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CAUSALITY OF MILITARY EXPENDITURES WITH ECONOMIC GROWTH IN DEVELOPED AND DEVELOPING COUNTRIES WITH THE STRONGEST MILITARY POWER BASED ON GLOBAL FIRE POWER FOR THE PERIOD 1978-2022

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ABSTRACT

This research aims to determine the direction of the causal relationship between military expenditure and economic growth in developed and developing countries with the strongest military powers based on Global Fire Power 2024 for the period 1978-2022. This research is quantitative research with secondary data. Military expenditure data was obtained from the Stockholm International Peace Research Institute (SIPRI), and economic growth data was obtained from The World Bank. The research model used is Pairwise Granger Causality Tests with the help of Eviews software to make testing easier. The results of this research show that in 21 developed countries, there is simultaneously a one-way causal relationship from military expenditures to economic growth. From 37 developing countries, it is simultaneously known that there is no causal relationship between military expenditures and economic growth.

Keywords: Military Expenditure, Economic Growth, Granger Causality.

INTRODUCTION

Liddle (2006) believes that there are two factors in building national strength, namely economic and military factors. If you don't have a strong economy and military, then the country's defense will be weak. In strengthening national defense, of course military expenditures cannot be separated. Military expenditure is the cost used to build the country's defense forces in times of war and peace. Military expenditure is used to finance maintenance and upkeep, as well as defense facilities for a certain period of time, Hartley, et al (1995).

Military expenditure is an input measure that is the aggregation of payments to the army and others associated with a country's armed forces, for goods purchased by the armed forces, and services purchased from civilians, over a one-year period, Gray Bader (2003). Wang, et al (2012) wrote that military expenditures is part of the government's strategy in fiscal policy which aims to strengthen the economy in a country and maintain national security in that country.

In this case, the first controversial topic to emerge in the defense literature is whether military expenditures can encourage or hinder a country's economic growth. Based on the perspective of economic schools of thought, such as Keynesian and Neoclassical, it is explained that military expenditures can influence economic growth. Keynesian thinking leads to aggregate demand. According to Keynesian thinking, with an increase in military expenditures, aggregate demand will rise, so that output and employment opportunities will increase.

In this thinking, increased military expenditures fuels economic growth by increasing employment, capital stock, and profits, resulting in greater investment in a country. Keynesian thinking explains that military expenditures has a positive effect on economic growth. For example, increasing utilization of capital stock through higher military expenditures can increase profits and increase investment, thereby increasing economic growth. Kollias, et al (2004).

In contrast to Keynesian thinking, Neoclassical thinking actually explains that military expenditures has a negative impact on a country's economic growth. In less developed and developing countries, Khalid and Noor (2015) show that military expenditures has a strong positive impact on economic growth in a country, while several researchers, such as Kunu, et al (2016); Aziz and Asadullah (2017) have proven the negative impact of military expenditures on economic growth.

Several studies examining this relationship in developed countries, such as Odehnal and Neubauer (2016), have found that military expenditures has a positive impact on economic growth in high-income countries. However, increasing military expenditures was found to have an insignificant effect on economic growth, as in research by Chang, et al (2011). Karadam, et al (2017) consider the volume of military expenditures as an important factor in explaining the positive relationship between military expenditures and economic growth.

The general opinion emerging from this discussion is that the theoretical and empirical literature provides conflicting results and there is no consensus on the existence and direction of causality between military expenditures and economic growth. For this reason, the author is interested in further analysis regarding the direction of the causal relationship between military expenditures and economic growth across countries in 45 years, from 1978 to 2022. This research is important to carry out to provide evidence of whether or not there is a causal relationship between military expenditures and a country's economic growth.

Apart from that, Trueba, et al (2020) in their research recommends further exploration with similar studies in developed and developing countries, not only whether there is a relationship or not but also the direction of causality. This recommendation from Trueba, et al, (2020) is also one of the reasons the author conducted this research. The author is not specific to developed and developing countries, but to countries that are included in the top 145 with the strongest military powers, which in fact include many developed and developing countries.

LITERATURE REVIEW

The Role of Government in the Economy

The classical theory that discusses economic growth which is influenced by the role of government is Keynes's Classical Theory. This theory assumes that government intervention in the economy determines whether economic development can run optimally. The implication of Keynes's view is that to ensure stable growth, the government's role in managing the economy is needed both through monetary policy (interest rates and money supply) and fiscal policy (taxation and government expenditures), Sukirno, (2006). Therefore, according to Mangkoesobroto (2002), there is always government interference or intervention in the economy of a country.

State Budget

The state budget is the result of planning in the form of a list of various activities, both regarding revenues and expenditures, expressed in units of money and within a certain time period, Ibnu Syamsi (1983). The state budget is used as a fiscal political tool to influence the direction and acceleration of national income. The budget that will be used depends on the economic situation faced by a country. In normal economic conditions, a balanced state budget is used, whereas in deflationary economic conditions a deficit state budget is usually used and conversely, in inflationary economic conditions a surplus state budget is used.

Military Expenditures

Military expenditure or military budget, also known as the defense budget, is a measure of expenditure allocated in a country's defense system. The purpose of military expenditures is to provide strong military defense for a country and maintain security for its citizens. Military expenditure is an input measure that is the aggregation of payments to the army and others associated with a country's armed forces, for goods purchased by the armed forces, and services purchased from civilians, over a one-year period, Gray Bader (2003). Wang, et al (2012) wrote that military expenditures is part of the government's strategy in fiscal policy which aims to strengthen the economy in a country and maintain national security in that country.

Economic growth

According to Lincoln (1999), economic growth is characterized by an increase in Gross Domestic Product (GDP) or Gross National Product (GNP) regardless of whether the increase is greater or less than the population growth rate and whether or not there are changes in the economic structure. Economic growth indicators can be seen from Gross Domestic Product (GDP), because economic growth can be understood as an increase in national income or an increase in output of goods and/or services produced within one year. GDP describes real national income which is calculated from the overall output of goods and/or services produced by a country.

The Relationship between Government Expenditures and Economic Growth

According to Wagner, in an economy, if per capita income (PPK) increases, then government expenditures will relatively increase. Slightly different from Wagner, Peacock and Wiseman argue that under normal circumstances, an increase in GNP will cause an increase in government revenues, as well as an increase in government expenditures. Mangkoesobroto (2016).

Direction of Causality

There are four approaches to considering the direction of the causal relationship between military expenditures and economic growth. The first approach is the growth hypothesis, which focuses on the impact of military expenditures on economic growth. According to this hypothesis, military expenditures positively influences economic growth by increasing total demand; this is called the Keynesian effect. The literature can be said to support the existence of unidirectional causality between military expenditures and economic growth, Chang, et al (2011).

The second approach is the conservation hypothesis. In this case, Wayne Joerding's (1986) conservative argument says that, theoretically, a country whose economy is growing can strengthen itself against internal and external threats by increasing its military expenditures. Thus, the literature states that there is unidirectional causality from economic growth to military expenditures, Dritsakis (2004).

The third approach is the feedback hypothesis, which asserts the existence of bidirectional causality between military expenditures and economic growth Tsanyao Chang et al. (2001). The final approach is the neutrality hypothesis, which suggests there is no causal relationship between military expenditures and economic growth, Kollias, et al (2004); Chang, et al (2011).

METHODS

Types of research

This type of research is descriptive quantitative research, namely by searching for information about existing symptoms, clearly defining the goals to be achieved, planning the approach, collecting data as material for making a report. According to Sujarweni (2019), quantitative research is a type of research that produces discoveries that can be obtained using statistical procedures and other means of measurement. Quantitative research focuses on symptoms that have certain characteristics called variables. In this approach, relationships between variables are analyzed using objective theory.

Research Model

The research model used in this research is the Granger Causality Test. The causality test is used to determine the causal relationship between variables. This causal relationship can be tested using Pairwise Granger Causality Tests. The Granger causality test is used to determine the effect of each variable on other variables.

The following are four types of Granger causality that can occur in an estimation system, Konya (2006).

1. If the value of Prob. smaller than α (0.05), then there is one-way Granger causality from military expenditures (negative or positive military expenditures) to economic growth (negative or positive economic growth).

2. If the value of Prob. smaller than α (0.05), then there is one-way Granger causality from economic growth (negative or positive economic growth) to military expenditures (negative or positive military expenditures).
3. If the value of Prob. smaller than α (0.05), then there is two-way Granger causality between military expenditures (negative or positive military expenditures) and economic growth (negative or positive economic growth).
4. If the value of Prob. smaller than α (0.05), then there is no Granger causality between military expenditure (negative or positive military expenditure) and economic growth (negative or positive economic growth).

Data Types and Sources

The type of data in this research is secondary data, namely data taken indirectly from the source, in the sense of taking data that is already available in agencies or websites in the form of reports. For the military expenditure variable, data was obtained from the Stockholm International Peace Research Institute (SIPRI), www.sipri.org. Meanwhile, for the economic growth (GDP) variable, data was obtained from The World Bank, www.data.worldbank.org.

Data and Measurement

For the military expenditure variable in this study, data is used based on constant prices in US\$ units. Meanwhile, the GDP variable in this study uses GDP data based on constant prices in US\$ units. A total of 58 countries will be studied over a 45 year period from 1978-2022. The number of countries is taken from 145 countries with the strongest military powers based on Global Fire Power (GFP) in 2024, with the following conditions:

1. Negara yang termasuk dalam 145 negara dengan kekuatan militer terkuat berdasarkan *Global Fire Power (GFP)* tahun 2024.
2. Negara yang terdapat data pengeluaran militer di *SIPRI* dan data PDB di *The World Bank* periode 1978-2022 secara terus menerus.

Below, researchers present a list of countries that became research objects after going through screening based on the two provisions above.

Table 1

List of Countries That are the Object of Research

No	Country	Country classification	No	Country	Country classification
1	United States	Developed countries	30	Algeria	Developing country
2	United Kingdom	Developed countries	31	Argentina	Developing country
3	Japan	Developed countries	32	Mexico	Developing country
4	Italy	Developed countries	33	South Africa	Developing country
5	France	Developed countries	34	Philippines	Developing country
6	Australia	Developed countries	35	Bangladesh	Developing country
7	Germany	Developed countries	36	Nigeria	Developing country
8	Spain	Developed countries	37	Malaysia	Developing country
9	Sweden	Developed countries	38	Colombia	Developing country
10	Singapore	Developed countries	39	Chile	Developing country
11	Greece	Developed countries	40	Peru	Developing country
12	Portugal	Developed countries	41	Morocco	Developing country
13	Netherlands	Developed countries	42	Ecuador	Developing country
14	Norway	Developed countries	43	Tunisia	Developing country
15	Denmark	Developed countries	44	Sri Lanka	Developing country
16	Finland	Developed countries	45	Oman	Developing country
17	New Zealand	Developed countries	46	Jordan	Developing country

No	Country	Country classification	No	Country	Country classification
18	Belgium	Developed countries	47	Bolivia	Developing country
19	Austria	Developed countries	48	Paraguay	Developing country
20	Ireland	Developed countries	49	Kenya	Developing country
21	Luxembourg	Developed countries	50	Uruguay	Developing country
22	India	Developing country	51	Cameroon	Developing country
23	Turkiye	Developing country	52	Guatemala	Developing country
24	Pakistan	Developing country	53	Dominican Republic	Developing country
25	Brazil	Developing country	54	El Salvador	Developing country
26	Indonesia	Developing country	55	Botswana	Developing country
27	Iran	Developing country	56	Burkina Faso	Developing country
28	Egypt	Developing country	57	Nepal	Developing country
29	Thailand	Developing country	58	Sierra Leone	Developing country

Source: Global Fire Power 2024 (Processed)

Conceptual Thinking Framework

The framework of thinking is basically derived from several theories and concepts that are appropriate to the problem or phenomenon being researched, giving rise to assumptions in the form of flow charts of thought that can be formulated into operational hypotheses or hypotheses that can be tested (Sujarweni, 2019).

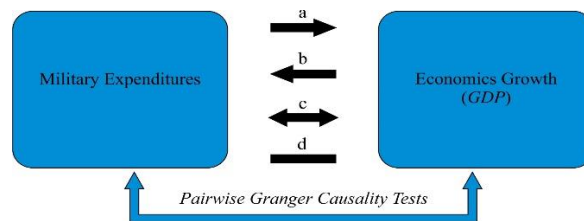


Figure 1. Conceptual Framework

Hypothesis

- H₁. It is suspected that there is a one-way causal relationship from military expenditures to economic growth
- H₂. It is suspected that there is a one-way causal relationship from economic growth to military expenditures
- H₃. It is suspected that there is a two-way or ambiguous causal relationship between military expenditures and economic growth
- H₄. It is suspected that there is no causal relationship between military expenditures and economic growth

Testing Stages

The testing stages in this research are presented in the form of a flow chart to facilitate understanding. The researcher made the testing stage into three steps, namely the data that had been obtained was compiled and adapted to the template that would be used when testing using the software. Then the data that had been neatly arranged was tested using Eviews 9.0 software. according to the selected model, namely Pairwise Granger Causality Tests. After being tested using software, the test results are interpreted and analyzed to get answers to the problem formulation and research objectives.



Figure 2. Testing Stages

RESULTS AND DISCUSSION

Description of Developed Country Data

Below, the researcher presents the results of descriptive statistical tests based on the classification of developed countries to determine the minimum value, maximum value, average and standard deviation of military expenditure and economic growth variables using panel data.

Table 2

Descriptive Statistics Test Results for Developed Countries

	<i>MILEX</i>	<i>GDP</i>
<i>Mean</i>	48025.92	1.46E+12
<i>Median</i>	7045.000	3.70E+11
<i>Maximum</i>	917092.3	2.09E+13
<i>Minimum</i>	96.20000	1.51E+10
<i>Std. Dev.</i>	143231.9	3.00E+12
<i>Skewness</i>	4.386230	4.116152
<i>Kurtosis</i>	21.37524	21.41892
<i>Jarque-Bera</i>	16325.09	16026.71
<i>Probability</i>	0.000000	0.000000
<i>Sum</i>	45384493	1.38E+15
<i>Sum Sq. Dev.</i>	1.94E+13	8.50E+27
<i>Observations</i>	945	945

Source: Processing results using Eviews 9 (2024)

Based on table 2, it can be seen that N or the amount of data for each variable is 945. This number comes from 21 developed countries with the strongest military powers based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978-2022).

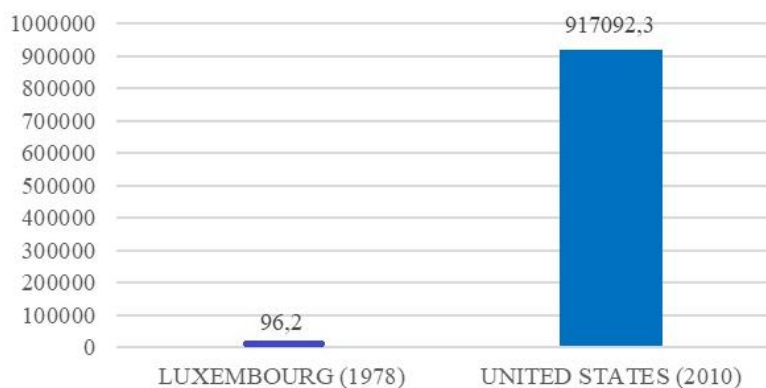


Figure 3. Military Expenditure Chart of Developed Countries

Based on table 2 and figure 3, it can be seen that military expenditure in developed countries has a minimum value of 96.20000 in Luxembourg in 1978 and a maximum value of 917092.3 in the United States in 2010. These results show that the value of

military expenditure in countries is large. advances in this study ranged from 96.2 US\$ to 917092.3 US\$.

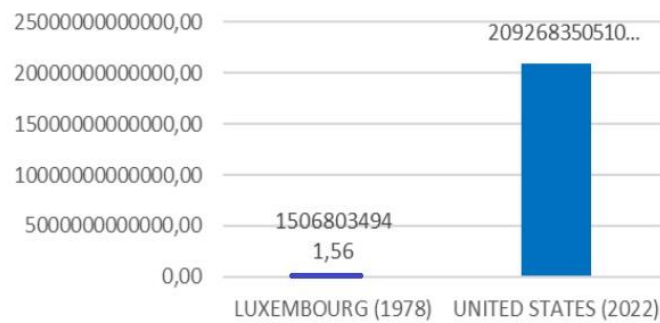


Figure 4. Economic Growth Chart of Developed Countries

Based on table 2 and figure 4, it can be seen that economic growth based on GDP in developed countries had a minimum value of 1.51E+10 (15,068,034,941.56) in Luxembourg in 1978 and a maximum value of 2.09E+13 (20,926,835,051.000.00) in the United States in 2022. These results show that the value of economic growth based on GDP in developed countries in this study ranges from 15,068,034,941.56 US\$ to 20,926,835,051,000.00 US\$.

Description of Developing Country Data

Below, the researcher presents the results of descriptive statistical tests based on the classification of developing countries to determine the minimum value, maximum value, average and standard deviation of military expenditure and economic growth variables using panel data.

Table 3

Results of Descriptive Statistics Tests for Developing Countries

	<i>MILEX</i>	<i>GDP</i>
<i>Mean</i>	3668.910	2.18E+11
<i>Median</i>	1880.900	7.59E+10
<i>Maximum</i>	80955.80	2.96E+12
<i>Minimum</i>	7.100000	1.50E+09
<i>Std. Dev.</i>	7253.920	3.54E+11
<i>Skewness</i>	6.259229	3.219328
<i>Kurtosis</i>	52.45561	16.30898
<i>Jarque-Bera</i>	180553.2	15164.34
<i>Probability</i>	0.000000	0.000000
<i>Sum</i>	6108734.	3.63E+14
<i>Sum Sq. Dev.</i>	8.76E+10	2.08E+26
<i>Observations</i>	1665	1665

Source: Processing results using Eviews 9 (2024)

Based on table 3, it can be seen that N or the amount of data for each variable is 1665. This number comes from 37 developing countries with the strongest military powers based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978-2022).

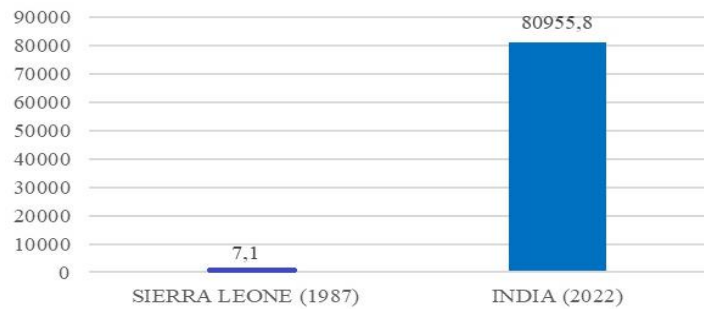


Figure 5. Military Expenditure Chart of Developing Countries

Based on table 3 and figure 5, it can be seen that military expenditure in developing countries has a minimum value of 7.10000 in Sierra Leone in 1987 and a maximum value of 80955.80 in India in 2022. These results show that the large value of military expenditure in the country developed in this study ranged from 7.1 US\$ to 80955.8 US\$.

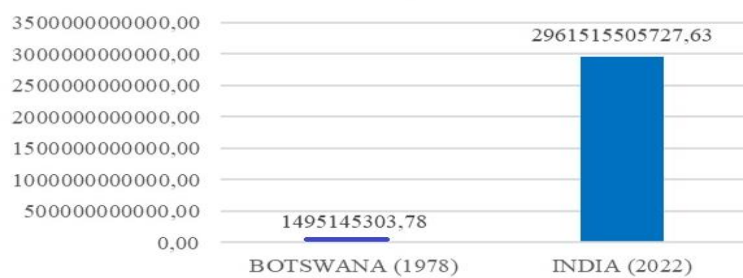


Figure 6. Economic Growth Chart of Developing Countries

Based on table 3 and figure 6, it can be seen that economic growth based on GDP in developing countries had a minimum value of 1.50E+09 (1,495,145,303.78) in Botswana in 1978 and a maximum value of 2.96E+12 (2,961,515,505,727.63) in India in 2022. These results show that the value of economic growth based on GDP in developing countries in this study ranges from 1,495,145,303.78 US\$ to 2,961,515,505,727.63 US\$.

Granger Causality Test Results in Developed Countries

Below, researchers present the results of the Granger causality test to determine the direction of the causal relationship between military expenditure variables and economic growth in developed countries with the strongest military forces based on Global Fire Power (GFP) in 2024 over a period of 45 years (1978-2022).

Table 4

Granger Causality Test Results in Developed Countries

<i>Null Hypothesis:</i>	<i>Obs</i>	<i>F-Statistic</i>	<i>Prob.</i>
<i>GDP does not Granger Cause MILEX</i>	924	6.95145	0.0085
<i>MILEX does not Granger Cause GDP</i>		32.1940	2.E-08

Source: Processing results using Eviews 9 (2024)

Based on table 4 above, it is known that the economic growth variable significantly influences the military expenditure variable with a value of Prob. 0.0085 which means it is smaller than 0.05. This shows that H_2 is accepted and H_1 , H_3 , and H_4 are rejected, so there is a one-way causality relationship from economic growth to military expenditures in developed countries with the strongest military power based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978-2022).

This does not happen otherwise, it is known statistically that the military expenditure variable does not significantly influence economic growth with the value of Prob. 2.E-08 which means greater than 0.05. This also shows that H_4 is accepted and H_1 , H_2 , and H_3 are rejected, so there is no causal relationship between military expenditure and economic growth in developed countries with the strongest military power based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978-2022).

Based on the results of the Granger causality test in table 4 above, it shows that in general the developed countries with the strongest military strength based on Global Fire Power (GFP) in 2024 over a period of 45 years (1978-2022) have a one-way causal relationship to economic growth. military expenditures. So every increase or decrease in the value of economic growth will affect the amount of military expenditures. So, in general, the size of military expenditures in developed countries is influenced by the size of economic growth.

In table 4, the hypothesis accepted is the conservation hypothesis, which is based on the conservative argument of Wayne Joerding (1986) which says that, theoretically, a country whose economy is growing can strengthen itself against internal and external threats by increasing its military expenditures. Dritsakis (2004).

Granger Causality Test Results for Developing Countries

Next, the researchers present a table of Granger causality test results for developing countries with the strongest military powers based on Global Fire Power (GFP) in 2024 for a period of 45 years (1978-2022).

Table 5

Granger Causality Test Results for Developing Countries

<i>Null Hypothesis:</i>	<i>Obs</i>	<i>F-Statistic</i>	<i>Prob.</i>
<i>GDP does not Granger Cause MILEX</i>	1628	1.50020	0.2208
<i>MILEX does not Granger Cause GDP</i>		199.206	9.E-43

Source: Processing results using Eviews 9 (2024)

Based on table 5 above, it is known that the economic growth variable does not significantly influence the military expenditure variable with the value of Prob. 0.2208 which means it is greater than 0.05. This shows that H_4 is accepted and H_1 , H_2 , and H_3 are rejected, so there is no causal relationship between economic growth and military expenditures in developing countries with the strongest military power based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978). -2022).

The opposite also happens, it is known statistically that the military expenditure variable does not significantly influence economic growth with the value of Prob. 9.E-43 which means greater than 0.05. This also shows that H_4 is accepted and H_1 , H_2 , and H_3 are rejected, so there is no causal relationship between military expenditure and economic growth in developing countries

with the strongest military power based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978-2022).

Thus, it can be concluded that there is no causal relationship between military expenditures and economic growth, and vice versa. So to answer the problem formulation in this research, namely accepting H_4 , namely the neutrality hypothesis (Kollias, Manolas, and Paleologou 2004; Chang, Huang, and Yang, 2011) which shows that there is no causal relationship between military expenditures and economic growth in developing countries. with the strongest military strength based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978-2022).

Based on the results of the Granger causality test in table 5 above, it shows that in general, in developing countries with the strongest military power based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978-2022) there is no causal relationship between military expenditure and economic growth. So increases or decreases in the value of military expenditures and economic growth do not influence each other.

CONCLUSION AND RECOMMENDATION

Conclusion

1. Granger Causality Relationship in Developed Countries

Based on the results of Pairwise Granger Causality Tests from developed countries, it is known that the economic growth variable significantly influences the military expenditure variable with a value of Prob. 0.0085 which means it is smaller than 0.05. Furthermore, the military expenditure variable also does not significantly influence economic growth with the Prob value. 2.E-08 which means greater than 0.05.

Thus it can be concluded that there is a one-way causal relationship from military expenditures to economic growth. So to answer the problem formulation in this research, namely accepting H_2 , namely the conservation hypothesis.

Based on the results of the Granger causality test in table 4 above, shows that in general the developed countries with the strongest military power based on Global Fire Power (GFP) in 2024 over a period of 45 years (1978-2022) there is a one-way causal relationship from economic growth to military expenditures. So every increase or decrease in the value of economic growth will affect the amount of military expenditures. So, in general, the size of military expenditures in developed countries is influenced by the size of economic growth.

2. Granger Causality Relationship in Developing Countries

Based on the results of Pairwise Granger Causality Tests from developing countries, it is known that the economic growth variable does not significantly influence the military expenditure variable with the value Prob. 0.2208 which means it is greater than 0.05. The opposite also happens, it is known statistically that the military expenditure variable does not significantly influence economic growth with the value of Prob. 9.E-43 which means greater than 0.05.

Thus, based on the results of Pairwise Granger Causality Tests from developing countries, it is known that it can be concluded that there is no causal relationship between military expenditure and economic growth, and vice versa. So to answer the problem formulation in this research, namely accepting H_4 , namely the neutrality hypothesis (Kollias, et al (2004; Chang, et al (2011).

Based on the results of the Granger causality test above, it shows that in general, in developing countries with the strongest military strength based on Global Fire Power (GFP) in 2024 over a period of 45 years (1978-2022) there is no causal relationship between military expenditures and economic growth. So increases or decreases in the value of military expenditures and economic growth do not influence each other.

Recommendation

1. Based on the results of the Granger causality test above, it shows that in general the developed countries with the strongest military strength based on Global Fire Power (GFP) in 2024 with a period of 45 years (1978-2022) there is a one-way causal relationship from economic growth to military expenditures. So every increase or decrease in the value of economic growth will affect the amount of military expenditures. So in these developed countries, each country must maintain stable economic growth and even always strive for growth to continue to show a positive trend so that military expenditures is also stable and can continue to help in terms of national defense.
2. Based on the results of the Granger causality test above, it shows that in general, in developing countries with the strongest military power based on Global Fire Power (GFP) in 2024 over a period of 45 years (1978-2022) there is no causal relationship between military expenditure and economic growth. Nevertheless, developing countries must continue to strive so that economic growth continues to increase. In terms of military expenditures, developing countries must also continue to make efforts to ensure that their defense needs remain adequate.

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