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Religiosity and human capital formation in the overlapping generation model in Indonesia

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Abstract
This research aims to determine the extent of the part of spiritual empowerment and the construction of human capital in the overlapping generation model in Indonesia. The study constructs a model by mathematical approach, which ensures the equilibrium of the entire market; use data of the Indonesian region in the 1983-2019 period and the analyzed by regression. Government spending in the fiscal and monetary sector effectively increases the Gross Domestic Product; the influence of labor positively affects the use of capital stock, where the current capital stock is influenced by the stock capital of the previous year. The aspect of government spending has a positive effect on capital stock.

Keywords: Overlapping generation model; human capital; economic growth; religiosity

Introduction

The criticism of the Neo-Classical theory regarding economic growth models is related to three things, the growth rate of output per capita is not determined by long-term saving and investment behavior, technological progress is treated as exogenous, and many empirical results are not encouraging (Tsangarides & Mirestean, 2009). However, Asongu (2015) has shown that long-term growth is consistent with population growth which has implications for endogeneity models of economic growth. In addition, the differences in the growth rate of per capita income between countries have a significant effect on the level of welfare (Kurniasih, 2017).

The importance of capital's role to labor or capital intensity in economic growth with a specific production function, strengthened by the part of technological change, was also revealed by Boianovsky (2015). However, economic growth is still an exogenous variable, while Devadas & Pennings (2019) argue it is a model with the endogeneity of technology. Nayyar (2014) in his empirical study shows that per capita output and capital labor ratio grows sustainably, with stability in return to capital and stable capital-output ratio. But, Devadas & Pennings (2019) and Peterson (2017) show that the growth rate average does not correlate with per capita income, international trade is positively correlated, while population growth is negatively correlated with economic growth.

Economic growth is treated as a variable exogeneity following the views of Boianovsky (2015), while post-Keynesian emphasizes the demand side (Mauro, 2015), where long-term demand fluctuations are from the business cycle side, while Domar is on the factor side of capital production. Raisová & Ďurčová (2014) look more at the short or medium term, the shift in demand for economic growth. However, Boianovsky (2015) said that model is related to knife-edge equilibrium growth. The Overlapping Generation Model (OLG) was popularized by Diamond (1965), with the main difference from the Ramsey-Cass-Koopmans model, namely the aspect of generation continuity with the entry of new households into the economy. The Ramsey model uses the Neo-Classic production function in a competitive factor market and output market. In addition, Ramsey, Prize, & Diamond (2016) on the OLG model with knowledge externality and the endogeneity of the growth model that maintains the age balance theory between times with perfect competition in all markets.

The novelty of this research is to apply the formulation of the inter-time dynamic equilibrium in the OLG with the accumulation of human capital and religiosity. This model will involve the interaction between generations in a sustainable economic development model. The intertemporal balance is derived based on the first-order agent and market equilibrium conditions. When the production function is linearly homogeneous, the production factors are valued based on their marginal productivity. Research like this is

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still scarce, especially those that reveal the level of religiosity of human capital on GDP, money supply, and stock of capital. Human capital in this study is also divided into two parts. The first is the workforce specifically for women, and the second is the number of workers as a whole, which gives completely different results. This study also reveals a rare relationship between exogenous variables; it's the relationship between change in money stock and GDP, broad money, and stock of capital; the results of this study provide efficient implications for the improvement of economic development studies.

This research is urgent to do considering the demographic conditions of the Indonesian population who have a high religiosity. Every rule in each religion embraced will affect the behavior of its adherents, including behavior in the consumption process. At the same time, consumption is an essential factor in money circulation and the economic growth of a country. Therefore, it is necessary to determine whether this condition is a factor in which Indonesia's quarterly GDP growth rate, money supply, and stock of capital are very volatile, even at times the rate of decline or increase is very drastic and inconsistent with growing positively. The contribution of the results of this study provides evidence and new insights in the field of economics regarding the influence of religiosity and the formation of human resources in the OLG in Indonesia on GDP, broad money, and stock of capital. It can also be used as a basis for government considerations in making fiscal and monetary policies so that economic growth changes in money supply and stock capital.

Literature Review

The development process requires sustainability in the completion of its programs; the older generation and the younger generation are interconnected to demonstrate the sustainability of planning and implementation, the OLG or OLG model (Imrohoroglu, et al., 1999) assumes to maximize lifetime utility when deciding on a consumption optimization plan. In the first period, young households invest depending on the ratio of time preference to the interest rate, while older families sell their overall assets to younger households.

The OLG is fundamentally different from Ramsey Cass Koopmans's model (Ramsey, 1928), namely the population turnover, if the population grows by n percent, the population will grow $L_{t+1} = (1+n)L_t$, assuming there are two time periods t and t + 1 where $L_t = \frac{L_{t+1}}{(1+n)}$, income from salary will be allocated for consumption in the first period and savings, and in the second period the population will spend their savings and the interest rate received. With utility satisfaction depending on consumption period one and period two, as well as the assumption of Constant Relative Risk Aversion utility which is formulated as follows $U_t = \frac{C_{1t}^{1-\theta}}{1-\theta} + \frac{1}{1+\rho}\frac{C_{2t+1}^{1-\theta}}{1-\theta}$ with $\theta > 0$ and $\rho > -1$. To achieve balanced growth by conditioning $\rho > n + (1-\theta)g$ to ensure that the lifetime utility does not spread.

Assume several companies with a production $Y_t = F(K_t, A_t L_t)$, with a constant return to scale, where technology constantly grows. Hence, $A_{t+1} = (1+g)A_t$, the market is in a competitive situation so that the factors of production receive as much as their marginal productivity and zero profit. Consumption in the second period (t + 1) as a result of utilizing the first periodic savings $C_{2t+1} = (1+r_{t+1})(w_t A_t - C_{1t})$ so that maximization of satisfaction with budget constraints can be formulated as follows £=$\frac{C_{1t}^{1-\theta}}{1-\theta} + \frac{1}{1+\rho}\frac{C_{2t}^{1-\theta}}{1-\theta} + \lambda\left[A_t w_t - \left(C_{1t} + \frac{1}{r_{t+1}}C_{2t+1}\right)\right]$.

Fan (2008) shows that religion positively impacts children's educational attainment and increases future acceptance. Indicators are shown by hard work, honesty, seriousness, and responsibility, which inherits cognitive and non-cognitive skills in children (Kautz & Heckman, 2014), and even parental religious participation is often motivated by children's mental and moral development (Bartkowski, Xu, & Bartkowski, 2019). By conditioning in the OLG model, each individual has a family where he becomes a child in the first period and becomes a parent in the set that parental participation is conductive to train children's religion (Mc Cleary and Bacond period). Parents derive the utility function from current consumption w_{t+1}, and current religious participation ρ_t, the parents do not work in the second period and the accumulation is not on physical capital, so the budget constraints are $C_t = (1-\rho_t)W_t$.

Individual capital is positively influenced by parent's capital and social capital. Children's social capital depends positively on parental religious participation, where if social capital is stated as S_t and conditions that there is a relationship between social capital and parental religiosity, thus formulated $S(\rho_t)$ and human capital accumulation follows $h_{t+1} = S(\rho_t)h_t$. Intertemporal utility function between generations is formulated, $U = C_t w_{t-1}^{\beta} e^{\gamma\rho_t}$ where β as an indicator that measures parental attention to children's wages in the future perspective and γ shows that the level of preference for religious participation

can be negative, positive and/or zero. Adilson, Basilio, & Einloft (2017) in modern growth theory shows that technological innovation, accumulated knowledge capital and new product development are never exploited exclusively by invention but can be used for others, and aggregate output can be increased if all inputs are increased in the same proportion.

An exciting research study is a compelling study of dynamic intertemporal balance in the OLG with human capital accumulation and religiosity. It will involve interactions between generations in a sustainable economic development model, and intertemporal compensation is derived based on the agent's first-order and market equilibrium conditions. When the homogenous production function is linear, the production factor is assessed based on its marginal productivity.

The amount of domestic product is assessed based on the total payment for the production factors involved in the production process. Every business actor is oriented towards achieving maximum profit and maximizing utility over time. So, the profit function is written as $\pi_t = K_t^{\alpha} A_t^{1-\alpha} - w_t A_t - q_t K_t$. In the OLG model, the distribution of time spent by workers who want to improve their skills through training affects budget constraints and written functions as $C_t^1 + S_t^1 = (1 - \tau_t) w_t$, the percentage of time allocated for education and training τ_t, this can also be used to strengthen aspects of religiosity / religion. The allocation of time for strengthening religiosity, training and education will affect human capital each household, the greater the time allocation will increase the formulated capital accumulation, $g(\tau_t)$. So that human capital accumulation can be represented as $H_t = h_t g(\tau_t)$, the greater the time allocation for strengthening religiousity, expertising and skills, the greater the human capital stock in the t + 1 period, the higher the income from work.

On the other hand, the tendency to maximize discounted lifetime income on the time availability is presented, so that it is obtained $(1 - \tau_t) w_t h_t + \frac{w_{t+1} h_{t+1}}{1 + r_{t+1}} = (1 - \tau_t) w_t h_t + \frac{w_{t+1} h_1 g(\tau_t)}{1 + r_{t+1}}$. The equilibrium condition is related to the balance of the labor market, between the demand for labor (manufacture) and the supply of labor, each generation has L units of time per period, therefore labor supply; $L(1 - \tau_t) + L$ and labor market balance $N_t = L h_t (2 - \tau_t)$ When households use their savings to buy new products and there is no depreciation of physical capital, this will affect the balance of the capital market $LS_t^1 = (1 - \delta) K_t + I_t$. Based on Walras law, the conditions mentioned above will also affect the equilibrium of the goods market (assuming closed economy), $Y_t = L c_t^1 + L c_t^2 + K_{t+1} - (1 - \delta) K_t + G_t$.

Research Method

This study uses a quantitative approach to dynamic data series from the Indonesia period 1984-2019. The method of analysis follows the regression procedure. Furthermore, a dynamic mathematical, empirical model is derived according to the expectations, adaptive expectations, and partial adjustment models; then, the estimation model is selected to determine the relationship between variables. The variables used include the amount of Gross Domestic Product during the 1983-2019 period, the amount of stock capital, and the amount of money stock capacity. The exogenous variables are the number of women devoted to women, the total population, stock capital in the previous year, the government's expenditure, the amount of money stock in the last year, the exchange rate, the level of registers. The model to be formed is a development of the model The Ramsey–Cass–Koopmans model (Ramsey, 1928) and the Overlapping Generation Model (OLM) (Imrohoroglu. et al., 1999). OLG is in contrast to the Ramsey neoclassical growth model, where agents are infinitely lived.

Meanwhile, in the OLG model, agents live a finite length of time, long enough to overlap with at least one period of another agent's life. The model that will be formed also considers the Lucas paradox (Lucas, 1990), which explains that capital does not flow from developed countries to developing countries even though developing countries have lower levels of capital per worker. So, the model formulated in this research is a development model of the OLG for Religiosity and Human Capital Formation.

Result and Discussion

Religion and the formation of stock capital are essential concerns for the growth model, both of which are included in the Neo-Classical growth model (Ramsey, 1928), whose formulation is $Y_t = A K^{\alpha} L^{\beta}$, The magnitude of the spiritual level is reflected in the letter form of labor input, and the state of capital is determined by the degree of capital, the values α and β have a relationship with the labor market and capital. Based on the formulated identity of the equation, the basis for the balance side of the money market where the demand for money is considered the same as the money broker. So that the balance situation is formulated as follows $mm(NFA + NDA) = Md(Y, r, er)$, the equilibrium condition reflects the market when it is always in an equilibrium position. When the goods market has a balanced position, $Y_t = L c_t^1 +$

$Lc_t^2 + K_{t+1} - (1-\delta)K_t + G_t$, This means that the goods market also leads to equilibrium so that the IS curve is on the side of equilibrium as well, these two curves will be a quartermaster of balance. The balance of aggregate demand in an economy will produce an aggregate supply side balance, so the aggregate supply equation needs to be further elaborated, $Y_t = AK^{\alpha}L^{\beta}$

Growth theory provides simple answers to two questions: population growth and population productivity growth due to technological change. Change is indicated by a different situation from the aspect of the workforce. The parameter determining the high level of economic growth is technological progress and the difference in remaining savings over time. The new growth theory of identifying technological progress is better than accumulation. The recent growth theory with the Lucas approach (Lucas, 1990), which shows the relationship between the production function and the state of these resources. When the production function is linearly homogeneous and paid according to marginal productivity, the production function is formulated as $Y_t = w_t Y_t + q_t K_t$.

The condition of equilibrium in the goods market includes the market conditions for goods as OLG by Imrohoroglu. et al. (1999) is $Y_t = Lc_t^1 + Lc_t^2 + K_{t+1} - (1-\delta)K_t$ and the amount of consumption is described as the equation below; $c_{t+1}^2 = h_{t+1}w_{t+1} + (1+i_{t+1})s_t^1$ so that the result of the equation is construct as follows, $w_t A_t + q_t K_t = Lh_1 w_t(1-\tau) - Ls_t^1 + Lh_t w_t + (1+i_t)K_t - (1-\delta)K_t$. The problem is to create a form of economic benefit in the form of efficiency by means of profit efficiency and utility benefit. Requests for a certain amount of capital for the efficiency condition of the use of experts so that profit maximization is used $\pi_t = K_t^{\alpha} A_t^{1-\alpha} - w_t A_t - q_t K_t$, where A_t states the total demand for employees of each agent with a certain amount of capital at a certain time. Based on the overlapping generation growth model, the Y_t variable states the amount of growth per efficiency, while K_t achieves the capital efficiency per labor. One will use the level of energy and capital efficiency in the efficiency dimension which is pronounced as follows:

$$\frac{\partial Y}{\partial At} = (1-\alpha)k_t^{\alpha} = wt$$

$$\frac{\partial Y}{\partial K} = \alpha k_t^{\alpha-1} = q_t = i_t + \delta$$

Where wt states the amount of employee real efficiency wages and q_t shows the amount of capital rent, so that the amount of real capital is the same as the interest rate plus the real capital depreciation rate.

$Y_t = Lc_t^1 + Lc_t^2 + K_{t+1} - (1-\delta)K_t + G_t$
$Md = mo + m_y Y_t + m_r r_t + m_e e_t$
$Y_t = AK^{\alpha}L^{\beta}$
$dY_t + (1-\delta)dK_t = a_t dL1_t + a_2 dL2_t + a_3 dK_{t+1} + a_4 dG_t$
$dM_t - m_y Y_t = dMo + m_r dr_t + m_e de_t$
$dy_t - \alpha_t K_t = dA + b_t L1_t + b_2 L2_t$

The dimensions of this equation act as endogenous variables, namely the amount of national production, capital stock and money stock. The matrices for the conditions of endogenous variables are: $\begin{bmatrix} 1 & (1-\delta) & 0 \\ -m_y & 0 & 1 \\ 1 & -\alpha & 0 \end{bmatrix}\begin{bmatrix} dY_t \\ dK_t \\ dM_t \end{bmatrix}$, $(1-\delta)+\alpha$ this is a multiplier value greater than zero. While there are eight exogenous variable, namely L_1, L_2, K_{t+1},G,dm_o, r,e, and dA $\begin{bmatrix} a_1 & a_2 & a_3 & a_4 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & m_r & m_e & 0 \\ b_1 & b_2 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$ with a number of exogenous variables that are on the right, i.e. L_1, L_2, K_{t+1},g,dm_o, r, e, dA. The matrix is the inverse endogenous variable is $\begin{bmatrix} \alpha & -1 & m_y\alpha \\ 0 & 0 & \alpha^2-(1-\delta) \\ (1-\delta) & -\alpha & m_y(1-\delta) \end{bmatrix}$. So that the coordination of the two conditions and then divided the multiplier number into:

$$\begin{bmatrix} dY_t \\ dK_t \\ dM_t \end{bmatrix} = \frac{1}{(1-\delta)+\alpha}\begin{bmatrix} \alpha & -1 & m_y\alpha \\ 0 & 0 & \alpha^2-(1-\delta) \\ (1-\delta) & -\alpha & m_y(1-\delta) \end{bmatrix}\begin{bmatrix} a_1 & a_2 & a_3 & a_4 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & m_r & m_e & 0 \\ b_1 & b_2 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

The simplification equation models are as follows;

$dYt = \alpha_1 dL_1 + \alpha_2 dL_2 + \alpha_3 dk_{t+1} + \alpha_4 dm_o + \alpha_5 dr_t + \alpha_6 de_t + \alpha_7 dA_t$
$dKt = \beta_1 dL_1 + \beta_2 dL_2 + \beta_3 dk_{t+1} + \beta_4 dm_o + \beta_5 dr_t + \beta_6 de_t + \beta_7 dA_t$
$dMt = \gamma_1 dL_1 + \gamma_2 dL_2 + \gamma_3 dk_{t+1} + \gamma_4 dm_o + \gamma_5 dr_t + \gamma_6 de_t + \gamma_7 dA_t$

The influence of old and young workers on GDP creation, namely $\frac{\alpha\, a_1+m_y\alpha b_1}{(1-\delta)+\alpha}$, the same is the influence of the older generation $\frac{\alpha\, a_2+m_y\alpha b_2}{(1-\delta)+\alpha}$. The GDP response also occurs from changes in the marginal function of money demand which tends to increase the value of the market effect of behavioral, as well as to the empowerment of capital accumulation (α) which tends to increase. If changes in net capital research, the amount of influence $\frac{\alpha\alpha_3}{(1-\delta)+\alpha}$, the amount is practically influenced by the flow of the production capacity, the same as the effect on the money supply $dKt = \beta_1 dL_1 + \beta_2 dL_2 + \beta_3 dk_{t+1} + \beta_4 dm_o + \beta_5 dr_t + \beta_6 de_t + \beta_7 dA_t$. To determine the effect of changes in stock of capital in the previous period on output is equal to $\frac{\alpha a_3}{(1-\delta)+\alpha}$ large change (α) and the effect of capital will affect the amount of production.

Changes in the size of the capital stock are influenced by the size of labors, both young workers and older generations, $(\alpha^2 - (1-\delta))/\alpha + (1-\delta)$ multiplied by b_1 and, b_2, and factors of technological change (dA) in the form of $\alpha^2 - (1-\delta)$, it means the change in stock capital and the amount of depreciation, both factors result in an increase in the stock of capital.

Changes in stock of money resulting from exogenous changes reveal the effect of changes in labor$(1-\delta)a_1 + m_y(1-\delta)b_1$ divided by the amount of the multiplier $((1-\delta)+\alpha)$, and the influence of the old workforce $(1-\delta)a_2 + m_y(1-\delta)b_2$. Meanwhile, the effect of changes in stock capital (humanities resources) on money resources is equal to $(1-\delta)a_3$. The smaller the depreciation rate the smaller the growth of the money stock. Changes in government spending to changes in money stock are determined by $(1-\delta)\ a_4$, the smaller the depreciation, the smaller the change in the amount of money needed.

Changes in money stock due to changes in real money stock, i.e. $\frac{1}{(1-\delta)+\alpha}$ increases as everything, while the demand for money will increase $\frac{m_r}{(1-\delta)+\alpha}$ equal to the response to the demand for money due to variable interest rates and for the exchange rate $\frac{me}{(1-\delta)+\alpha}$, and technology component as $\frac{1}{(1-\delta)+\alpha}$ times the change component of $m_y(1-\delta)$.

Based on data 1984-2019, the following results were found; by using the GDP dependent variable with several endogenous variables, including population variables (male population and total population), stock of capital in the previous year, government spending, money stock a year earlier, interest rates, exchange rate rates, and technological changes. Changes in government spending have a significant effect of 0.000360, which means that if the government component changes one percent, it changes the national income or production 0.00036, and vice versa. The monetary sector, namely through a change in the number of stocks circulating by one percent, will result in changes in GDP to decrease by 0.000456 percent significantly. From this point of view, it is clear that fiscal policy through an increase in government spending will increase national income; the multiplier effect has worked, although it is small but is significant. Likewise, the monetary impact is also effective in exercising the economic impact on the Gross Domestic Product. The relatively negative 0.000456 shows the significance of the money multiplier.

The workforce's contribution reflects the quality of human resources due to increased skills; the increase in education affects. Still, the development of the existing data shows that female workers and total labor have an insignificant impact. While the effects of stock capacity, if it changes by one percent, will increase the output of 0.000164 with a degree of significance of 15 percent, new human capital benefits will be achieved at a higher level. The exchange rate ability to change GDP is relatively large, 11646031, and is not significant at a 5 percent level; instead of at only 11 percent is substantial, a high number reflects a relatively high import content when the endogenous variable is replaced with a component of the amount of money stock in a broad sense with the same exogenous variable.

Changes in the money supply due to changes in the stock capital component are significant at 0.331434, meaning that if the use of one percent stock capacity will increase the value of broad money by 0.331434, the effectiveness of stock capital can increase monetary growth in Indonesia. If the capital stock for the year is increased, its ability to increase production capacity will use and necessity multiply capital. On the other hand, last year's monetary sector growth will increase by one percent and will be able to increase the monetary sector by 0.502509 percent. Suppose the movement in the money market occurs; in that case, there is fluctuation in the money market, the dangers that arise in the effects of inflation, and the efforts to replicate the impact of the money market process. The existence of the population towards broad money shows negative and positive wages but is statistically insignificant. In contrast, the effect of different capital stock that shows a significant number at probability 0.0028 with a practical value of 0.331434. Meanwhile, the value of the government sector shows a significant number at 0.1308 with a magnitude of

the effect of 0.185741; this means that fiscal policy variables are very effectively used to encourage an increase in the flow of monetary spending. The influence of monetary policy in the previous year was powerful and significant at 0.0002. In quantitative terms, the number is 0.502509, meaning that the current year's money flow of one percent will increase the money supply in the following year by 0.502509 percent, almost a half. Changes in exchange rates have an effect of 0.250. Statistically, it is significant with a magnitude of 0.0005, meaning that a change of one percent in exchange rate will increase the amount of money by 0.250 percent. The spectacular effect of changes driven by technology will impact 204668.9, at a 15.7 significant level (see Table 3).

Table 1. Reduced from Endogenous variable of GDP, Stock Capital, and Money Supply

Exogenous Effect on Endogenous	Endogenous Y (Endogenous GDP)	Endogenous Kt (Stock of capital)	Money Supply
Labor 1	$\frac{\alpha a_1 + m_y \alpha b_1}{(1-\delta)+\alpha}$	$\frac{\alpha^2 - (1-\delta)b_1}{(1-\delta)+\alpha}$	$\frac{(1-\delta)a_1 + m_y(1-\delta)b_1}{(1-\delta)+\alpha}$
Labor 2	$\frac{\alpha a_1 + m_y \alpha b_1}{(1-\delta)+\alpha}$	$\frac{\alpha^2 - (1-\delta)b_2}{(1-\delta)+\alpha}$	$\frac{(1-\delta)a_2 + m_y(1-\delta)b_2}{(1-\delta)+\alpha}$
Initial Capacity Shares	$\frac{a_3}{(1-\delta)+\alpha}$	0	0
Government Expenditure	$\frac{a_4}{(1-\delta)+\alpha}$	0	0
Change in Money Stock	0	0	$\frac{-\alpha}{(1-\delta)+\alpha}$
Interest Rate Changes	0	0	$\frac{m_r}{(1-\delta)+\alpha}$
Change in Exchange Rates	0	0	$\frac{m_e}{(1-\delta)+\alpha}$
Technology changes	0	$\frac{1}{(1-\delta)+\alpha}$	0

Table 2. t-test and Probability of Endogenous Variable Y (GDP)

Exogenous Effect on Endogenous	Endogenous Y (Endogenous GDP)	t test	Probability
Intercept	-8.87E+11	-3.822394	0.0007
Labor 1	-52288.45	-0.816248	0.4215
Labor 2	31463.91	0.971938	0.3397
Initial Capacity Shares	0.000164	1.500736	0.1450
Government Expenditure	0.000360	2.779697	0.0098
Change in Money Stock	-0.000456	-3.566172	0.0014
Interest Rate Changes	7.75E-05	0.336127	0.7394
Change in Exchange Rates	-11646031	-1.678418	0.1048
Technology changes	169.0067	1.104953	0.2789

Source: Processed Data (2020)

Changes in the stock of capital with available data from 1984 to 2019 can be seen in the following information: Several variables that have passed their effect on some stock capital, female population variables have a significant impact on the availability of stock capital -2.253E+8 in a negative sense and the total population 1.15E + 08 effect on the capital formation sector.

The effect of labor on the use of stock capacity is statistically significant; for women, the result is -2.25, and for the whole workforce, vivacious is 1.15, at the same time. Increasing stock capacity in the current years will drive 0.8314 increase in stock capacity in the following year, which shows a very significant number. The aspect of government expenditure will be able to increase the stock of capacity by 0.347278, which means that an increase in changes in the expenditure budget of one percent can change the capital stock by 0.347278 and has a statistical significance on the money market, it can be seen that the effect of rates on stock capacities.

These results indicate the quality of the workforce's contribution, which reflects human resources, which are based on increased skills and education towards huge capital stocks. Still, they do not contribute significantly both to GDP and Broad Money. As the basis for the formulation used to calculate the impact, which is based on the OLG Model with the accumulation of human capital and religiosity, this finding shows that in Indonesia, where people have religion as a guide to life, which will undoubtedly affect all life activities, especially economic activities; it can be seen clearly from its insignificant effect on GDP and Money Supply. GDP in a country is the total value of final goods and services produced by all economic units in a country. At the same time, broad money is all assets that manage its function as money; it can be in the form of narrow money, quasi money, and securities. This less impactful religiosity can be caused by the Indonesian people not carrying out their economic activities in full accordance with religious rules. Still, the people's economy is more based on democracy or running an active economic life today. So they are not bound by religion both in producing goods and services and in using money.

Table 3. t-test and Probability of Endogenous Broad Money

Exogenous Effect on Endogenous	Endogenous Broad Money	t-test	Probability
Intercept	-2.90E+14	-2.90E+14	0.1856
Labor 1	-37421311	-37421311	0.5306
Labor 2	19789703	19789703	0.5118
Initial Capacity Shares	0.331434	0.331434	0.0028
Government Expenditure	0.185741	0.185741	0.1308
Change in Money Stock	0.502509	0.502509	0.0002
Interest Rate Changes	-0.071843	-0.071843	0.7373
Change in Exchange Rates	2.50E+10	2.50E+10	0.0005
Technology changes	204668.3	204668.3	0.1571

Source: Processed Data (2020)

Table 4. t-test and Probability of Stock of Capital

Exogoneous Effect on Endogenous	Stock of Capital	T-test	Probabity
Intercept	-3.92E+14	-1.349287	0.1885
Labor 1	-2.25E+08	-2.812174	0.0091
Labor 2	1.15E+08	2.838745	0.0085
Initial Capacity Shares	0.831406	6.062427	0.0000
Government Expenditure	0.347278	2.140904	0.0415
Change in Money Stock	-0.305143	-1.908035	0.0671
Interest Rate Changes	0.541389	1.876733	0.0714
Change in Exchange Rates	1.75E+09	0.201951	0.8415
Technology changes	-145699.9	-0.761289	0.4531

Source: Processed Data (2020)

This finding contradicts the results of Fan (2008) study, which explains that religion positively impacts children's education and increases future acceptance. Parents' religious participation is also motivated by children's cognitive and moral development (Bartkowski, Xu, & Bartkowski, 2019). By the OLG model in which parental participation is conductive to train children's religion. Parents will get satisfaction from consumption that comes from receiving children's future income. Parent and social capital positively influence human capital, while social capital is positively influenced by parental religious participation. So that religiosity will have an impact on people's consumption patterns. Meanwhile, consumption is an essential factor in the money circulation process and the economic growth and GDP of a country. However, the results of this study religiosity-based human capital do not significantly impact

GDP and broad money; this shows the weak impact of religiosity on the consumption patterns of modern society in Indonesia.

The study results are not in line with the results of research by Soava et al. (2020) in European Union (EU) countries which show that work style on economic growth has a significant impact. This study also does not support the findings by Young (2018) in Pakistan, which shows the opposite effect, namely the negative and significant effect of labor on economic growth. In particular, the employment relationship (female Labor) on economic growth in Pakistan shows a significant positive impact (Ehsan, 2020). Meanwhile, on the stock of capital, the study results, which showed a significant impact of human capital religiosity, indicated a substantial effect on the level of religiosity of human resources. In this study, there are two types of human resources, the first (Labor 1) is female labor, and the second (Labor 2) is the total number of workers. The exciting result to discuss is that there is a contradiction in the direction of the influence of each group where human capital, a female workforce, actually has a significant negative impact on the Stock of Capital. In contrast, human capital in the form of labor without distinguishing gender has a significant positive effect on the stock of money.

This phenomenon is fascinating to discuss. According to Chen & Plotnikova (2014), stock capital is company capital that comes from the sale of shares issued by the company. The company gets the principal capital from the funds obtained from the sale of these shares. This study's phenomenon reveals that female religiosity workers have a significant negative impact on share capital. This indicates that the more religious the female workers are, the more bound by religious rules in their work activities. In contrast, religious traditions may conflict with company rules which will ultimately impact employee performance, the peak of which is company performance. At the same time, the company's performance is one of the factors that investors consider in buying shares (Gunathilaka, 2018). Thus, the more religious female workers are, the lower the stock of capital will be. However, overall, the number of workers, not specifically women, will significantly positively impact the supply of capital; this is because the number of workers indicates the company's size. Company size is one of the indicators for investors to consider stock purchase options (Gala & Julio, 2016). In such a way, the higher the number of workers, the higher the stock of capital..

The following exogenous variable is Initial Capacity Shares. This study proved not to have a significant effect on GDP but had a positive and significant impact on both broad money and stock of capital. It is clear because GDP can also be interpreted as the added value of goods and services produced by various production units in a country. Meanwhile, initial capacity shares are the initial capacity shares that the company or state will sell to obtain capital for production. So that the initial capacity shares will not have much impact on the added value of the goods and services that will be produced because it is more on the initial capital stock in production. At the same time, the amount of initial stock capacity will undoubtedly affect the amount of money circulating in the community the higher the initial stock available. If the shares are sold, it will certainly reduce the circulation of money in the community; this will also affect the share capital. The more capacity shares, if sold, the share capital obtained will also be higher.

Meanwhile, Government Expenditure has a significant effect on GDP and Stock of Capital but has no significant impact on broad money. Government expenditure with a significant positive impact contradicts the research results by Gifari (2016) in Malaysia, which shows the opposite direction. However, these results are in line with the findings of Nurlina (2015) in Indonesia, which also proves that there is a positive and significant effect of government expenditure on economic growth, which is also in line with the findings of Azwar (2016), which proves that government expenditure is a variable forming GDP. Regarding the positive and significant relationship between Government Expenditure on Economic Growth. The results of this study also strongly support the findings of Maulid et al. (2021) and Abdullah (2017).

Government expenditure does not have a significant effect on broad money. Almost similar research says the opposite, such as research of Ouertani, Naifar, & Haddad (2018), which reveals a significant influence of broad money on government expenditure. Meanwhile, government expenditure has a significant effect on the stock of capital, which is not in line with the results of Scott & Ovuefeyen's (2014) research which also reveals an insignificant impact.

This study also shows the effect of change in money stock on GDP and broad money, which is significant but not crucial to the stock of capital. The more changes in the money stock, in terms of long-term money circulating in the community, show the increasing number of investments made by the district, where investment is one of the GDP factors, so the higher the change in the money stock, the higher the GDP. Likewise, the relationship between change in money stock and broad money, where broad money is part of the change in the money stock, is, of course, very significant. Meanwhile, the shift in money stock on the supply of capital is unnecessary because the number of long-term deposits in circulation is not as

much as cash. The amount of stock of capital is undoubtedly almost comparable to the change in the money stock.

The change in exchange rate only has a significant effect on broad money because it is closely related to broad money itself. Changes in exchange rates only substantially impact wide cash because it is closely related to broad money itself. Meanwhile, on GDP, change in exchange rates has a negative but not significant effect. The results of this study contradict the findings of Hatmanu et al. (2020) in Romania, which shows a positive and considerable influence. The results of this study also contradict the findings of Vorlak et al. (2019) in Cambodia, which offers a negative effect. However, the results of this study are in line with the findings of Karahan (2020) in Turkey, which both shows the negative impact of the exchange rate on economic growth; this could be due to the almost similar economic conditions in the two countries for the same research year, and of course closely related to government policies at that time.

Interest rate changes do not significantly affect GDP, Broad money, and stock of capital. However, if we examine the direction of its influence on GDP, interest rate changes positively affect GDP, although the product is not too strong. This finding contradicts the research (Hatmanu et al., 2020), which shows a negative effect. This finding also does not support the conclusions of (Mushtaq & Siddiqui, 2016), which reveals the significant impact of interest rates on economic growth, especially in non-Islamic countries. This difference can be due to Indonesia, a multi-religious population where some do not pay much attention to interest rates. Still, others are very concerned about interest rates.

Likewise, technology changes in this study were found to have no significant effect on DGP, broad money, or stock of capital. This finding is not in line with the study results of (Toader et al., 2018) in European Union (EU) countries which showed a significant effect. However, the magnitude of the impact differed depending on the type of technology examined. The same thing was also found in a study of (Çalışkan, 2015) in Romania, which showed significant technological changes in the country in increasing GDP. This difference in results can be due to the technology applied in Indonesia is still not optimal.

Conclusions, suggestions and limitations

The findings can be derived from the problems described above; these findings are that fiscal policy through increased government spending will increase national income. The multiplier effect has worked; although it is small, it is significant. Likewise, the monetary impact is also effective in exercising the economic effect on Gross Domestic Product which shows the significance of the money multiplier.

The workforce's contribution reflects the quality of human resources due to increased skills; increased education effects. Still, the development of existing data shows that female workers and total labor have an insignificant impact. Meanwhile, the effect of stock capacity on human capital development has only achieved benefits at a higher level. The ability of the exchange rate to change GDP is relatively large, meaning that the product created reflects a relatively high import content. Changes in the money supply due to changes in the stock capital component imply that the effectiveness of stock capital can increase monetary growth in Indonesia. If the capital stock for the year is increased, its ability to increase production capacity will be the use and necessity of modal shifters.

The existence of the population towards broad money shows a negative and positive wage but is not statistically significant. In contrast, the effect of differences in capital stock capital shows a considerable number. The use of new stock capital will increase the value of the money stock in circulation. Meanwhile, the value of the government sector shows a significant number of fiscal policy variables that are very effectively used to encourage an increase in the flow of monetary spending—the powerful influence of monetary policy in the previous year and positive impact on current financial flows. Changes in exchange rates (exchange rates) positively affect an increase in the money supply; the effect of spectacular changes, namely on the aspect of technology where technological changes are statistically compelling. Several variables passed in their influence on the amount of stock capital; the female population variable significantly affects the existence of the capital stock. The effect of labor on the use of stock capacity shows a positive impact. In contrast, working on the previous stock capacity affected the increase in stock capacity this year. The aspect of government expenditure (governance expenditure) will increase the stock of capital, and the money market shows how much influence the rate on the use of stock capital.

References

Abdullah, M. A. (2017). The Impact of Government Expenditure on Economic Growth in Indonesia, Malaysia and Singapore. *Journal of Economic Education*, *6*(1), 11–18.

Adilson, F., Basilio, J., & Einloft, P. (2017). The incorporation of structural change into growth theory : A historical appraisal. *EconomiA*, *18*(3), 392–410. https://doi.org/10.1016/j.econ.2017.05.003

Asongu, S. A. (2015). Long-term effects of population growth on aggregate investment dynamics: Selected country evidence for Africa. *African Journal of Economic and Management Studies*, *6*(3), 225–250. https://doi.org/10.1108/AJEMS-12-2012-0083

Azwar. (2016). Allocative Role of Government through Procurement of Goods/Services and Its Impact on Indonesian Economy. *Kajian Ekonomi Keuangan*, *20*(2), 149–167.

Bartkowski, J. P., Xu, X., & Bartkowski, S. (2019). Mixed blessing: The beneficial and detrimental effects of religion on child development among third-graders. *Religions*, *10*(1), 1–18. https://doi.org/10.3390/rel10010037

Boianovsky, M. (2015). *Beyond capital fundamentalism: Harrod, Domar and the history of development economics* (No. 12). Duke.

Çalışkan, H. K. (2015). Technological Change and Economic Growth. *Procedia - Social and Behavioral Sciences*, *195*, 649–654. https://doi.org/10.1016/j.sbspro.2015.06.174

Chen, X., & Plotnikova, T. (2014). Measuring the Initial Capital Stock: a Generalized Framework. *Procedia Economics and Finance*, *14*(14), 147–153. https://doi.org/10.1016/S2212-5671(14)00696-0

Devadas, S., & Pennings, S. (2019). Assessing the effect of public capital on growth: An extension of the World Bank Long-Term Growth Model. *Journal of Infrastructure, Policy and Development*, *3*(1), 22. https://doi.org/10.24294/jipd.v3i1.1083

Diamond, P. A. (1965). National Debt in a Neoclassical Growth Model. *The American Economic Review*, 1126–1150.

Ehsan, S. (2020). *Female Labor Force Participation, Its Determinants and Effect on GDP in Pakistan Saad Ehsan Submitted to the Institute of Graduate Studies and Research in partial fulfillment of the requirements for the Degree of Master of Science in Economics*. Eastern Mediterranean University, Gazimagusa, North Cyprus.

Fan, C. S. (2008). Religious Participation and Children's Education: A Social Capital Approach. *Journal of Economic Behavior & Organization*, *65*(2), 303–317.

Gala, V., & Julio, B. (2016). *Firm Size and Corporate Investment Vito Gala*. Retrieved from http://repository.upenn.edu/fnce_papers/30

Gifari, A. (2016). *The Effects of Government Expenditure on Economic Growth: the Case of Malaysia*. Retrieved from https://mpra.ub.uni-muenchen.de/71254/

Gunathilaka, C. (2018). Factors Influencing Stock Selection Decision the Case of Retail Investors in Colombo Stock Exchange. *International Conference on Business Management*, (December 2013), 107–115. Retrieved from http://www.dr.lib.sjp.ac.lk/bitstream/handle/123456789/1596/Factors Influencing Stock Selection Decision the Case of Retail Investors in Colombo Stock Exchange.pdf?sequence=1&isAllowed=y

Hatmanu, M., Cautisanu, C., & Ifrim, M. (2020). The impact of interest rate, exchange rate and european business climate on economic growth in Romania: An ARDL approach with structural breaks. *Sustainability (Switzerland)*, *12*(7). https://doi.org/10.3390/su12072798

Imrohoroglu, S., Imrohoroglu, A., & Joines, D. (1999). Social Security in an Overlapping Generations Economy with Land. *Review of Economic Dynamic*, *2*(3), 638–665. https://doi.org/10.1006/redy.1999.0066.The

Karahan, Ö. (2020). Influence of Exchange Rate on the Economic Growth in the Turkish Economy. *Financial Assets and Investing*, *11*(1), 21–34. https://doi.org/10.5817/fai2020-1-2

Kautz, T., & Heckman, J. J. (2014). *Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success* (No. 8696). Bonn, Germany.

Kurniasih, E. P. (2017). Effect of economic growth on income inequality, labor absorption, and welfare in Indonesia. *Economic Journal of Emerging Markets*, *9*(2), 181–188. https://doi.org/10.20885/ejem.vol9.iss2.art7

Lucas, R. (1990). Why doesn't Capital Flow from Rich to Poor Countries? *American Economic Review*, *80*(2), 92–96. https://doi.org/10.5833/jjgs.23.481

Maulid, L. C., Bawono, I. R., & Sudibyo, Y. A. (2021). The Effect of Government Expenditure on Economic Growth in Indonesia. *Ekuilibrium : Jurnal Ilmiah Bidang Ilmu Ekonomi*, *16*(1), 24. https://doi.org/10.24269/ekuilibrium.v16i1.3172

Mauro, B. (2015). *Modelling Economic Growth: Domar on Moving Equibrium* (No. 2015–10). Durham, NC.

Mushtaq, S., & Siddiqui, D. A. (2016). Effect of interest rate on economic performance: evidence from Islamic and non-Islamic economies. *Financial Innovation*, *2*(1). https://doi.org/10.1186/s40854-016-0028-7

Nayyar, V. (2014). *Gross Domestic Product Growth Correlations: Multi Country Study with Focus on China and India*. Blekinge Tekniska Hogskola.

Nurlina. (2015). The Effect of Government Expenditures on Indonesia Economic Growth. *Journal of Economic, Business, and Accountancy Ventura*, *18*(1), 1–14. https://doi.org/10.14414/jebav.v18i1.377

Ouertani, M. N., Naifar, N., & Haddad, H. Ben. (2018). Assessing Government Spending Efficiency and Explaining Inefficiency Scores: DEA-Bootstrap Analysis in the Case of Saudi Arabia. *Cogent Economics & Finance*, *6*(00), 1–16. https://doi.org/10.1080/23322039.2018.1493666

Peterson, E. W. F. (2017). The role of population in economic growth. *SAGE Open*, *7*(4), 1–15. https://doi.org/10.1177/2158244017736094

Raisová, M., & Ďurčová, J. (2014). Economic Growth-supply and Demand Perspective. *Procedia Economics and Finance*, *15*(14), 184–191. https://doi.org/10.1016/s2212-5671(14)00476-6

Ramsey, F. P. (1928). A Mathematical Theory of Saving. *The Economic Journal*, *38*(152), 543–559. https://doi.org/10.2307/2224098

Ramsey, F., Prize, N., & Diamond, P. A. (2016). Chapter 3 The basic OLG model: Diamond. In *Groth, Lecture notes in macroeconomics (Mimeo)* (pp. 67–126).

Scott, A. O., & Ovuefeyen, E. J. (2014). Do Government Expenditure and Debt Affect Stock Market Development in Nigeria? An Empirical Investigation. *Research Journal of Finance and Accounting*, *5*(20), 1–11.

Soava, G., Mehedintu, A., Sterpu, M., & Raduteanu, M. (2020). Impact of employed labor force, investment, and remittances on economic growth in eu countries. *Sustainability (Switzerland)*, *12*(23), 1–31. https://doi.org/10.3390/su122310141

Toader, E., Firtescu, B. N., Roman, A., & Anton, S. G. (2018). Impact of information and communication technology infrastructure on economic growth: An empirical assessment for the EU countries. *Sustainability (Switzerland)*, *10*(10), 1–22. https://doi.org/10.3390/su10103750

Tsangarides, C. G., & Mirestean, A. (2009). Growth Determinants Revisited. *IMF Working Papers*, *09*(268), 1. https://doi.org/10.5089/9781451874136.001

Vorlak, L., Abasimi, I., & Fan, Y. (2019). The Impacts of Exchange Rate on Economic Growth in Cambodia. *International Journal of Applied Economics, Finance and Accounting*, *5*(2), 78–83. https://doi.org/10.33094/8.2017.2019.52.78.83

Young, A. O. (2018). Impact of Labour Force Dynamics on Economic Growth in Nigeria : An Empirical Analysis Using ARDL Bound Testing Approach. *Journal of Resources Development and Management*, *42*, 31–46.