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Research Article

Economic Growth and Agricultural Subsidies: An Empirical Assessment of the Turkish Economy

Ekonomik Büyüme ve Tarımsal Destekler: Türkiye Ekonomisi Üzerine Ampirik Bir Değerlendirme

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Abstract

Agricultural subsidies are not only instruments to increase production at the sectoral level but also important public policy tools that affect growth dynamics at the macroeconomic level. In this context, public interventions in the sector can contribute to the growth process both directly and indirectly by influencing resource allocation. This research investigates at how agricultural subsidies, gross fixed capital formation, government final consumption expenditures, inflation, and agricultural output affect economic growth in Türkiye from 1990 to 2023. The Johansen Cointegration technique was employed in this research to find the long-term connection between the variables. Also, the FMOLS, CCR, and DOLS techniques were used to figure out the direction and coefficients of the cointegration relationship. Here are the main results of the study: (i) The variables stay the same at their first differences; (ii) The series show a long-term cointegration relationship; (iii) The FMOLS, DOLS, and CCR methods show that higher agricultural subsidies, gross fixed capital formation, government final consumption expenditures, and inflation all help the economy grow.

Keywords: *Agricultural Subsidies, Economic Growth, CCR, DOLS, , FMOLS.*

Öz

Tarımsal destekler, sadece sektörel düzeyde üretim artışı sağlamaya yönelik araçlar olmayıp aynı zamanda makroekonomik düzeyde büyüme dinamiklerini etkileyen önemli bir kamu politikası aracıdır. Bu kapsamda, bu sektöre yönelik kamu müdahaleleri, kaynak tahsisini etkileyerek büyüme sürecine doğrudan ve dolaylı katkılar sunabilmektedir. Bu çalışmanın amacı, Türkiye'de 1990-2023 dönemini kapsayan verileri kullanarak tarımsal destekler, brüt sabit sermaye oluşumu, hükümet nihai tüketim harcamaları, enflasyon ve tarımsal üretimin ekonomik büyümeyi deneye dayalı olarak nasıl etkilediğini ortaya koymaktır. Bu çalışmada, Johansen Eş Bütünleşme analizi uygulanarak değişkenler arasındaki uzun dönemli ilişkinin varlığı araştırılmıştır. Eş bütünleşme ilişkisinin yönü ve katsayılarının tahmini için ise FMOLS, CCR ve DOLS yöntemlerinden yararlanılmıştır. Çalışmadan elde edilen bulgular şunlardır: i) Değişkenler birinci farklarında durağan olmaktadırlar ii) Serilerin uzun dönemde birlikte hareket ettiği tespit edilmiştir. iii) FMOLS, DOLS ve CCR yöntemi sonuçlarına göre tarımsal destekler, brüt sabit sermaye oluşumu, kamu nihai tüketim harcamaları ve enflasyonda meydana gelen artışın ekonomik büyümeyi artırıcı bir etkiye sahip olduğunu göstermektedir.

Anahtar Kelime: *CCR, DOLS, Ekonomik Büyüme, FMOLS, Tarımsal Destekler.*

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Introduction

The sectors forming the foundation of the economic structure are generally classified as agriculture, industry, and services (Degu, 2019, pp. 59). The share of these sectors within the economy varies depending on the level of development of countries (Tadele, 2004, pp. 2). Particularly in developing countries, the industry and services sectors have a larger share compared to the agricultural sector (Sağdıç & Yıldız, 2019, pp. 153). In Türkiye, the agricultural sector's share in Gross Domestic Product (GDP) is 7%, while its share in employment is 20%, indicating that this sector still holds significant economic and social importance (TUIK, 2024). Therefore, agriculture continues to maintain its critical role in economies, not only by ensuring the supply of essential food products but also by providing raw materials to the industrial sector and contributing to capital formation and employment generation (Şaşmaz & Özel, 2019, pp. 51).

As economic structures evolve and transform on a global scale, the role of the state in economic life is also increasing. States that strengthen their economic power have the potential to enhance social welfare levels (Candan & Yurdadoğ, 2017, pp. 155). Governments support various sectors through incentives, which are among the fiscal policy instruments, to achieve both economic and social development. These supports are also considered tools for addressing social issues (Lin & Huang, 2021, pp. 1). The ultimate goal of incentive policies is to improve the country's welfare level. To achieve this, various instruments such as tax advantages, loans with favorable repayment terms, VAT exemptions, allocation of investment areas, and interest support are utilized. The fundamental principle of support policies is the efficient use of resources in areas that will contribute the most to the domestic economy. In this context, the sectors prioritized for incentives may change in line with economic developments. Through incentive programs, the state either incurs expenditure obligations or foregoes certain tax and revenue items (Öztürk & Gökdemir, 2023, pp. 423).

Agricultural policies in both developed and developing countries have been shaped to increase productivity and production capacity, with the aim of improving social welfare and redistributing income (Krueger et al., 1988, pp. 255–256). Globally, the agricultural sector has been subject to significant government intervention, and nearly all countries implement some form of support policies in this area. However, the scale of agricultural support in developed economies is considerably higher than in developing countries (Anderson et al., 2013, pp. 424–425). There are two main perspectives on agricultural support. One view holds that governments provide support to gain political advantage by attracting votes from farmers. The other view suggests that support policies aim to mitigate the structural weaknesses of agriculture, such as inelastic demand and supply (Chen et al., 2015, pp. 39). Growth in the agricultural sector is strategically important for both economic development and food security. Among the key drivers of rising agricultural productivity are technological innovations, investments in human capital, and institutional reforms (Hayami & Ruttan, 1985). Increases in agricultural production are closely linked to the effectiveness of agricultural technology and knowledge transfer systems. Therefore, incentives that promote investment in technological infrastructure should be strengthened.

From the establishment of the Republic until the 1980s, Türkiye implemented protection- and support-oriented policies in the agricultural sector, taking steps to safeguard agricultural incomes and ensure production continuity. However, from 1980 onward, the state's role in agriculture declined, and regulations were introduced to promote the private sector. This structural transformation negatively affected the agricultural sector, leading to its weakening. While agriculture was previously strengthened through state support, it gradually lost this backing after 1980, with reduced subsidies and privatization policies becoming prominent between 1980 and 2000. After 2000, a restructuring process began in the agricultural sector (Yağış, 2024, pp. 825). Over the years, new policy elements with different dimensions were integrated into Türkiye’s traditionally production-focused agricultural support policies. Until the 2000s, support policies were limited to intervention purchases, market price support, input and credit subsidies, and general services. However, significant changes occurred in agricultural policies after 2000. Within the framework of the Agricultural Reform Implementation Project (ARIP), launched in 2001, Türkiye's agricultural policies were restructured with a market-oriented approach, and state enterprises and agricultural cooperatives were reorganized. During this process, price management practices were discontinued, and the National Farmer Registration System (NFRS) was established to

provide direct income support to farmers. These policy changes aimed to allow farmers to make production decisions based on price signals while maintaining income support levels similar to the previous price support system (Larson et al., 2015, pp. 1265). In this context, after 2000, agricultural support programs emphasized area-based direct payments, deficiency payments, livestock subsidies, agricultural insurance support, compensatory payments, rural development-focused agricultural aids, and other agricultural support mechanisms (Örnek & Oğu, 2021, pp. 256). The trend of agricultural support expenditures within the national budget between 1990 and 2023 is illustrated in Figure 1.

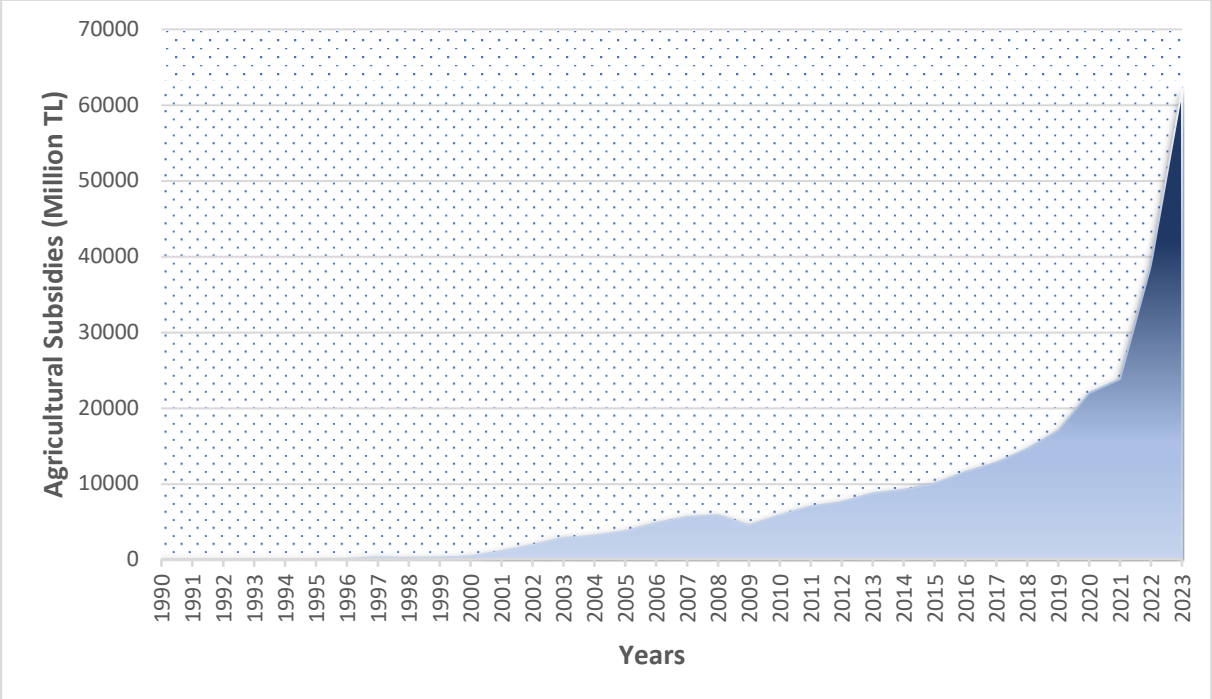

Figure 1: Agricultural Subsidies

As seen in Figure 1, agricultural support expenditures were only 132 million TL in 1990, but this amount increased to 1.177 million TL in 1991. A significant upward trend in agricultural support expenditures was observed starting in 2000. Support payments, which stood at 358 million TL in 2000, made a major leap to 1.032 million TL in 2001. This increase continued in 2002 and 2003, reaching 1.867 million TL and 2.804 million TL, respectively. This rapid rise indicates a period of fundamental changes in Türkiye's agricultural policies. Particularly after the 2001 economic crisis, reforms were implemented, restructuring agricultural support and increasing its share within the budget. In 2013, total support payments reached 8.69 billion TL, while by 2023, this amount surged to 62 billion TL. During the 2013-2023 period, a total of 228.156 billion TL was allocated to the agricultural sector. In 2013, agricultural support spending increased by 14.6% compared to the previous year, while in 2023, the increase was recorded at 59.6%. Starting in 2013, agricultural support expenditures grew at an annual rate of 14.6%. In subsequent years, the growth rates remained relatively low at 5.4% (2014) and 8.4% (2015). However, as seen in Figure 1, growth rates began to accelerate from 2016 onwards, with increases of 15.7% (2016) and 11.1% (2017), indicating a more moderate trend during this period. Between 2018 and 2020, there was a notable momentum in support budgets, with 2020 standing out due to a high 28.5% increase. In 2021, the growth rate slowed to 10%, but in 2022 and 2023, exceptionally high increases of 65.5% and 59.6%, respectively, were recorded. These data illustrate that Türkiye's agricultural support policies have been flexibly shaped in response to evolving economic and sectoral needs. The sharp increases in 2022 and 2023 are particularly linked to external factors such as inflationary pressures, rising production costs, and global economic uncertainties (MTF, 2024).

The share of the agricultural sector in employment in Türkiye decreased from 43% in 1995 to 25% in 2009. In 1980, agriculture accounted for 25.8% of the national income, but due to export-oriented macroeconomic policies implemented in the 1980s, this share declined rapidly. Even while agriculture

was still heavily involved in international commerce, its share of GDP fell from 12% to 8.5% by 1995. In 2009, agriculture made up 12% of Türkiye's exports and 5% of its imports (OECD, 2011, pp. 193). The Turkish Statistical Institute (TUIK) says that the agricultural sector's share of GDP fell to 6.4% in 2013 and then to 5.7% in 2023 (TUIK, 2024).

The paper contributes to the corpus of research by looking at how Türkiye's long-term economic growth has been impacted by agricultural support programs from 1990 to 2023. The study covers critical control variables including gross fixed capital investment, government spending, inflation, and agricultural production to gain a better picture of how these policies influence the economy as a whole. This lets the analysis separate the impacts of support programs from other structural issues, which makes the results more accurate and trustworthy. The study uses three separate cointegration estimate methods, namely, FMOLS, DOLS, and CCR, to look at long-term correlations. This gives the research a solid methodological base. This study's use of many estimating methods makes its results more reliable and gives policymakers more useful information than many other studies that just use one method. The research also looks at the impacts of agricultural assistance throughout a wide range of economic cycles and policy contexts by utilising a large dataset that covers many decades. In this way, it adds something new to both the methods and the content, and it will be a useful reference for future study on how agricultural policy affects economic growth.

The study is presented in five main sections: introduction, literature review, data sources and methodology, empirical methods and findings, and policy recommendations and conclusion.

1. Literature Review

There are a large number of studies in the literature examining the impact of agricultural subsidies on macroeconomic variables. A significant portion of this literature consists of studies investigating the effects of agricultural subsidies on economic growth. These studies, covering both Türkiye and other countries, reveal different aspects of the subject. Some of the studies focusing on Türkiye can be summarized as follows:

Terin et al. (2013) analyzed the economic factors affecting agricultural growth in Türkiye between 1990 and 2012 using regression analysis. The findings indicate that investments and subsidies in agriculture positively impact the share of agriculture in GDP, while the agricultural labor force negatively affects this growth. Çevik and Zeren (2014) assessed the relationship between agricultural credit and economic development in Türkiye from 2005 to 2013 using the Hatemi-J asymmetric causality test. Their study found that agricultural credit is a driving force behind financial development.

Aktaş et al. (2015) compared the effects of agricultural support policies on agricultural production in countries with different economic structures, including the United States, the European Union, Australia, Brazil, China, South Africa, Israel, Canada, Mexico, Russia, Chile, and Türkiye. Using panel data analysis covering the years 1995–2010, their study found that market price supports and input subsidies had positive effects on agricultural production. While support policies have generally benefited the agricultural sector in developed countries, their impact in developing nations has often been less favorable. For their 2016 study, Işık and Bilgin looked at a number of agricultural support programs that were set up in Türkiye between 1986 and 2015. They concluded that these subsidies had a large, positive influence on farming. The link between subsidies for farming and prodeuction level was also analysed by Yıldız (2017) in Türkiye. He employed a variety of economic models, such causlity tets, co-integration analysis, error correction models, and impulse response functions, to back up the idea that subsidies play a large role in boosting output.

Özkan and Karaköy (2018) looked at and compared agricultural support programs in Türkiye and EU countries from 2006 to 2016. Their study looked at topics like how much of the GDP comes from farming, how many jobs it produces, and how much of the government budget goes to subsidies. They thought it was strange that agricultural subsidies were increasing up in EU countries but reduced in Türkiye at the same time. Direk et al. (2019) studied over the years 2000-2018 using the methods of the Gregory-Hansen co-integration test and the FMOLS approaches. Their empirical findings indicated that subsidies helped Türkiye's agricultural production increase. From a broader economic perspective, Şaşmaz and Özel (2019) studied how tax incentives influenced Türkiye's agricultural sector from 1980 to 2016. Their findings indicated that these incentives didn't directly aid the business, but that economic

growth did help farming. Kopuk and Meçik (2021) studied how investments and subsidies in the industrial and agricultural sectors helped Türkiye's economy grow from 1998 to 2020. Their causality test showed that various sorts of aid helped the economy become better.

Köse and Meral (2021) scrutinised the links between economic growth, food security, and agricultural subsidies in Türkiye from 1986 to 2016. They employed the ARDL and Toda-Yamamoto causality tests and the results demonstrate that there is a two-way relationship between food security and economic growth. However, they couldn't uncover a clear correlation between subsidies and economic growth. Finally, Sağdıç and Çakmak (2021) studied how prooduction levels are impacted by the quarterly payments between 2006 and 2019. Their empirical investigation using Hacker and Hatemi-J's novel causality test methods gives us additional information about how subsidies impact agricultural production over time. Their study of co-integration indicated that the variables were related to each other over a lengthy period of time. The findings demonstrated that payments for agricultural subsidies had a direct influence on the amount of food produced. The Hatemi-J Asymmetric Causality Test also found a substantial connection between positive and negative shocks in agricultural subsidies and negative shocks in agricultural production. These numbers illustrate that measures that support farmers have both short-term and unequal effects on the amount of produce. Gezer and Gezer (2022) conducted a research on the effects of agricultural subsidies and loans on agricultural production in Türkiye from the first quarter of 2006 to the third quarter of 2021 using the Nonlinear ARDL method. The results agricultural production in Türkiye from the first quarter of 2006 to the third quarter of 2021 using the Nonlinear ARDL method. The results showed that increases in agricultural subsidies and loans positively influenced agricultural production in the short term. However, positive agricultural subsidy shocks were found to decrease agricultural production in the fourth lag period.

2. Data Source and Methodology

In Türkiye, the direction and magnitude of the effects of agricultural subsidies, gross fixed capital formation, government final consumption expenditures, inflation, and agricultural production on economic growth between 1990 and 2023 have been analyzed using the fully logarithmic linear model presented below.

$$GDP_t = \beta_0 + \beta_1 \ln AS_t + \beta_2 \ln GFCF_t + \beta_3 \ln GE_t + \beta_4 \ln INF_t + \beta_5 \ln VA_t + \varepsilon_t \quad (1)$$

The dependent variable GDP represents economic growth, while the key independent variables AS, GFCF, GE, INF, and VA represent agricultural subsidies, gross fixed capital formation, government final consumption expenditures, inflation, and agricultural production, respectively. Data on economic growth, gross fixed capital formation, government final consumption expenditures, inflation, and agricultural production were obtained from the World Bank Database, while data on agricultural subsidies were sourced from the Central Government Budget Statistics Database of the Republic of Türkiye's Ministry of Treasury and Finance (MTF, 2024).

3. Empirical Method and Findings

3.1. Unit Root and Stationarity Analysis

Time series analyses are among the methods commonly used to examine the economic, financial, or social indicators of a specific country or group of countries. Since this study focuses on the data of a single country, time series methods have been preferred. In order to apply FMOLS, DOLS, and CCR cointegration methods, the series must be stationary at the first order, meaning they need to be differenced to achieve stationarity, and a cointegration relationship must exist among the series. Accordingly, the Augmented Dickey-Fuller (ADF) unit root test (Dickey & Fuller, 1981) was conducted to determine the stationarity levels of the series. The test results are presented in detail in Table 1.

Table 1: ADF Unit Root Test Statistics

Model with Constant and Trend				
	Level I(0)		First Difference I(1)	
Variables	**t- Stats.**	**Prob.**	**t- Stats.**	**Prob.**
lnGDP	0.54250	0.9858	-5.8369***	0.0000
lnAS	-0.9379	0.7587	-3.6786***	0.0103
lnGCFC	-0.6965	0.8340	-6.1810***	0.0000
lnGE	0.1758	0.9668	-4.3181***	0.0023
lnINF	-1.1285	0.6926	-4.8854***	0.0004
lnVA	-1.5098	0.5163	-5.93.39***	0.0000

Note: * (%10), ** (%5) and *** (%1) indicate significance levels.

When the ADF unit root test results are examined, according to the data presented in Table 1, it can be seen that the probability values for the variables in models with a constant and trend exceed the critical value at the 5% level. Therefore, we fail to reject the null hypothesis that the series has a unit root, indicating non-stationarity. However, when the variables are transformed into their first differences, it is found that the probability values in both models are smaller than the critical value. This result indicates that the series become stationary after taking their first differences.

3.1.1. Johansen Cointegration Test

Once it was confirmed that the series became stationary after taking their first differences, the Johansen cointegration test (Johansen & Juselius, 1990) was used to explore whether a long-term relationship exists among the variables. This method helps determine if certain combinations of non-stationary time series can form a stable, long-term equilibrium. In essence, the test looks at whether the variables move together over time and maintain a shared path, despite short-term fluctuations. If cointegration is present, it suggests that the variables are interconnected in the long run and tend to follow a common trend. Thus, even if the variables show short-term fluctuations, they may move together in the long term (Yapraklı, 2007, pp. 291). The results of the analysis conducted in this regard are presented in detail in Table 2.

Table 2: Results of Johansen Cointegration Test

Trace Test				
Number of Cointegrated Vectors	**Eigenvalue**	**Trace Statistic**	**%5 Critical Value**	**P-value**
r = 0	0.912076*	178.9157	95.7537	0.0000
r ≤ 1	0.763613*	110.8396	69.8189	0.0000
r ≤ 2	0.712500*	70.45563	47.8560	0.0001
r ≤ 3	0.529275*	35.55276	29.7970	0.0097
r ≤ 4	0.399235	14.45530	15.4947	0.0713
r ≤ 5	0.006686	0.187850	3.8414	0.6647

Note: *The cointegration test shows the availability of 4 cointegrated equations at the 5% significance level.*

Max-Eigen Test				
Number of Cointegrated Vectors	**Eigenvalue**	**Maximum Eigenvalue Statistic**	**%5 Critical Value**	**P-value**
r = 0	0.912076*	68.07603	40.0776	0.0000
r ≤ 1	0.763613*	40.38400	33.8769	0.0073
r ≤ 2	0.712500*	34.90288	27.5843	0.0048
r ≤ 3	0.529275	21.09746	21.1316	0.0505
r ≤ 4	0.399235*	14.26745	14.2646	0.0499
r ≤ 5	0.006686	0.187850	3.84147	0.6647

Not: *The Maximum Eigenvalue test shows the availability of 3 cointegrated equations at the 5% level.*

When Table 2 is examined, it has been determined that the estimated trace and maximum eigenvalue statistics exceed the critical values at the 5% significance level. Specifically, in the trace statistic test, the p-values for r = 0, r ≤ 1, r ≤ 2, and r ≤ 3 are found to be below the 5% significance level, but for r ≤ 4 and r ≤ 5, they fall below the critical values. Similarly, in the maximum eigenvalue test, statistical values greater than the critical values were reached for r = 0, r ≤ 1, r ≤ 2, and r ≤ 4, but the case for r ≤ 3 was borderline. Based on these findings, the null hypothesis "Ho: There is no cointegration" is rejected, and a long-term cointegration relationship among the examined economic variables is identified.

3.2. Findings of the FMOLS, DOLS ve CCR Techniques

When a long-term relationship is detected among variables, determining the direction and coefficients of this relationship is an important assessment stage. In this regard, different estimation methods were used in the study to determine the direction and coefficients of the cointegration relationship. For long-term coefficient estimation, the Fully Modified Least Squares (FMOLS) method introduced by Phillips and Hansen (1990), the Canonical Cointegration Regression (CCR) method proposed by Park (1992), and the Dynamic Least Squares (DOLS) method developed by Saikkonen (1992) and Stock and Watson (1993) were preferred. The reasons for selecting these methods can be listed as follows: they address serial autocorrelation and endogeneity issues (Erdoğan et al., 2018, pp. 42), which would otherwise cause biased and inconsistent results if not properly accounted for. However, each method uses a different strategy to address these problems. FMOLS, for example, employs non-parametric corrections and does not include lags or leads of the variables in the model. In contrast, DOLS incorporates an adequate number of lags and leads to deal with endogeneity and serial correlation. CCR is similar to FMOLS in eliminating these issues but differs in that it transforms both the dependent and independent variables using the long-run covariance structure. In conclusion, all three methods produce unbiased and consistent estimates, even though they follow slightly different strategic approaches. The findings obtained in the study were analyzed using the relevant estimation methods and presented in Table 3.

Tablo 3: FMOLS, DOLS, and CCR Estimation Results

Model	**Variables**	**Coefficient**	**Standart Error**	**t-stats.**	**P-Values**
FMOLS	LNAS	0.0096***	0.0015	6.3095	0.0000
	LNGFCF	0.3447***	0.0107	32.1724	0.0000
	LNGE	0.5304***	0.0187	28.3220	0.0000
	LNINF	0.0498***	0.0024	21.1160	0.0000
	LNVA	-0.0306*	0.0153	-1.9966	0.0573

Model	Variables	Coefficient	Standart Error	t-stats.	P-Values
	C	4.6857***	0.2914	16.0790	0.0000
DOLS	LNAS	0.0356***	0.0083	4.2697	0.0053
	LNGFCF	0.4445***	0.0483	9.1974	0.0001
	LNGE	0.4429***	0.0773	5.7296	0.0012
	LNINF	0.0625***	0.0068	9.2061	0.0001
	LNVA	0.1132*	0.0523	2.1637	0.0737
	C	3.5766***	0.8904	4.0170	0.0070
CCR	LNAS	0.0087***	0.0016	5.4542	0.0000
	LNGFCF	0.3287***	0.0141	23.2951	0.0000
	LNGE	0.5665***	0.0239	23.7449	0.0000
	LNINF	0.0474***	0.0026	17.9182	0.0000
	LNVA	-0.0028	0.0185	-0.1511	0.8812
	C	4.1511***	0.3330	12.4666	0.0000

Not: ***, **, and * indicate 1%, 5% and 10% significance levels.

When Table 3 is examined, it is determined that according to the FMOLS method, a 1% increase in the LNAS variable leads to a 0.96% increase in economic growth. Similarly, the DOLS method suggests that a 1% increase in LNAS leads to a 3.56% rise in economic growth. The CCR method also indicates a positive effect, though more modest, estimating that a 1% increase in LNAS boosts growth by 0.87%. While the size of the impact differs across methods, all three approaches consistently show that agricultural subsidies contribute positively to economic growth. Looking at the other independent variables, the results also highlight the importance of fixed capital investment. According to the FMOLS method, a 1% increase in LNGFCF raises economic growth by 34.47%. The DOLS method estimates this effect at 44.45%, and the CCR method finds a similar impact of 32.87%. These findings clearly show that fixed capital investments are a powerful driver of economic growth. When it comes to LNGE, the FMOLS method estimates that a 1% increase leads to a 53.04% rise in economic growth. The DOLS method reports a slightly lower effect at 44.29%, while the CCR method shows an even higher impact of 56.65%. Overall, the results point to government spending as another significant contributor to long-term economic growth.According to the FMOLS method, a 1% increase in inflation raises economic growth by 4.98%. According to the DOLS method, this effect is 6.25%, while the CCR method shows a 4.74% increase. The results of all three methods generally indicate that inflation has a positive effect on economic growth. According to the FMOLS method, a 1% increase in LNVA has a negative effect of 3.06% on economic growth. The DOLS method shows that this effect is positive at 11.32%, while the CCR method indicates that LNVA has no significant effect on economic growth.

Overall, although the FMOLS, DOLS, and CCR methods provide similar directional predictions, there are differences in the coefficients. However, the general trends regarding the effects of the variables on the growth rate are largely consistent. When compared to the examined literature, this situation is similar to the studies of Terin et al. (2013), Çevik and Zeren (2014), Aktaş et al. (2015), Işık and Bilgin (2016), Yıldız (2017), Kopuk and Meçik (2021), and Gezer and Gezer (2022).

To check the stability of the models, CUSUM and CUSUMQ tests are applied, and their results are presented in Figure 2. The CUSUM test indicates that the coefficients are stable over the sample period;

in other words, the model parameters remain constant over time. The CUSUMQ test also shows no structural break in the variance, suggesting that there is no evidence of sudden shocks or volatility changes during the period.

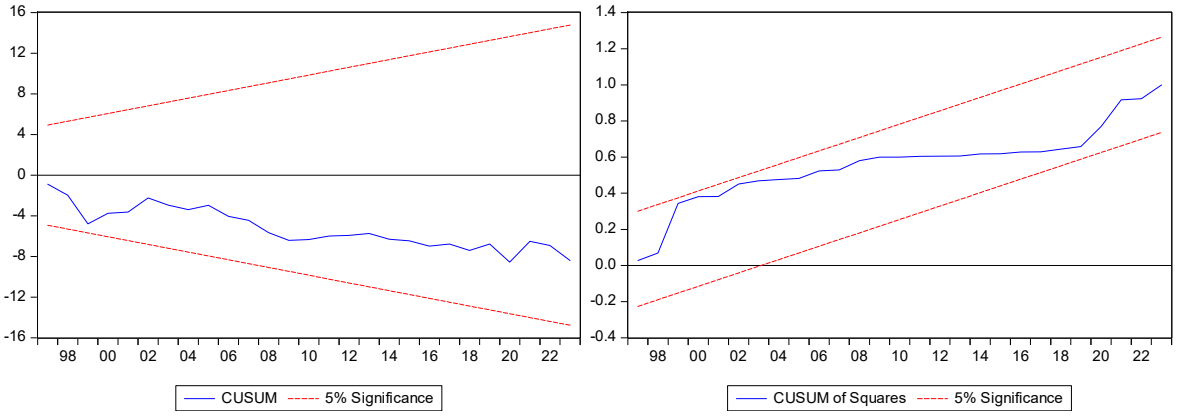

Figure 2: CUSUM and CUSUMQ Tests

4. Policy Recommendations and Conclusion

This research was conducted to analyse the impacts of agricultural subsidies, government final consumption expenditures, gross fixed capital formation, inflation, and agricultural production on economic growth in Türkiye between 1990 and 2023, using FMOLS, DOLS, and CCR estimation methods. In this study, the direction and magnitude of the effects of agricultural subsidies on economic growth in Türkiye between 1990 and 2023 are analyzed using a fully logarithmic linear model. The main independent variables are agricultural subsidies, gross fixed capital formation, government final consumption expenditures, inflation, and agricultural production. Agricultural subsidies constitute the main focus of the model, while the other variables serve as controls. The analysis revealed that gross fixed capital formation and government expenditures had a significant positive effect on economic growth. Agricultural subsidies were also found to have a positive contribution to economic growth, while inflation generally had a positive impact. However, the effect of agricultural production on economic growth varied across the three methods. Based on these findings, the results of this study and some policy recommendations generated within the context of these results are discussed below:

i) Agricultural subsidies increase economic growth. Given the positive impact of agricultural subsidies on economic growth, it is essential to ensure the efficient distribution of these subsidies. Directing subsidies in a way that enhances productivity and encourages agricultural production will contribute to the sustainable growth of the agricultural sector. To have a stronger impact on economic growth and make the agriculture sector more competitive throughout the globe, it has to rely less on imported goods. The government should use wide incentives and research and development initiatives to increase the production of essential inputs like seeds, fertilisers, and energy. This step will make fluctuations in currency rates have less of an influence on the industry. Support policies should be adjusted so that they focus on increasing productivity instead of just manufacturing more things. We need to employ modern farming technologies, fix up the irrigation systems, and promote digital farming to help the agricultural industry grow in a manner that is beneficial for the environment. It is also vital to make it simpler for small and medium-sized farmers to borrow money. One approach to do this is to provide them loans with no interest or very low interest rates to aid them with their money troubles. Farmers' salaries can stay consistent if more individuals can get agricultural insurance. People should also regard agriculture as more than just a method to generate money. It is a strategic sector that is highly vital for food security and rural development.

ii) Policies that encourage investment should be at the top of the list since they have a large impact on economic growth. Long-term development plans should concentrate on improving infrastructure and offering companies and farmers reasons to use new technology. Investing in these vital areas might help the economy grow in a manner that lasts and make it more competitive on the international market.

iii) The large impact of government final consumption expenditure on growth highlights how important it is that public money is spent wisely. Public spending should be carefully managed to ensure that it goes where productivity is increased, and efforts should be made to reduce waste. Doing business in this way not only helps the economy grow in a way that is better for the environment, but also ensures that public resources are used in a way that helps achieve long-term development goals. By making sensible investments and allocating resources wisely, the government can help the economy remain stable and thrive.

iv) Inflation could support growth in the short run, but if it gets out of hand, it might destroy the economy's stability. It is crucial to have sound monetary policies that keep prices steady in order to preserve investors' confidence and support long-term growth. Using strategies that target inflation will help keep it in check and provide a strong basis for a stable economy that is focused on growth. Keeping inflation low and consistent could help the economy grow in a manner that lasts longer and make it simpler for individuals to be ready for the long term.

v) Different ways of measuring demonstrate that agricultural production has different influence on economic growth. This implies that this sector requires more targeted and larger government support. To make farming more productive, we need to invest in educating farmers new technologies and making it simpler for them to receive loans. The economy can grow and develop more if the agricultural industry is more efficient and makes sure that farmers have the tools, skills, and resources they need.

In conclusion, this study's findings align closely with the existing literature. Notably, the strong and positive influence of capital investments and government spending is a cornerstone of sustainable growth strategies. When it comes to agricultural subsidies and production, the results underline the need for more effective and well-designed policies aimed at maximizing the sector’s contribution to the broader economy. Future research that delves deeper into sector-specific dynamics can offer even more nuanced insights, helping policymakers craft evidence-based strategies for long-term economic growth.

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Araştırma Makalesi

Economic Growth and Agricultural Subsidies: An Empirical Assessment of the Turkish Economy

Ekonomik Büyüme ve Tarımsal Destekler: Türkiye Ekonomisi Üzerine Ampirik Bir Değerlendirme

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Genişletilmiş Özet

Ekonomik yapının temelini oluşturan sektörler genel anlamda tarım, sanayi ve hizmet sektörleri olarak sınıflandırılmaktadır. Özellikle gelişmekte olan ülkelerde, sanayi ve hizmetler sektörleri, tarım sektörüne kıyasla daha büyük bir paya sahiptir. Türkiye'de tarım sektörünün, Gayri Safi Yurtiçi Hasıla (GSYH) içindeki payının %7 ve istihdamdaki payının %20 olması, bu sektörün hem ekonomik hem de toplumsal açıdan hala büyük bir öneme sahip olduğunu göstermektedir. 1990 yılında tarımsal destekleme harcamaları yalnızca 132 milyon TL seviyesindeyken, 1991 yılında bu tutar 1.177 milyon TL'ye yükselmiştir. 1995 yılında %43 iken 2009 yılında %25'e düşmüştür. 1980 yılında tarım sektörünün milli gelir içindeki payı %25,8 iken, 1980'lerde uygulanan ihracata dayalı makroekonomik politikaların etkisiyle bu oran hızla azalmıştır. 1995 yılında, tarımın GSYİH'ye katkısı %12'den %8,5'e gerilemiş, ancak sektörün dış ticaretle olan ilişkisi önemli ölçüde devam etmiştir; 2009 yılında tarım, Türkiye'nin ihracatının %12'sini ve ithalatının %5'ini karşılamıştır. Türkiye İstatistik Kurumu (TÜİK) verilerine göre, 2013 yılında tarım sektörünün GSYH'ye katkısı %6,4'e, 2023 yılında ise %5,7'ye gerilemiştir.

Tarımsal destekler, genellille kırsal kesimin gelirini artırmaya yönelik bir sosyal politika aracı olarak değerlendirilse de, aslında, bu tür destekleme politikaları sadece kırsal refahı değil, aynı zamanda bir ülkenin makroekonomik yapısını şekillendiren temel dinamikleri de etkileme potansiyeline sahiptir. Nitekim birçok ülke, uzun süredir tarımsal destekleme mekanizmalarını hem kırsal kalkınmayı teşvik etmek hem de gıda arz güvenliğini sağlamak maksadıyla kullanmaktadır. Ancak zamanla ortaya çıkan ampirik çalışmalar, bu politikaların yalnızca tarım sektörüyle sınırlı kalmadığını, daha geniş ekonomik çerçevede üretim yapısı, gelir dağılımı ve iç talep gibi değişkenler üzerinden büyümeyi doğrudan ya da dolaylı olarak etkileyebileceğini ortaya koymaktadır. Bu çalışma, 1990-2023 yılları arasında Türkiye'de uygulanan tarımsal desteklerin ekonomik büyüme üzerindeki uzun dönemli etkisini inceleyerek literatüre önemli katkılar sunmaktadır. Tarımsal desteklerin makroekonomik performans üzerindeki rolünü kapsamlı bir şekilde değerlendirebilmek amacıyla, brüt sabit sermaye yatırımı, kamu nihai tüketim harcamaları, enflasyon ve tarımsal üretim kontrol değişkenleri modele dahil edilmiştir. Böylece, destek politikalarının ekonomik büyüme üzerindeki etkileri, yapısal faktörlerden bağımsız olarak analiz edilerek daha sağlıklı sonuçlara ulaşılması hedeflenmiştir. Çalışmada Johansen Eş Bütünleşme analizi uygulanarak değişkenler arasındaki uzun dönemli ilişkinin varlığı araştırılmıştır. Eş bütünleşme ilişkisinin yönü ve katsayılarının tahmini için ise FMOLS, CCR ve DOLS yöntemlerinden yararlanılmıştır. FMOLS, CCR ve DOLS eşbütünleşme tahmin yöntemleri kullanılarak uzun dönemli ilişkiler test edilmiştir. Literatürde sıklıkla tek yöntem üzerinden yapılan benzer çalışmaların aksine, bu araştırma farklı ekonometrik yaklaşımları bir araya getirerek bulguların sağlamlığını artırmakta ve

politika yapıcılar için daha güvenilir sonuçlar sunmaktadır. Aynı zamanda, uzun yılları kapsayan geniş veri seti sayesinde, tarımsal desteklerin etkileri farklı ekonomik döngüler ve politika değişiklikleri bağlamında değerlendirilmektedir.

Literatüre bakıldığında tarımsal desteklerin tarımsal üretim ve ekonomik büyüme üzerindeki etkilerine ilişkin farklı farklı sonuçlar bulunmuştur. Çalışmaların önemli bir kısmında bu desteklerin tarımsal üretim ve büyüme üzerinde pozitif bir etkiye sahip olduğu bulunurken, bazılarında ise anlamlı bir ilişki tespit edilememiştir. Bununla birlikte, tarımsal desteklerin gelişmiş ülkelerde pozitif, gelişmekte olan ülkelerde ise negatif etkiler yaptığını bulan çalışmalar da mevcuttur. Literatürde sıklıkla tek yöntem üzerinden yapılan benzer çalışmaların aksine, bu araştırma farklı ekonometrik yaklaşımları bir araya getirerek bulguların sağlamlığını artırmakta ve politika yapıcılar için daha güvenilir sonuçlar sunmaktadır. Bu bağlamda çalışma, tarımsal teşviklerin ekonomik büyümeye katkısını analiz eden literatüre hem metodolojik hem de içerik açısından özgün bir katkı sunmaktadır.

Genel olarak çalışmadan elde edilen bulgular, ilgili tahminleme yöntemleri kapsamında analiz edilerek incelendiğinde, üç yöntemde (FMOLS, DOLS ve CCR) tarımsal desteklerin ekonomik büyümeyi pozitif yönde etkilediğini ortaya koymakta olup, katsayılar arasında belirgin farklılıklar gözlemlense de yöntemler birbirine yakın sonuçlar vermektedir. Bununla birlikte diğer bağımsız değişkenlere bakıldığında, FMOLS yöntemi, LNGFCF'de meydana gelen %1'lik bir artışın ekonomik büyümeyi %34,47 oranında artırdığını göstermektedir. DOLS yöntemine göre bu etkinin %44,45, CCR yöntemine göre ise %32,87 olduğu belirlenmiştir. Sonuçlar, sabit sermaye yatırımlarının ekonomik büyüme üzerinde güçlü ve pozitif bir etkiye sahip olduğunu ortaya koymaktadır. FMOLS yöntemi, LNGE'deki %1'lik artışın ekonomik büyümeyi %53,04 oranında artırdığını göstermektedir. DOLS yöntemi bu etkinin %44,29, CCR yöntemi ise %56,65 olduğunu ortaya koymaktadır. Sonuçlar, hükümet harcamalarının ekonomik büyüme üzerinde önemli bir itici güç olduğunu göstermektedir. FMOLS yöntemi, enflasyondaki %1'lik bir artışın ekonomik büyümeyi %4,98 oranında artırdığını göstermektedir. DOLS yöntemine göre bu etki %6,25 olurken, CCR yöntemi ise %4,74'lük bir artışa işaret etmektedir. Üç yöntemin sonuçları genel olarak enflasyonun ekonomik büyüme üzerinde pozitif bir etkisi olduğunu göstermektedir. FMOLS yöntemine göre LNVA'da meydana gelen %1'lik bir artış, ekonomik büyüme üzerinde %3,06 oranında negatif bir etkiye sahiptir. DOLS yöntemi bu etkinin %11,32 oranında pozitif olduğunu gösterirken, CCR yöntemi LNVA'nın ekonomik büyüme üzerinde anlamlı bir etkisinin olmadığını ortaya koymaktadır. Genel olarak bakıldığında, FMOLS, DOLS ve CCR yöntemleri benzer yönlü tahminler sunsa da, katsayılarda farklılıklar bulunmaktadır. Ancak değişkenlerin ekonomik büyüme üzerindeki etkileri açısından genel eğilimler büyük ölçüde tutarlıdır. İncelenen literatür ile durum karşılaştırıldığında Terin vd. (2013), Çevik ve Zeren (2014), Aktaş vd (2015), Işık ve Bilgin (2016), Yıldız (2017), Kopuk ve Meçik (2021) ve Gezer ve Gezer (2022) çalışmalarıyla bu durum benzerlik göstermektedir.

Sonuç olarak, bu çalışmada analiz edilen değişkenlerin ekonomik büyüme üzerindeki etkileri, ilgili literatür ile büyük ölçüde uyumludur. Özellikle sermaye yatırımları ve kamu harcamalarının ekonomik büyümeye pozitif katkısı, sürdürülebilir büyüme stratejilerinin oluşturulmasında belirleyici faktörler olarak öne çıkmaktadır. Tarımsal desteklerin ve üretimin ekonomik büyüme üzerindeki etkileri dikkate alınarak, tarım sektörüne yönelik politikaların daha etkin hale getirilmesi gerekmektedir. Gelecekte yapılacak çalışmalar, sektörel bazda daha ayrıntılı analizlerle bu değişkenlerin etkilerini derinlemesine inceleyerek politika yapıcılara daha kapsamlı öneriler sunabilir.