

The Effect of Incremental Capital Output Ratio (ICOR), Labor Force Participation Rate (TPAK) and Index Human Development (IPM) Against Economic Growth in Indonesia



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ABSTRACT: The purpose of this study was to examine and analyze the influence of Incremental Capital Output Ratio (ICOR), Labor Force Participation Rate (TPAK), and Human Development Index (IPM) on Economic Growth at 33 provinces in Indonesia during the 2011-2022 period. The research used Panel Data regression, after carrying out the Chow test and Hausman test and Langrange Multiplier test, the estimation used was the *Random Effect Model* (REM). The results of testing the model with $\dot{y}=5$ percent show that ICOR and the Human Development Index have a significant positive effect on Economic Growth in Indonesia, while the Labor Force Participation Rate has no effect on Economic Growth in Indonesia. Therefore, the Indonesian government should be able to make policies that are able to encourage increased investment that needs to be realized and developed so that the capital stock can be optimally utilized to accelerate economic growth. The government should also encourage formal education to increase technical capabilities for more skilled workers so that they can adapt to the required competency needs. Then the Indonesian government can also make policies that are able to encourage the welfare and quality of society to encourage economic growth such as equal distribution of education and health services for all people, in addition to increasing *social insurance* for all people.

KEYWORDS: Economic Growth, ICOR, TPAK, HDI

I. INTRODUCTION

National economic growth has an influence on regional economic structure because national growth has an influence on regional growth, because regions are an internal part of a country. Indonesia is a unitary state, which has the characteristic that development is carried out through planning that includes national plans and regional plans. (Pambudi et al., 2022). Economic growth which can be measured from the development of the annual Gross Domestic Product (GDP) is one of the benchmarks for assessing the socio-economic conditions of a country and for regions seen in the form of Gross Regional Domestic Product (GDP), namely in seeing the success of development carried out by a regional government. (Syamsuddin et al., 2021).

Economic growth means the development of activities in the economy which causes the goods and services produced in society to increase and the prosperity of the people to increase. The problem of economic growth can be seen as a macroeconomic problem in the long term. From one period to another the ability of a country to produce goods and services will increase. This increasing ability is caused by production factors that will always experience

increase in quantity and quality. Investment will increase the amount of capital goods. The technology used will evolve. Besides that, the workforce increases as a result of population development, and work experience and education add to their skills. (Astuti et al., 2017)

Economic growth will always be associated with traditional capital formation. And has been discussed by classical, neo-classical and modern counterparts in the world. Swan traces the classical to the neoclassical views of the economists who explained capital accumulation and Lucas also pointed out that economic growth has traditionally been associated with accumulation of human and physical capital, and increased productivity arising from technological innovation. "The Big Push" by Rosenstein-Rodan suggests that countries need to jump from one stage of development to another through the virtuous cycle, where large investments in infrastructure and education coupled with private investment will move the economy to a more productive stage (Whacai, 2014).

In planning for national and regional economic growth, targets for economic growth have been determined. One of them is that which comes from investment, so the target of achieving economic growth is very much needed in a business indicators related to investment. The indicators needed are the *Incremental Capital Output Ratio* (ICOR), namely additional output and

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additional capital. The determinant that influences the formation of economic output in a region and region is the capital stock (Central Bureau of Statistics, 2022). The smaller *the ICOR* value the greater the productivity and efficiency of invested investment and low *ICOR* value will result in an increasing rate of economic growth. (Central Bureau of Statistics 3, 2022).

The labor force participation rate is one of the driving factors for economic growth. The more workers who have the skills and qualities available, the greater the output produced, which will affect per capita income. When per capita income rises, economic growth will also increase (Risnawati, 2019). This indicates the need to increase access to education that is more equitable, not only focusing on urban centers but also for difficult areas, and also on the outskirts of cities or remote sub-districts throughout Indonesia.

HDI has a big influence on the decline in the level of economic growth. It can be said that economic growth through education can be said to be very important in order to reduce poverty levels. In addition, in order for residents to get good jobs, they must be accompanied by proper education and have good skills and expertise. One of the causes of poverty occurs naturally depending on the condition of the area or the potential of the area, which has an impact on the workforce in each business field. (Todaro 2010).

METHOD

The scope of this study discusses economic growth in 33 provinces in Indonesia and there are 5 provinces that were not included in this study because they are new provinces namely, North Kalimantan Province which was established in 2014, South Papua, Central Papua, Papua Mountains, and Southwest Papua, established in 2022, variables used by ICOR, labor force participation rate, human development index and economic growth. The research time spans 8 years starting from 2011-2022. The scope of this research is the field of economic growth in Indonesia. This research was conducted using a quantitative approach. Quantitative research uses an explanatory design (*explanatory research*) such as testing the relationship between hypothesized variables (Mulyadi, 2011).

Data is information collected from an object. Types of data can be grouped according to their nature, source, method of obtaining, and time of collection (Silvia, 2021). By its nature, quantitative data is deep data the form of numbers that can be measured with a certain size and have a certain value, while qualitative data is data that is not in the form of numbers and cannot be calculated.

According to the source, Wthe data in this study are external data sourced from the Central Statistics Agency (BPS) Indonesia. Therefore, according to how to obtain it, this research data is secondary data. Data collected from various literature studies on previous publications and research.

According to the time of collection, this study uses panel data, which is a combination of *cross-sectional* data and *time data series*. *Cross-section* data for 34 provinces in Indonesia (while *time series* data covers the period 2011-2022 (12 years). This study uses descriptive and inferential statistical analysis methods. Descriptive statistical analysis is used to provide an overview of economic growth in all provinces in Indonesia during the 2011-2022. The inferential analysis used is in the form of panel data regression analysis panel data regression analysis is used for determine the magnitude of the influence of the independent variable on the dependent variable.

By including ICOR, labor force participation rate and human development index as independent variables and economic growth as the dependent variable, the model equation is explained by MRW (Riyadi & Woyanti, 2022)

$$PDRB_{it} = \beta_0 + \beta_1 TK_{it} + \beta_2 IPM_{it} + \beta_3 K_{it} + e_{it} \dots\dots\dots (1)$$

From the equations made by MRW, the researcher writes the model formulation as follows:

$$LOGPDRB_{it} = \beta_0 + \beta_1 ICOR_{it} + \beta_2 TPAK_{it} + \beta_3 IPM_{it} + e_{it} \dots\dots\dots (2)$$

information:

- LOGPDRB = Logarithm of GRDP in 33 provinces in Indonesia
- ICOR = *Incremental Capital Output Ratio* in 33 provinces in Indonesia
- TPAK = Labor force participation rate in 33 provinces in Indonesia
- IPM = Human Development Index in 33 provinces in Indonesia
- β_0 = Intercept or regression constant
- β = The level of elasticity of the contribution of the independent variable to the dependent variable
- e = *Error term*
- i = *Croos section*
- t = *Time series*

Then it is estimated as follows

$$\beta_0 \geq \text{or} \leq 0$$

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$$\beta_1 \geq \text{or} \leq 0$$

$$\beta_2 \geq \text{or} \leq 0$$

The test was carried out by comparing the significance level (Sig.) of the study with a significance level of 0.05 (5%) with the criteria if the research significance level was > 0.05 , H_0 was accepted and H_1 was rejected. If the research significance level is < 0.05 , H_0 is rejected and H_1 is accepted. In testing the three panel data regression models, it was carried out using the Chow test, Hausman test, and test *Langrange-Multiplier*

RESULTS

Table 4.1 Research Descriptive Statistics

	PDRB	ICOR	TPAK	IPM
Means	291	0,6900	67,59	69,27
Median	122	0,7500	67,57	69,45
Maximum	1.950	32,2800	79,56	81,65
Minimum	16	-59,6300	59,40	55,01
Observasi	396	396	396	396

Source: Data processed by Eviews (2023)

Note: GRDP in thousand trillion rupiah

There are 396 observations in this study. The economic growth variable at the provincial level has an average (mean) value of 291 thousand trillion, a minimum value of 16 thousand, and a maximum value of 1,950 thousand trillion. The ICOR variable has an average value of 0.69 percent, a minimum value of -59.63 percent, and a maximum value of 32.28 percent. The TPAK variable has an average value of 67.59, a minimum value of 59.40 percent and a maximum value of 79.56 percent. The HDI variable has an average value of 69.27 percent, a minimum value of 55.01, a maximum value of 81.56 percent.

Table 4.2 Selection of the Best Panel Data Regression Model

Test	Probability	Conclusion
Chow tets	1.244,7363 (0.0000)***	FEM
Hausman tets	0,0000 (0,5891)	REM
LM tets	2.130,373 (0,0000)***	REM

Source: Data processed by Eviews (2023)

*Note: ** 5 percent significance, *** 1 percent significance*

The table above shows the results of the best model selection test in this study. In the first stage, the Chow test was carried out to determine whether the CEM or FEM model was the best. The Chow test results show that the P-value is 0.0000 so that the P-value $< \alpha = 1$ percent or $0.0000 < 0.01$. That is, with a significance level of 1 percent, a decision is made to reject H_0 or accept H_1 so that FEM is better than CEM. Then in the second stage, the Hausman test was carried out to determine whether the REM or FEM model was the best.

The Hausman test results have a P-value of 0.5891 so that the P-value $> \alpha = 1$ percent or $0.5891 > 0.01$. That is, with a significance level of 1 percent, a decision is made to accept H_0 or reject H_1 so that REM is better than FEM. And in the third stage a Langrange Multiplier test is carried out to determine whether the REM or CEM model is the best. The results of the Langrange Multiplier Test have a P-value of 0.0000 so that the P-value $< \alpha = 1$ percent or $0.0000 < 0.01$. That is, with a significance level of 1 percent, a decision is made to reject H_0 or accept H_1 so that REM is better than CEM. Based on these results it can be concluded that the estimate to be used is the REM model.

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Table 4.3 Results of the Classical Assumption

Test	Probability Value
Heteroscedasticity (Glejser)	0.1167
Multicollinearity(VIF)	VIF<10

Source: Data processed by Eviews (2023).

Testing the heteroscedastic assumption using *the Glejser Test* shows a *p*- value of 0.1167, greater than *alpha* 5 percent or $0.1167 > 0.05$ which indicates accept H_0 . That is, with a significance level of 5 percent it can be stated that there is no heteroscedasticity in this model. Then the multicollinearity test shows that there are no multicollinearity problems, where the VIF value < 10 (Appendix). The analysis in the next section will use the REM model regression.

Table 4.4. Regression Random Effect Model (REM) Results

Variable	Coefficient	t-Statistics	Probability
ICOR	0,0010	3,0855	0,0022***
TPAK	0,0019	0,8361	0,4036
IPM	0,0828	25,233	0,0000***
C	12,9012	30,377	0,0000***
R-squared	0,8279		
Adjusted R-squared	0,8266		
F- statistic	628,8371		
Prob (F- statistic)	0.0000		

Source: Data processed by Eviews (2023)

*Note: ** 5 percent significance, *** 1 percent significance* DISCUSSION

Based on Table 4.4 regarding the results of REM estimation, the partial test results show that ICOR has a P-value of 0.0022 with a decision to reject H_0 . This means that ICOR has a significant positive effect on economic growth with a significance level of 5 percent. If ICOR rises 1 percent, it will increase economic growth by 0.0010 percent, *ceteris paribus*.

The results of this study are in line with research conducted by Lowhachai et al., (2014) where ICOR has a positive effect on economic growth in Asia and Thailand. Results of research conducted by Mazllami (2021) also produced the same thing in the country of Slovenia in the period 1995 to 2020. The results of this study are also in line with research that has been conducted by and Setyanto et al., (2013) with the ICOR results of the agricultural sector which are efficient and have an influence on economic growth in districts/cities in Indonesia.

This is different from research (Atmojo, 2019) The error correction model of the incremental capital output ratio in the manufacturing sector and its impact on economic growth in Indonesia with ICOR results does not have a significant effect on economic growth in the long term or short term. Research (Kothe 2013) Analysis of the incremental capital output ratio on the economic growth of provinces on the island of Java, obtained negative and significant ICOR results for economic growth.

Capital gain for developing countries is an important factor for economic growth in these countries. First, developing countries have a lower capital stock than developed countries. Second, developing countries tend not to have a dedicated workforce. Third, developing countries need more capital to absorb new technologies owned by developed countries.

The implication of this research is that increasing ICOR in Indonesia is very important for economic growth. To move the economy requires substantial capital and the application of more advanced technology. The recommendation from this study is that the government needs to make policies that support efficiency in investment management, such as simplifying business licensing procedures and providing fiscal incentives with certain criteria. The government should be able to provide policies that can encourage increased investment that needs to be realized and developed so that the capital stock can be optimally utilized to accelerate economic growth.

The Labor Force Participation Rate variable has a P-value of 0.4036 or the decision to accept H_0 . This means that with a significance level of 5 percent, the Labor Force Participation Rate has no effect on economic growth. If the TPAK increases by 1 percent, it will increase economic growth by 0.0019 percent, *ceteris paribus*. This result is not in line with the hypothesis formed, but is in line with research that has been conducted by (Rozmar et al., 2017).

With the results of the research, TPAK had no effect on economic growth in Jambi in 2005-2015. Similar to the results of Maulana et al.'s research, (2023) conducted research with the results of TPAK having no effect on economic growth in Aceh during the 2015-2020 period. This research is in line with Keynes' theory which states that when the number of workers increases, wages

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decrease. This is not profitable but will be detrimental, because the decrease in wages means that there is a decrease in purchasing power in society for an item so that producers will lose money and cannot absorb the existing workforce (Soesastro, 2005). In contrast to the results of research conducted (Yogatama & Hidayah, 2022).

The results of this study are not in line with research conducted by (Ul Haque et al., 2019). The results of his research are that in the short term total force participation has a positive influence on economic growth in Bangladesh for the data period from 1991 to 2017.

The results of the analysis show that the labor force participation rate variable has a positive and significant effect on economic growth in 5 ASEAN countries. Likewise with the results that were carried out (Syamsuddin et al., 2021). The labor force participation rate has a positive and significant influence on economic growth in Aceh Province.

The implication of the results of this study is that the quality of TPAK needs to be improved to increase economic growth in Indonesia. The participation rate of the labor force that rises every year in Indonesia illustrates an increase in the number of workers, with a large number of workers will support an increase in the production of goods and services in the production sector, so that the added value of output in the production sector can increase economic growth. Therefore, the recommendation from this research is that the government as the policy maker is expected to be able to open up many jobs so that the participation rate of the labor force in Indonesia, which increases every year, can be properly absorbed by employment so that it will increase economic growth. Then the government should encourage formal education to improve technical capabilities for more skilled workers so that they can adapt to the required competency needs.

Furthermore, the Human Development Index (IPM) variable has a P-value of 0.0000 or the decision to reject H_0 . This means that HDI has a significant positive effect on economic growth with a significance level of 5 percent. When the HDI rises by 1 percent, it can increase economic growth by 0.0828 percent. This is also in line with research that has been conducted by (Istianto et al., 2021) which found that the human development index has a positive and significant influence on economic growth in districts/cities in Bolaang Mongondow Raya.

This research is also in line with research conducted by (Taqi et al., 2021) where the results of his research show that HDI has a significant positive relationship to economic growth in Pakistan. Likewise with research conducted by (Zhang & Danish, 2019), the results document that developing countries in Asia with a better human development index are able to encourage economic growth.

This research is also in line with research that has been conducted by (Budi et al., 2014) that HDI has a positive and significant effect on economic growth in Lamongan Regency. This is different from the research conducted by (Pambudi & Nurhayati, 2022), where the results of the research on IPM have no significant effect on economic growth in the city of Pematang Siantar.

This positive and significant relationship is in accordance with the hypothesis at the beginning of the study which stated that the HDI variable has a positive and significant relationship to economic growth. The existence of a positive and significant relationship between HDI and economic growth can occur due to an increase in HDI. HDI development in Indonesia has always experienced an increase from year to year. HDI and economic growth have a close relationship because an increase in HDI will encourage most industries to produce more efficiently so as to be able to produce cheaper goods, which in turn lower prices, so that public consumption will increase so that in the end people's income will increase.

HDI is an indicator used to measure the degree of human development, namely life expectancy, literacy rate, average length of schooling, per capita expenditure. So HDI is an important factor in stimulating the economic growth of a country or region. Solow stated that economic growth always comes from one or more of three factors, an increase in the quantity and quality of labor. The high life expectancy in Indonesia has the potential to increase the workforce to be employed in economic sectors (Budi et al., 2014).

The implication of this research is that the human development index is one of the important factors that contribute to economic growth in Indonesia. According to Mirza (2012), the human resources of a nation are the biggest factor that determine the character and pace of social and economic development of the nation concerned.

Based on the results of this study, the recommendations given are that the government must improve the quality of human life by optimizing the use of education and health facilities. Education can support strengthening the quality of human resources. This is expected to encourage one's knowledge and skills. In addition, health is a prerequisite for increasing productivity, where the success of education rests on good health. In health, the government can make policies in the form of free education programs, scholarships for the underprivileged, encourage healthy living behaviors and optimize the role of health insurance. Then the constant has a P-value of 0.0000 with a decision to reject H_0 or $0.0000 < 0.01$. Meaning with then growth a significance level of 1 percent when there is no change with the ICOR, TPAK and economic HDI variables will be in the position of 12.90 billion rupiah.

Then in terms of the F-statistic value of 628.8371 and the *p-value* of 0.0000, a decision can be made to reject H_0 .

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That is, with a significance level of 1 percent, it can be stated that the ICOR, TPAK, and HDI variables simultaneously influence economic growth so that this model is feasible for use in research.

Based on table 4.4, it is known that the R² adjustment value or the coefficient of determination is 0.8279. This means that the ICOR, TPAK, and HDI variables are able to explain economic growth of 82.79 percent while the remaining 17.21 percent is explained by other variables outside Model.

CONCLUSIONS

Based on the presentation of research results using panel data regression analysis on the effect of ICOR, TPAK and HDI on economic growth in 33 provinces in Indonesia, it can be concluded as follows:

1. The results of this study indicate that ICOR must be in an effective and efficient position in Indonesia. Because the ICOR variable has a positive influence on economic growth in Indonesia. In this case, the existence of funds for managing investment funds must be allocated to infrastructure development or to productive sectors to boost output productivity because an increase in output requires capital for the production process so as to increase economic growth.
2. The Labor Force Participation Level has no effect on Economic Growth in Indonesia. The Labor Force Participation Rate which rises every year illustrates an increase in the number of workers with a large number of workers supporting the increase in the production of goods and services in the production sector, so that the added value of output in the production sector can increase economic growth.
3. The results of these findings identify that the Human Development Index is important to be improved in Indonesia. Because the Human Development Index variable has a positive effect on economic growth in Indonesia. With an increase in the Human Development Index every year, productivity increases. Increased productivity describes an increase in the production of goods and services. With an increase in productivity has an impact on increasing economic growth.

SUGGESTIONS

Based on the research results and conclusions, the suggestions given by the author are:

1. In an effort to increase economic growth in Indonesia in this study, ICOR can increase economic growth in Indonesia. So the government should be able to provide policies that are able to encourage increased investment that needs to be realized and developed so that the capital stock can be optimally utilized to accelerate economic growth.
2. In addition, the level of labor force participation has no effect on economic growth. The government as the policy maker is expected to be able to accommodate or provide maximum employment so that people of productive age who will enter the world of work can contribute to advancing economic growth in Indonesia. Therefore, the government must also encourage formal education to improve technical capabilities for more skilled workers so that they can adapt to the required competency needs.
3. Likewise with the human development index, if the human development index can increase economic growth then the government should make policies that are able to encourage the welfare and quality of society to encourage economic growth such as equity in education and health services for all people, in addition to increasing social insurance for all public.

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