test to check whether there is a causal relationship between two variables (Tanjung & A. Devi, 2013).

D. RESULT AND DISCUSSION

1. Progression of Indonesia's Education

Indonesia's Development of Gross Domestic Education (GDE) growth shows high volatility between 2011 and 2019. Based on Figure 4.1, it is known that the development of Indonesia's GDE at constant prices according to business sector has continued to increase throughout 2005-2019, where the highest value occurred in 2019 amounting to Rp.10,949,155. 40 billion or an increase of IDR 523,303.5 million and a decrease in 2020 of IDR 10,723,054.80 billion or a decrease of IDR 226,101 million. The sharp decline in GDE in 2020 was due to the high number of COVID-19 cases globally. So that all economic sectors experience contraction which in turn makes economic growth negative.

2. Progression of Digital Education, Opennes, IHDI and Progression in Indonesia

Based on a survey report conducted by the Indonesian Internet Service Providers Association (APJII), the number of internet users as of the second quarter of 2020 in Indonesia has reached 196.70 million people. That means 73.7 percent of Indonesia's 2019 population (266.91 million people) are internet literate. When compared to the 2018 APJII survey report, there was an increase of 8.9 percent or around 25.5 million people. An increase in the number of internet users in Indonesia will increase economic growth.

The trend of Indonesia's education openness based on table 4.3 tends to decrease, where in 2005-2016 it experienced a decline, and began to rise again in 2017 by 32.08 percent and increased again by 35.37 percent in 2018 then fell sharply in the last two years to 30 .19 percent in 2019 and 28.79 percent in 2020. The ratio of education openness has tended to decrease, followed by a decline education 2000-2019, although in several years there has been an increase.

From the development of I-HDI Indonesia, it can be seen that there has been an increase from 2005-2019. Even though in 2020 there was a decrease in I-HDI by 0.71 points to 68.87. Part of the decline in IHDI in 2020 was triggered by the pandemic situation that hit Indonesia, which had an impact on decreasing quality of life. IHDI in Indonesia is classified as moderate, which ranges from $60.00 \leq HDI \leq 69.99$.

3. Research Result

Time series data is declared to be stationary if it does not contain unit-roots. According to Gujarati, the time series data is said to be stationary with the condition that it has a constant average and variance throughout the period and will move stably without seeing the movement of positive or negative trends (Tanjung & A. Devi, 2013). This stationary test was performed using the Augmented Dickey-Fuller method, which compared the calculated ADF value with the Mackinnon critical value. The data to be tested is at the first level of differentiation.

The components of GDP, DE, OP, IHDI and INV are stationary at the 2nd difference level with alpha 5% seen as stationary. The interpretation of stationary results is as follows:

a. In the GDP variable, it can be seen that the probability value at the 2nd level difference value is 0.0109 smaller than alpha 5% so it is concluded that the GDP is stationary.
b. The DE variable can be seen as the probability value at the level of 2nd difference, which is 0.0000 smaller than alpha 05% so it can be concluded that the DE is stationary.
c. In the OP variable, it can be seen that the probability value at the level of 2nd difference, which is 0.0000 smaller than the alpha value of 5%, so it is concluded that the OP is stationary.
d. In the IHDI variable, it can be seen that the probability value at the level of 2nd difference, which is 0.0002 smaller than the alpha value of 5%, so it is concluded that the IHDI is stationary.
e. In the INV variable, it can be seen that the probability value at the level of 2nd difference, which is 0.0000 smaller than the alpha value of 5%, so it is concluded that the INV is stationary.

The next stage is the cointegration test to find out the existence of long-term relationships in non-stationary components. This shows that, although each component is not stationary, a linear combination of all variable components will produce a stationary residual.

Johansen's cointegration test shows that there is a long-term relationship between variables (cointegrated) that form a linear relationship. The results show that the DE, OP, IHDI, INV and GDP used in this study have a cointegration relationship. It can be said from

the results of the cointegration test that DE, OP, IHDI, INV and GDP have a stable or balanced relationship even the similarity of movement in the long run. Every short-term period, DE, OP, IHDI, INV and GDP tends to adjust to each other in achieving their long-term equilibrium. Because it was cointegrated, the test was continued with the VECM method.

Based on stationary and cointegration tests, the relationship between DE, OP, IHDI, INV and GDP is stationery and equilibrium in the long term so that causality analysis can be carried out and will show valid and reliable results.

The results of the above can be known:

1. IHDI probability value on DE is 0.0130, and the value is smaller than α = 5%. While the probability value of DE on IHDI is 0.6679 and the value is greater than the level of confidence α = 5%. Then it can be concluded that IHDI and DE have unidirectional causality, i.e. there is causality from IHDI to DE. It can be seen from the results that the IHDI variable is statistically significant in influencing DE. On the other hand, DE is not significant in influencing IHDI. Therefore, it is concluded that there is a one-way causality from IHDI to DE;
2. DE probability value on GDP is 0.0048 and the value is smaller than the level of confidence α = 5%. While the probability value of GDP in DE is 0.7947 and the value is greater than the level of confidence α = 5%. Then it can be concluded that DE and GDP have directional causality in which the direction of causality from DE to GDP. Also, the results above show that the DE variable statistically significantly influences GDP. However, on the contrary, GDP did not significantly affect DE. Thus, it is concluded that there is one-way causality from DE to GDP;
3. GDP probability value on IHDI is 0.0350 and the value is smaller than the level of confidence α = 5%. While the probability value of IHDI in GDP is 0.0019 and the value is smaller than the level of confidence α = 5%. Then it can be concluded that GDP and IHDI have directional causality in which the direction of causality from GDP to IHDI. Also, the results above show that the GDP variable statistically significantly influences IHDI. And also IHDI variable is significantly affect GDP. Thus, it is concluded that there is two-way causality from GDP to IHDI; and causality from IHDI to GDP.

4. GDP probability value on INV is 0.0226 and the value is smaller than the level of confidence α = 5%. While the probability value of INV in GDP is 0.2027 and the value is greater than the level of confidence α = 5%. Then it can be concluded that GDP and INV have directional causality in which the direction of causality from GDP to INV. Also, the results above show that the GDP variable statistically significantly influences INV. However, on the contrary, INV did not significantly affect GDP. Thus, it is concluded that there is one-way causality from GDP to INV;
5. OP probability value on GDP is 0.0161 and the value is smaller than the level of confidence α = 5%. While the probability value of GDP in OP is 0.9037 and the value is greater than the level of confidence α = 5%. Then it can be concluded that OP and GDP have directional causality in which the direction of causality from OP to GDP. Also, the results above show that the OP variable statistically significantly influences GDP. However, on the contrary, GDP did not significantly affect OP. Thus, it is concluded that there is one-way causality from OP to GDP;
6. The probability value of OP on INV is 0.1714, and the value is greater than the level of confidence α = 5%. And the INV probability value on OP is 0.7373 and the value is higher than the confidence level α = 5%. Then it can be concluded that there is no causality between OP and INV.

Based on the estimation results for the long term, DE, OP, IHDI, and INV have a positive and significant relationship with GDE. In times of rising DE, OP, IHDI and INV, this will rising Indonesia's GDP. This result is certainly in accordance with research by Nabila, Purnomo, Tran, and Hoang research that DE, OP, IHDI, and INV have a positive influence on economic growth. therefore, the need for the seriousness of attention by the government needs to be given to macro instrument policies to support increasing national economic growth. (Nabila, Purnomo, Tran and Hoang, 2020).

4. Discussion

This is also in line with the results of research by Nasution et al., (2020) which explains that the number of internet users has a positive effect on education growth. This is in line with the function of the internet which makes it easier for people to access and make choices in conducting e-commerce transactions both in choosing education quality, country of education, and convenience for the education or service they want, making domestic or local

education increasingly required to compete in this era. this digital. Digital education is driving rapid shifts in consumer demand online, creating opportunities for the growing digital education and also contributing to steady education growth. The role of digital education is that activities are made easier through various platforms that make it easier for students subjects given by the teacher, for example to understanding (Sianturi, 2017). Apart from that, it can also connect consumers directly with producers, including various micro, small and medium enterprises of all circles (Hadi, A. P., Putri, N. K., & Faturokhman, 2019).

Herwati's research (2016) shows that the level of trade openness has a positive and significant effect on education growth in the long term, while in the short term it does not significantly affect education growth. Education openness has no effect on Indonesia's education growth, which is also in line with the findings of Nurafni Siahaan's research (2021) that openness has no effect on Indonesia's GDP growth in 2018-2020. affecting GDP growth, meaning that Indonesia's export performance tends to decline from 2012-2019 as well as import performance which tends to decline in the same year, making education openness have no significant effect in the short term. This is one of the structural weaknesses in Indonesian education, its education performance is only a relatively small portion of the total Indonesian education growth. Indonesia's trade-to-GDP ratio is actually very low, around 40 percent (far below the world average ratio of around 55-60 percent). This low ratio indicates that Indonesia is not well integrated in global education.

Saparuddin et al., (2015) stated that education plays a role in increasing the acceleration of production humanbeing integration, this process will increase capabilities in the future besides that, it will also increase integration in the following period. This view is in line with the findings of Alina and Asta (2019), who analyze the role of direct investment in manufacturing developments in Europe. The findings show that direct education has an impact on increasing the productivity of the labor force in most European countries, because direct education plays a role in technical changes and the capital-labor ratio in manufacturing. According to Dewi and Sutrisna (2015), education does not only have a positive impact on education growth, but also contributes to employment. This view is in line with the findings of Yugang (2018), that foreign direct education (FDI) positively contributes to growth and employment in the education.

E. CONCLUSION

From the explanation above it can be concluded as a whole from the results of this study, that there is a positive and significant relationship between digital education, education openness, IHDI, and education on the growth of Indonesia's Gross education in the long term. while in the short term, all variables have no significant effect on Indonesia's GDE growth. In the long term, a strong and dominant variable influencing GDE growth is education. In the short term, only IHDI and education openness have a significant and positive impact on digital education. IHDI only significant and positive education affects IHDI. In the education variable, GDE and digital education have a significant and positive effect on education. The results of the Granger causality test show that there is a causal relationship between IHDI and digital education, digital education and GDE, GDE and IHDI, IHDI and GDE, GDE and education, education and openness, and GDE. The IRF test shows that the GDE variable is stable for 82 periods, the digital education variable is stable for 63 periods, the education openness variable is stable for 42 periods, IHDI is stable for 71 periods and education is stable for 72 periods. to the Gross Domestic education (GDE) variables are the digital economy (32%) and IHDI (27.4%).

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Hal ini bisa dilihat dalam pemikiran-pemikiran ilmuwan muslim klasik, seperti Al-Ghazali, Ibnu Khaldun, At-Tusi, Ibnu Taymiyah, Ibnu Qayyim dan lain-lain. Penjelasan tentang pemikiran ekonomi para ulama tersebut, lihat Aidit Ghazali, Islamic Thinkers on E. (1991). *Quill Publishers*.

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