

***Sukuk* and Endogenous Growth in Indonesia: Generalized Method of Moments Approach**

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Abstract—This research analyzes the effect of sukuk and several financial instruments (stocks and bonds) on economic growth in Indonesia. The data is quarterly time series started from 2002 till 2017 using Generalized Method of Moments (GMM) analysis model. This model has ability to produce unbiased, consistent and efficient estimation even though in the model, endogenous variables and measurement error variables are existed. The results show that sukuk and bonds have positive and significantly affect ($\alpha < 0.05$) on economic growth (Gross Domestic Income per worker), but stocks and savings have negative and significantly effect on economic growth. Through these results, we know that economic growth in Indonesia effected by capital flow, and by supporting the number of Muslim populations in Indonesia, policy makers and stockholders (governments and corporate) could take these advantages promoting these instruments especially sukuk as means of funding for their business activities and developing purposes while keeping the performances and public trust on their instruments, furthermore governments and corporate could get fund for their business activities and developing purposes.

Keywords— Sukuk; Financial Instruments; Endogenous Growth; GMM

I. INTRODUCTION

Debating the effect of financial market instruments such as stocks, bonds and sukuk on economic growth, where some economists argued that these instruments are affecting economic growth, but other economists argued opposed. Pradhan et al. (2018) argued that in long-run, financial markets and innovation will effect economic growth, but short run; there is two-way relationship between these two variables. Furthermore, Silva et al. (2017) stated that financial markets could increase economic growth but also increase instability on economic growth, therefore Durusu-ciftci et al. (2017) stated that government intervention is needed reducing the complexity of financial development and regulating macroeconomic stability in order increasing the investor's confidence in financial markets. But Ono (2017) found that economic growth in Russia is influenced by natural resources.

In addition, several researchers also conducted research on each instruments separately such as the effect of stocks on economic growth, Pradhan et al. (2014) asserted that in ASEAN, the development of financial sectors, capital markets, economic growth and other four major macroeconomic variables have cointegration, but the processing of data have varied results depended on heterogeneity of countries' data in the samples. While Carp (2012) confirmed that real investment encouraged higher economic growth and indirectly created positive externalities toward capital markets and real sector indicators. Research on bonds was conducted by Thumrongvit et al. (2013) and Pradhan et al. (2015) and stated that there is causal relationship between development of bonds and economic growth which are shown by insignificant positive relationship, due to insignificant negative relationship of corporate bonds (1989-2003). In the other hand, Coskun et al. (2017) stated that capital markets and economic growth have relationship in long run, but sovereign bonds have negative effect on economic growth.

Beside stocks and bonds, sukuk has attracted investors both in none and Muslim countries, especially European and North American countries, since its stability facing the 2008 financial crisis. October 29, 2013, England announced sukuk issuances and became the first nation that issued sukuk outside Muslim countries (Beck et al., 2013; Godlewski et al., 2016; Hasan & Dridi, 2010; Ibrahim, 2015; Smaoui & Nechi, 2017). Smaoui & Nechi (2017) said that the number and value of sukuk issuances are very high, but scientific references and researches on sukuk are still few and limited on different views and findings, even so, believe that sukuk has positive effect on economic growth. It can be seen on sukuk rating in the United States during financial crisis which is positive and significant on company performances, and sukuk with *ijarah* method provides better results and positive reactions on investors (Aloui et al., 2015; Godlewski et al., 2016; Hamid et al., 2014; Sclip et al., 2016). Research on sukuk was also conducted by Suriani et al. (2018) which made comparison between sovereign sukuk and sovereign bonds and the results are reciprocal relationship between sukuk and exchange rates, while bonds are strongly influenced by interest rates, exchange rates and price levels, so sukuk is more stable than bonds.

On the other hand, several theoretical and empirical studies stated sukuk are not promising and even have negative impact since sukuk does not represent financial innovation and using western rules on securitization that oriented on maximum profit. Moreover, high cost complying sharia's standards are part of sukuk's risk and on views of capital structure theory, there are trade off and pecking order perspective (Alam et al., 2013; Azmat et al., 2014; Godlewski et al., 2013; Ibrahim, 2015; Mohamed et al., 2015; Wilson, 2008).

Current research analyzes the effect of sukuk and other financial instruments (stocks and bonds) along with human development index and technology in the context of endogenous growth toward economic growth in Indonesia. Furthermore, this research observes the transformation of people's thought on saving-oriented society into investment-oriented society in the context of existence of financial instruments such as stocks, bonds and sukuk.

The paper is organized as follows: Section II presents literature review. Section III explains the methodology. Section IV describes empirical results and discussion and the conclusion could be found in section V.

II. LITERATURE REVIEW

Mankiw (2000) argued that economic prosperity of a country could be measured by real Gross Domestic Products (GDP), while the growth rate of real Gross Domestic Products measured the economic progress. Slightly change in the growth rate of real GDP will result difference income on that country.

Research on economic growth emphasized different opinion, such as Cozzi (2017a, 2017b) concluded that there are two paradigms of economic growth, (i) when population increases and the combination of growth is complementary to overall production function of total factor productivity growth, the semi-endogenous growth approach is playing role in long run; (ii) when population growth is lacking, constant or shrinking and the combination of growth is substituted, the fully endogenous approach becomes dominant.

While Irmen & Tabaković (2017) argued that changing on endogenous capital techniques and recruitment of workers in family business or competitive companies could be classified as neoclassical growth model. On the other hand, Sunaga (2017) stated that lacked on capital and innovation will make economy trapped in innovation that are not entrepreneurial, but when the innovation is sufficiently developed, economy fluctuates in innovation that are not entrepreneurial and entrepreneurial invasion.

Thompson (2018) argued that the increasing of industries and economic development are economic innovation character, where innovation is the main engine of growth that increasing the value of economy. Innovation introduces new products and services, new processes and new methods which are formed of social capital. According to Pradhan et al. (2018), innovations such as patents, trademarks, research and development and researcher's activities effecting the economic growth in the long run due to the increasing of productivity and efficiency on economy and adding values on products and services and new sources of income.

Financial market is market mechanism that allows people or corporation conducting selling and purchasing in the form of financial assets/ instruments. Meanwhile, according to Mankiw (2000), financial markets are institutions where individual who want to save, could supply fund directly to individual who want to borrow. According to Fabozzi et al. (1999), financial markets have three functions namely (i) determining the price of traded assets; (ii) liquidity offers; (iii) reduction of transaction costs such as search costs and information costs.

The connection between financial market and economic growth are clarified by several researchers such as Kim et al. (2018) and Pradhan et al. (2018) stated that financial sector through efficiency of financial allocation and Islamic financial inclusion have positive effect on sustainability of economic growth in the Organisation of the Islamic Conference countries although the level of growth in each countries is different. According to Ruiz (2018), this difference occurs because of the limitations of financial market development, which countries that are below the financial development threshold have low economic growth, while countries that are above the financial development threshold have rapidly economic growth, both for industrialized countries and developing countries, but industrialized countries get value added from the positive influence of institutional investors. Stona et al. (2018) which conducted research in Brazil found that financial markets leaven Brazilian economy, so any policies taken on financial markets will effect on the stability of Brazilian economy. Rahman & Shahari (2017) in their research on the ASEAN market and 3 foreign markets (Japan, Korea and China) stated that market integration occurred after cooperation between countries, especially in financial integration that effecting real economic sectors. Researching by Demir & Hall (2017) stated that there are two important aspects of financial structure and economic development, namely (1) economic development is important for financial structures (2) Market-based financial sector is positively related to the level of economic development, and only in Germany, banking sector has dominant effect toward economic growth.

While Batuo et al. (2018) stated that financial market developments and market freedom led to financial instability, but the increasing economic growth could reduce financial instability even though the reduction was not too much after the era of open financial markets. Pan & Mishra (2018), which conducted research on the Chinese economy, stated that stimulating economic growth in such a vast region, it could not rely on one instrument (stocks), but the performances of the national economic which

monopolizing the economy will increase short-run economic growth, while in long-run, the B stocks market in Shanghai influence the real economic on low value in negative direction because of stock market in China is part of tools achieving certain goal, but not to increasing economic growth. Pradhan et al. (2014) confirmed that financial sector development, stock market, economic growth and four key macroeconomic variables have cointegration in the ASEAN forum countries, where in long-run, banking and stock market sectors determine economic growth, on the other hand, statistically the set of independent variables varies among the countries sample due to the heterogeneity of the countries in each panel. While Carp (2012) asserted that higher level of economic growth is driven by real investment, which indirectly creates positive externalities on stock market indicators and the real sectors.

In general, all of incomes are not totally consumed; some are saved, in this condition, individuals/ institutions needing funds gain opportunities to get funds through investment by allocating saving and determining interest rates and prices of financial assets such as stocks, bonds and sukuk.

Aside from stocks, Pradhan et al. (2015) examined bonds and discovered the relationship between the development of bonds and economic growth where economic growth affects bonds in one condition, and the other condition bonds affect economic growth and sometimes between bonds and economic growth affect each other. The same thing was conveyed by Thumrongvit et al. (2013) which stated positive and significant relationship between bonds and economic growth, especially in sovereign bonds, but insignificantly negative relationship on corporate bonds. Even so, the dominance of sovereign bonds make the entire bonds market having positive relationship but insignificant. On the other hand, Coskun et al. (2017) stated that in the long run, there is relationship between capital markets and economic, but sovereign bonds have negative influence on economic growth. Moreover in the United States, economic growth will affect the sovereign bonds as research conducted by Boukhatem & Sekouhi (2017) and Wang et al. (2017) argued that looking at the slope of the bond yield reward curve, it could predict long-run economic growth which the interest rates will affect investors' expectation on future economic growth, whether they are planning to consume or to invest. According to research by Glomsrød & Wei (2018), green bonds and diversification will be very beneficial for the communities, not only reducing emission but also increasing GDP in all regions with estimated increasing of 1.6% above BAU in 2030.

Since financial crisis in 2008, sukuk attracted investors' attention, especially European and North American countries due to its stability facing the financial crisis. October 29, 2013 England announced sukuk issuance and became the first country outside Muslim countries that issued sukuk (Smaoui & Nechi, 2017; Godlewski et al., 2016; Ibrahim, 2015; Beck et al., 2013; Hasan & Dridi, 2010). Suriani et al. (2018) compared sovereign sukuk and sovereign bonds and concluded that sukuk has relationship with exchange rates, while bonds are strongly influenced by interest rates, exchange rates and price levels, so sukuk is more stable than bonds. Although the development of number and value of sukuk issuances are very high, the scientific reference regarding sukuk is still few and focusing in different views regarding the influence of sukuk to economic growth (Smaoui & Nechi, 2017).

Researching by Hamid et al. (2014) concluded that the initial risk in this study showed significant sukuk rating on company performances. Whereas Aloui et al. (2015) and Sclip et al. (2016) stated that positive effect of diversifying Islamic portfolios during the United States financial crisis. Sukuk issuance with *ijarah* method gives better result and positive reaction from investors (Godlewski, 2016).

Contrary to above views, several studies stated sukuk was not promising as Wilson (2008) and Ibrahim (2015) stated, sukuk does not represent financial innovation because sukuk use western securitization rules that are profit-oriented maximum. Azmat et al. (2014) and Ibrahim (2015) evaluated sukuk and justify the above views, which the results shown significant difference between guaranteed bonds on real asset bonds, *ijarah* sukuk, and conventional safe bonds. Muhamed et al. (2015) explained company's motivation in issuing sukuk seen from various views of capital structure theory, found a trade-off and pecking order theory. The results of the study by Alam et al. (2014) and Godlewski et al. (2014), sukuk became less promising instrument and even had negative impact, as stated by Azmat et al. (2014), there is risk of sukuk due to high costs regarding sharia standards.

III. METHOD

A. Data

The data are secondary data that obtained from the electronic publications of the Central Statistics Agency, the Financial Services Authority, the Ministry of Finance, the Indonesia Stock Exchange, Bank of Indonesia and the World Bank in the form of quarterly time series data started from 2002 till 2017. The variables are economic growth (*lnpdp1*) is endogenous variable in the form of real gross domestic product valued in constant 2010 per labor in Rupiah and transformed into log form. Technology variable (*tek*) is proxied by the ratio value of the investment (*PMTB*) to the value of output in points. Stocks variable (*lnshm*) is the outstanding value of stocks in Indonesia on rupiah and transformed into log form. Bonds (*lnobl*) is used the outstanding value of sovereign and corporate bonds in rupiah and transformed into log form. Whereas Sukuk (*lnsuk*) is the outstanding value of sovereign and corporate sukuk which began on the 4th quarter of 2002 in rupiah and transformed in the form of log, and the

Human Development Index (ipm) as a measurement of the comparison of life expectation, knowledge and decent living standards (Central Board Statistics) are interpolated into quarterly data in points and finally saving variable (lns) is the outstanding value of savings in Indonesia on rupiah currency that has been logged.

In this regression, we use GMM as model analysis which have instrument variables, so we use variables such as population density (dens) in units of people/ km², consumption variable (lncons) is all consumption expenditure in rupiah that been transformed into log, deposit variable (lnsimp) which contains the value of outstanding Indonesian public deposits on rupiah and made into log, the investment variable (lninv) which is the value of gross fixed capital formation in the unit of rupiah that has been logged, and unemployment with the data of open unemployment rate which interpolated into a quarterly period in units or percent.

B. Analysis

This study is based on the Neoclassical Sollow Growth model which is further defined by Mankiw, Romer and Weil (MRW) regarding endogenous growth known as the MRW model, the formulation of this model as follows (Mankiw et al., 1992) :

$$Y_t = K_t^\alpha H_t^\beta (A_t L_t)^{1-\alpha-\beta} \quad (1)$$

Where Y_t is the value of economic growth at time t, and K_t is the accumulation of capital at time t, while H_t is assumed accumulating of human capital at time t and A_t is the level of technology at time t and L_t is the amount of labor at time t.

Mankiw et al. (1992) assumed that the same production function is applied to human capital, physical capital and consumption, in other words, a consumption unit can be transformed without additional costs into one physical capital units or one human capital units. Furthermore it is assumed that $\alpha + \beta < 1$ which means there is decreasing in the return of all capital (If $\alpha + \beta = 1$, there will be a constant return to scale on the factor multiplied, in this case of steady state does not occur) . Assumed that in this model constant returns to scale so that $\frac{\alpha+\beta}{1-\alpha-\beta} \ln(n + g + \delta)$ equals to zero, while variable y is defined as output to labor ($\frac{Y_t}{L_t}$), whereas technology (A) is assumed from the ratio between the investment value in this case proxied by Gross Fixed Total Formation to the output symbolized by ($\frac{K_t}{Y_t}$) which describing the efficiency of the used of investment towards the output, and variable s_{kt} represent the capital that is transformed into log :

$$\ln \left[\frac{Y_t}{L_t} \right] = \left[\frac{K_t}{Y_t} \right] + \frac{\alpha}{1-\alpha-\beta} \ln s_{kt} + \frac{\beta}{1-\alpha-\beta} s_{ht} \quad (2)$$

Then variable s_{kt} is expanded into 3 variables which representing each of these financial instruments, so the equation becomes:

$$\ln \left[\frac{Y_t}{L_t} \right] = \left[\frac{K_t}{Y_t} \right] + \frac{\alpha}{1-\alpha-\beta} \ln s_{kt1} + \frac{\alpha}{1-\alpha-\beta} \ln s_{kt2} + \frac{\beta}{1-\alpha-\beta} \ln s_{kt3} + \frac{\beta}{1-\alpha-\beta} s_{ht} \quad (3)$$

The model above reflect the effect of financial instruments (sukuk, stocks and bonds), technology and human development index on economic growth (Gross Domestic Product per Labor) in accordance of MRW endogenous growth theory using quarterly time series data range 2002-2017 and the Generalized Method of Moments (GMM) analysis model. GMM is a kind of model analysis that could tackle potential omitted variable bias, simultaneity issues and this model is consistent and efficient even though in the model consists of endogenous and measurement error variables (Indra, 2009; Lubis & Setiawan, 2013; Maichal, 2012; Smaoui & Nechi, 2017; Taurif et al., 2014).

Equation (2) is transformed into GMM processing which $\ln \frac{Y_t}{L_t}$ is proxied with $\ln \text{pdpbl}$, $\frac{K_t}{Y_t}$ is proxied with tek , s_{ht} is proxied with ipm , and $\ln s_{kt}$ is proxied with $\ln \text{suk}$, so equation form become:

$$\ln \text{pdpbl} = \alpha + \beta_1 \text{tek} + \beta_2 \ln \text{suk} + \beta_3 \text{ipm} + u \quad (4)$$

which representing first model of GMM, and the second model, we transform equation (3) which additional variable $\ln s_{kt2}$ is proxied by $\ln \text{obl}$ and $\ln s_{kt3}$ is proxied by $\ln \text{shm}$, so the formulation as below:

$$\ln \text{pdpbl} = \alpha + \beta_1 \text{tek} + \beta_2 \ln \text{suk} + \beta_3 \ln \text{obl} + \beta_4 \ln \text{shm} + \beta_5 \text{ipm} + u \quad (5)$$

As for the transformation of saving-oriented society to investment-oriented society in the context of the existence of financial instruments such as stocks, bonds and sukuk, one variable is added into the equation, so the equation becomes :

$$\ln \text{pdpbl} = \alpha + \beta_1 \text{tek} + \beta_2 \ln \text{suk} + \beta_3 \ln \text{obl} + \beta_4 \ln \text{shm} + \beta_5 \text{ipm} + \beta_6 \ln \text{s} + u \quad (6)$$

IV. RESULTS AND DISCUSSION

According to methods above, the regressions are group into three models namely Model I, Model II, and Model III. Model I is model that involving variables such as GDP per labor (lnpdbl), technology (tek), sukuk (lnsuk) and human development index (ipm) according equation (4) which all independent variables (tek, lnsuk, and ipm) of regression result have positive effect on lngdpl with their respective values (0.0595; 0.0640; 0.0675), however tek has insignificant effect, so lngdpl is significantly affected by lnsuk and ipm. Furthermore, Model II is regarding to equation (5) deliver positive effect on lnpdbl with respective values (0.4404; 0.0189; 0.2384; 0.0066) but the effect of tek and ipm are insignificant. However, a negative significantly effect on economic growth is given by lnshh (0.2024). Model III, processing data with equation (6) and deliver lnsuk, lnobl and tek have positive and significant effect on lngdpl with respective values (0.0305; 0.3125; 1.0854), while lnshh, ipm and lns negatively affect lnpdbl with their respective values (0.0235; 0.0035; 0.1127) and only ipm has insignificantly effect on lnpdbl.

After processing the data with the three models, we conducted the weakness instrument test and endogenous test, and the three models passed both tests. For more information, see Table I and Table II below:

TABLE I. GMM ESTIMATION

<i>Variables</i>	<i>Model I</i>	<i>Model II</i>	<i>Model III</i>
Lnsuk	0,064023*	0,018815*	0,030495*
Lnobl	-	0,238388*	0,312465*
Lnshh	-	-0,20235*	-0,023497*
Ipm	0,067464*	0,006590	-0,003525
Tek	0,059499	0,440389	1,085432*
Lns	-	-	-0,112646*
C	16,15933*	14,47685*	14,84944*
DW-Stat	0,672395	1,443692	1,526354
J-Statistic	6,284038	6,547001	5,831172
Prob (J-Statistic)	0,178917	0,161853	0,212116
R-squared	0,952627	0,980486	0,977569
Adjusted R-Squared	0,950134	0,978712	0,975077

Note: * significant (5%)

TABLE II. MODEL TESTS

Tests	Model I	Model II	Model III
Weakness	48,13067	46,40886	27,45133
Endogenous	6,353293*	7,131943*	7,790804*

Note: * significant (5%)

According to the findings above, we know that the null hypothesis especially for the sukuk, and bonds are accepted and reciprocal with research that conducted by Hasan & Dridi (2010), Beck et al. (2013), Thumrongvit et al. (2013), Ibrahim (2015), Pradhan et al. (2015), Godlewski et al. (2016), Smaoui & Nechi (2017), Boukhatem & Sekouhi (2017), Suriani et al. (2018) and Glomsrod & Wei (2018). And Stock has negative and significant effect to economic growth as stated by Carp (2012) and Pan & Mishra (2018). Saving in this research has negative and significant effect, it is caused by most of investment in Indonesia are supported by the capital flow, so saving has little effect on economic and beside that cost and tax for the saving are not equal with the return or interest that investors get from the saving so the saving almost look like mean of deposit than investment (Asnawi, 2015). Moreover with these positive and significant effected of sukuk and numerous of Muslim populations, government and related stockholder could take this instrument as part as investment tools that could help directing the communities moved from saving-oriented society to investment-oriented society.

V. CONCLUSIONS

This research is aimed to analyze the influences of sukuk and other financial instruments (stocks and bonds) with combination on human capital and technology on economic growth in Indonesia. According to the findings above, only sukuk and bonds have a positive and significant effect on economic growth, and then savings have a negative and significant effect on economic growth. So through these findings, we know that economic growth in Indonesia is affected by the capital, and these findings could be a suggestion for the government and related stockholders making policies and directions to the societies taking these instruments as part of their investment tools so that the communities can play an active role in the development and improvement of the national economic.

For further research, it could be analyzed for the relationship among HDI and stocks because at model II and III, HDI and stocks have negative impact on economic growth that could be caused by many things such as the high quality of human

resources but not accompanied by the placement of Human Resources allocation or the availability of employment and for the stocks, some scholar said that stock's IPO that have positive impact on the economic growth.

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