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The Effect of Unemployment, Dependency Ratio, and Poverty on Gross Domestic Product Growth in Indonesia

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Abstract

This study aims to analyze the effect of unemployment, dependency ratio, and poverty on Gross Domestic Product (GDP) in Indonesia in the context of demographic transition during the period 1990-2022. The demographic transition in Indonesia is characterized by changes in the age structure of the population which has an impact on the country's economic dynamics. The research method used is Autoregressive Distributed Lag (ARDL), which allows the analysis of short-run and long-run relationships between the independent variables (unemployment, dependency ratio, and poverty) and the dependent variable (GDP). The results of this study also show that the independent variables (unemployment, dependency ratio, and poverty) have a significant effect on GDP in Indonesia both partially and simultaneously during the period 1990-2022.

Keywords: GDP; unemployment; dependency ratio; poverty; ARDL

1. Introduction

Every country will experience a demographic transition process, where the time required is different for each stage. For developed countries, it takes a faster time than for developing countries. The demographic transition explains the changes over time related to fertility (births) and mortality (deaths). There is a fundamental difference between the demographic transition process in developed countries and Indonesia. In developed countries, the demographic transition begins with economic development, industrialization and modernization [1].

Table 1. Poverty Rate in Java Island

Variable	1990 - 2005	2006 - 2022
Unemployment	6 %	6.9 %
Dependency Ratio	58 %	49.7 %
Poverty	16.6 %	10.9 %
GDP	4.4 %	4.9 %

Source: Central Bureau of Statistics

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The dynamic impact of the demographic transition is caused by several factors, including industrialization and globalization. Problems occur not because of these two factors, but rather from the response built by a country to the ongoing civilization because the demographic transition is part of the renewal. Population growth plays a central role in the sustainability of a country's economy, especially in Indonesia, which contributes very significantly to the development process in the economic sector [2].

The implications of this renewal have the potential to create adequate inequality if the policy is not relevant to the needs of the community. Therefore, the variables that are the subject of research, namely, poverty, unemployment, and dependency ratio, which directly become independent variables in this study. Where, these three variables act as instruments that influence the economic development process through the GDP indicator as the dependent variable.

Poverty, as one of the critical variables, has a direct impact on people's ability to contribute to economic development. The inability of a large proportion of the population to meet their basic needs creates pressure on public resources and services. The problem occurs when poverty, which is indirectly provided by the government, is misaligned with the accessibility of productive labor, causing massive unemployment, which leads to a destructive gap in the dependency ratio of children and the elderly.

The dependency ratio, which reflects the relationship between the economically inactive population and the economically active population, also plays a key role in the context of economic development. A high ratio can put pressure on the government budget, especially when the productive-age population has to fulfill the economic and social needs of economically inactive groups such as children and the elderly and is affected by inadequate accessibility regarding household income distribution.

Unemployment is also a major consideration in realizing inclusive economic development. High levels of unemployment can create social and economic instability, hinder productivity, and reduce the potential contribution of the labor force to economic development. This is the case with unemployment in table 1, which has increased. Of course, this phenomenon contradicts the percentage of GDP, which tends to experience the same thing.

In this context, a successful economic development strategy will integrate poverty alleviation policies, rational management of the dependency ratio, and the creation of employment opportunities for productive age. Thus, the role and involvement of these three variables will form the foundation for achieving the goal of balanced economic development and strengthening society's capacity to deal with global dynamics.

However, it remains to be further identified as to the potential impact of each independent variable on the dependent variable. Whether unemployment, dependency ratio, and poverty directly affect GDP in the context of demographic transition, or vice versa.

2. Literature Review

2.1. Demographic Transition

Demographic transition occurs when a country changes from high to low birth and death rates, as well as low population growth [3]. Factors that influence the demographic transition include the process of industrialization, modernization, urbanization, advances in medical technology, and improved nutritional conditions.

It is not population alone that affects economic growth, but the demographic transition. The demographic transition is characterized by changes in the age structure of the population. The proportion of the young population (aged 0 to 15 years) is decreasing, the proportion of the working-age population is increasing rapidly and the old population (over 65 years) is increasing slowly. The process of shifting the age distribution of the population will lead to a decrease in the youth dependency ratio and the elderly dependency ratio [4].

2.2. Unemployment

High youth unemployment will lead away from optimal economic growth, and will increase the risk of social instability [1]. Youth unemployment can have a negative impact on a region's economy. They found that youth unemployment can lead to reduced consumption, investment, and overall economic growth. Therefore, addressing youth unemployment is very important in maintaining the economic stability of a region [2].

2.3. Dependency Ratio

Dependency ratio is the ratio between the non-productive age population (0-14 years old and 65 years old and above) and the productive age population (15-64 years old). Dependency ratio is one of the demographic indicators that affect economic development. The higher the dependency ratio indicates the greater the burden that must be borne by the productive age population because part of their income is used to finance the lives of unproductive and unproductive people [5].

An aging population can have a negative impact on economic growth, but foreign labor immigration policies and long-term care for the elderly can help reduce the negative impact and an aging population can affect the foreign net asset position in the long run and can affect the response of investment to technological shocks [6].

2.4. Poverty

Poverty is not being able to meet the minimum standard of living [5]. In a standard of living, income is measured by several indicators, including gross domestic product (GDP) per capita, domestic and relative growth rates per capita, national income

distribution, poverty levels, and the level of community welfare. However, based on the economic concept, it can be measured whether the income received by the community is sufficient to meet basic needs [5].

The poverty rate also affects employment and the economy of a region. People living in poverty tend to have difficulty finding decent work and having a stable income [1].

2.5. GDP

Economic development is a process towards changes that a country pursues continuously in order to develop economic activities and the standard of living of its people so that people's welfare is expected to increase [7]. Growth is an important condition for the creation of inclusive growth. Growth is an important condition for the creation of inclusive growth, that it is important to determine what kind of economy has the characteristics of inclusive growth.

3. Method

The type of data in this study is quantitative data. Quantitative data is data obtained using numbers that show a description of the object under study. Data on population growth, dependency ratio, poverty, unemployment, and economic development in Indonesia for a period of 32 years from 1990 - 2022 on the basis of data acquisition from Badan Pusat Statistik (BPS).

The ARDL (Autoregressive Distributed Lag) model is a quantitative data analysis method used to analyze long-term and short-term relationships between two or more variables. This model is commonly used in time series regression analysis to overcome non-stationarity problems and model the short-term and long-term effects of changes in the independent variable on the dependent variable.

According to [8] the Error Correction Model (ECM) model is used if the Yt and Xt values are not stationary but have a cointegration relationship. The ARDL (Autoregressive Distributed Lag) model is a commonly used econometric model for analyzing long-term and short-term relationships between variables. The ARDL equation has the following general form:

$$GDP_t = \beta_0 + \beta_1 GDP_{t-1} + \beta_2 Pop_{t-1} + \beta_3 Dep_{t-1} + \beta_3 Unemp_{t-1} + \varepsilon_t \quad (1)$$

Description:
GDPt : Economic growth or GDP in the time period
β_0 : intercept
β_1 : coefficient for economic growth or GDP lag one (GDPt-1)
β(2,3,4) : coefficients for lag one independent variables dependency, unemployment and poverty ratio
ε_t : error at a certain time period.

4. Results and Discussion

The testing steps in the ARDL regression model in this research are data stationarity test, cointegration test, and ARDL model estimation.

4.1. Stationery Test

Stationarity test is a method used in time series data analysis to determine whether a time series is stationary or not. A data series is said to be stationary if its statistical characteristics such as mean, variance, and autocorrelation remain constant over time by looking at its probability value.

Table 2. Result of Stationerity Test

Variabel	Level I (0)	First Diffirence I (1)
GDP (Y)	0.0028	0.0000
Unemployment (X1)	0.1776	0.0002
Dependency Ratio (X2)	0.9244	0.0478
Poverty (X3)	0.3261	0.0000
ADF Fisher Chi Square	0.0000	

Source: Researcher Processed Data

Based on table 2 shows that the stationarity test results for each variable using the unit root test are stationary in each variable. Although different from the GDP variable, but at the first diffirence level all variables have a probability level below the 5% significance level. The Augmented Dickey-Fuller (ADF) approach also indicates that all variables are stationary with the results of probability values that are also below 5%. Therefore, the research can be continued because the results of the stationarity test indicate that the GDP, unemployment, dependency ratio, and poverty variables have met the standards of the research mechanism

using the ARDL model.

Table 3. Akaike Information Criterion (AIC) Model Selection

Model	LogL	AIC*	BIC	HQ	Adj. R-Sq
26	-25.76	3.08	3.98	3.36	0.93
1	-24.78	3.08	4.03	3.38	0.93
3	-32.12	3.45	4.30	3.72	0.90
2	-31.24	3.46	4.36	3.74	0.90
4	-34.17	3.52	4.33	3.78	0.90
28	-34.63	3.56	4.36	3.81	0.89

Source: Researcher Processed Data

From table 3, it is known that the ARDL method model selection with the Akaike Information Criterion (AIC) approach uses the (4,3,4,4) model with the smallest lag optimum value of -25.76%. With an optimum lag of (4,3,4,4), the short-term relationship estimation distance in the ARDL model occurs every 3-4 years.

Table 4. ARDL model estimation

Variabel	Coefficient	Probability	Variabel	Coefficient	Probability
Y(-1)	-0.34	0.00	X2(-1)	-3.50	0.01
Y(-2)	-0.09	0.26	X2(-2)	-2.09	0.07
Y(-3)	-0.64	0.00	X2(-3)	-2.64	0.20
Y(-4)	-0.42	0.00	X2(-4)	-1.42	0.00
X1	-1.82	0.00	X3	-2.95	0.00
X1(-1)	1.92	0.00	X3(-1)	1.21	0.02
X1(-2)	1.52	0.00	X3(-2)	-0.28	0.12
X1(-3)	-4.46	0.00	X3(-3)	-0.22	0.33
X2	3.34	0.00	X3(-4)	0.71	0.01
C = 2.7229					

Source: Researcher Processed Data

Table 4 shows the ARDL estimation results using the ARDL (4,3,4,4) model. The model shows that many variables are significant, although there are variables that are not significant in some lags. Thus, the ARDL model can proceed to the next stage.

4.2. Cointegration Test

The following are the results of the cointegration test through the Error Correction Model (ECM) approach which includes short-term to long-term relationships using the bound test method.

Table 5. Result Cointegration Test

F-Statistic Value = 4.311833		
Level	I(0)	I(1)
10%	2.37	3.2
5%	2.79	3.67
1%	3.65	4.66

Source: Researcher Processed Data

Table 5 shows the cointegration test results of each variable identified through the F-Statistic Value (F Count). The result obtained is the value of F Count > Critical F Value at the limit of l(0) and l(1) which is 4.311833 > 2.79 and 3.67. This proves that the three variables in this study, namely GDP growth, Unemployment, Dependency Ratio, and poverty level, are cointegrated in the long run or it can be said that the four variables move together in the long run.

From the short-term ARDL estimation results in table 6, the CointEq (-1) value is found in the lower column. This variable shows the error correction of the model used. The CointEq (-1) value is negative and significant with a probability of 0.00 and a coefficient of -2.51. The nominal gain is empirically significant at 1%, 5%, and 10% alpha levels. This indicates that the ARDL model used is verified.

However, the problem is when the dependency ratio has a positive role in the level of GDP in Indonesia. Which, should the percentage of dependency ratio that has decreased tends to have a positive impact on GDP growth in Indonesia. This is because

the income received by the productive age population is allocated for personal interests such as health investments, deposits, and others that support economic growth directly.

Table 6. Result Cointegration Test (Short-Term Relationship)

Variabel	Coefficient	Probability	Variabel	Coefficient	Probability
D(Y(-1))	1.20	0.00	D(X2(-1))	-0.60	0.02
D(Y(-2))	1.07	0.00	D(X2(-2))	1.85	0.08
D(Y(-3))	0.42	0.00	D(X2(-3))	0.29	0.00
D(X1)	-1.85	0.00	D(X3)	-2.95	0.02
D(X1(-1))	2.93	0.00	D(X3(-1))	-0.20	0.09
D(X1(-2))	4.46	0.00	D(X3(-2))	-0.49	0.01
D(X2)	3.50	0.00	D(X3(-3))	-0.71	0.00
CointEq(-1): K = -2.51, Probability = 0.00					

Source: Researcher Processed Data

As the results of research [9] in the journal Demographic Transition, Savings, and Economic Growth in China and India (ARDL). Each 1% reduction in the dependency ratio in India is associated with a 3.7% increase in GDP per capita. However, what happens in the results of data processing is precisely the opposite of optimizing the empowerment of the productive age population as an instrument for sustainable economic growth.

Table 7. Result Cointegration Test (Long-Term Relationship)

Variabel	Koefisien	Probability
Unemployment (X1)	-1.12	0.000
Dependency Ratio (X2)	2.56	0.000
Poverty (X3)	-0.61	0.015

Source: Researcher Processed Data

It can be seen in table 7 that the three independent variables have a negative and significant long-term effect on GDP growth. This means that when the dependency ratio increases by 1%, GDP will increase by 2.56% in the long run. This could be due to several reasons, such as increased consumption driven by a larger population, or greater investment of the non-productive age population in social infrastructure (e.g. education, health) that increases long-term productivity.

4.3. ARDL Model Stability Test

The stability test in the ARDL model aims to ensure that the model parameters remain consistent and do not change significantly during the observation period. If the model is unstable, then the estimation results may be inaccurate or misleading.

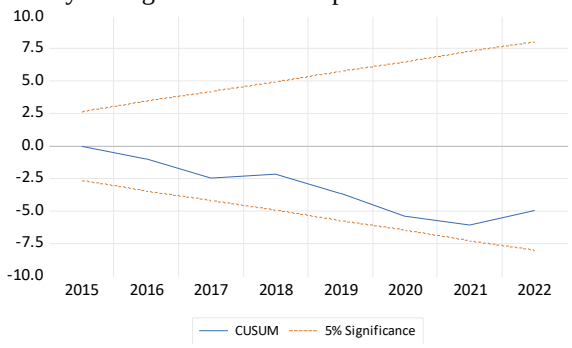

Figure 1. Variable Stability CUSUM Chart

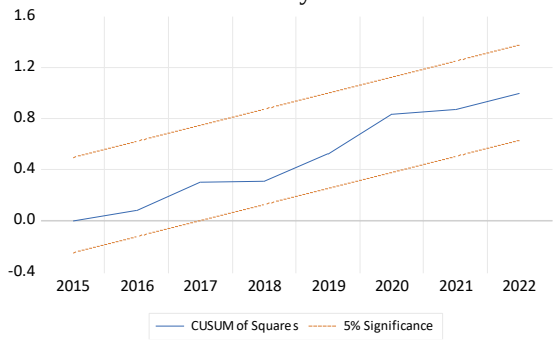

Figure2. Variable Stability CUSUM Q Chart

Based on the results of the CUSUM and CUSUMQ graphs, if the lines do not cross the critical limits, the model is considered stable in terms of variance, and the analysis can proceed without major changes to the model. However, if the graphs show the CUSUM and CUSUMQ lines exceeding the critical limits, then there is an indication that the model is experiencing variance instability that needs further investigation. Both graphs show that the variables that are the object of this study indicate that the relationship between unemployment, dependency ratio, and poverty to GDP growth is stable.

5. Conclusion

Based on data obtained from the Central Bureau of Statistics (BPS) for the period 1990 to 2022, it can be analyzed how several socio-economic variables such as unemployment, dependency ratio, and poverty affect the growth of Gross Domestic Product (GDP) in Indonesia. The analysis shows that there is a significant relationship between these variables and GDP.

Based on BPS data for the period 1990-2022, unemployment and poverty have a negative influence on economic growth, while the dependency ratio has a positive influence. The three variables simultaneously contribute significantly to the dynamics of GDP growth in Indonesia.

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