



THE IMPACT OF FISCAL POLICY TOOLS ON AGRICULTURAL PRODUCTION: TÜRKIYE AS A MODEL

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ABSTRACT

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The agricultural sector in developing countries (including Iraq) faces inefficient financial policies that have led to low levels of agricultural production and their inability to achieve food security for their citizens, especially the fiscal policy is an effective tool in achieving balanced growth and enhancing the economic performance of economic sectors, including the agricultural sector, as it is one of the strategic sectors. Because of its ability to achieve food security and support the level of economic performance in both developing and developed economies. The success of the experience of the Republic of Turkey, in which the agricultural sector represents one of the basic pillars of the Turkish economy during the initial stages of economic development and its high contribution to the gross domestic product and the agricultural workforce. It invited us to analyze the mechanisms of the impact of fiscal policy on the Turkish economy and its role in stimulating the economic performance of this sector, and its ability to support agricultural exports during the period 1999-2022, and the extent to which it can be adopted as a roadmap for the impact of financial policies on agricultural production in developing economies (including the Iraqi economy). The results of the study showed that there is a significant and positive relationship between the variables of government spending on the agricultural sector, the total credit granted to the agricultural sector, and the total formation of fixed capital for the agricultural sector as independent variables in their impact on the dependent variable (agriculture production) in the long term during the study period. Despite the differences in the nature of the economic and environmental conditions between Turkey and Iraq, the study suggests adopting the Turkish model of fiscal policy in supporting the agricultural sector as an incentive policy to increase agricultural production and achieve food security in Iraq.

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INTRODUCTION

The main problem that most developing countries (including Iraq) suffer from is their inability to achieve food security, which is one of the goals of economic policies in developing and developed countries. The reason for this is due to the inefficiency of financial policies directed towards the agricultural sector in countries with food deficit. The agricultural sector represents an important starting point for developing and developed economies, in the face of scarce capital and the continuous need for food and to achieve rapid economic growth in the early stages of economic development. Therefore, the importance of the agricultural sector has been

demonstrated in various economic literatures, emphasizing its significance as a source of food, financial resources, and human resources, as well as an important market for non-agricultural goods (Al-Najafi and Abdul-Majeed, 1997).

The Republic of Türkiye represents one of the countries where the agricultural sector represents one of the basic pillars in supporting the necessary economic growth and achieving food security, and the high contribution to the total production and agriculture labor force from the total labor force. Therefore, the Turkish model of fiscal policy was adopted in its impact on the agriculture production, as a model that can be used in the financial policies of developing economies (including the Iraqi economy).

The research aims to study the mechanisms of fiscal policy as a macroeconomic policy of the Turkish Republic in affecting its agricultural production for the period (1999-2022), and the extent to which it can be adopted as a roadmap for the impact of financial policies on agricultural production in developing economies (including the Iraqi economy).

The research hypothesis was that the economic fiscal policy in Türkiye had positive effects on the agriculture production during the study period. The research methodology was represented by two paths: the first was the descriptive approach, which included what was in the economic literature and the experiences of economies in the mechanisms of the impact of fiscal policy on agricultural production. As for the second path: Which is represented by the statistical approach and achieved by adopting the econometric model to measure the impact of the financial policy tools of the Republic of Turkey on agricultural production.

LITERATURE REVIEW

The impact of fiscal policy on agriculture production has attracted the attention of many researchers, as evidenced by studies by Wangusi and Muturi (2015), Zirra and Ezie (2017), Shevchuk and Kopych (2017), Salqaura *et al.* (2018), Oluwaseun *et al.* (2020), Yehia (2022), and Abdulhussain *et al.* (2022), that the general government spending on the agricultural sector, it has a positive, significant impact on agricultural production through its ability to provide infrastructure and agricultural and technical investments for this sector.

The studies by Alzubaidi and Sultan (2023) and Al-Mashhadani (2018). Which explained the importance of the significant effects of macroeconomic policies (financial and monetary) on the agricultural sector and agricultural value added (about Add value see: Alzubaidi and Almullah, 2022 a; Alzubaidi and Almullah, 2022 b), while other researchers have demonstrated, such as: Yehia (2022), Abdulhussain *et al.* (2022), Oluwaseun *et al.* (2020), Salqaura *et al.* (2018), Zirra and Ezie (2017), Shevchuk and Kopych (2017), and Wangusi and Muturi (2015) in that general government spending on the agricultural sector, it has a positive, significant impact on agricultural production through its ability to provide infrastructure and agricultural and technical investments for this sector. The result of the Matthew and Mordecai (2016) study was contrary to previous studies, which concluded that spending on the agricultural sector has a negative impact on the agriculture production in Nigeria as a result of these expenditures not being directed wisely and effectively towards agricultural investments.

While the study by Gjokutaj (2021) explained that the gross fixed capital formation in the agricultural sector directly and significantly effects on the agriculture production. Explaining that investing in agricultural development improves the level of productivity and agricultural exports, and encourages the level of foreign direct investment. As for Zirra and Ezie's study in 2017, it was concluded that the credit granted to the agricultural sector has positive and significant effects on agricultural production.

MATERIALS AND METHODS*

The model

At this stage, the variables that will be included in the model are determined, which is represented by the following:

$$AGO = f(CAS, GSA, FCA, TIR)$$

Since:

AGO: Represents the dependent variable, expressed as agriculture production (as a percentage of GDP).

CAS: Represents the credit granted to the agricultural sector (as a percentage of GDP).

FCA: Represents gross fixed capital formation in the agricultural sector (as a proportion of GDP).

TIR: Total direct tax revenue (imposed on income and capital) (as a proportion of GDP).

Data for the above variables were collected from IMF (2024) and DataBank (2024).

Model testing stage

The Auto-regressive Distribution Lag Model (ARDL) was adopted in estimating the model parameters, which was applied by Pesaran and Shin (1999) and developed by Pesaran *et al.* (2001). The importance of the model lies in the possibility of applying it to time series of rank I (0) or rank I (1), or a mixture of the two ranks (Hussein and Abdullah, 2022). But the only condition for this model is that there should be no time series with rank I (2). Otherwise, this will be determined by performing a stationary (unit root) test for the time series. This model also has better properties in the case of short time series compared to other usual methods of cointegration testing (Jarallah and Thannon, 2013).

Unit roots or stationary test

In order to detect the stationary of time series variables, the Augmented Dickey-Fuller test (ADF) was used. It is one of the best methods for testing the unit root and determining the degree of integration of variables. The Akaike Information Criterion (AIC) was also used to eliminate the possibility of any autocorrelation problem for the random error term. This is in order to test the null hypothesis, which assumes that the time series has a unit root, the alternative hypothesis assumes that the time series does not have a unit root (Al-Bajari and Al-Mashhadani, 2019). Table (1) shows that all variables are not stationary at this level. This indicates acceptance of the null hypothesis, which states that the data has a unit root.

(Note*): (***, **, *, n.s) indicate a significance level (1%, 5%, 10%, not significant) respectively.

(Note*): All tables included were prepared by researchers based on the outputs of the EViews 12 program.

In other words, it is not static at its first level, and this is because the calculated (t) values are less than the (t) tabulated values at a significance level of 5%. But when you take the first difference of these variables; they will become stationary (called first-order integrals).

Table (1): Results of the stationary test (unit root) for the model variables.

Variable	Philips Perron Test (PP)			
	At Level		At First Difference	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
AGO Prob.	-1.3336 (0.6063) ^{n.s}	-2.6987 (0.2419) ^{n.s}	-6.9412 (0.0000) ^{***}	-6.9192 (0.0000) ^{***}
CAS Prob.	-3.2728 (0.0219) ^{**}	-1.2249 (0.8936) ^{n.s}	-7.0999 (0.0000) ^{***}	-8.6070 (0.0000) ^{***}
GSA Prob.	-1.4922 (0.5288) ^{n.s}	-3.0486 (0.1305) ^{n.s}	-6.7708 (0.0000) ^{***}	-6.6929 (0.0000) ^{***}
FCA Prob.	-1.3714 (0.5883) ^{n.s}	-3.4527 (0.0566) [*]	-7.2094 (0.0000) ^{***}	-7.1010 (0.0000) ^{***}
TIR Prob.	-2.0139 (0.2801) ^{n.s}	-1.7181 (0.7275) ^{n.s}	-6.6913 (0.0000) ^{***}	-6.7843 (0.0000) ^{***}

Probability based on MacKinnon (1996) one-sided P-values.

The bound test approach to cointegration

Bounds testing methodology was proposed by Pesaran *et al.* (2001), it is used to confirm the presence or absence of cointegration between variables, in other words, ensuring that there is a long-term balanced relationship between the model variables. This is done by comparing the calculated (F) value with the tabulated (F) values at significant levels 10, 5, 2.5, and 1%, respectively (Al-Bajari and Al-Mashhadani, 2019).

Table (2) shows the results of the bounds test for the model, it is noted that the calculated (F) value reached 5.553, which is greater than the tabulated (F) value at a significance level of 5% for both limits (lower and Upper). This indicates the existence of co-integration, or in other words, the existence of a long-term relationship between the variables of the study.

Table (2): Co-integration Test Using Bounds Testing Methodology.

Bounds test Approach				
Test Statistic	Value	Significance	Lower Bound I (0)	Upper Bound I (1)
F-Statistic	6.6425	10%	1.9	3.01
K	4	5%	2.26	3.48
		2.5%	3.15	2.62
		1%	3.65	3.07

The Stage of Diagnostic Testing of the Model

After completing the estimation of the model parameters, a set of diagnostic tests will be conducted in order to confirm the quality of the performance of the estimated model before adopting it.

It is clear from Table (3) that the probability value of the (J-B) test is greater than 5%, which means accepting the null hypothesis, which indicates that the residuals generated from the estimated model follow a normal distribution with a mean equal to zero and a standard deviation of (0.238). As for the probability value of the (LM) and (ARCH) tests, it was greater than 5%, which means accepting the

null hypothesis, which indicates that the estimated model is free of the problem of autocorrelation between the residuals and does not suffer from the problem of heterogeneity of variance.

Table (3): Diagnostic Tests of The Estimated Model in Türkiye

Histogram Normality Test			
Jarque-Bera	3.598215	Probability	(0.1654) ^{n.s}
Mean	-0.003286	Std. Dev.	0.237790
Serial Correlation LM Test: Breusch-Godfrey			
F-Statistic	1.971137	Prob. F (2,41)	(0.1564) ^{n.s}
Obs.*R ²	5.189835	Prob. Chi_Squ. (2)	(0.0747) [*]
Heteroskedasticity Test: ARCH			
F-Statistic	0.516766	Prob. F (2,41)	(0.6003) ^{n.s}
Obs.*R ²	1.081885	Prob. Chi_Squ. (2)	(0.5822) [*]

RESULTS AND DISCUSSION

In this section, we will discuss the interpretation of the long-run and short-run estimation results and the error correction parameter, which were calculated by using of the EViews 12 program:

Table (4): Estimating the Results of the ARDL Model.

Method: ARDL (2, 2, 2, 1, 2)				
Long Run Coefficients				
Variables	Coefficient	S.E	t-Statistic	Prob.
CAS	1.073339	0.214040	5.014665	0.0000) ^{***} (
GSA	0.728037	0.197599	3.684417	0.0008) ^{***} (
FCA	4.408909	0.664280	6.637123	0.0000) ^{***} (
TIR	0.137456	0.098041	1.402026	0.1702) ^{n.s} (
Short Run Coefficients				
Variables	Coeff.	S.E	t-Stat.	Prob.
ECM (-1)	-0.681123	0.111617	-6.102338	(0.0000) ^{***}
D (AGO (-1))	0.221907	0.088885	2.496567	(0.0177) ^{**}
D (CAS)	-0.679009	0.454786	-1.493028	(0.1449) ^{n.s}
D (CAS (-1))	-1.056012	0.473809	-2.228772	(0.0328) ^{**}
D (GSA)	-0.002950	0.155669	-0.018950	0.9850) ^{n.s} (
D (GSA (-1))	-0.456618	0.172362	-2.649170	0.0123) ^{**} (
D (FCA)	5.554196	0.533041	10.41983	0.0000) ^{***} (
D (TIR)	-0.348746	0.154403	-2.258671	(0.0306) ^{**}
D (TIR (-1))	-0.485794	0.159036	-3.054624	0.0044) ^{***} (
R ² = 0.7479		Adjusted R ² = 0.6934		

From Table (4), the results of estimating the long- and short-term relationship and the error correction factor noted the following:

1st: The Results of the Relationship in the Long Run

The credit granted to the agricultural sector has a positive and significantly effects on the agriculture production at a significant level of 1% Table (4). This is

because agricultural credit will enable farmers to provide production inputs for agricultural production and marketing to support farmers and increase agricultural production. This result was consistent with Zirra and Ezie's study in 2017 on the positive impact of agricultural credit on agricultural production.

General government spending on the agricultural sector has a positive and significantly effects on the agriculture production at a significant level of 1% Table (4). The reason for this is that government spending on the agricultural sector by creating infrastructure, increasing support for farmers and increasing investments in the agricultural sector will be reflected in lowering production costs and increasing agricultural production. And this is consistent with the study of Matthew and Mordecai (2016) in that spending on the agricultural sector has a negative impact on the agriculture production in Nigeria, and the reason for this is that this money is not spent wisely on this sector. While this result was different with the studies of Yahya (2022), Abdulhussain *et al.* (2022), Oluwaseun *et al.* (2020), Salqaura *et al.* (2018), Zirra and Ezie (2017), Shevchuk and Kopych (2017), and Wangusi and Muturi (2015) in that spending on the agricultural sector, providing infrastructure, and agricultural investments had their positive effects on the agriculture production of the countries of study for the researchers.

Gross fixed capital formation in the agricultural sector has a positive and significantly effects on the agriculture production at a significant level of 1% Table (4). The reason for this is that the increase in total fixed capital will enable farmers to increase agricultural investments and thus increase agricultural production. And it is consistent with the study of Gjokutaj (2021), which explained that investing in agricultural development improves the level of productivity and agricultural exports, and encourages the level of foreign direct investment.

There is no significant relationship between total direct tax revenues and the agriculture production Table (4). This is due to two reasons: firstly, large-scale production in the long run reduces the share of the tax effect on the income generated by agricultural production, and secondly, the direct and large effects of other fiscal policy variables contribute to reducing the effects of taxes in the long run.

2nd: Results of the Relationship in the Short Run and the Error Correction Parameter.

The results showed that the error correction factor parameter reached (-0.681123), which is a negative value and less than one. It is statistically significant at a level of significance of less than 1%. This confirms the validity of the long-term equilibrium relationship. In other words, the possibility of correcting model errors, that is, 68% of the proportion of imbalances that occur according to the estimated model in Turkey requires approximately one year and five months to be corrected ($1/0.681123 = 1.47 \cong 1.5$).

The credit granted to the agricultural sector has a negative and significant impact on the agriculture production at a significant level of 1% Table (4). The reason for this is due to two factors: the first is that the effects of loans on agricultural production do not appear in the short term, especially since dealing with agricultural production is mostly in the long term, and the second factor is that most agricultural loans are not effectively spent on the agricultural sector. This result was contrary to the result of the long-term effect.

General government spending on agricultural sector has a negative and significant effect on the agriculture production at a significant level of 1% Table (4). The reason for this is that government spending on the agricultural sector does not have short-term effects, as the response of the agricultural commodities produced is mostly long term. This result was contrary to the result of the long-term effect. This is consistent with the study of Matthew and Mordecai (2016) in that spending on the agricultural sector has a negative impact on the agriculture production in Nigeria, and the reason for this is that this money is not spent wisely on this sector. While this result was different with the studies of Yahya (2022), Abdulhussain *et al.* (2022), Oluwaseun *et al.* (2020), Salqaura *et al.* (2018), Zirra and Ezie (2017), Shevchuk and Kopych (2017), and Wangusi and Muturi (2015) in that spending on the agricultural sector, providing infrastructure, and agricultural investments had their positive effects on the agriculture production of the countries of study for the researchers.

Gross fixed capital formation in the agricultural sector directly and significantly effects on the agriculture production at a significant level of 1% Table (4). Because the increase in total fixed capital will enable farmers to increase agricultural investments and thus increase agricultural production This result was identical to the result of the impact in the long term. It is consistent with the study of Gjokutaj (2021), which explained that investing in agricultural development improves the level of productivity and agricultural exports, and encourages the level of foreign direct investment.

Total direct tax revenues have an inverse and significant effect on the agriculture production at a significant level of 1% Table (4). This is because the tax burden will increase production costs and thus reduce gross profits, leading to a reduction in farmers' production incentive and agricultural output. This is consistent with the studies of Yahya (2022) and Oluwaseun *et al.* (2020).

Finally, the value of the coefficient of determination R^2 was 75%. That is, the changes that occur in the agriculture production are explained by the independent variables included in the model. A percentage of 25% is explained by other variables outside the model or by the random variable.

The results of the study showed that the fiscal policy in Turkey during the study period 1999-2022 was a stimulative financial policy that pushed the agricultural sector towards increasing agricultural production as a percentage of GDP in the short and long term.

CONCLUSIONS

Achieving balanced economic growth and adopting stimulating financial policies for the agricultural sector in the Republic of Turkey. This sector has played an effective role in enhancing the gross domestic product and its contribution to increasing the level of employment in the agricultural sector. The results of the study demonstrated the significant and positive impact of government spending, fixed capital, and credit directed to the agricultural sector on the agriculture production as a percentage of gross domestic products in the short and long terms. While the effects of total tax revenues had negative effects on the agriculture production as a percentage of total production in the long term only. Therefore, the study recommends adopting the Turkish model of fiscal policy in supporting the

agricultural sector as a motivational policy to increase agricultural production and achieve food security in Iraq.

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CONFLICT OF INTEREST

The researcher supports the idea that this work does not conflict with the interests of others.

أثر أدوات السياسة المالية على الانتاج الزراعي: تركيا انموذجاً

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الخلاصة

إن القطاع الزراعي في البلدان النامية (منها العراق) يواجه سياسات مالية غير كفؤة أدت الى تدني مستويات الانتاج الزراعي وعدم قدرتها على تحقيق الأمن الغذائي لمواطنيها، لاسيما أن السياسة المالية تعد أداة فاعلة في تحقيق النمو المتوازن، وتعزيز الاداء الاقتصادي للقطاعات الاقتصادية ومنها القطاع الزراعي باعتباره أحد القطاعات الاستراتيجية، لقدرته على تحقيق الأمن الغذائي ودعم مستوى الاداء الاقتصادي في الاقتصادات النامية والمتقدمة على حد سواء. ان نجاح تجربة الجمهورية التركية التي يمثل فيها القطاع الزراعي أحد المرتكزات الاساسية للاقتصاد التركي خلال المراحل الاولى للتنمية الاقتصادية ولمساهمة المرتفعة في الناتج المحلي الاجمالي والقوة العاملة الزراعية. دعنا الى تحليل اليات تأثير السياسة المالية للاقتصاد التركي ودورها في تحفيز الاداء الاقتصادي لهذا القطاع وقدرته على دعم الصادرات الزراعية خلال المدة 1999-2022. ومدى إمكانية اعتمادها كخارطة طريق لتأثير السياسات المالية في الانتاج الزراعي للاقتصادات النامية (منها الاقتصاد العراقي) العراقي. لقد أظهرت نتائج الدراسة العلاقة المعنوية والموجبة لمتغيرات الانفاق الحكومي على القطاع الزراعي وإجمالي الائتمان الممنوح للقطاع الزراعي وإجمالي تكوين رأس المال الثابت للقطاع الزراعي كمتغيرات مستقلة، في التأثير على المتغير التابع (الانتاج الزراعي) في الامد البعيد خلال مدة الدراسة، وعلى الرغم من اختلاف طبيعة الظروف الاقتصادية والبيئية بين تركيا والعراق إلا أن الدراسة تقترح اعتماد النموذج التركي للسياسة المالية في دعم القطاع الزراعي كسياسة تحفيزية لزيادة الإنتاج الزراعي وتحقيق الأمن الغذائي في العراق.

الكلمات المفتاحية: السياسة المالية، الانتاج الزراعي، سياسة الانفاق.

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