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# AGRICULTURAL EXPORTS, AGRICULTURAL IMPORTS AND ECONOMIC GROWTH IN CHINA

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**Abstract:** *Since the beginning of the third millennium, the Chinese agricultural exports increase at a strong pace. In this context, this paper aims to answer the question if the agriculture trade promotes Chinese economic growth by employing the ARDL bounds testing for the study period from 1984 to 2017. In the long run, our highlights reported that domestic investment and agricultural exports have a positive effect on economic growth. However, agricultural imports have a significant negative impact on growth. In the short run, our insights reported a positive and significant effect of domestic investment, agricultural imports, and agricultural exports on economic growth. The positive impact of agriculture exports on growth is due to the importance of agriculture in terms of creating jobs and opportunities for the economy. Therefore, sufficient national investment in the agriculture sector tends to enlarge these opportunities and then improves Chinese economic growth.*

**Keywords:** *Agricultural trade, economic growth, ARDL bounds testing.*

**JEL Classification :** *F11, F14, O47, O53, Q17, Q18.*

## 1. Introduction

As one of the most controversial issues in the economic theory, globalization is considered as a double-edged weapon with its benefits and costs of the economy and community well-being. Theoretically, there are two approaches which defined the globalization: The first point of view considered foreign trade as a determinant element of productivity benefits and improved economic performance. However, the second approach defined the globalization based on its effects on equity and local development (See. Carter et al., (1996); Estrades and Terra (2012)).

Without any doubt, several studies revealed that trade openness contributes to the growth of an economy. Specifically, through its externalities through facilitating the technology transfer and spillovers, the economic performance improves (See. Tiba et al. (2015); Tiba and Frikha (2018)). Furthermore, trade freedom constitutes a fundamental element in the growth processes through its effects on productivity and then economic growth. The relationship between economic growth and exports is structured around two theoretical assumptions: The first assumption is the export-led growth, where it assumed that an increase in the export leads to generating an increase in the demand for a country's coupled with an increase in the real economic activity. Besides, the increase in the export volume increases the specialization in exporting goods that leads to increasing the economies of scale and gaining in terms of productivity. Also, the rise of the volume of exports makes easier the domestic-capital formation. However, the growth-led export assumption implies the rise of the income level is linked to the rise of the technology which boots productivity. Consequently, the production process gained momentum in terms of skills and technology that contributes to comparative advantage, and then the growth in exports. The second one is the import-led growth assumption, which assumes the importance of the import in the economic sphere through facilitating access to foreign technologies, knowledge, and R&D, which improves productivity and as a result the economic growth (See. Awokuse (2008); Tiba and Frikha (2019); Tiba (2019)).

Several works and studies have shown the importance of the agricultural sector to the contribution of economic activity and its effects on several macroeconomic variables such as Reziti (2020); Luh (2017); Islam (2020); Akpan et al (2014); Bashir and Susetyo (2018); Bassey et al (2014); Ronaghi et al. (2018); Said and Shelaby (2014); Paniagua-Molina and Solís-Rivera (2020); Sarker and Oyewumi (2015); Costa et al (2015); Matchaya et al (2019); Bahta and Groenewald and (2015); Awoderu et al (2022); Ayyaz et al (2019); Nwachukwu (2014); Chege et al (2015); Dos Santos et al (2019); Akpaeti et al (2014); Joël and Glory (2018); Genang et al (2020); Rahman et al (2017); Ashraf and Singh (2021); Udoudo et al (2016); Gisore and Were (2017); Tochukwu et al (2021); Pinjisakikool (2009); Gavrilă (2012).

The most of previous studies studied the impact of trade on agricultural productivity using the cross-country sample pointed out that an economy with fewer trade barriers shown rapid productivity growth (See. Coe et al. (1997), Edwards (1998), and Badinger (2007)). In addition,

with the individual countries' analysis, the results found a positive impact of trade on productivity (See. Tybout et al. (1991), Hay (2001), Jonsson and Subramanian (2001), Pavcnik (2002), Ferreira and Rossi (2003), and Amiti and Konings (2007); Bakari and Brahmi (2020)). As one of the greatest agricultural trade economy, China has many opportunities in terms of the trade of agricultural products. Since the beginning of the third millennium, the Chinese agricultural exports increase at a strong pace. The share of Chinese total agricultural exports passed from 9.70% in 2000 to 21.18% in 2016. This significant increase in the share of Chinese agriculture exports pointed out the huge momentum gained by the trade of agricultural goods in the Chinese economy during the past two decades.

The objective of this paper is to answer the question if the agriculture trade promotes Chinese economic growth. For this purpose, we employed the ARDL bounds testing for the study period from 1984 to 2017. To the best of our knowledge, this is the first paper that attempts to treat the agriculture trade contribution to economic growth, by considering the agriculture trade as a determinant factor of the Chinese growth model.

The algorithm of the paper is as follows: Section 2 contains a brief literature overview. Section 3 portrays the data and methodology. Section 4 discusses the empirical results. And concludes the paper is in Section 5.

## 2. Agriculture Trade and Economic Growth Literature Survey

To fully understand the link between trade in the agricultural sector and economic growth. We will present a set of works that examine the link between international trade and economic growth in the first place. Then, we will carry out a review of the literature which presents the different results concerning the link between agricultural trade and economic growth.

### 2.1. Trade and economic growth

The implications of trade for economic growth remain an area of much debate in theoretical and empirical research. In fact, several economists have theoretically shown the favorable effect of trade on economic growth such as Michaely, (1977); Balassa, (1978, 1989 and 1995); Tyler, (1981); and Grossman and Helpman, (1989). In contrast, there is another group of economists who have shown the adverse effects of trade on economic growth such as Helleiner (1986),

Ahmad and Kwan (1991).

Bakari and Mabrouki (2016) examined the nexus between trade and economic growth for the case of Turkey during the period 1960 -2015. They found that Trade has a positive effect on economic growth. In the context of Japan, Bakari (2017g) examined the impact of domestic investment, exports, and imports on economic growth for the period 1970 – 2015. He used ordinary least squares (OLS) since all variables are stationary in level. He found that domestic investment and exports affect positively economic growth. He found also that imports don't have any impacts on economic growth in the case of Japan. Bakari (2016a) searched the nexus between exports, imports, and economic growth in Canada during the period 1990 and 2015. By using Johansen co-integration analysis of Vector Auto Regression Model and the Granger-Causality tests, he found that exports and imports cause economic growth.

Also, Bakari and Mabrouki (2017a) found a positive relationship between trade and economic growth in the case of Panama for the period 1980 – 2015. In their investigation, they use Cointegration analysis and VAR Model. In addition, Bakari (2021) reinvest the nexus between exports and economic growth in 49 African Countries during the period 1960 – 2018. In his analysis, he applied many econometric methods such as Panel FMOLS and DOLS Estimates; Panel VECM; Panel ARDL Model; Pooled OLS, Random Effect Model, Fixed Effect Model and Hausman Test; Panel Pairwise Granger Causality Tests; Panel Toda Yamamoto Causality Test; and Panel GMM Model. All Panel models indicate that there is a positive bidirectional causality between exports and economic growth in the long run and in the short run. In the case of USA, Bakari and Tiba (2019a) searched the determinants of economic growth during the period 1970 – 2016. By using VECM model they found that exports have a positive effect on economic growth in the long run. However, the impact of imports is negative. Bakari and Tiba (2019b) investigated the incidence of trade openness, foreign investment inflows, and domestic investment on economic growth during the period 2002 - 2017 for the case of 24 Asian economies. By applying Static Gravity Model, they found that domestic investment positively influences economic growth. However, we found that foreign direct investment and exports are negatively affecting economic growth. Also, the population, imports, and final consumption expenditure have no real impact on economic growth.

However, in the context of Tunisia, Bakari (2017c), Bakari et al (2018a), Bakari et al (2018b)

Bakari (2020b), Bouchoucha and Bakari (2021) and Bakari et al (2021c), found that exports have ha negative effect on economic growth. However, they found that imports have a positive effect on economic growth. In their analysis, they used different models, different data, and different controls variables. These are the same results found by Bakari (2018c) in the case of Algeria during the period 1969 – 2015, by Bakari (2017b), in the case of South Africa during the period 1960 – 2015, by Fakraoui and Bakari (2019) in the case of India for the period 1960 – 2017, by Kartikasari (2017) in the case of Riau Islands Indonesia for the period 2009 - 2016,and by Bakari (2017a) in the case of Egypt for the period 1965 – 2015. Bakari (2017e) investigated the relationship between domestic investment, exports, imports, and economic growth in Sudan for the periods 1976 - 2015. According to the Vector Error Correction Model, there is no relationship between variables in the long run term. Their results render proof that Reformations and moderations in economic strategies are still poor to perform trade openness and domestic investment competent to strengthen the Sudan's economy.

In the case of Urugay and for the period Bakari et al (2019) found that there is no relationship between trade and economic growth in the long run. In their analysis, they used cointegration analysis and vector error correction model. These are the same results found by Bakari et al (2021a) in the case of Brazil using the same empirical methodology but for the period 1970 – 2017. For the period 1981 - 2015, Bakari et al (2018c) found that there is no relationship between exports, imports, and economic growth in the case of Nigeria. These results proved that exports are not seen as source of economic growth in many developing countries.

### 2.2. Agricultural Trade and Economic Growth

It is striking that experimental research on the contribution of agricultural trade to economic growth has been somewhat ignored in the literature, despite its role in the development process that has long been recognized (See: Echevarria (1997); Gardner (2005); Kogel and Prskawetz (2001); Gollin, Parente, and Rogerson (2002); Tiffin and Irz (2006), Bakari (2018b) Bakari and Abdelhafidh (2018) Abdelhafidh and Bakari (2019), Bakari (2020a); Bakari et al (2020); Bakari et al (2021b)). But many economists argue that agricultural trade plays a crucial role in economic growth and sustainable development.

Sanjuàn-Lopez and Dawson (2010) examined the impact of agricultural exports on economic

growth for 42 developing countries over the period 1970-2004. They used cointegration analysis and the FMOLS model. The empirical results have shown that agricultural exports have a positive effect on economic growth.

Faridi (2012) studied the nexus between agricultural exports and economic growth during the period 1972–2008 in Pakistan. He concluded by using the Johansen test and granger causality test that agricultural export has no significant effects on economic growth. For the case of Cameroon, Gilbert et al. (2013) searched the impact of the structure of agricultural exports on economic growth for the period 1975 - 2009 using VECM model. They found that coffee and banana exports have a positive and significant relationship with economic growth while cocoa export was found to have a negative and insignificant effect on economic growth.

Forgha and Aquilas (2015) investigated the relationship between agricultural exports and economic growth in Cameroon during the period 1980-2014 by applying cointegration analysis and the vector error correction model (VECM). They found that agricultural exports have no effect on economic growth in the short term. On the other hand, in the long run, they found that agricultural exports have a positive impact on economic growth.

Ijirshar (2015) treated the impact of agricultural exports on economic growth by using Johansen co-integration and error correction model (ECM) for empirical investigation in the Nigerian economy for the period of 1970–2012. He found that agricultural exports have a positive effect on economic growth in the long run. For the period 1973 - 2013, Yifru (2015) searched the impact of agricultural exports on economic growth in Ethiopia. He discovered that coffee export and oilseeds export have a positive and significant impact on economic growth, however pulses export was found to have negative and insignificant impact on economic growth in short run and positive but insignificant in the long run.

Alam and Myovella (2016) applied an estimated model based on cointegration analysis and Granger-type Causality tests to explore the relationship between agricultural exports and economic growth in Tanzania over the period 1980-2010. The empirical findings indicate that agricultural exports have a positive impact on economic growth. Also, Bakari (2016b) found that agricultural exports have a positive impact on economic growth in the case of Tunisia during the period 1988 – 2014. Bulagi et al (2015) found a positive relationship exists between

agricultural exports and economic growth in the case of South Africa for the period 1981 - 2014.

Uremadu and Onyele (2016) examined the impact of total agricultural exports, cocoa exports, and rubber exports on Nigeria's economic growth from 1980 to 2014. Their highlights showed that only total agricultural exports have a positive effect on economic growth.

Toyin (2016) examined the causal link between agricultural exports and economic growth in South Africa for the period 1975 to 2012. Using the VAR model and the Granger causality test, the insights recorded that there was no causal relationship between agricultural exports and GDP.

Bakari (2017g) studied the impact of vegetable exports on economic growth in Tunisia for the period 1970 to 2015. By employing the cointegration analysis and the vector error correction model, he revealed that vegetables had a positive effect on long-term and short-term economic growth. In the same spirit, Bakari (2017d) examined the impact of olive oil exports on economic growth. He found that olive oil exports had a positive impact on Tunisia's economic growth in the long-term and the short-term. Similarly, Bakari (2018a) analyzed the effect of citrus exports on economic growth for the periods 1970 and 2016. The findings pointed out that citrus export has no influence on economic growth in the long run, but a positive effect on economic growth is detected in the short run. His study indicates that citrus exports are not considered as a relevant source of economic growth in Tunisia.

Using time series quarterly data for the year 1990-2014, cointegration analysis and VECM, Simasiku and Sheefeni (2017) inspected the nexus between agricultural export and economic growth in Namibia. They found that agricultural exports have a positive but insignificant incidence on economic growth. In Ghana and the period 1990-2011, Siaw et al. (2018) found that cocoa exports had positive and significant effects on economic growth, while pineapple and banana exports had negative effects on economic growth, and pineapple exports were not significant in both the long and short term.

Bakari and Mabrouki (2017b) studied the effect of agricultural exports on the economic growth for the South-East European economies over the period 2006-2016. By applying the static

gravity model, they found that agricultural exports have a positive impact on economic growth. In the same context, Bakari and Mabrouki (2018) investigated the impact of agricultural exports and agricultural imports on economic growth in North Africa Countries for the period 1982 – 2016. They applied as econometric methods the correlation analysis and the static gravity model. Empirical results point that agricultural trade has a positive correlation with economic growth, but it appears that agricultural exports and economic growth have a feeble correlation. The static gravity model estimation shows that agricultural exports have a constructive impact on economic growth. However, agricultural imports have not any impact on economic growth.

Mahmood and Munir (2017) investigated the relationship between agricultural exports and economic growth in Pakistan using Johansen cointegration and Granger causality tests during the period 1970 to 2014. The empirical facts show that agricultural exports have a positive effect on economic growth, but this effect is insignificant. However, the results show that economic growth has a positive effect on agricultural exports. These facts can be explained by the inability of agricultural exports to compete in international markets because of the high competitiveness and low quality of exported agricultural products.

In the case of Egypt, Ahmed and Sallam (2018) examined the long and short-term relationship between agricultural exports and economic growth during the period from 1970 to 2013 using cointegration analysis models, error correction models (ECM), and generalized autoregressive conditional heteroscedasticity (GARCH). They found that there was a positive relationship between agricultural exports and economic growth in the long and short terms. Busari et al (2022) analyzed the nexus between agricultural exports and economic growth in Nigeria. By used data covering the period between 1980 and 2018 Johansen's co-integration method, and vector error correction mechanism (VECM), empirical results indicated that agricultural exports have a positive effect on economic growth.

## 3. Data and Methodology

The current survey employs annual unbalanced data cover the period from 1984 to 2017 and is collected from the World Bank database (World Development Indicators, WDI 2018). The data includes GDP (in constant 2010 US$), gross fixed capital formation (in constant 2010 US$), agricultural exports (in constant 2010 US$), and agricultural imports (in constant 2010 US$).

The aggregated form of the empirical equation is modeled as follows:

$$Y_t = f\,(K_t AX_t AM_t) \quad (1)$$

Now, we are converting all series into logarithms to get the direct elasticities. The empirical equation is formed as follows:

$$\mathrm{Log}Y_t = C_0 + \beta_1 \mathrm{Log}K_t + \beta_2 \mathrm{Log}\,AX_t + \beta_3 \mathrm{Log}AM_t + \varepsilon_t \quad (2)$$

As specified by Pesaran et al., (2001), the ARDL bounds testing approach may be realized in three stages. The initial stage is to estimate Eq. (1) by ordinary least squares, to experiment for the existence of a long-run relationship among the variables, by running an F-test for the joint significance of the coefficients of the lagged level variables, which points out no cointegration relationship between them. The Eq. (1) may be recorded as follows:

$$\Delta\mathrm{Log}\,Y_{(t)} = C + \sum_{i=1}^{m} \beta_{1i} \Delta\mathrm{Log}\,Y_{(t-i)} + \sum_{i=0}^{n} \beta_{2i} \Delta\mathrm{Log}\,K_{(t-i)} + \sum_{i=0}^{o} \beta_{3i} \Delta\mathrm{Log}\,AX_{(t-1)} + \sum_{i=0}^{p} \beta_{4i} \Delta\mathrm{Log}\,AM_{(t-1)} + \delta_1 \mathrm{Log}\,K_{(t-1)} + \delta_2 \mathrm{Log}\,AX_{(t-1)} + \delta_3 \mathrm{Log}\,AM_{(t-1)} + \varepsilon_{(t)} \quad (3)$$

Where, Log is the natural logarithm, Δ indicates the variable in the first difference, Y is the variable referring to the real gross domestic product, K is the variable referring to the gross fixed capital formation, AX is agricultural exports, AM is agricultural imports, C is an intercept, t refers to the time in years from 1984 – 2017, and $\varepsilon_t$ is a white –noise error term. Lags (m,n,o,p) are determined using the VAR optimal model, which means that the lag minimizes the Akaike (AIC), Schwarz (SIC), and Hannan-Quinn (HIC) information criteria.

As soon as Eq. (1) has been estimated, the attendance of a cointegration acquaintance among the variables must be examined by taking advantage of the bounds test. Indeed, the cointegration test is rooted predominately on the Fisher test (F-stat) for the joint significance of the coefficients of the lagged level variables, i.e., H0: $\delta_1 = \delta_2 = \delta_3 = 0$, which marks that there is integration. After assimilating the F-stat value with asymptotic critical value bounds studied by Pesaran et al. (2001), the null hypothesis of no cointegration is rejected when the value of the F test surpasses the upper critical bounds value, inculpating that there is a cointegration relationship between the studied variables.

When the null hypothesis of no cointegration is rejected, and cointegration is scheduled, in the second stage, the conditional ARDL long-run model that assumes the long-run dynamic where the orders of the ARDL (m, n, o, p) model are chosen by employing AIC. Finally, the end-stage attempts to esteem the error correction model for the short-run by involving the ordinary least squares technique and the AIC to choose the order of the ARDL (n, m, o, p). Diagnostic tests and stability tests are also painstaking to experiment with the quality of suitable for the ARDL model. Besides, to prove the modality of our estimated model and the lustiness of our estimation, we will play a set of tests named diagnostic tests such as Heteroskedasticity Tests, Breusch-Godfrey Serial Correlation LM test, the test of Normality, R-squared, Adjusted R-squared, and Durbin-Watson test. Finally, we will employ a cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests to assay the stability of the residuals.

## 4. Results and Discussions

Before we maintained with the ARDL bounds test, we put to test for the stationarity status of the picked time-series data to plot their order of integration. This is to keep that the variables should not be stationary at an order of I(2) because the computed F-statistics assuming by Pesaran et al. (2001) are applicable only when the variables are I(0) or I(1). The Augmented Dickey-Fuller (ADF) test[1] and the Phillips and Perron (PP) test[2] methods are normally common to the unit root test adopted by many researchers, so the same methods were followed in this study.

**Table 1. Tests for Units Roots**

| | **ADF** | | **PP** | |
|---|---|---|---|---|
| | C | CT | C | CT |
| **Log (Y)** | 0.553793 | 3.140932 | 1.210406 | 1.724755 |
| | 2.944346 | 2.934072 | 2.969580 | 2.956315 |
| **Log (K)** | 2.000200 | 2.563393 | 0.800249 | 1.721702 |
| | 3.602577 | 3.548965 | 3.349277 | 3.249131 |
| **Log (AX)** | 1.680767 | 2.499199 | 2.767064 | 2.320106 |
| | 5.161190 | 5.493414 | 5.169945 | 5.720202 |
| **Log (AM)** | 0.411143 | 5.009256 | 0.277028 | 2.787715 |

[1] Augmented Dickey Fuller test, See: Dickey and Fuller (1979, 1981)
[2] Phillips–Perron test, See: Phillips and Perron (1988)

| | | | | |
|---|---|---|---|---|
| | 5.319606 | 5.308762 | 6.160105 | 5.771966 |

***Note: ***, **, * denote significances at 1%, 5% and 10% levels, respectively;***
***( ) denotes stationarity in level;***
***[ ] denotes stationarity in first difference;***
***'C' denotes Constant;***
***'CT' denotes Constant and Trend;***

The results of the unit-roots tests are reported in Table 1 and indicate that all the variables of interest are integrated of order one or I(1) except Log(AM) is integrated of order I(0) and I (1). The ARDL bounds test is then applied to the model. The bound test was performed to verify the existence of a long-term relationship between the variables by performing an F-test to determine the joint significance of the coefficients of the shifted levels of the variables. The null hypothesis of no cointegration will be rejected if the computed F statistic is greater than the critical value of the upper bound. If the calculated F statistic is less than the critical value of the lower limit, we cannot reject the null of no cointegration. Finally, the result is not conclusive if the calculated F statistic is between the critical values of the lower and upper limits.

**Table 2. ARDL Bounds Test**

| **ARDL Bounds Test** | | |
|---|---|---|
| Test Statistic | Value | K |
| F-statistic | 7.524547 | 3 |
| **Critical Value Bounds** | | |
| Significance | I0 Bound | I1 Bound |
| 10% | 2.72 | 3.77 |
| 5% | 3.23 | 4.35 |
| 2.5% | 3.69 | 4.89 |
| 1% | 4.29 | 5.61 |

Table 2 reports the results of calculated F-statistics. The bound test confirms the existence of a long-run relation. So, the ARDL Model can be returned. For the determination of the number of delays, we adopt the criterion of Akaike Information Criteria (AIC).

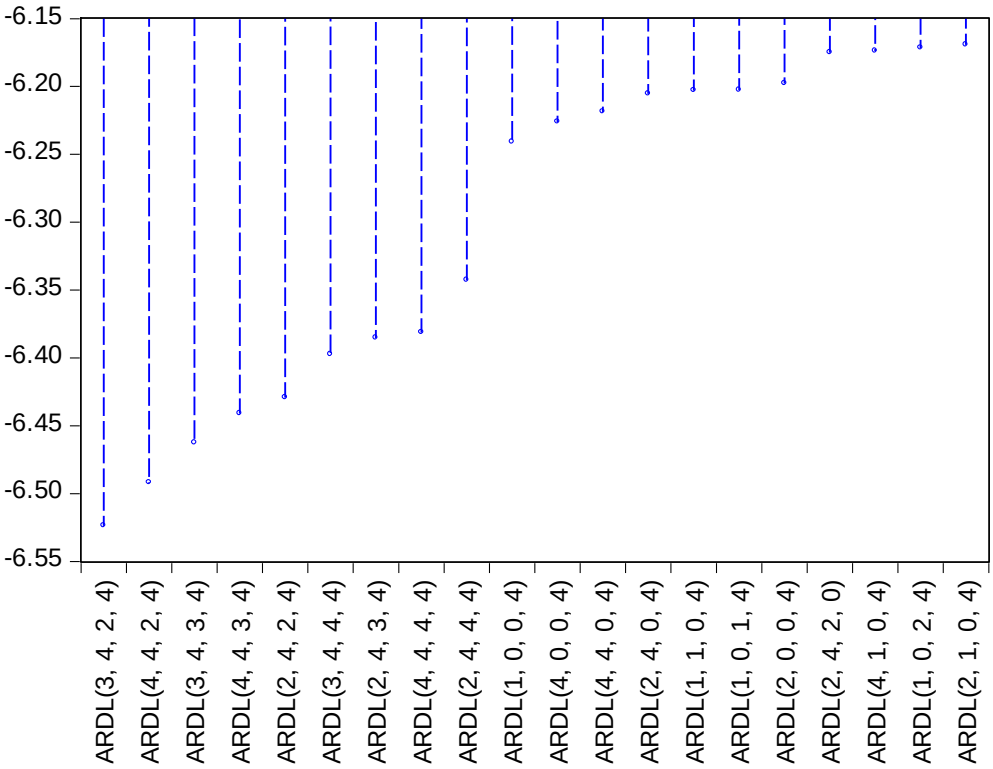


**Fig.1 Akaike Information Criteria (top 20 models)**

Fig. 1 shows the best 20 models according to the Akaike Information Criteria (AIC). The number of delays for China is (3, 4, 2, 4). According to Banerjee et al (1998), the statistical significance of lagged error term i.e.,$\boldsymbol{ECT_{t-1}}$ is further substantiation of the existence of a constant long-run relationship between the series. The statistically significant estimate of lagged error term i.e., $\boldsymbol{ECT_{t-1}}$with negative sign corroborates our established long-run relationship between domestic investment, agricultural exports, agricultural imports, and economic growth. The empirical proof announced in Table 3, which pointed out that the coefficient of $\boldsymbol{ECT_{t-1}}$ is -1.107886 which is statistically significant at a 1 percent level of significance (With a P-value equal to 0.0011). In this case, we can say that the equilibrium cointegration equation is significant and that there is has a long-term relationship between the variables.

The long-run analysis is reported in Table 3. Our empirical evidence indicates that domestic investment and agricultural exports have a positive effect on economic growth, and it is statistically significant at a 1 percent level of significance. The impact of agricultural imports

is negative and statistically significant at a 1 percent level of significance. If we find evidence of a long-run relationship between domestic investment, agricultural exports, agricultural imports, and economic growth, then we estimate the short-run coefficients by employing the WALD test which is including in the ARDL model. Table 4 represents the short-run relationship between variables.

**Table 3. ARDL Cointegrating and Long Run Form**

| **Dependent Variable: DLOG(Y)**<br>**Selected Model: ARDL(3, 4, 2, 4)** | | | | |
|---|---|---|---|---|
| **Cointegrating Form** | | | | |
| **Variable** | Coefficient | Std. Error | t-Statistic | Prob. |
| DLOG(Y(-1), 2) | 0.729792 | 0.242899 | 3.004509 | 0.0110 |
| DLOG(Y(-2), 2) | 0.285290 | 0.195355 | 1.460367 | 0.1699 |
| DLOG(K, 2) | 0.152188 | 0.036364 | 4.185164 | 0.0013 |
| DLOG(K(-1), 2) | -0.095522 | 0.041229 | -2.316899 | 0.0390 |
| DLOG(K(-2), 2) | -0.114191 | 0.040888 | -2.792773 | 0.0163 |
| DLOG(K(-3), 2) | -0.099069 | 0.034597 | -2.863467 | 0.0143 |
| DLOG(AM) | -0.003715 | 0.012899 | -0.287986 | 0.7783 |
| DLOG(AM(-1)) | -0.043514 | 0.015669 | -2.777062 | 0.0167 |
| DLOG(AX, 2) | -0.010157 | 0.038019 | -0.267158 | 0.7939 |
| DLOG(AX(-1), 2) | -0.019182 | 0.021651 | -0.885982 | 0.3930 |
| DLOG(AX(-2), 2) | -0.021507 | 0.017953 | -1.197974 | 0.2541 |
| DLOG(AX(-3), 2) | -0.049448 | 0.016690 | -2.962767 | 0.0119 |
| $\boldsymbol{ECT_{t-1}}$ | -1.107886*** | 0.258400 | -4.287478 | 0.0011 |
| $\mathbf{Cointeq} = \mathbf{DLOG(Y)} - (\mathbf{0.4999} * \mathbf{DLOG(K)} - \mathbf{0.0002} * \mathbf{LOG(AM)} + \mathbf{0.0275} * \mathbf{DLOG(AX)} + \mathbf{0.0441})$ | | | | |

***Notes: ECT denote Error Correction Term***
****** denote significance at 1% level***

**Table 4. WALD Test/Short run in ARDL Model**

| | **Dependent Variable: DLOG(Y)** |
|---|---|
| Log(K) | 0.0174** |
| Log(AM) | 0.0955* |
| Log(AX) | 0.0823* |

***Note: ***, ** and * denote significances at 1% , 5% and 10% levels, respectively.***

The results in Table 4 indicate a positive and significant effect of domestic investment, agricultural imports, and agricultural exports on economic growth in the short run. The impact of agricultural imports and agricultural exports on economic growth is characterized by a weak significant in the short run.

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The estimated ARDL models have passed a series of diagnostic tests to ascertain the robustness of our empirical results. The diagnostic tests are comprised of serial correlation, heteroskedasticity tests, the normality of residual term, Durbin-Watson test, R-squared, and Adjusted R-squared are all associated with the empirical equation.

**Table 5. Diagnostics Tests**

| **Residual Diagnostics Tests** | **Dependent Variable: LOG(Y)** |
|---|---|
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | 0.9353 |
| Heteroskedasticity Test: Harvey | 0.1076 |
| Heteroskedasticity Test: Glejser | 0.6531 |
| Heteroskedasticity Test: ARCH | 0.8312 |
| Breusch-Godfrey Serial Correlation LM Test: | 0.2951 |
| Test of Normality | 0.136979 |
| R-squared | 0.952393 |
| Adjusted R-squared | 0.888917 |
| F-statistic | 15.00392 |
| Prob(F-statistic) | 0.000015 |
| Durbin-Watson stat | 1.930499 |

Table 5 reported the results of residual diagnostic tests. Heteroskedasticity tests, Serial correlation LM test, the test of Normality, $R^2$, Adjusted $R^2$, Fisher statistic, and Durbin-Watson test indicate that the adopted specification is globally satisfying. The stability test of long-and-short run estimates is tested by using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares (CUSUMsq) of recursive residuals. Figs. 2 and 3 show the results of stability tests such as CUSUM and CUSUMsq.

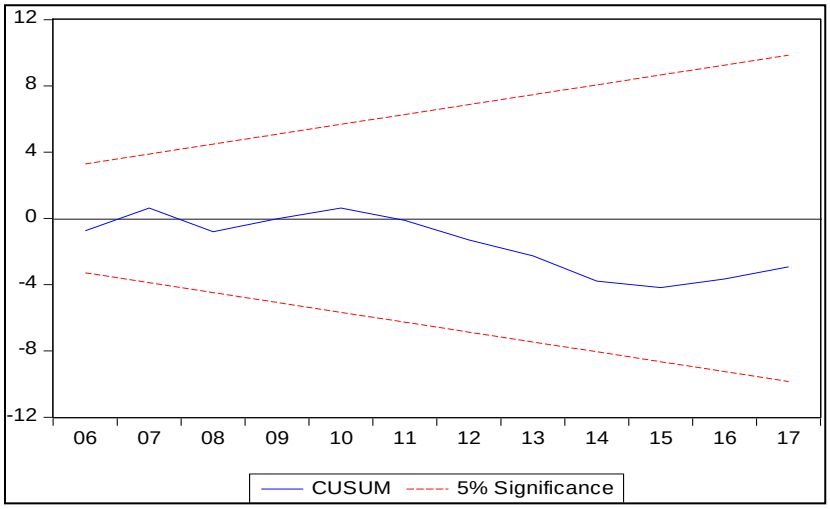

**Fig.2 CUSUM Test**

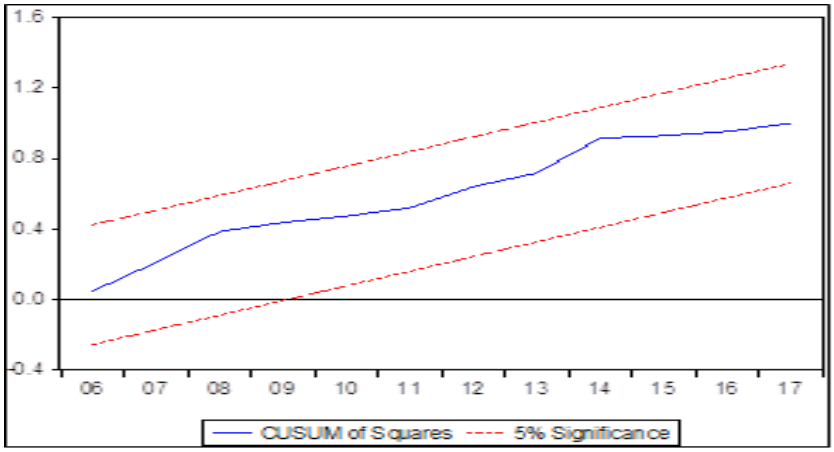


**Fig.3 CUSUMsq Test**

The results of CUSUM and CUSUMsq tests indicate that graphs of both are between the critical bounds at 5% level of significance. This confirms that the ARDL parameters are stable and efficient.

## 5. Conclusion

The agriculture sector plays a key role in the economy in terms of satisfying the domestic and foreign demand which leads to creating more jobs and opportunities. As one of the greatest agricultural trade economies, China has many opportunities in terms of the trade of agricultural products. Since the beginning of the third millennium, the Chinese agricultural exports increase at a strong pace. In this context, this paper aims to answer the question if the agriculture trade promotes Chinese economic growth by employing the ARDL bounds testing for the study period from 1984 to 2017. To the best of our knowledge, this is the first paper that attempts to treat the agriculture trade contribution to economic growth, by considering the agriculture trade as a determinant factor of the Chinese growth model. The long-run findings revealed that domestic investment and agricultural exports have a positive effect on economic growth. However, agricultural imports have a significant negative impact on growth. In the short run, our highlights revealed a positive and significant effect of domestic investment, agricultural

imports, and agricultural exports on economic growth. The positive impact of agriculture exports on growth is due to the importance of agriculture in terms of creating jobs and opportunities for the economy. Besides, sufficient national investment in the agriculture sector tends to enlarge these opportunities and then improves the Chinese economic growth. Furthermore, the negative impact of agriculture imports on growth is justified by the absence of a real contribution of imports to growth, even China is an export economy.

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