IJCEAS

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XVI, Issue: 1, Year: 2026, pp. 443-460

The Relationship Between Benoit Hypothesis and Rural Value Added in Türkiye for the Period 1973 – 2023 with Fourier Type Tests

Hüseyin KARAHAN[1]
Melih ÖZÇALIK[2]

Received: 28.01.2026, Accepted: 11.05.2026
DOI Number: 10.5281/zenodo.20563228

Abstract

The econometric model of the study consists of economic growth, rural value added, and defence expenditures. The purpose of this study is to determine whether there is a causal relationship between economic growth, defence expenditures, and rural value-added variables in Turkey. In accordance with the results of the unit root tests, the rural value added, economic growth, and defence expenditure variables are stationary at level values and first difference levels. According to the results of the Tsong – Lee – Tsai – Hu cointegration test, there is no long-run relationship among economic growth, defence expenditures, the trade openness rate, and rural value-added. According to the results of the Fourier-type Toda Yamamoto causality test, there is a bidirectional causality relationship between economic growth, defence expenditure, trade openness rate, and rural value-added variables in Turkey. The original value of the study is that since defence expenditure and rural value added affect the economic growth variable, the increase or decrease in one variable is thought to affect the increase or decrease in the other variable. In terms of the causal relationship, it has been found that there is a causal link between the trade openness ratio variable and economic growth and variables associated with it. Consequently, in terms of economic growth, there is an opportunity cost between defence expenditure and rural value-added variables.

Keywords: Economic Growth, Defense Expenditures, Agriculture, Time Series Models

JEL Codes: F430, H560, Q000, C320

[1] PhD, Manisa Celal Bayar University, Economics PhD, Türkiye, dr.huseyinkarahan45@gmail.com, https://orcid.org/0000-0002-0361-7175
[2] Prof. PhD., Manisa Celal Bayar University, Department of Economics Faculty of Economics and Administrative Sciences, Türkiye, melihozcalik@cbu.edu.tr, https://orcid.org/0000-0002-3559-4975

1. Introduction

Rural Value Added (RVA) is a type of agricultural growth that enables farmers or other producers in the agricultural sector to produce agricultural products with characteristics that differentiate them from traditional products. These characteristics may include variations in elements such as form, location, and quality, which should be in line with consumer preferences. Value-added agriculture can be defined as the modification of production processes to re-establish the role of farmers in the agricultural production process, to establish closer relationships with consumers to improve or maintain the quality of agricultural products (Özkan, 2024).

In Turkey, the Young Farmer Project has been implemented to develop rural areas and prevent internal migration by ensuring the continuity of young farmers in the agricultural sector. However, the Young Farmer Project has failed to encourage internal migration from cities to rural areas, and those benefiting from the support are generally those residing in rural areas (Gedik and Yılmaz, 2023).

The agricultural sector in Turkey plays a crucial role in enhancing productivity, formulating export-oriented plans, and generating both RVA and economic growth (EG). Accordingly, the increase in agricultural exports in Turkey holds strategic importance in terms of rural development and EG. Moreover, agricultural production is important in terms of economic growth and RVA (Gürbüzer and Çiftçi, 2025).

Organic farming and rural development ensure sustainability in agricultural production in Turkey. Furthermore, rural development and organic farming have been observed to positively impact rural employment in rural areas and increase the income of small farmers (Bayramoğlu, Ağızan, and Ağızan, 2025).

The agricultural sector plays a major role in increasing the overall production and economic welfare of a country. Thanks to technological developments in the agricultural sector, modern agricultural techniques, and efficient agricultural production methods, it is seen that RVA increases as farming productivity increases. It is seen that the farming sector has a positive effect on the increase in agricultural production. EG by increasing agricultural employment, poverty alleviation, and rural development (Adebayo et al, 2024).

Depreciation of the national currency may make agricultural products of any country more desirable. Accordingly, the depreciating currency is thought to increase agricultural exports as it reduces the cost of agricultural products in foreign currency. The increase in exports by agricultural producers leads to an increase in RVA (Iorember et al., 2024).

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XVI, Issue: 1, Year: 2026, pp. 443-460

The Farming sector is one of the sectors contributing to global warming due to emissions from different farming activities. On the other hand, RVA helps to increase the financing of environmentally friendly technologies to increase Economic Growth (EG) resulting from RVA and to reduce emissions from the farming sector (Raihan et al., 2023).

It is thought that an increase in Defense Expenditure (DE) will increase the use of natural resources. In addition, an increase in the use of natural resources also increases EG. Withering natural resources necessitates countries with natural resource scarcity to develop advanced technologies in terms of natural resources. Accordingly, Turkey should have advanced technologies both in terms of the production of natural resources and defense industry technologies. It is believed that the share of DE in growth will gradually increase due to security concerns originating from the Middle East, Europe, and Armenia that DE may have causal links with growth (Benoit Hypothesis). In the past, DE used to be imported from the USA, but in recent years, Turkey has preferred import substitution policies in DE (Sohag et al., 2019).

In general, studies on defence expenditure suggest that military spending will affect the economy, with both positive and negative consequences. Whilst defence spending may divert human capital from the economy. On the other hand, it fosters the development of the workforce, particularly in developing economies. An increase in defence spending can help maintain peace between nations and enable economic benefits to be derived from allies with higher levels of prosperity. It has also been observed to stimulate demand and drive EG in a stagnant economy (Dunne, Nikolaidou & Smith, 2002).

In the literature review, the studies by Ahmed et al. (2020) and Çiçek et al. (2024) in the literature review suggest a one - way causal relationship from defence expenditure to economic growth; however, as the Benoit Hypothesis assumes a two-way causal relationship between economic growth and defence expenditure, it appears that these two studies partially support the Benoit Hypothesis.

Furthermore, in the study by Erkut et al. (2024) included in the literature review, differentiation is achieved by using variables such as ecological footprint, globalization, and energy consumption, in addition to those featured in the Benoit hypothesis.

The study is conducted to determine whether there is a relationship between EG, DE, and RVA variables in Turkey for the period 1973 – 2023. The reason why the study started in 1973 is that the Benoit Hypothesis was published in 1973. In the literature review, while the relationship between EG and RVA is examined, the relationship between EG and DE is also examined. The purpose of the study is to investigate whether there is a relationship between EG, RVA, and DE variables in Turkey in the period 1973 – 2023. The study is based on the studies of Gbadeo et

al. (2025) and Usman et al. (2022). In Gbadeo et al. (2025) study, there is a one-directional causal relationship from DE to EG in Nigeria in the period 1960 – 2021. In Usman et al. (2022) study, there is a single-action causal link from EG to RVA in the period 1995 – 2017 in South Asian countries.

2. Literature Review

Due to recognition of the Benoit Hypothesis that examines the causal link between EG and DE, part of the literature review includes studies that examine the relationship between EG and DE.

Among the variables of the study, there are studies that suggest a relationship between RVA and EG. In the second part of the literature review, there are studies that suggest a relationship between RVA and EG. Furthermore, the literature review indicates that, in addition to causal relationships between EG and RVA, variables such as carbon emissions, ecological footprint, and foreign trade volume are frequently used.

Table 1: Literature Review on the Relationship Between EG and DE

AUTHOR	TIME	VARIABLE	METHOD	CONCLUSION
Aydın, B. (2019)	1960 – 2017	EG and DE	ADF and PP Unit Root Test(URT), ARDL Model, Diagnostic Tests, CUSUM Test, and Toda Yamamoto(TY) Causality Test	According to the results of the study, there is a causal link between DE and EG as in the Benoit Hypothesis.
Emmanoulidis, K. & Karpetis, C. (2020)	1961 – 2015	EG and DE	ADF, DF – GLS, NG – Perron, PP, and KPSS URT, ARDL Bound Test, Granger	In accordance with the results of the study, there is a long-term relationship between DE and EG.

			Causality Test(GCT)	
Ahmed, S., Alam, K., Rashid, A., & Gow, J. (2020)	1970 – 2014	DE, EG, Energy Consumption, CO_2 Emissions, Export	ADF, KPSS, and PP URT, Kapetanios URT, ARDL short run and long run analysis, Bootstrap Causality Test	According to the findings of the study, there is a bidirectional causal relationship between energy consumption and carbon emissions, whilst there is a unidirectional causal relationship from DE to EG. Furthermore, there is a unidirectional causal relationship from carbon emissions to EG.
Khalid, U. & Habimana, O. (2021)	1961 – 2024	DE, EG, Investments and Public Expenditures	Ordinary Least Squares, Cross Corelagrams and Wavelet Approach	According to the results of the study, DE does not affect EG.
Ceyhan, T. & Köstekçi, A. (2021)	1988 – 2019	EG, DE, and Unemployment	ADF, PP, and LP URT and Maki Cointegration Test	In accordance with the results, there is a long-term relationship between variables.
Saba, C.S. & Ngepah, N. (2022)	1990 – 2018	EG, DE, Human Development Index	LLC, IPS, Fisher ADF, Fisher PP, and Breitung URT, Cross Section Dependency (CSD) Test,	According to the results of the study, there is a causal relationship between EG, DE, and the

			Johansen Cointegration Test, Westerlund Cointegration Test	human development index.
Çiçek, M., Yenilmez İnce, M., Günay Kabakçı, E., (2024)	2000 - 2021	EG, DE, Export, Import, Total Workforce, Fixed Capital Investments,	Fixed Effect and Random Effects Models, Hausman Test, and Driscoll-Kraay Predictor	According to the findings of the study, it appears that DE influences EG in the countries covered by the study. Furthermore, it appears that the volüme of a country's foreign trade influences EG.
Erkut, M., Kabakçı Günay, E., Yenilmez İnce, M., (2024)	1970 – 2018	Ecological Footprint, Globalisation Index, Real GDP, Energy Consumption	Cross-Section Dependent Test, Homogeneity Test, CIPS URT, and Westerlund Cointegration Test	According to the findings of the study, whilst globalisation has been shown to reduce the ecological footprint in countries concerned, energy consumption and economic growth have been shown to increase it.
Gbadeo, A. D., Bekun, F. V., Akande O. J.,	1960 – 2021	EG and DE	ADF, and KPSS URT, Error Correction	According to the results of the study, there is a

& Adekunle, O. A. (2025)	Model, Toda Yamamoto and Hatemi Causality Tests and Impulse Response Function	one-directional causal relationship from DE to EG.

Source: written by the authors

Table 2: Literature Review on the Relationship between EG and RVA

AUTHOR	TIME	VARIABLE	METHOD	CONCLUSION
Agboola, M. O., & Bekun, V. O. (2019)	1981 – 2014 (Annual)	EG, Energy Consumption, RVA, and Foreign Direct Investment	ADF, PP, and Zivot Andrews URT, ARDL Model, and GCT	According to the results of the study, there is a one-directional causal link from RVA to EG, energy consumption, and foreign direct investments.
Usman, M., Anwar, S., Rizwan Yaseen M., Sohail Amiad Makhdum M., Kousar R., Jahanger A. (2022)	1995 – 2017	Carbon Emissions, RVA, EG, Non – Renewable Energy Use, Renewable Energy Consumption, and Incoming Tourists	Friedman, Frees, and Pesaran CSD Tests, LLC, IPS, FADF URT, Pedroni and Johansen Cointegration Tests, FMOLS Estimator, and Dumitrescu Hurlin Causality Test	In accordance with the results, there is a one-directional causal relationship from EG to RVA.
Raihan, A. & Tuspekova, A. (2022)	1990 – 2019	EG, Carbon Emissions, Renewable Energy Consumption,	GCT, Correlation Analysis, ADF, DF – GLS, and PP	According to the results of the study, there is a one–directional causal

			Forested Areas, RVA, Tourism, Urbanisation, and Fossil Fuel Energy Use	URT, ARDL Bound Test, Fully Modified Ordinary Least Squares, and Canonic Cointegration Estimator	relationship from RVA to EG.
Raihan, A. (2023)	1984 2020	–	EG, Carbon Emissions, Energy Consumption, and RVA.	ADF, DF-GLS, PP URT, ARDL Model, Johansen and Engle Granger Cointegration Tests, DOLS, FMOLS, and CCR Estimators	According to the results of the study, there is a one–directional causal link from RVA to EG.
Raihan, A. Muhtasim, D. A., Farhana, S. (2023)	1990 2020	–	EG, Carbon Emissions, Renewable Energy Consumption, Urbanisation, Industrialisation, RVA, and Forested Areas	Correction Analysis, Variance Inflation Factor, ADF, PP, DF-GLS URT, ARDL Bound Test, DOLS Estimator, Diagnostic Tests, and CUSUM Test	In accordance with the results, there is no long – term relationship between RVA and EG.

Source: written by authors

Based on the literature review of the study, it is thought that the share of RVA and DE may be affected by changes in EG.

3. Econometric Method

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XVI, Issue: 1, Year: 2026, pp. 443-460

This study analyses the relationship between EG, RVA, Trade Openness Rate(TOR), and DE in Turkey between 1973 and 2023. The reason for conducting the study in 1973 – 2023 is that the Benoit Hypothesis was published in 1973. While the EG and RVA data, which are the variables of the study, are used from the World Bank, the DE data from the Stockholm International Peace Research Institute (SIPRI) are preferred. In Eq.1, while the dependent variable of the study is EG, the independent variables are divided into RVA and the percentage share of DE in growth. WinRats 8.1 and STATA 15 econometric programmers are preferred for the econometric analysis of the study. In the econometric methodology of the study, the Fourier-type URT, the cointegration test, and the causality test are applied.

Equation 1: The econometric model of the study $Yeg = Xrva + Xde +$ Xtor

4. Econometric Results

In the econometric analysis, first the URT, then the cointegration test, and causality tests are discussed.

4.a. Unit Root Tests

The study includes Augmented Dickey Fuller (ADF), that does not take into account the structural break, and Becker, Enders, Lee (BEL) URT, which takes into account the structural break.

4.a. 1. ADF Unit Root Test

Since URT is applied when the variables are stationary at the first difference level, it is measured whether the variables are stationary at the first difference level. ADF and PP URT have %1, %5, and %10 critical values (CV). H_0 hypothesis of ADF and PP URT, if the statistics are less than %5 CV, the variable series are non-stationary. H_1 hypothesis, if the statistics is greater than %5 CV, the variable series are stationary (Taşkıran and Altuntaş, 2022).

Table 3: ADF URT

D(EG)	**Statistic**	**%1 CV**	**%5 CV**	**%10 CV**
Z	-11.420	-3.587	-2.933	-2.601
Prob. Value		0.000		
D(DE)	**Statistic**	**%1 CV**	**%5 CV**	**%10 CV**
Z	-6.866	-3.587	-2.933	-2.601
Prob. Value		0.000		
D(RVA)	**Statistic**	**%1 CV**	**%5 CV**	**%10 CV**
Z	-6.603	-3.587	-2.933	-2.601
Prob. Value		0.000		
D(TOR)	**Statistic**	**%1CV**	**%5 CV**	**%10 CV**
Z	-6.824	-4.159	-3.504	-3.182

Prob. Value	0.000

Source: Authors' calculations

According to the results of Table 3, since the absolute values of the statistics are greater than the absolute values of the CV, all three variables are stationary at the first difference level.

4.a.2.Fourier BEL URT

Normal URT does not consider the structural breaks in the series of variables. However, URT based on Fourier functions considers the structural breaks in the series of variables. The Fourier BEL test has two stages. Firstly, it is checked whether the variables are stationary. If the variables are stationary, then the F test is used to check whether the trigonometric coefficients are significant. If the trigonometric coefficients are significant, the stationarity of the variable series is reported. In the Fourier BEL test, the H_0 hypothesis states that the variable is stationary, while the H_1 hypothesis states that the variable has a unit root (Hepsağ, 2022).

Table 4: Fourier BEL URT

EG	**Statistic**	**%1 CV**	**%5 CV**	**%10 CV**
Bootstrap tau-m(k)	0.1878	0.4477	0.3720	0.3209
Bootstrap p-value		0.3688		
RVA	**Statistic**	**%1 CV**	**%5 CV**	**%10 CV**
Bootstrap tau-m(k)	0.1025	0.1403	0.1180	0.1079
Bootstrap p-value		0.1472		
DE	**Statistic**	**%1 CV**	**%5 CV**	**%10 CV**
Bootstrap tau-m(k)	0.2482	0.4424	0.3611	0.3091
Bootstrap p-value		0.2017		
TOR	**Statistic**	**%1 CV**	**%5 CV**	**%10 CV**
Bootstrap tau-m(k)	0.1356	0.1566	0.1427	0.1353
Bootstrap p-value		0.0971		

Source: Authors' calculations

According to the results of Table 4, the stationarity of the variables is reported since all four variables are stationary (test statistic<%5 CV) and the F test is significant. Moreover, since all EG, RVA, DE, and TOR variables are stationary at their level values, the TY Causality Test will be applied in the study.

IJCEAS
International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XVI, Issue: 1, Year: 2026, pp. 443-460

In academic research, first–difference values are not used in the Fourier unit root test, as they result in a loss of information and distort structural breaks in the series used in the test. Consequently, level values are used in the Fourier unit root test (McElroy & Politis, 2013).

Given the stationarity of the first differences of the series included in the ADF tests, the Fourier – Tsong – Lee – Tsai – Hu cointegration test is applied. Given the stationarity of the level values of the series included in the Fourier URT, the Fourier – TY causality test is applied.

4.b. Fourier Cointegration Test(FCT)

Since the variables in the study are stationary at the first difference level, the condition for applying the cointegration test is provided. Engle-Granger and Johansen cointegration tests do not consider structural breaks. Cointegration tests that consider Fourier functions take structural breaks into account (Hepsağ, 2022). In this study, Tsong – Lee – Tsai Hu FCT is applied.

4.b. 1. Fourier Tsong – Lee – Tsai Hu FCT

In the current two-stage FCT, firstly, in the H_0 hypothesis, there is a long-run relationship between the variables, while in the H_1 hypothesis, there is no long -run relationship between the variables. When the H_0 hypothesis is accepted, if the F test is performed and the trigonometric coefficients are significant, the long-run relationship between the variables is reported (Doğaner and Tunalı, 2022).

Table 5: Fourier Tsong – Lee – Tsai – Hu Fourier Cointegration Test

All Variables	Statistics	%1 CV	%5 CV	%10 CV
Bootstrap CI11f	0.0776	0.0894	0.0763	0.07058
Bootstrapped p-value		0.0438		

Source: Authors' calculations

According to the results in Table 5, there is a long-term relationship between the variables, as the statistical value is less than %5 CV. Furthermore, the F-test indicates a long-term relationship between the variables, as the test statistics are greater than CV.

According to the results of the Fourier cointegration test, it is thought that an increase in long-term EG will raise the TOR, thereby increasing the share of DE in EG and also boosting RVA.

4.c. VAR Lag Length

Determination of the lag length is considered as one of the necessary conditions when performing the Fourier Type TY Causality test, which will be discussed in the next section. The minimum value is determined as the lag length (Akardeniz, 2023).

Table 6: VAR Lag Length

VAR Lag Selection(EG & DE Variables)		**VAR Lag Selection(EG & RVA Variables)**	
Lags	**AICC**	**Lags**	**AICC**
0	-43.364	**0**	513.3847
1	-41.047	**1**	358.1370
2	-38.73	**2**	367.1370
VAR Lag Selection (RVA & DE Variables)			
Lags		**AICC**	
0		-57.3765	
1		-208.1420	
2		-199.0918	
VAR Lag Selection (EG & TOR Variables)		**AICC**	
Lags			
0		584.3244	
1		502.6715	
2		501.9435	
3		499.6165	
4		495.1214	

Source: Authors' calculations

According to the results of Table 6, the minimum values are determined as the lag length.

4.d. Fourier Type TY Causality Test

The application of the Fourier Type TY causality test depends on the stationarity of the variables at the level values. When applying for the current test, the lag length is determined first. In addition, the current test also considers structural breaks. The null hypothesis of the present test is that there is no causal relationship between the variables. The H_1 hypothesis of the current test is that there is a causal relationship between the variables (Köstekçi, 2024).

Table 7: Fourier Type TY Causality Test

Causality Direction of Variables	**Fourier-TY Test Statistic**	**%5 CV**	**Bootstrapped Prob. Value**

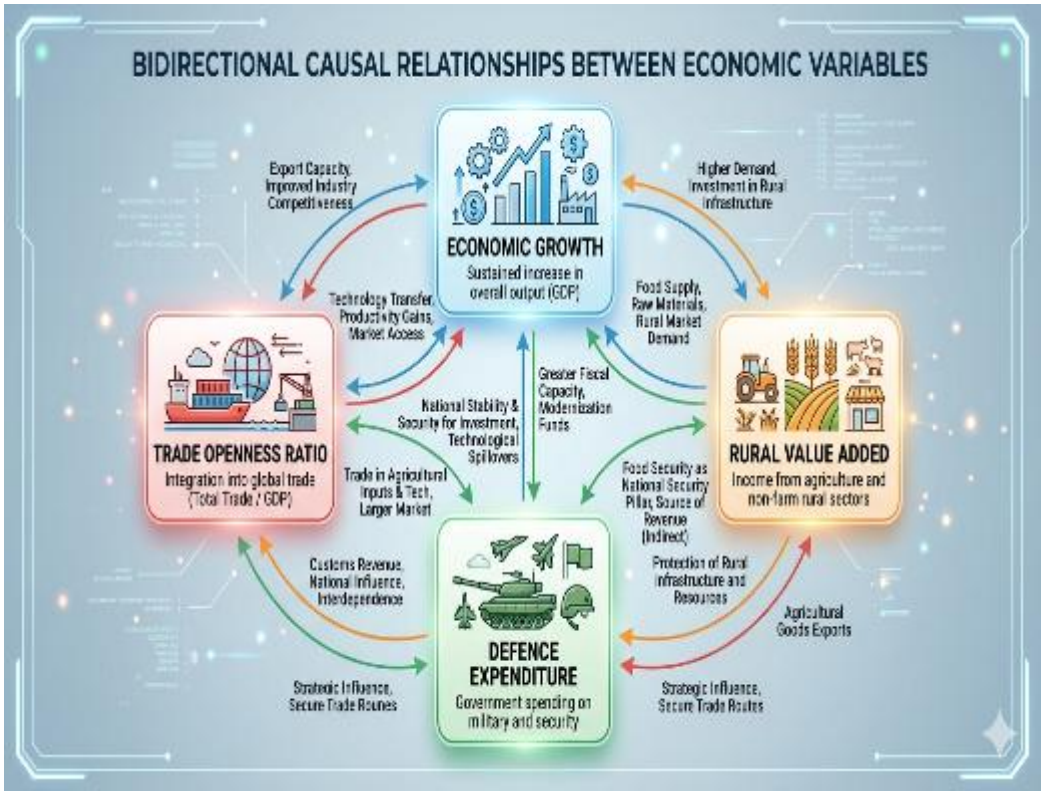
IJCEAS
International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XVI, Issue: 1, Year: 2026, pp. 443-460

DE → EG	71.2391	7.9963	0.0000
EG → DE	67.0073	9.6201	0.0000
RVA → EG	88.6623	9.9171	0.0000
EG → RVA	110.2723	9.7253	0.0000
RVA → DE	119.9463	41.0371	0.0000
DE → RVA	69.64291	3.4869	0.0000
EG → TOR	100.5526	12.9856	0.0000
TOR → EG	73.0199	5.9425	0.0000
TOR → RVA	262.3278	51.7835	0.0000
RVA → TOR	99.2467	10.2291	0.0000
TOR → DE	61.3173	5.9731	0.0000
DE → TOR	133.3433	78.1607	0.0000

Source: Authors' calculations

According to the output results in Table 7, in order to determine that there is a causality relationship among the variables, the statistics must be higher than the %5 CV. Accordingly, it is understood that all variables in the study have a directional causality relationship among themselves.

Figure 1: Causality Relationship Between Variables



Source: Gemını AI made by Authors

There is a dualistic causal link between EG and DE. Accordingly, an increase in EG is expected to lead to an increase in DE. It is thought that an increase in DE will lead to an increase in EG. There is a dualistic causal link between EG and RVA. It is thought that as EG increases, RVA will also increase. When RVA increases, it is thought that EG will increase. There is a dualistic causal link between RVA and DE. Accordingly, it is thought that an increase in RVA may also increase DE.

According to the results of the causality test, an increase in EG is expected to boost the country's agricultural competitiveness with other nations by raising the level of TOR, and an increase in RVA is also observed. Furthermore, DE must be increased to safeguard a country's trade routes and agricultural infrastructure investments.

5. Discussions

The discussion section of the study addresses the similarities and differences between the current study and studies in literature.

This academic study hypothesizes that, given that RVA and EG variables may influence one another, and that – as in the Benoit Hypothesis – the share of DE in EG is thought to affect EG, there may be causal relationships between RVA, the percentage share of DE in EG, and EG. According to the econometric findings of the study, there are bidirectional causal relationships between EG and other variables. It is thought that an increase in the TOR variable may boost EG. It is also thought that an increase in EG may, in turn, increase the variables of RVA and DE, which are derived from EG.

In the econometric model presented in the study by Ahmet et al. (2020), included in the literature review, differentiation is achieved by incorporating energy consumption and carbon emissions in addition to the causal link between DE and EG. Furthermore, in the study by Çiçek, İnce Yenilmez & Kabakçı Günay (2024), the volume of foreign trade is used in addition to DE and EG. In the present study, however, the TOR and RVA variables are selected in addition to DE and EG.

There are differences between the findings of Emmanoulidis & Karpetis (2020) and Khalid & Habimana (2021) and the findings of the current study. The reasons for the differences between the studies in literature and the current study are listed as the long - term relationship between the variables and the absence of a causal link.

The findings of Usman et al. (2022) and Gbadeo et al. (2025) have both similarities and differences with the findings of the present study. Because, while Usman et al. (2022) found a unidirectional causality relationship from EG to RVA, Gbadeo et al. (2025) found a unidirectional causality relationship from DE to EG. The findings of the present study are a combination of these two studies, as there is a two-way causal relationship between the variables.

IJCEAS

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XVI, Issue: 1, Year: 2026, pp. 443-460

6. Conclusion

The purpose of the study is to determine whether there is a causal relationship between EG, DE, and RVA in Turkey for the period 1973 – 2023. In accordance with the findings of the present study, the ADF test reveals that the variables are stationary at the first difference level. In addition, in the Fourier-type BEL URT, the variables are stationery at level values. According to the findings of the Fourier–type Tsong–Lee–Tsai–Hu cointegration test, there is no long – run relationship between the variables. After the VAR lag lengths, according to the findings of the Fourier-type TY Causality Test, there is a dualistic causal link between the variables. An increase in DE has a positive or negative effect on RVA and EG. An increase in RVA affects DE and EG positively or negatively.

As the study involves a bidirectional causal relationship, it is anticipated that an increase in TOR – one of the variables included in the study – will boost Turkey's foreign trade volüme and, consequently, EG. Furthermore, as RVA and DE are dependent variables of EG, increases are also observed in these variables. Furthermore, to increase RVA, it is necessary to establish financially sound cooperatives with a large membership base; for these cooperatives to develop their own brands; and, as this leads to a reduction in input costs and enhances the marketability of cooperative brands, export their products to external markets and sell them at higher prices.

In Turkey, if the percentage share of DE in growth increases, RVA may decrease; if RVA in growth decreases, the percentage share of DE may increase. Due to security concerns in Turkey, the share of DE in growth should increase. In addition, an optimal balance between RVA and DE in growth in Turkey should be ensured in order not to adversely affect people working in the agricultural sector or entrepreneurs living in Turkey in the economic context. As a result, an alternative cost choice should be made between the percentage share of DE in growth or the share of the agricultural sector in growth in Turkey, or the percentage shares of DE and RVA growth should be increased.

References

Adebayo, T. S., Alola, A. A., Ullah, S., & Abbas, S. (2024, May). The growth impacts of agriculture value-added, energy utilization, and environmental degradation in Pakistan: Causality in the continuous wavelet transform approach. *In Natural Resources Forum (Vol. 48, No. 2, pp.343-363).*

Oxford, UK: Blackwell Publishing Ltd. https://doi.org/10.1111/1477-8947.12306Digital Object Identifier (DOI)

Agboola, M.O., Bekun, F.V. (2019). Does agricultural value added induce environmental degradation? Empirical evidence from an agrarian country. *Environ Sci Pollut Res* 26, pp. 27660–27676. https://doi.org/10.1007/s11356-019-05943-z

Ahmed, S., Alam, K., Rashid, A., & Gow, J. (2020) Militarisation, Energy Consumption, CO2 Emissions and Economic Growth in Myanmar, Defence and Peace Economics, 31:6, pp. 615-641, https://doi.org/10.1080/10242694.2018.1560566

Akardeniz, E. (2023). Türkiye'de döviz kuru belirleyicileri için Fourier Toda-Yamamoto nedensellik testinden kanıtlar. *Business & Management Studies: An International Journal,* 11(3), https://doi.org/10.15295/bmij.v11i3.2253 pp. 772-787.

Aydın, B. (2019). Türkiye Ekonomisi İçin Benoît Hipotezinin Geçerliliği. *Savunma Bilimleri Dergisi*, (39), pp. 1-27 https://doi.org/10.17134/khosbd.913668.

Bayramoğlu, Z., Ağızan, K., & Ağızan, S. (2025). Determination of Location Quotient of Organic Agriculture in Türkiye. *Tekirdağ Ziraat Fakültesi Dergisi,* 22(1), pp. 58-73. https://doi.org/10.33462/jotaf.1367319

Ceyhan, T., & Köstekçi, A. (2021). The effect of military expenditures on economic growth and unemployment: Evidence from Turkey. *Fırat Üniversitesi Sosyal Bilimler Dergisi*, 31(2), pp. 913 – 928. https://doi.org/10.18069/firatsbed.898944

Çiçek, M., Yenilmez, M. I., & Günay, E. K. (2024). Savunma Harcamalarının Ekonomik Büyümeye Etkisi: Seçilmiş G20 Ülkeleri Üzerine Bir Panel Veri Analizi. *Öneri Dergisi*, *19*(62), pp. 61-78. https://doi.org/10.14783/maruoneri.1447768 https://izlik.org/JA86CM99TE

Doğaner, A., & Tunalı, H. (2022). Türkiye'de Ekonomik Kompleksite ve İnsani Gelişmişlik Endekslerinin Kişi Başına Düşen Gelire Olan Etkisinin Fourier Eşbütünleşme Modeli ile İncelenmesi. *İktisadi İdari ve Siyasal Araştırmalar Dergisi*, 7(19), pp. 477-494.

Dunne, J. P., Nikolaidou, E., & Smith, R. (2002). Military spending, investment and economic growth in small industrialising economies. *South African Journal of Economics*, *70*(5), pp. 789-808.

Erkut, M, Kabakçı Günay, E. İnce Yenilmez, M. (2024). The Effect of Globalization on Ecological Footprint: The Case of Mikta Countries, Journal of Economics and Administrative Sciences, 25(1): 14-26, https://doi.org/10.37880/cumuiibf.1332363

Emmanouilidis, K., & Karpetis, C. (2020). The defense–growth nexus: A review of time series methods and empirical results. *Defence and Peace Economics*, 31(1), pp.86-104. https://doi.org/10.1080/10242694.2018.1428261

Gbadebo, A. D., Bekun, F. V., Akande, J. O., & Adekunle, A. O. (2025). Defence spending and real growth in an asymmetric environment: Accessing evidence from a developing economy. *International Journal of Finance & Economics,* 30(2), pp.1372-1389. https://doi.org/10.1002/ijfe.2966Digital Object Identifier (DOI)

Gedik, D. S., & Yılmaz, E. (2023). Determination of the factors affecting the level of benefit from young farmer project support in rural development: Tekirdag sample, Türkiye. *Tekirdağ Ziraat Fakültesi Dergisi,* 20(2), pp.418-429. https://doi.org/10.33462/jotaf.1165409

Gemini AI (2026), https://gemini.google.com/app?hl=tr

Gürbüzer, G. B., & Çiftci, F. (2025). Projections of agricultural product exports and their impacts on rural development. *Tekirdağ Ziraat Fakültesi Dergisi,* 22(2), pp. 574-588. https://doi.org/10.33462/jotaf.1619704

Hepsağ, A. (2022). Ekonometrik Zaman Serileri Analizinde Güncel Yöntemler (Winrats Uygulamalı), Der Yayınları, İstanbul.

Iorember, P. T., Yusoff, N. Y. M., Abachi, P. T., Usman, O., & Alola, A. A. (2024). Effect of exchange rate uncertainty, energy prices, and sectoral spending on agriculture value added, household consumption, and domestic investment. *Heliyon*, 10(9) pp.1 - 15 10.1016/j.heliyon.2024.e30138

Khalid, U., & Habimana, O. (2021). Military Spending and Economic Growth in Turkey: A Wavelet Approach. *Defence and Peace Economics*, *32*(3), pp. 362–376. https://doi.org/10.1080/10242694.2019.1664865

Köstekçi, A. (2024). Jeopolitik risklerin kamu maliyesindeki yansımaları: Türkiye üzerine Fourier-Toda-Yamamoto nedensellik analizi. *JOEEP: Journal of Emerging Economies and Policy*, 9(2), pp.400-411.

McElroy, T., & Politis, D. N. (2013). Distribution theory for the studentized mean for long, short, and negative memory time series. *Journal of Econometrics*, *177*(1), pp. 60-74. https://doi.org/10.1016/j.jeconom.2013.06.002

Özkan, G. (2024). Katma Değerli Tarım, Döngüsel Ekonomi ve Sürdürülebilir Kalkınma: Ekonomik, Çevresel ve Sosyal Perspektifler. *JENAS Journal of Environmental and Natural Studies*, 6(3 (Nesrin Algan'a Armağan Sayısı)), pp.287-298. https://doi.org/10.53472/jenas.1587727

Raihan, A., Tuspekova, A. (2022). Dynamic impacts of economic growth, energy use, urbanization, tourism, agricultural value-added, and forested area on carbon dioxide emissions in Brazil. *J Environ Stud Sci* 12, pp. 794–814. https://doi.org/10.1007/s13412-022-00782-w

Raihan, A., Muhtasim, D.A., Farhana, S. *et al*. (2023). Dynamic Linkages between Environmental Factors and Carbon Emissions in Thailand. *Environ. Process.* 10, 5 pp. 1- 26. https://doi.org/10.1007/s40710-023-00618-x

Raihan, A. (2023). An econometric evaluation of the effects of economic growth, energy use, and agricultural value added on carbon dioxide emissions in Vietnam. *Asia-Pac J Reg Sci* **7**, pp.665–696. https://doi.org/10.1007/s41685-023-00278-7

Raihan, A., Voumik, L.C., Mohajan, B. *et al*. (2023) . Economy-energy-environment nexus: the potential of agricultural value-added toward achieving China's dream of carbon neutrality. *Carbon Res.* **2**, 43 pp. 1-21. https://doi.org/10.1007/s44246-023-00077-x

Saba, C.S., Ngepah, N. (2022) Nexus between defence spending, economic growth and development: evidence from a disaggregated panel data analysis. *Econ*

Change Restruct 55, pp.109–151. https://doi.org/10.1007/s10644-020-09311-7

Sohag, K., Taşkın, F. D., & Malik, M. N. (2019). Green economic growth, cleaner energy, and militarization: Evidence from Turkey. *Resources Policy,* 63, 101407., pp. 1 – 9. https://doi.org/10.1016/j.resourpol.2019.101407

Taşkıran, F., & Altuntaş, S. T. (2022). Borsa İstanbul'un Zayıf Formda Etkinliğinin Testi. *Recep Tayyip Erdoğan Üniversitesi Sosyal Bilimler Dergisi,* 9(1),pp. 33-53 https://doi.org/10.34086/rteusbe.1106170

Usman, M., Anwar, S., Yaseen, M. R., Makhdum, M. S. A., Kousar, R., & Jahanger, A. (2022). Unveiling the dynamic relationship between agriculture value addition, energy utilization, tourism, and environmental degradation in South Asia. *Journal of Public Affairs*, 22(4), e2712. pp. 1 – 15. https://doi.org/10.1002/pa.2712