MediaTrend 19 (1) 2024 p. 177-192
Media Trend
Berkala Kajian Ekonomi dan Studi Pembangunan
http://journal.trunojoyo.ac.id/mediatrend

Application of The TSLS Method in a Simultaneous Equation Model of Investment and Economic Growth Panel Data

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Article Information

History of article:
Received November 2023
Approved November 2023
Published March 2024

A B S T R A C T

The Indonesian government believes that increasing investment will also be able to encourage domestic economic activity and increase economic growth. Indonesia's economic growth is not only influenced by investment, but is also supported by the foreign trade sector, namely government spending, consumption and exports and imports. The aim of this research is to determine the simultaneous relationship between investment and economic growth as proven through the Hausman test. The data used in this research is secondary data on foreign investment, Domestic Regional Product (GDRP), interest rates, net exports, consumption and government expenditure, which is panel data from 34 provinces in Indonesia over a period of 10 years (2010-2019). The test produces a probability that is less than the 5% significance level. The research results explain that there is a simultaneous relationship between investment and national income which is described by the GDRP value, so the 2SLS method can be used to determine the factors that influence these two variables. The research conducted shows that the variables of interest rates, government spending, consumption and exports and imports will have an influence on economic growth and investment in a country, so that fiscal policy and monetary policy decisions must be appropriate considering their broad impact on an economy. The limitations of this research are The research object only used 34 provinces in Indonesia and only over a 10 year period.

Keywords: *GDRP (Gross Domestic Regional Product), Investment, Two stage least squares (2SLS) method*
JEL Classification Code: *E01 E21 F1 P24*

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DOI: http://dx.doi.org/10.21107/mediatrend.v19i1.17742

INTRODUCTION

Economic growth is the process of economic progress over a certain period of time towards a better economic situation. Economic growth is one of the necessary conditions for economic development and is a benchmark and determinant of subsequent development policies. The increase that occurs in national scale development can be seen in Gross Domestic Product (GDP). Meanwhile, in a region it can be seen in the Gross Regional Domestic Product (GRDP) (Hamza, L. M., & Agustien, 2019)

The condition for an economy to be able to achieve progress is through investment (Zakaria, 2019). Investment is an activity of placing funds in an asset for a certain period with the hope of obtaining income and/or increasing investment (Harada, 2015). Government Indonesia moment This currently apply policy which addressed For increase investment good domestic nor foreign. Matter This done government Indonesia because government believe that enhancement investment can push activity economy in in country and push growth economy. According to Kurniawan, (2019) state that project investment plan for invest source power good project big nor project small For get profit in period front. The benefits that can be obtained are in the form of: mark monetary. Capital nor profit which accepted must converted become mark monetary. Plan investment must analyzed with carefully. Investment can also encourage an economy that is experiencing a decline due to a lack of capital so that economic development can be implemented (Krova, M., Sogen, J. 6, & Luruk, 2018).

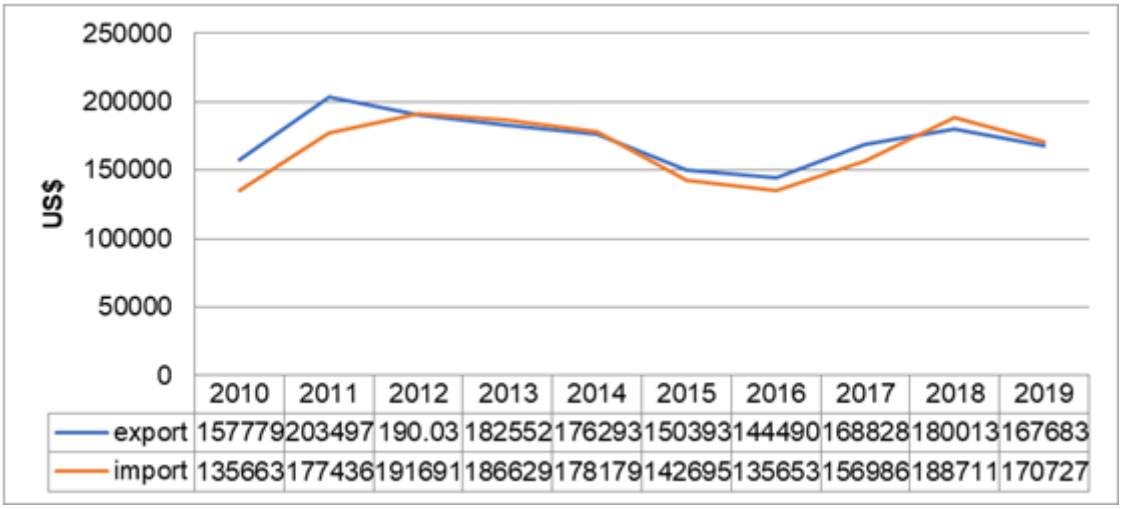
Analysis plan investment on in essence is research regarding something project (good big nor small) can succeed held or no, or something method idea business, worthy or or not something business/ idea business. Project investment usually need fund Which big and impact period long for company. Investment planning done with more thorough, so that no invest on projects which no profitable.There are several contradictory opinions regarding foreign and domestic investment which state that foreign investment can have an impact on domestic investment, especially on domestic investors who do not have the power to reduce the income they receive so that this condition will reduce the investment made by domestic investors. Apart from that, the presence of foreign investment also has the potential to replace domestic investment, thereby triggering an increase in imports and consumption, as well as reducing the level of exports and investment (Arsyad, 2014).

Several research analyzes regarding the influence of investment value on economic growth have been carried out, including research by (Fauzy, N. D., & Aimon, 2020), who analyzed the economy of SumatraWest in 1988-2018. The indicators used in this research are foreign investment, domestic investment and labor. The results obtained are that foreign investment has a positive and significant effect on economic growth, while domestic investment and labor have an influence but are not significant. Next research,(Maulida, Y., Hamid, A., & Hasibuan, 2022) obtained the results that investment, inflation and the human development index have a significant effect on GRDP in Aceh Province. Research by (Magdalena, S., & Suhatman, 2020) in Central Kalimantan in 1990-2019 with indicators of government spending, foreign investment and domestic investment. The results obtained in this research are that government spending has a significant positive effect, while foreign investment and domestic investment do not have a significant effect on economic growth. The method used in this research is multiple linear regression with the OLS (Ordinary Least Square) method (Alice, E. S. L., 2021); (Fauzy, N. D., & Aimon, 2020).

Growth economy Indonesia not only supported by sector investment, but also

by trading outside country. David Ricardo explain necessity trading international For development economy and benefit specialization and trading between country (Sukirno, 2008). A country can accelerate the rate of economic growth by increasing and promoting exports of goods and services. Import volume is negatively related to relative prices and varies positively with aggregate demand. Higher relative prices can lead to substitution of imports which automatically reduces the dollar value of imports as volume decreases. In international trade, import-export activities are a very important factor in increasing economic growth. Exports and imports can provide benefits for a country that participates in them. Indonesia is a country that adopts an open economic mechanism while trading with other countries through exports and imports. The difference between exports and imports is usually called Net Exports.

Graph 1 shows development export Indonesia within a period of time 2010-2019. For the 2010-2019 period, exports looked fluctuating, but in 2012-2016 exports decreased every year. For five years, the value of Indonesia's exports has decreased. The export value in 2015 decreased compared to 2011, in 2016 the decline in exports continued. Exports continue to weaken because demand for Indonesia's main export market is still experiencing a slowdown. on the other hand, Indonesia's export market is still limited so it cannot look for other markets to secure exports. In 2017 exports increased, according to the Central Statistics Agency, the increase in exports in 2017 was due to an increase in animal/ vegetable fats and oils. Then in 2019 they experienced a decline again, based on the Central Statistics Agency, the decline in the value of exports nationally was due to a decline in the value of exports from the oil and gas and non-oil and gas sectors. Exports are the driving wheel of economic growth, where if exports increase then economic growth will also increase. Imports also experienced fluctuating growth, the highest imports occurred in 2012, namely US$ 191,691 million and the lowest in 2016, amounting to US$ 135,652 million. For the 2016-2018 period, imports have increased. According to the Central Statistics Agency, the causes of the increase in imports are demand for public consumption, fulfillment of raw materials for industry and capital goods for infrastructure projects. can be seen in the comparison picture of export and import values



Source : Central Statistics Agency (processed) 2022

Figure 1.
Indonesian Eport and Imports 2010-2019 (in millions US$)

for 2010-2019, it can be concluded that Indonesia's trade balance for 2014-2017 is in surplus because the value of exports exceeds the value of imports. Meanwhile, in 2012-2014 Indonesia's trade balance was due to the value of imports being greater than exports.

Theoretically, exports can increase aggregate supply and demand expenditure and can also increase economic growth. It is important for a country to have net exports in the economy because exports create one of the sources of foreign exchange for the country. A trade surplus which will increase Gross Domestic Product (GDP) occurs when the value of imports is lower than the value of exports, and conversely will result in a decrease in GDP if the value of imports is greater than the value of exports. According to a study carried out by Karlita, (2013) exports have a function in advancing economic growth. If exports increase compared to imports, it will increase national income growth and foster economic growth.

Interest rates are also a consideration in a country's economy. Interest rates have a close relationship to economic growth (Indriyani, 2016). Based on data from Word Bank and the Central Statistics Agency (BPS), an increase in BI interest rates could affect the movement of domestic economic growth and the domestic economy has the potential to experience a slowdown along with rising interest rates. Bank Indonesia raised the benchmark interest rate (BI rate) to above 12%, this resulted in a slowdown in economic growth which grew to only 4.59% in the first quarter of 2006. In 2008 the BI rate rose above 9% which resulted in the Indonesian economy slowing down again. (grew around 4 percent) in the second quarter of 2009, then in 2013 the BI rate reached 7.5% so that growth slowed again to below 5%. In 2017 the BI 7-day rate (BI7DR) decreased to the lowest level of 4.5%, so that economic growth could grow stably at the level of 5%. From the other side, the Bubga tribe is one of the variables in the economy that is always closely observed because it is able to influence people's lives and has an important impact on the health of the economy (Nofitasari, R., Amir, A., & Mustika, 2017). Low interest rates have a post-effect on capital and investment efficiency leading to better output expansion but prolonged low interest rates can form distortions in the form of unsustainable asset price bubbles (Sari, G. A. A. R. M., & Baskara, 2018).

Interest rates involve comparing the amount of money at different time periods (Mankiw, 2006). Interest rates are a variable that is widely observed in the economy. In fact, every day movements in interest rates are reported by newspapers. The interest rate variable is considered important because this variable is able to influence people in making decisions about allocating their money. Interest rates are a consideration for people in determining the allocation of their funds, whether for consumption, saving or investing. An increase in interest rates causes investment to decrease and vice versa, if interest rates fall, there will be an increase, this is because the cost of investment has decreased (Ernita, D., Amar, S., & Syafsyan, 2013). These changes that occur on the monetary side ultimately have a big impact on investment. In efforts to increase a country's economic growth, there are many influencing factors. One of them is investment. This is in accordance with the four wheels of growth Nordhous, (2004), including human resources, natural resources, capital formation and technology. However, the problem that arises is that, as a developing country, the level of investment in Indonesia is still very low.

The interest rate factor is an important factor for investors to invest in a country. Interest rates have a positive influence on foreign direct investment, because investors will invest capital in countries that pay higher returns on capital (Ahmed, U.,

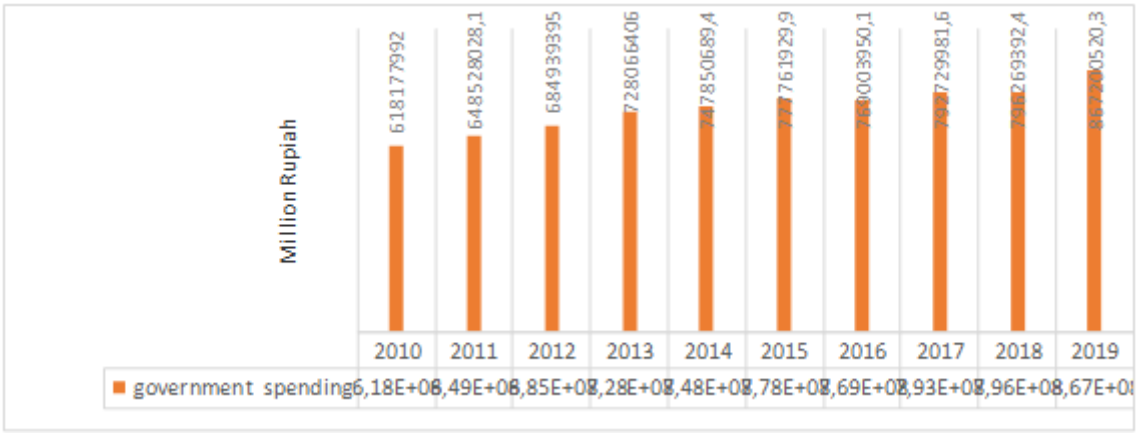
& Ajao, 2012). Researchers examined various factors that influence domestic investment in Central Java with the variables studied including; interest rates, inflation, GRDP, and labor. Here the research results show that inflation and interest rates have a negative influence on domestic investment. Research Dewi, P. K., & Triaryati, (2015) shows the results that interest rates have a significant negative effect on foreign direct investment. The higher the interest rate prevailing in a country, the less willing investors are to invest their capital.

Whether economic performance is good or bad is not only influenced by interest rates and exports and imports, but there are several factors that contribute and play an important role in influencing economic growth, factors including consumption and government spending. Consumption is a variable that is closely related to the economy because consumption has a directly proportional relationship to GDP. Tapsin, (2014) revealed that consumption has a significant effect on economic growth, where an increase in consumption will increase the value of GDP which in turn increases economic growth.

Apart from the factors above, government spending is also an important factor that needs to be considered in the economy. Keynes recommended that the government increase spending because it saw the government as an independent agent that could grow the economy through public works. In times of recession, increased government spending can stimulate consumption and investment and thereby raise national income.

Based on figure 2, it can be seen that the development of government spending has increased every year. However, in 2016 government spending decreased due to the global economy weakening throughout 2015 and continuing in 2016, which had a significant impact on the performance of the domestic economy. Government spending is one factor in increasing economic growth. Government spending includes gross government consumption and investment. Government spending as a fiscal policy tool is a government priority. Explains that there is a close relationship between government spending and economic growth, where government spending will increase higher economic growth.

Rudibo & Sasana, (2017) conducted research using panel data regression analysis using the Fixed Effect Model method and using the eviews program. The results of the research show that direct spending has a positive and significant impact on economic growth in the former Semarang Residency area, labor has a



Source : Central Statistics Agency (processed) 2022

Figure 1.
Development of goverment spending in 2010-2019 (In Million Rupiah)

positive and significant impact on economic growth in the Semarang Ex-Residency area, indirect spending has no impact on economic growth in the Semarang Ex-Residency area, and investment has no impact on economic growth in the former Semarang Residency area, and together direct spending, labor, indirect spending and investment have an impact on economic growth in the Semarang Former Residency area. Research was also carried out by (Putra, 2022) using the Error Correction Model (ECM) method with secondary data obtained from the World Bank in 1999-2020. The results of the research are that in the long term, export and import variables have an effect on economic growth, while the exchange rate has no effect on economic growth. In the short term, only the import variable influences economic growth, while the other two variables, namely the export variable and the exchange rate, do not influence economic growth. Wulandari, L. M., & Zuhri, (2019) conducted research using the method used in this research, namely linear regression and using the Eviews application. The results of this study show that international trade variables do not have a significant impact on economic growth, and investment variables have a significant positive impact on economic growth. Research conducted by (Yusup, A., 2022) in Majalengka district with sample data from 2010-2018. The research results show that household consumption has a positive and significant influence on economic growth. investment has a positive and significant effect on economic growth.

Mustika, C., Umiyati, E., & Achmad, (2015) analyzed the influence of net exports on the rupiah exchange rate against the United States dollar and economic growth in Indonesia. The regression results prove that in the study period, namely 1993 to 2014, net exports did not have a significant impact on Indonesia's economic growth and net exports had a positive and significant impact on the rupiah exchange rate per US dollar. Munandar, (2016) conducted research using regression analysis data and using the Ordinary Least Squares (OLS) method using statistical software. The results of this study show that government spending, PMA, PMDN and net exports on the economic growth of provinces in Indonesia simultaneously show a significant positive relationship. Partially, provincial government spending has a positive and significant impact on economic growth. PMA and PMDN have a significant positive effect on economic growth. Net exports have a significant positive effect on economic growth.

Dewi, P. K., & Triaryati, (2015) conducted research using multiple linear regression using time series data. The research results found that economic growth had a significant positive effect on foreign direct investment and interest rates and taxes had a significant negative effect on foreign direct investment. Prasasti, K. B., & Slamet, (2020) conducted research by testing the Two Stages Least Square (2SLS) method with time series data from 1973 to 2012. The results show that partially inflation and interest rates have no effect on investment in Indonesia. Simultaneously inflation and interest rates have an effect together. the same for investment in Indonesia. From this research it is also known that investment has a significant effect on economic growth in Indonesia. Research using the 2SLS method was also carried out by (Ernita, D., Amar, S., & Syafsyan, 2013) regarding the analysis of economic growth, investment and consumption in Indonesia. The results of the research show that consumption, investment, government spending and net exports simultaneously have a significant influence on Indonesia's economic growth. Meanwhile, partially consumption, investment, government spending and net exports have a significant and positive impact on economic growth in Indonesia. Putra, S. E., Amar, S., & Syofyan,

(2014) conducted research with the results of this research showing that consumption, investment, government spending and net exports have a significant impact on economic growth. Meanwhile, according to partial consumption, consumption has a positive and significant impact on economic growth. Investment has a positive and significant impact on economic growth in Jambi province. Government spending has a positive and significant impact on economic growth in Jambi Province. And net exports have a positive and significant effect on economic growth.

Research conducted by Hamdan, (2016) analyzed the influence of exports and imports on economic growth in Arab countries during the 1995 period. -2013. This research was conducted using panel data in 17 countries: Jordan, United Arab Emirates, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan, Oman, Qatar, Kuwait, Lebanon, Egypt, Djibouti, Mauritania, Morocco, Yemen and Palestine. This study found that the influence of exports and imports has a positive effect on the efficiency and effectiveness of work elements in achieving a certain level of income. Output in the production process. There is a need to increase technology imports to increase labor productivity which can directly drive economic growth, and thereby raise living standards in Arab countries.

In research conducted by (Purba, J. H. V, & Magdalena, 2017) the analytical method used is path analysis which shows the results that exchange rates and changes in exports have an influence and significance on economic growth. The exchange rate (Rp/USD) partially has a positive and significant influence on Indonesia's export volume, with a total influence of 71.57%, then partial changes in exports have a positive and significant influence on Indonesia's economic growth, with a total influence of 65.29% . In the exchange rate variable, the results in this study show that changes in the exchange rate partially have a positive but not significant influence on Indonesia's economic growth, with a total influence of 1.19%. Another research was conducted by (Hodijah, S., & Angelina, 2021) the results of this research are that exports have a positive and significant effect on economic growth in the short term. Furthermore, imports have a negative and significant effect on economic growth. The research was conducted by (Pangestin, Y. Y., Soelistyo, A., & Suliswanto, 2021) using the Party Adjustment Model (PAM) method with annual data from 2000-2019. The results of this research are that the investment variable has a positive influence influence on Indonesia's economic growth, the Net Export variable has an insignificant positive influence on the Indonesian economy growth and government spending have a positive influence and significant influence on Indonesia's economic growth.

This research carried out a simultaneous equation model on investment and Gross Regional Domestic Product, which is an example of a case that indicates the existence of a simultaneous relationship. The simultaneous equation model for investment and Gross Regional Domestic Product will use the 2SLS method and panel data. The model can be used to estimate different models under under-identified and over-identified conditions. There are differences with previous research which used time series data and used the OLS method.

METHODOLOGY

The research uses secondary data from data published by the Central Statistics Agency (BPS). The research uses panel data in the form of 34 provinces in the 2010-2019 period with case studies in Indonesia. This research uses the analysis tool Stata 16 and MS.Excel 2010. The variable Independent used is net export, interest rate, compsumption and Goverment Expenditure. The variabel Dependen used in equation one and equation two is Invest-

ment and Gross Regional DomesticnProduct.

Operational definition of the variable Economic growth, economic growth is an indicator of the success of development of an economy because the welfare and progress of an economy is determined by the amount of growth shown by changes in national output (Amdan & Sanjani, 2023). Investment is an activity of placing funds in an asset for a certain period with the hope of obtaining income and/or increasing investment. Foreign investment can encourage an economy that is experiencing a decline due to a lack of capital so that economic development can be implemented (Krova, M., Sogen, J. 6, & Luruk, 2018). Net exports are the difference between exports and imports. Such activities can generate foreign exchange for the country. Interest rates are one of the macroeconomic factors that influence stock prices. The BI rate is the monetary policy interest rate set by Bank Indonesia (Saridawati, 2015). Consumption is one factor that can influence economic growth. Government expenditure is an obligation that must be paid by the government to finance government activities.

This research uses a quantitative analysis method, where the data used is panel data from 34 provinces in Indonesia from 2010 - 2019. The quantitative analysis model used in this research is simultaneous equations (two stage least squares/2SLS). This research uses the STATA 16 analysis tool and Ms. Office Excel 2010 to assist in data processing.

In determining the estimation method that will be used in the simultaneous equations, model identification is required. A simultaneous equation has three possible identifications that arise, namely: Underidentified, Exactly identified, and Overidentified. Structural equations in a simultaneous model can be estimated if the equation is exactly/just identified or overidentified, whereas if the structural equation is underidentified then it cannot be estimated (Sumodiningrat, 2010).

A simultaneous equation model can be identified if all structural equations meet the conditions:

(K-k) < (m-1) then the equation is not identified. If (K-k) = (m-1) then the equation is “Exactly/just identified, but if (K-k) > (m-1) then the equation is “Over identified”.

where K is the sum of all predetermined variables in the simultaneous equation model, k is number of predetermined variables in a particular equation, M is Sum of all endogenous variables in the model, m is Number of endogenous variables in a particular equation

The principle of identification of order and rank conditions in structural equations in a system of simultaneous equations is as follows (Gujarati, 2009) If K – k > m – 1 and the rank of the matrix A = M – 1 then the equation is overidentified

1. If K – k = m – 1 and the rank of the matrix A = M – 1, then the equation is exactly/just identified
2. If K – k > m – 1 and the rank of the matrix A < M – 1, then the equation is underidentified
3. If K – k < m – 1 and the rank of the matrix A < M – 1 then the equation is not identified

The next step is to choose a panel data regression model. There are several tests to determine which panel data regression model is the best. The tests carried out to select the panel data regression model are the Chow test and the Hausman test, so that the selected model is the Common Effect Model (CEM), Fixed Effect Model (FEM) or Random Effect Mode (REM).

The model in this research is to determine the factors that influence investment and economic growth simultaneously which is seen based on research conducted by Sholihah et al (2017) where in this research the simultaneous equation method (2SLS) is used. The research model used in this research is shown in the following equation:

Investment Equation

$$I_{it} = \alpha_1 + \beta_1 PDRB_{it} + \beta_2 SB_{it} + e_{it} \quad (1)$$

GDRP Equation

$$PDRB_{it} = \alpha_1 + \beta_1 I_{it} + \beta_2 NE_{it} + \beta_3 K_{it} + \beta_4 G_{it} + e_{it} \quad (2)$$

where I is investment (million US$), PDRB is gross regional domestic product (billion rupiah), SB is interest rate (percent), K is consumption (million rupiah), G is government expenditures (million rupiah), NE is net exports (million US$), α is intercept, $\beta_1 ... \beta_4$ is coefficient, e is error/error.

RESULTS AND DISCUSSION

Table 1 Descriptive statistics aim to provide an overview or description of data seen from, the minimum, maximum, mean (average), and standart deviation of each research variable. The results of the descriptive analysis using Stata 16 of the variables in this study are as follows. Based on the result from the table above, it can be seen that the amount of data used in the study was 340 data for 10 years in the 2010-2019 period. From the following table, it is known that the investment, PDRB, interest rate, consumption and goverment spending minimum value of 0 and mximum value of consumption 1,07e+09.

So based on the identification above, the model we use can fulfill the requirements for simultaneous equations/2SLS. Because these two models are indicated as over identified and exclusively/just identified. The Chow test is used to determine which model is better to use, namely between CEM or FEM. If the Probability cross section F value is <0.05 then the model chosen is the FEM approach. So it can be concluded that for equation 1 and equation 2 it is more appropriate to use FEM.

Table 1.
Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std deviaton
Investment	340	0	7124,9	780,5791	1233,021
PDRB	340	0	1836241	261162,7	372428,5
Net Export	340	-2,85e+08	2.72e+08	8198327	6,83e+07
Interest rate	340	0	7.54	6,112559	1,078768
Consumption	340	0	1,07e+09	1,41e+08	2,25e+08
Government spending	340	0	2,09e+08	2.20e+07	3,08e+07

Sourch: Stata Processing data (2023)

Table 2.
Model Identification

Equality	K	K	m	Classiction K-k=m-1	Identification
Investment	4	1	2-1	3>1	Over identified
GDRP	4	3	2-1	1=1	Exactly/ just identified

Table 3.
Chow Test

Equation	Probability F	Sig
Equation 1	0.0000	0.05
Equation 2	0.0000	0.05

Sourch: Stata Processing data (2023)

Table 4.
Hausman Test

Equation	Probability F	Sig
Equation 1	0.0116	0.05
Equation 2	0.0000	0.05

Sourch: Stata Processing data (2023)

Table 5.
Estimation Results

Equation 1 Dependent Variable Investment				Equation 2 Dependent Varable GDRP			
Variable	Coefficient	T-Value	P-Value	Variable	Coefficient	T-Value	P-Value
Cons	214.1024	1.03	0.304	Cons	-2455.27	-0.69	0.490
GDRP	0.002089	8.80	0,000	I	0.390426	0.46	0.647
SB	3.426024	1.03	0.894	N.E	0.000964	25.95	0.000
Adj R-square		0.8479		K	0.001409	65.10	0.000
Prob Fstat		0.000		G	.002587	15.59	0.000
				Adj R-Square	0.9997		
				Prob F.stat	0.000		

Crossection		Crossection	
Aceh	480.8068	Aceh	6317.71
Sumatera utara	386.3156	Sumatera utara	19281.71
sumatera barat	-.6749594	sumatera barat	5844.379
Riau	406.7544	Riau	111903.6
Jambi	-8.276619	Jambi	13199.86
Sumatera selatan	715.4207	Sumatera selatan	-3084.797
Bengkulu	86.16329	Bengkulu	7340.92
Lampung	-50.82431	Lampung	-545.367
Kep. Bngka Belitung	99.94496	Kep. Bngka Belitung	8200.14
Riau	490.405	Riau	42591.22
DKI Jakarta	2646.866	DKI Jakarta	18246.32
Jawa barat	3758.667	Jawa barat	-112262.7
Jawa tengah	184.868	Jawa tengah	-43624.36
DI Yogyakarta	10.63426	DI Yogyakarta	579.0805
Jawa timur	381.13	Jawa timur	-84033.73
Banten	2170.622	Banten	-1247.058
Bali	447.1316	Bali	8713.793
Nusa tenggara barat	385.12	Nusa tenggara barat	-1377.951
Nusa tenggara timur	53.70316	Nusa tenggara timur	-5606.206
Kalimantan barat	558.5623	Kalimantan barat	6996.135
Kalimantan tengah	573.5447	Kalimantan tengah	21828.86
Kalimantan selatan	282.3907	Kalimantan selatan	7969.468
Kalimantan timur	869.1565	Kalimantan timur	184459
Kalimantan utara	87.8851	Kalimantan utara	23497.6
Sulawesi utara	196.7436	Sulawesi utara	12659.36
Sulawesi tengah	1004.931	Sulawesi tengah	15626.98
Sulawesi selatan	180.4305	Sulawesi selatan	16012.06
Sulawesi tenggara	300.6987	Sulawesi tenggara	19657.93
Gorontalo	76.47217	Gorontalo	7011.708
Sulawesi barat	50.29589	Sulawesi barat	8823.295
Maluku	90.64829	Maluku	2048.853
Maluku utara	350.5344	Maluku utara	6034.507
Papua barat	153.6034	Papua barat	17109.93
Papua	1165.939	Papua	11495.09

Source : Stata processing data, (2023)

The Chow test is used to determine which model is better to use, namely between FEM or REM.

The Husman test was carried out to determine a better model between FEM and REM. Hausman test if the cross section probability value F < 0.05, then the model chosen is the FEM approach, and vice versa. So it can be concluded that for equation 1 and equation 2 it is more appropriate to use FEM.

The results of the simultaneous equation modeling of the 2SLS method on the Investment and Gross Regional Domestic Product equations are as follows:

$$I = 214.1024 + 0.0020889 + 3.426024 + e_{it}$$

$$GDRP = -2455.269 + 0.3904255 + 0.0009635 + 0.0014098 + 0.02587 + e_{it}$$

The first investment model that is formed can be seen that the coefficient of determination is 0.8479 where this equation has the ability to explain changes in the dependent variable based on the independent variable of 84% and the rest is explained by other variables outside the model. Meanwhile, the coefficient of determination value in the second model is 0.9997, where this equation has the ability to explain changes in the dependent variable based on the independent variable of 99% and the rest is explained by other variables.

Based on the first model, the variable that significantly influences investment has a value of α=0.05 where the P-value < α, so the significant variable is Gross Regional Domestic Product (GDRP). Meanwhile, in the second model, the variable that significantly influences Gross Regional Domestic Product (GDRP) with a value of α=0.05 where the P-Value value < α means that the significant variables are net exports, consumption and government spending.

In the results of the first equation, investment is influenced by GDRP, interest rates are one of the variables that are hypothesised to have a significant relationship to investment. However, in this study interest rates had an insignificant positive effect on investment. GDRP has a significant effect on investment. GDRP contributes to investment, although only a little, only 0.21%.This result is in accordance with research conducted by Dewi, P. K., & Triaryati, (2015) which shows that there is a significant positive relationship between national income and investment with a case study using foreign direct investment in Indonesia. This means that if GDP increases, investment will also increase. However, in this study the interest rate variable had a positive and insignificant effect with a value of 34%. These results are not in accordance with the hypothesis carried out, and other studies conducted by Sari, G. A. A. R. M., & Baskara, (2018) and Dewi, P. K., & Triaryati, (2015) which show that there is a negative and significant relationship between interest rates and investment. However, this research is also supported by research conducted by Sholihah,& I. M., Syaparuddin, (2017) where there is no significant influence of interest rates on investment. This means that if interest rates rise, investment will increase. This could also be because this investment is more influenced by variables other than the interest rate variable. The higher the interest rate, the higher the capital costs that will be borne by the company. An increase in interest rates will have an impact on investment, where investment will experience a decline and interest rates will decrease provide a positive impact because investment will increase. Changes in interest rates are not fully able to influence investors' decisions in making investments. There are various other considerations that influence investors' decisions in investing, including infrastructure, political stability, security, and various other factors.

Indonesia's economic growth from

the expenditure side is influenced by investment, household consumption, government spending and net exports. Investment makes the largest contribution to economic growth, namely 39%. Followed by government spending at 2.5%, consumption at 0.14% and net exports contributing the smallest at only 0.096%.

The research results show a significant influence of each expenditure component on economic growth. This is proven by the significance value of each component being less than α =0.05. However, the investment component has no significant effect on economic development, this can be due to the still low level of investment caused by various factors including the low savings rate which has an impact on capital accommodation and security and politics which is quite risky for investors. investment growth in Indonesia is increasingly hampered by the complexity of the permit application process due to complicated administrative bureaucracy and lack of coordination between relevant departments, and there is still a lack of information regarding sources of funds from the banking sector that can be used to finance these projects, resulting in low quality and productivity of human resources, Therefore, the technology transfer plan was not implemented well, and competition became increasingly fierce to attract foreign investment from both developed and developing countries.

Government spending also contributes to increasing economic growth. Government expenditure is a fiscal policy instrument carried out to regulate government revenues and expenditures. These results are in accordance with research conducted by Haryanto, (2013) and Ichvani, L. F., & Sasana, (2019) which shows that there is a significant positive relationship between government spending on economic growth with case studies using district/city data in Central Java province and also ASEAN countries in(Ichvani, L. F., & Sasana, 2019). The results of this research support Keynes' theory. Keynes explained that government spending spurs economic growth. Keynes explained that shopping increased government can encourage an increase in aggregate demand which is followed by increasing production of goods and services so that economic growth will also increase increased. Government spending in this case is seen as a strength exogenous that changes aggregate output.

Net Exports are also a factor that influences national income. Net Exports is the difference between the amount of exports and imports in Indonesia. This shows that the influence of net exports on national income is very small if you look at the coefficient value which is almost close to zero. However, these results are in accordance with research conducted by Marlina, (2018) which shows that there is a significant positive relationship between net exports and economic growth in the case study of South Sulawesi province with the research period 2000-2010. In developing countries, to support the economy, they rely heavily on international trade due to the low availability of capital and savings. In the early 1970s, Indonesia tried to increase growth by substituting imports for industrial goods, this was done because of increasing domestic demand and the government's strategy to strengthen the domestic economy. An increase in the number of exports will increase domestic production. Regarding effort that can be done to increase export activities by implementing policies Indonesia's foreign trade is also aimed at increasing the global competitiveness of products Indonesia, also to spur economic growth and increase foreign exchange reserves. As is deregulation of foreign trade, it is hoped that there will be an increase in exports of Indonesian products, both from volume and value. Government policies apart from regulations that make things easier for exporters in customs, also be-

comes a facilitator in finding international markets for domestic products country. Efforts to find and develop foreign markets are carried out through diplomatic channels bilaterally and multilaterally, as well as gradually reducing barriers to trade abroad in accordance with international commitments while still paying attention to national interests. To move the wheels of the economy, it is certainly necessary to increase domestic production which will increase economic growth in Indonesia.

Household consumption is one of the main components supporting economic growth, contributing 14%. Household consumption expenditure is in the form of consumption of final goods and services to meet needs.Household consumption expenditure is in the form of consumption of final goods and services to meet needs. In several countries, household consumption contributes 50-70% to the formation of economic growth, thus having a large impact in determining economic activity from time to (Abdulkareem & Ramli, 2021). Consumption is one of the variables that is hypothesised to be significantly related to national income. This is in accordance with research conducted by Sholihah, I. M., Syaparuddin, (2017) and Ernita, D., Amar, S., & Syafsyan, (2013) which shows that there is a positive and significant relationship between consumption and national income. This can be caused by national income seen from the GDRP amount.

Countries that invest more will have a higher growth rate compared to countries that allocate less GDP to investment. Further research shows a strong relationship between investment and economic growth. Capital accumulation will have an influence on productivity so it is clear that a high level of investment will encourage faster economic growth.

CONCLUSIONS

In the first model equation, GDRP and interest rates have an effect on investment. GDRP contributes to investment only 0.21%. This means that if GDP increases, investment will also increase. GDRP and interest rates only contribute a little. This could be because this investment is more influenced by other variables than other variables. The results of the second model equation show that economic growth from the expenditure side is influenced by investment, household consumption, government spending and net exports. investment has no significant effect on economic growth, this can be due to the still low level of investment caused by various factors including the low level of savings which has an impact on capital accommodation and security and politics which is quite risky for investors. Government spending also contributes to increasing economic growth. Government expenditure is a fiscal policy instrument carried out to regulate government revenues and expenditures. Net exports have an effect on national income, but the effect of net exports on national income is very small. This is because developing countries rely heavily on international trade to support their economy due to the low availability of capital and savings. Household consumption is one of the main components supporting economic growth.

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