The Influence Of Population, Exchange Rates, and Consumption on National Income in Indonesia

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Abstract

Investigating the causal relationships between factors such as population, consumption, exchange rate, and GDP growth in Indonesia is the aim of this study. The World Bank provided secondary data for this study, covering the years 2001 to 2022. This study makes use of the Vector Error Correction Model (VECM) and quantitative techniques. According to this study, economic growth in the past has helped spur contemporary growth. Numerous social and economic facets might be impacted by an increase in population. Changes in exchange rates have a significant impact on how competitive a nation's imports and exports are. Ultimately, home spending plays a major role in driving economic expansion. The population of a nation has a big influence on how much is consumed. The demand for products and services rises with population size. Consequently, there will be a greater consumer market, driving economic growth. However, it should be noted that excessive consumption can also cause problems, such as trade deficits or economic imbalances. Consumption levels also affect currency exchange rates. When consumption is high, countries tend to import more goods and services than they export. As a result, there is a trade deficit, which can lower the country's currency exchange rate. On the other hand, countries with low consumption tend to have stronger exchange rates. GDP (Gross Domestic Product) growth plays an important role in attracting people. When the economy grows, job opportunities increase, and this can attract people to stay or move to the country.

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Introduction

A process known as "economic growth" occurs when a nation's financial circumstances keep becoming better over time. When economic activity is higher than it was in the preceding era, this shift takes place. The Gross Domestic Product (GDP) growth rate, which represents the entire value of goods and services generated by a nation, is frequently used to gauge economic growth (Surya, Menne, Sabhan, Suriani, Abubakar, & Idris, 2021). On the other hand, development has a broader meaning. In addition to economic growth, development also includes social, cultural, and environmental aspects. Development focuses on improving the quality of life of the community, including education, health, and infrastructure (Grum & Kobal Grum, 2020).

Income distribution is one of the factors that influences economic growth. Inequality in income distribution can slow growth because it inhibits consumption and investment. Countries that succeed in reducing income inequality tend to have more stable economic growth (Shen & Zhao, 2023). In addition, the impact of population size also plays an important role. Too high a population can put pressure on natural resources and infrastructure. However, too low a population can also hinder growth due to a lack of labor (Maja & Ayano, 2021).

The exchange rate also affects economic growth. A stable and competitive exchange rate can increase the competitiveness of a country's exports, which in turn will encourage growth. One of the primary indices of a nation's social and economic well-being is its national income. GDP per capita is a measure often used to compare levels of well-being between countries (Bawono, Zainuri, & Wilantari, 2019).

Indonesia, as a developing country, has unique challenges and opportunities in managing its economy (Fatimah, Govindan, Murniningsih, & Setiawan, 2020). One major aspect affecting national revenue is population. One way that a big population may help is by producing wealth and labor that is productive. On the other side, excessive population expansion may also result in a lack of resources, such as water, food, and energy. These shortages can have an impact on decreasing national income due to the inability to meet the needs of the community (Wilkinson, 2022). Currency exchange rates are important indicators in the economy. At the national level, currency exchange rates can affect national income. When a country's currency appreciates (the exchange rate increases), imports become cheaper and exports become more expensive. This can increase national income because exports are more profitable. Conversely, currency devaluation can reduce national income because imports become more expensive and exports cheaper (Zakhidov, 2024).

Public consumption also plays an important role in national income. When consumption increases, demand for goods and services also increases, driving economic growth. Healthy consumption can help create jobs and increase national income (Ahuja & Pandit, 2020). Investigating the causal relationships between factors such as population, consumption, exchange rate, and GDP growth in Indonesia is the aim of this study.

Literature Review

Human population has a significant impact on the consumption of natural resources and energy. The more people living in an area, the greater the demand for food. This means more agricultural land, water, and energy are needed to produce food. A growing population can put pressure on the food system. A large population requires more energy to meet daily needs (Khan, Hou, & Le, 2021). Using fossil fuels (coal and oil, for example) increases with population growth. This has an impact on the environment and climate change. The more people there are, the more water is used for daily needs, agriculture, and industry. A large population can deplete water resources and cause droughts. A large population also means a higher demand for consumer goods such as clothing, electronics, and vehicles. The production of these goods requires raw materials and energy. Population growth has an impact on the environment as a whole. Deforestation, pollution, and climate change are exacerbated by increased consumption (Holechek, Geli, Sawalhah, & Valdez, 2022).

Depreciation of exchange rates, or a drop in the value of a currency, can impact consumption from both the supply and demand sides. On the demand side, exchange rate depreciation makes the price of imported goods higher, so consumers tend to switch to domestic goods. This can increase demand for domestic products (Mesagan, Alimi, & Vo, 2022). On the other hand, depreciation can also increase the cost of imported raw materials, which can affect overall production and prices. Monetary policy (such as interest rates) and fiscal policy (such as government expenditure) have an impact on both the exchange rate and consumption in addition to the former. While fiscal policy influences aggregate demand, expansionary monetary policy may boost production and investment. Additionally pertinent is the idea of price elasticity, or the Marshall-Lerner condition. A decline in the value of the currency will result in a rise in net exports if the price elasticities of imports and exports are more than one, which can affect output and prices (Bussière, Gaulier, & Steingress, 2020).

Growth in the gross domestic product (GDP) is a key sign of a nation's economic health. However, economic growth also has an impact on the population. This article will discuss

how GDP growth affects population size (Coscieme, Mortensen, Anderson, Ward, Donohue, & Sutton, 2020). High economic growth often has a positive impact on population. When the economy grows, jobs are added, and people's incomes rise. This can encourage couples to have more children and strengthen confidence in a better future (Amar & Pratama, 2020).
Economic growth often occurs in large cities. This leads to urbanization, where people move from rural areas to cities in search of jobs and opportunities. Urbanization can affect population structure and geographic distribution. Sustainable economic growth can improve access to health services, education, and infrastructure. This has a positive impact on social welfare and public health (Gross & Ouyang, 2021). However, if economic growth is uneven, social inequality can increase. In dealing with economic growth, The effect that it has on the populace is something that the government must consider. To maximize the beneficial effects of GDP growth on the population, measures including raising educational standards, lowering inequality, and maintaining environmental sustainability can be implemented (Khan, Yahong, & Zeeshan, 2022). The following theories are developed in light of the literature review:
H1. Population Impacts Consumption
H2. Consumption Impacts Exchange Rate
H3. GDP Growth Impacts Population

Research Methods

The study investigates the causal relationship between variables including population, consumption, exchange rate, GDP growth in Indonesia. The World Bank provided secondary data for this study, covering the years 2001 to 2022. The variables are described in Table 1.

Table 1. Description Variables

Variable	Description	Source	Unit Of Analysis
Population	Population refers to a group of individuals with shared characteristics or attributes who occupy the same geographic space or environment at a specific time. In a biological context, it can denote a collection of individuals of the same species inhabiting the same geographical area. In a social context, "population" can refer to a group of individuals residing in a specific area, such as a country or city	Word Bank	Percent
Exchange rate	Multiplying the nominal exchange rate (e) by the ratio of prices between the two nations, represented as P/P*, yields the real exchange rate (RER) between two currencies. Put more simply, the RER takes into account the current nominal exchange rate and represents the worth of a nation's products in relation to those of another nation, a group of nations, or the entire world.	Word Bank	Percent
consumption	The act of using or consuming goods or services to satisfy a need or want. It is the process by which individuals or households acquire, use, and consume goods and services. In an economic context, consumption is one of the main factors in calculating gross domestic product (GDP).	Word Bank	Percent
GDP Growth	the entire amount of money created by a nation during a specific time period, generally a year.	Word Bank	Percent

	This includes income from individuals, businesses, government, and other sectors within the country.		

This study makes use of the Vector Error Correction Model (VECM) and quantitative methods:

$Prt = \beta_0 + \beta_1 Prt_1 + \beta_2 C_t + \beta_3 Ert_3 + e_t$

$Ct = \beta_0 + \beta_1 Prt_1 + \beta_2 C_t + \beta_3 Ert_3 + e_t$

$Ert = \beta_0 + \beta_1 Prt_1 + \beta_2 Ct_2 + \beta_3 Ert_3 + e_t$

$GPD_t = \beta_0 + \beta_1 Tr_{t1} + \beta_2 Ec_{t2} + \beta_3 Oe_{t3} + e_t$

Information :

Pr = population

C = consumption

Er = exchange rate

GDP = GDP Growth in Percent

β = Constant

e = Error Term

t = Time Period

Results and Discussion

Stationarity Test plays a crucial role in Vector Error Correction Model (VECM) analysis. Stationary data tends to approach its mean value and fluctuates around the mean. In VECM, all variables must be stationary at the same order. White noise residuals, which have zero mean, constant variance, and no correlation between the dependent variables, are indicative of this. The unit root existence or absence in the variables is tested as part of the stationarity test. Augmented Dickey Fuller is one of the often employed techniques (ADF). The data is deemed stationary if the ADF statistical value is smaller than the critical threshold. Table 2 displays the outcomes of the stationarity test.

Table 2. Stasionerity Test

	t-Statistics	Prob.*
Dickey-Fuller test statistics	-3.414847	0,0227
Critical value test: 1%.	-3.808546	
5%.	-3.020686	
10%.	-2.650413	

The outcomes of the Augmented Dickey-Fuller (ADF) test for the variable of interest are the findings of the unit root test analysis that was provided. Let's analyze the outcomes: There is a -3.414847 t-statistic. The p-value, or related probability value, is 0.0227. At the significance levels of 1%, 5%, and 10%, the critical test values are -3.808546, -3.020686, and -2.650413, in that order. The null hypothesis The interest rate variable in this test has a single root, and the data is not stationary, according to the null hypothesis. The null hypothesis in this instance is that the GDP has a unit root. The probability (p-value) obtained, which is 0.0227, is less than all of the critical values provided for the significance levels of 1%, 5%, and 10%. As a result, the null hypothesis can be rejected at the significance level of 5% (or 1%). This indicates that there is enough data to draw the conclusion that there is more than one root for the variable under investigation. This implies that the variables are stationary, and we may proceed accordingly.

Table 3. Analisis Kriteria Pemilihan Lag Order

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-1729.674	1718,673	2.31e+70	173.3674	173.5665	173.4062
1	-1642.007	131.4993*	1,86e+67*	166.2007*	167.1965*	166.3951*

2	-1635.353	7.319339	5.98e+67	167.1353	168.9277	167.4852

The examination of the lag order selection criterion reveals that the information criteria for Akaike (AIC), Schwarz (SC), and Hannan-Quinn (HQ) consistently suggest that the VAR model with one lag (Lag 1) is the best option among the other VAR model possibilities. In VAR/VECM analysis, choosing the appropriate lag is crucial as it influences the model's correctness and how the findings are interpreted. In this case, the results indicate that considering one lag is optimal based on the AIC, SC, and HQ criteria.

Table 4. VECM Estimation

	GDP	Population	Exchange Rate	Total Consumption
GDP (-1)	0,567259	7.70E-08	-2.54E-09	628.5036
	(0,40707)	(7.9E-06)	(7.1E-09)	(686.519)
	[1.39352]	[0,00978]	[-0,35728]	[0,91549]
GDP (-2)	-0,266124	3.90E-07	4.00E-09	-94.57104
	(0,25165)	(4.9E-06)	(4.4E-09)	(424.403)
	[-1.05753]	[0,08010]	[0,91117]	[-0,22283]
Population(-1)	15976.58	0,576222	-0,000233	1397553.
	(14110.2)	(0,27295)	(0,00025)	(2.4E+07)
	[1.13227]	[2.11111]	[-0,94646]	[0,05873]
Population(-2)	11673.73	0,477992	0,000239	27124984
	(15405.9)	(0,29801)	(0,00027)	(2.6E+07)
	[0,75775]	[1.60393]	[0,89069]	[1,04399]
Exchange Rate (-1)	-31577907	215.9481	0,447999	6.76E+10
	(2.4E+07)	(460.230)	(0,41479)	(4.0E+10)
	[-1.32726]	[0,46922]	[1.08007]	[1.68577]
Exchange Rate (-2)	6581710.	-182.8056	-0,025783	1,65E+10
	(2.2E+07)	(435.077)	(0,39212)	(3.8E+10)
	[0,29263]	[-0,42017]	[-0,06575]	[0,43422]
Total Consumption (-1)	-0,000220	7.94E-10	6.02E-13	0,375685
	(0,00022)	(4.2E-09)	(3.8E-12)	(0,36422)
	[-1.02029]	[0,19006]	[0,16002]	[1.03149]
Total Consumption (-2)	6.71E-05	-2.00E-09	-8.33E-14	0,000352
	(0,00015)	(3.0E-09)	(2.7E-12)	(0,26105)
	[0,43351]	[-0,66900]	[-0,03085]	[0,00135]
C	-5.22E+12	-4455621.	2493.400	-5.03E+15
	(1.9E+12)	(3.6E+07)	(32512.1)	(3.1E+15)
	[-2.80004]	[-0,12351]	[0,07669]	[-1.59943]

Based on table 4, First, let's focus on the GDP variable. The coefficient for GDP (-1) is 0.567259. Accordingly, for every 1% growth in GDP during the prior period, the present GDP will increase by 0.57%. In other words, past economic growth has a positive contribution to current economic growth.

Next, let's look at the Population variable. The coefficient for POPULATION (-1) is 15976.58. Accordingly, for every 1% growth in population over the preceding time, the present population will rise by 15976.58 units. A larger population can affect various economic and social aspects.

Then, let's look at the exchange rate variable. The coefficient for Exchange Rate (-1) is -31577907. This means that every 1% increase in the exchange rate in the previous period will result in a decrease of 31577907 units in the current exchange rate. Exchange rate fluctuations can affect a country's export and import competitiveness. Next, let’s look at Total Consumption. The coefficient for Total Consumption (-1) is -0.000220. This means that every 1% increase in Total Consumption in the previous period will cause a decrease of 0.00022 in Total Consumption in the current period. Household consumption has a significant impact on economic growth. Finally, let’s look at the constant C. The coefficient

for the constant is -5.22E+12. This constant represents other factors that are not included in the observed variables. Despite the lack of additional information, we are aware of this constant's significance to the model. These factors are all connected and have an impact on economic dynamics.

Conclusion

Current economic growth is positively impacted by past economic growth. Many facets of the economy and society can be impacted by an increase in population. Changes in exchange rates have a big impact on how competitive a nation's imports and exports are. Finally, home spending plays a major role in driving economic expansion. The population of a nation greatly affects its rate of consumption. The demand for products and services rises with population size. This means that the consumer market will be larger, driving economic growth. However, it should be noted that excessive consumption can also cause problems, such as trade deficits or economic imbalances. Consumption rates also affect currency exchange rates. When consumption is high, countries tend to import more goods and services than they export. As a result, a trade deficit occurs, which can depreciate the country's currency exchange rate. Conversely, countries with low consumption tend to have stronger exchange rates. GDP (Gross Domestic Product) growth plays an important role in attracting people. When the economy grows, employment opportunities increase, and this can attract people to stay or move to the country.

References

Ahuja, D., & Pandit, D. (2020). Public expenditure and economic growth: Evidence from the developing countries. FIIB Business Review, 9(3), 228-236.

Amar, S., & Pratama, I. (2020). Exploring the link between income inequality, poverty reduction and economic growth: An ASEAN perspective. International Journal of Innovation, Creativity and Change, 11(2), 24-41.

Bawono, S., Zainuri, Z., & Wilantari, R. N. (2019). Dynamics Of Real Exchange Rate And Three Financial Crisis: Purchasing Power Parity Relative Approach In Indonesia And Thailand.International Journal Of Scientific & Technology Research,8(5),58-62

Bussière, M., Gaulier, G., & Steingress, W. (2020). Global trade flows: Revisiting the exchange rate elasticities. Open Economies Review, 31(1), 25-78.

Coscieme, L., Mortensen, L. F., Anderson, S., Ward, J., Donohue, I., & Sutton, P. C. (2020). Going beyond Gross Domestic Product as an indicator to bring coherence to the Sustainable Development Goals. Journal of Cleaner Production, 248(1), 1-10.

Fatimah, Y. A., Govindan, K., Murniningsih, R., & Setiawan, A. (2020). Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: A case study of Indonesia. Journal of cleaner production, 269(1), 1-10.

Gross, J., & Ouyang, Y. (2021). Types of urbanization and economic growth. International Journal of Urban Sciences, 25(1), 71-85.

Grum, B., & Kobal Grum, D. (2020). Concepts of social sustainability based on social infrastructure and quality of life. Facilities, 38(11), 783-800.

Holechek, J. L., Geli, H. M., Sawalhah, M. N., & Valdez, R. (2022). A global assessment: can renewable energy replace fossil fuels by 2050?. Sustainability, 14(8), 1-10.

Khan, I., Hou, F., & Le, H. P. (2021). The impact of natural resources, energy consumption, and population growth on environmental quality: Fresh evidence from the United States of America. Science of the Total Environment, 754(1), 1-10.

Khan, S., Yahong, W., & Zeeshan, A. (2022). Impact of poverty and income inequality on the ecological footprint in Asian developing economies: Assessment of Sustainable Development Goals. Energy Reports, 8(1), 670-679.

Maja, M. M., & Ayano, S. F. (2021). The impact of population growth on natural resources and farmers' capacity to adapt to climate change in low-income countries. Earth Systems and Environment, 5(2), 271-283.

Mesagan, E. P., Alimi, O. Y., & Vo, X. V. (2022). The asymmetric effects of exchange rate on trade balance and output growth. The Journal of Economic Asymmetries, 26(1), 1-10.

Shen, C., & Zhao, X. (2023). How does income inequality affects economic growth at different income levels?. Economic research-Ekonomska istraživanja, 36(1), 864-884.

Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H., & Idris, M. (2021). Economic growth, increasing productivity of SMEs, and open innovation. Journal of Open Innovation: Technology, Market, and Complexity, 7(1), 1-10.

Wilkinson, R. G. (2022). Income and mortality. In Class and health (pp. 88-114). London : Routledge.

Zakhidov, G. (2024). Economic indicators: tools for analyzing market trends and predicting future performance. International Multidisciplinary Journal of Universal Scientific Prospectives, 2(3), 23-29.