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Determinants of Indonesia's Economic Growth 2010 – 2022 (Indonesia Panel data Analysis Using ARDL)

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ABSTRACT

Economic growth is one of the main indicators in measuring the welfare of a country. So the conditions of economic growth are very important for a country, the higher the economic growth of a country, the better the welfare of its people. This paper examines the effect of the number of labor force employed and the Gross Fixed Capital Formation (PMTB) on economic growth. Research data is secondary data, which is a combination of time series and cross-section data. By using cross-section data from 34 provinces in Indonesia with a period of years from 2010 to 2022. Panel Autoregressive Distributed Lag (ARDL) method is used to identify the long-run and short-run relationship between independent and dependent variables. The results of this study indicate that the number of employed labor force has a positive and significant effect on economic growth in the long run, but has a negative and significant effect on economic growth in the short run. Meanwhile, Gross Fixed Capital Formation has a positive and significant effect on economic growth in both the long and short run.

Keywords: *Economic Growth, Number of Employed Labor Force, FDI, ARDL*

INTRODUCTION

Economic growth is very important for a country that the higher the economic growth of a country will increase the welfare of its people. According to Kuznets (1973) sustainable economic growth can have an impact on increasing the prosperity of society, this is due to the increasing ability to provide more goods and services to meet the needs of the population, so that the condition of economic growth is important for a country. Economic growth is measured using several indicators, generally using the growth of the Gross Domestic Product (GDP) indicator, because GDP itself is the total value of goods and services that have been produced by a country in a certain period of time (Mankiw, 1995). Economic growth is measured using several indicators, generally using the growth of the Gross Domestic Product (GDP) indicator, because GDP itself is the total value of goods and services that have been produced by a country in a certain period of time.

There are several determinants that influence economic growth. Neoclassical mentions that production factors that influence economic growth include capital and labor. Currently, Indonesia is in a phase of experiencing an increase in the quantity of the workforce (Gayatri et al., 2023). The current increase in the quantity of the workforce is because Indonesia is experiencing a demographic bonus period, which means that the Indonesian population is more dominated by the productive age population (15-64 years) than the non-productive age population (0-14 years and over 65 years). The peak of the demographic bonus is estimated to occur between 2020-2035 (Directorate of Analysis and Development of Statistics, Central Statistics Agency, 2023). In 2023, the population of Indonesia will reach around 275 million people, with 70% of the Indonesian population included in the category of productive age population, which is

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around 15 to 64 years old. The demographic bonus occurs when the number of productive age population increases, this large number should be accompanied by increased productivity. When the productivity of the productive age population increases, a country will be able to enjoy the demographic bonus (Hakkert, 2007). This enjoyment will be even higher if the demographic bonus conditions are accompanied by the fulfillment of good health, quality education, and decent employment, as well as independence from young people (Mundle, 2017). If population growth continues without being balanced by increased productivity, good health, creation of decent jobs, and independence, then in the long term it will allow for an increase in poverty and unemployment rates (Siddique, 2023).

The number of productive age population (over 15 years) in Indonesia will increase the number of the workforce. The workforce group does not only consist of those who work "full time" but also those who work "part-time" and are still unemployed but continue to look for work. Most of them are in the informal sector and around 30 percent are in the formal sector. Those who are unemployed have not shown a level of productivity and can meet their own needs. Therefore, the problem of employment is still a major complex problem that must be faced, especially in the current demographic bonus period (Achmad et al., 2024).

Analysis and Development of Statistics, Central Statistics Agency, 2023). In 2023, the population of Indonesia will reach around 275 million people, with 70% of the Indonesian population included in the category of productive age population. A country experiences a demographic bonus when the number of productive age population increases, this large number should be accompanied by increased productivity. When the productivity of the productive age population increases, a country will be able to enjoy the demographic bonus (Hakkert, 2007). This enjoyment will be even higher if the demographic bonus conditions are also accompanied by the fulfillment of good health, quality education, and decent employment, as well as independence from young people (Mundle, 2017). If the growth of the productive age population continues without being balanced by increased productivity, good health, creation of decent jobs, and independence, then in the long term it will allow for an increase in poverty and unemployment rates (Siddique, 2023). The number of productive age population (over 15 years) in Indonesia will increase the number of the workforce. The workforce group does not only consist of those who work "full time" but also those who work "part-time" and are still unemployed but continue to look for work. Most of them are in the informal sector and around 30 percent are in the formal sector. Those who are unemployed have not shown a level of productivity and can meet their own needs. Therefore, the problem of employment is still a major complex problem that must be faced, especially in the current demographic bonus period (Achmad et al., 2024).In the Harrod-Domar Growth Model, a development model of the Classical Growth Theory, it is stated that the economy will remain at full employment and the capacity of the equipment will continue to be fully utilized throughout time (Drăgoi, 2019; Piętak, 2014). In this theory, economic growth occurs if there is capital accumulation through increased investment from savings. Investment is an important factor in economic growth because investment has two roles in the economy (Tvaronavičius & Tvaronavičiene, 2008). The first concept of investment influences the demand side, in this case, investment as a source of income that will increase the demand for goods and services in the market to increase national production and income, and the second investment from the supply side, investment can increase capital for companies increase innovation and increase the use of new technologies that can increase efficiency and productivity in the economy (Arsyad, 2010).

Using the Harrod-Domar framework, economic growth in Indonesia can be increased by increasing the role of capital accumulation through investment, especially in developing companies as providers of new jobs. If there is an increase in aggregate demand, business groups can increase production if the appropriate capital and quality of labor are available. This increase in capital or investment will in turn have a positive impact on economic growth in Indonesia. The Central Statistics Agency in its publication of Indonesia's Economic Growth for Quarter IV-2022 explained that investment has a contribution to GDP which is explained through PMTB which grew by 3.31% (yoy). In addition, the external sector also shows relatively good and controlled economic conditions, as can be seen from the strengthening rupiah exchange rate and the composite stock price index (IHSG) and the ratio of Indonesia's foreign debt to GDP which is also at a safe level (Central Statistics Agency, 2022). Using the Harrod-Domar framework, economic growth in Indonesia can be increased by increasing the role of capital accumulation through investment, especially in developing companies as providers of new jobs. If there is an increase in aggregate demand, business groups can increase production if the appropriate capital and quality of labor are available. This increase in capital or investment, it will in turn have a positive impact on economic growth in Indonesia. The Central Statistics Agency in its publication of Indonesia's Economic Growth for Quarter IV-2022 explained that investment has a contribution to GDP which is explained through PMTB which grew by 3.31% (yoy). In addition, the external sector also shows relatively good and controlled economic conditions, as can be seen from the strengthening rupiah exchange rate and the composite stock price index (IHSG) and the ratio of Indonesia's foreign debt to GDP which is also at a safe level (Central Statistics Agency, 2022).

The Ministry of Investment or the Investment Coordinating Board (BKPM) has released data related to investment for the Quarter IV 2022 amounting to IDR 314.8 trillion or an increase of 30.3% (yoy). This increase in investment has also created jobs for 339,879 Indonesian workers (TKI) and is expected to increase Indonesia's economic growth to around 5%. Although the increase is not too large, it is proven that investment has made an important contribution to Indonesia's economic growth (Ministry of Communication and Information, 2022). The breadth of types and values of investment, as well as the freedom of investment, can stimulate economic growth (Ratih et al., 2023; Kuznets, 1973).

METHODS

This study uses a quantitative descriptive approach to answer the problem. Two determinants are used as influencing variables that will be considered, namely the number of workers and the gross fixed capital formation (PMTB). The type of data used in this study is secondary data in the form of pool data, namely a combination of cross-section and time series data obtained from published data from the Central Statistics Agency (BPS). The data comes from 34 provinces in Indonesia with an analysis period of 2010 to 2022. The data is converted into natural logarithm (ln) form. Data transformation into natural logarithm form is carried out to overcome scale problems and will make it relatively easy to interpret the calculation results. The software tool in this study uses Eviews 10 software.

Autoregressive Distributed Lag (ARDL) is a dynamic model in econometrics that uses lags from both dependent and independent variables together and is used to analyze long-term relationships between two or more variables. The purpose of using the ARDL analysis model is that in the formation of this economic growth model, it is not only

influenced by other variables but is also influenced by the economic growth variable itself in the past (lagged).

Mathematically, the model in this study is structured as follows;

$$\ln PDRB_{it} = \beta_{0i} + \sum_{k=1}^{p} \beta_{1k} \ln PDRB_{i,t-k} + \sum_{k=1}^{q} \beta_{2k} \ln TK_{i,t-k} + \sum_{k=1}^{s} \beta_{4k} \ln PMTB_{i,t-k} + e_{i,t}$$

Where PDRB is Gross Regional Domestic Bruto, TK is the number of labor forces working, PMTB is the gross fixed capital Formation and $ei_{,t}$ term is the error term.

RESULTS AND DISCUSSION

Before implementing the ARDL model, testing was carried out on the data to see whether the data used was stationary. If the test results show that the data is significantly not stationary, then it is necessary to test whether the data is stationary in the first degree. This is done to see the stationary data at what degree. The stationarity test uses the Unit Root Test, in this study the conventional Augmented Dickey-Fuller (ADF) test type is used.

Table 1: Unit Roots Test Results

Variables	Prob. *Augmented Dickey Fuller* (ADF)		Discription
	at level	1st difference	
lnPDRB	0.0004*	0.0000	Stasioner at level
lnTK	1.0000	0.0000*	Stasioner at 1st diff
lnPMTB	0.0000*	0.0000	Stasioner at level

Source: Data Processing

In Table 1, it can be seen that the lnPDRB variable and the lnPMTB variable are stationary at the level level due to the probability value is smaller than 0.05. Meanwhile, the lnTK variable, it is stationary at the 1st difference level. Since all variables in this study are stationary both at the level and 1st different levels, the ARDL Panel model is suitable for use in this study. Furthermore, a cointegration test is carried out the long-term relationship between the independent variables (independent variables) and the dependent variables (dependent variables). Two types of tests are used for the cointegration test, namely the Pedroni cointegration test and the KAO cointegration test.

Table 2. Panel Cointegration Test Results

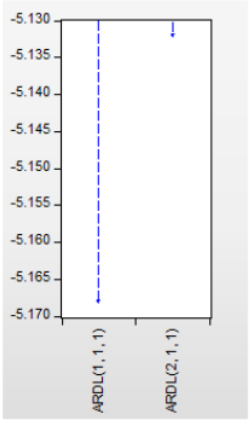
Pedroni Cointegration Test	*Statistic*	*Weight Statistic*
Panel v-Statistic	0.510941 (0.3047)	-1.337020 (0.9094)
Panel rho-Statistic	2.698977 (0.9965)	2.299590 (0.9893)
Panel PP-Statistic	-0.413475 (0.3396)	-2.763384 (0.0029)
Panel ADF-Statistic	-2.443387 **(0.0073)**	-4.659457 **(0.0000)**
Group rho-Statistic	5.035978 (1.0000)	
Group PP-Statistic	-1.699194 (0.0446)	

Group ADF-Statistic	-3.707006 **(0.0001)**
KAO Cointegration Test	***t-statistic***
ADF	-2.689413 **(0.0036)**

Source: Data Processing

Based on the results of the cointegration test according to Pedroni and KAO, the probability value is below the significance level α = 5% (0.05). So hypothesis H_0 which states that there is no cointegration is rejected, and it can be concluded that there is cointegration or a long-term relationship between the dependent variable and its independent variables. Furthermore, the optimum lag test is carried out, this test is carried out to see the best lag length in the model determined by the smallest Akaike Information Criteria (AIC) value. The null hypothesis indicates that there is no cointegration.

Graph 1. Optimum Lag Test



Source: Result Processing

Based on Figure 1, the system recommends the model with the smallest AIC value. So,the selected model is the ARDL Panel model (1, 1, 1), with a minimum AIC value of -5.168046. Subsequent to the optimum number of lags, the estimated results of the ARDL model (1, 1, 1) are as follows.

Table 3. ARDL Model Estimation Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
D(LNTK)	0.854925	0.102520	8.339117	0.0000**
LNPMTB	0.847820	0.013198	64.23960	0.0000**
Short Run Equation				
COINTEQ01	-0.237737	0.044816	-5.304718	0.0000**
D(LNTK,2)	-0.119074	0.031909	-3.731716	0.0002**
D(LNPMTB)	0.275405	0.047757	5.766801	0.0000**

C	0.928322	0.169738	5.469156	0.0000**
Mean dependent var	0.046631	S.D. dependent var		0.033402
S.E. of regression	0.020990	Akaike info criterion		-4.737376
Sum squared resid	0.118959	Schwarz criterion		-3.380623
Log likelihood	1104.425	Hannan-Quinn criter.		-4.200504

Note : ** level of significant 5%.
Source: Data Processing

CONCLUSIONS

Based on the results of the research model estimation, in the short term the number of the workforce has a negative effect on economic growth (Huang et al., 2019). It is suspected that in the short term the contribution of those working in the 2010-2022 period has a significant effect on economic growth (Tipayalai, 2020), but has not been able to increase economic growth. It is likely that the quality and suitability of work for most workers has not been able to drive increased purchasing power of the community which can contribute to economic growth. On the other hand, the formation of Gross Fixed Capital (PMTB) has a positive and significant effect on economic growth in the long and short term (Soava et al., 2020; Meyer & Sanusi, 2019). This shows that the role of capital in increasing Indonesia's economic growth is very important. It is very necessary to invite external investors to invest in Indonesia, especially industries that are able to absorb the number of demographic bonus workers. The error correction variable (COINTEQ01) with a probability of less than 0.05 and a negative value indicates that all independent variables move together towards the balance of the dependent variable in the long term. Therefore, the suggestion submitted to the Government is to increase the contribution of workers in the short term in the form of creating quality and decent jobs. Quality jobs will encourage worker productivity and of course will be followed by better income purchasing power. This will certainly be able to encourage Indonesia's economic growth.

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