



DOI: <https://doi.org>

J-STAR: Journal of Social & Technological Advanced Research

Journal homepage: <https://rjsaonline.org/index.php/J-STAR>



Econometric Modeling of Agricultural Exports and Economic Growth: A Quantitative Methodology for the Agricultural Sector in Uzbekistan

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ARTICLE INFO

ABSTRACT

Received:

February 24, 2026

Revised:

March 17, 2026

Accepted:

April 11, 2026

Available Online:

April 26, 2026

Keywords:

Agricultural Exports,
Economic Development,
Government Assistance,
Productivity, Export-Led
Growth Hypothesis,
Uzbekistan

This studies evaluated the impact of agricultural exports on financial increase, while accounting for productivity and support factors. The quantitative studies layout employed a established questionnaire to acquire main records from 300 Uzbek farmers, exporters, agribusinesses, and policy organisations. Data were evaluated with SPSS, encompassing descriptive statistics, reliability assessment (Cronbach's Alpha), correlation analysis, and multiple regression techniques. The model is expressed as $EG = \beta_0 + \beta_1AE + \beta_2GS + \beta_3AP + \epsilon$. The evaluation demonstrates excellent internal consistency (Cronbach's Alpha = 0.914) and a sturdy version fit ($R^2 = 0.788$, $F = 367.251$, $p < 0.001$). All three independent variables exert a positive and significant influence on economic growth, with agricultural exports demonstrating the most substantial effect ($\beta = 0.737$, $p < 0.001$), succeeded by government support ($\beta = 0.130$, $p = 0.001$) and agricultural productivity ($\beta = 0.094$, $p = 0.020$). These findings corroborate the export-led increase speculation and underscore the necessity for strategic policy interventions to bolster Uzbek agricultural exports and economic development.

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Introduction

Both established and developing economies prioritise economic growth to boost income, employment, and living standards (Armeanu et al., 2017). Many developing countries rely on agriculture for GNP, employment, and foreign exchange (Osabohien et al., 2019). Foreign currency from agricultural exports is needed to import capital goods and advanced technology (Oyetade et al., 2021).

Although agricultural exports are known to boost economic growth, the empirical evidence is inconclusive and context-dependent (Bakari & Mabrouki, 2018; Bakari & Tiba, 2022). More econometric analysis are needed because some studies show strong connections and others weak ones (Mahmood et al., 2018). The complete technique for studying the econometric relationship between agricultural export activity and Uzbekistan's economic growth, including independent variables like state support and farm sector productivity.

Method

Research Design

Kastratović (2024) conducted a quantitative analysis to analyse the association between factors using numerical data. The deductive research approach investigated theories to create hypotheses that were tested empirically (El Weriemmi & Bakari, 2024). This research uses explanatory research to establish causal connections among agricultural exports and monetary growth.

The quantitative layout was selected for this research because it collects standardised data from numerous respondents, improves impartiality and generalisability, and uses sophisticated statistical tools (Liu et al., 2026). A standardised questionnaire guaranteed data consistency, and statistical tools helped objectively analyse results (Okunlola & Ayetigbo, 2024).

Data Gathering

Primary Data Collection: A standardised questionnaire was used to gather records pertinent to the study's goals and capture respondents' current perceptions and experiences (Ravi Kumar et al., 2024). For quantitative and statistical analysis, the questionnaire had closed-ended items (Raihan et al., 2024).

The following 5-point Likert scale alternatives were used to assess respondents' thoughts and perceptions (Tom et al., 2024):

Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5.

Four parts covered research variables in the questionnaire (Kalogiannidis & Syndoukas, 2024):

- Evaluating agricultural export success and expansion.
- Government support and policy: assessing sector institutional support.
- Measurement of efficiency and innovation in agricultural production and technology
- Examining respondents' perceptions of the agricultural department impact on financial Increase.

This study targeted individuals knowledgeable about agriculture exports and economic activities, including farmers, exporters, agribusinesses, and policy stakeholders (Yogi et al., 2025). Simple random sampling gave every target population member an same opportunity of being selected, resulting in 300 respondents with high sample representativeness and low selection bias (Wen & Wirajing, 2026).

The questionnaire was distributed in person or online, and follow-up measures encouraged high response rates (Han et al., 2024; Nawaz & Lyu, 2026).

Conceptual Framework and Model Specification

According to export-led growth theory, the conceptual model has 3 independent variables and 1 dependent variable (Stern, 2019):

Variables of the Study

- Dependent Variable (DV): Economic Growth (EG)
- Independent Variables (IVs):
 - Agricultural Exports (AE)
 - Government Support (GS)
 - Agricultural Productivity (AP)

Conceptual Model

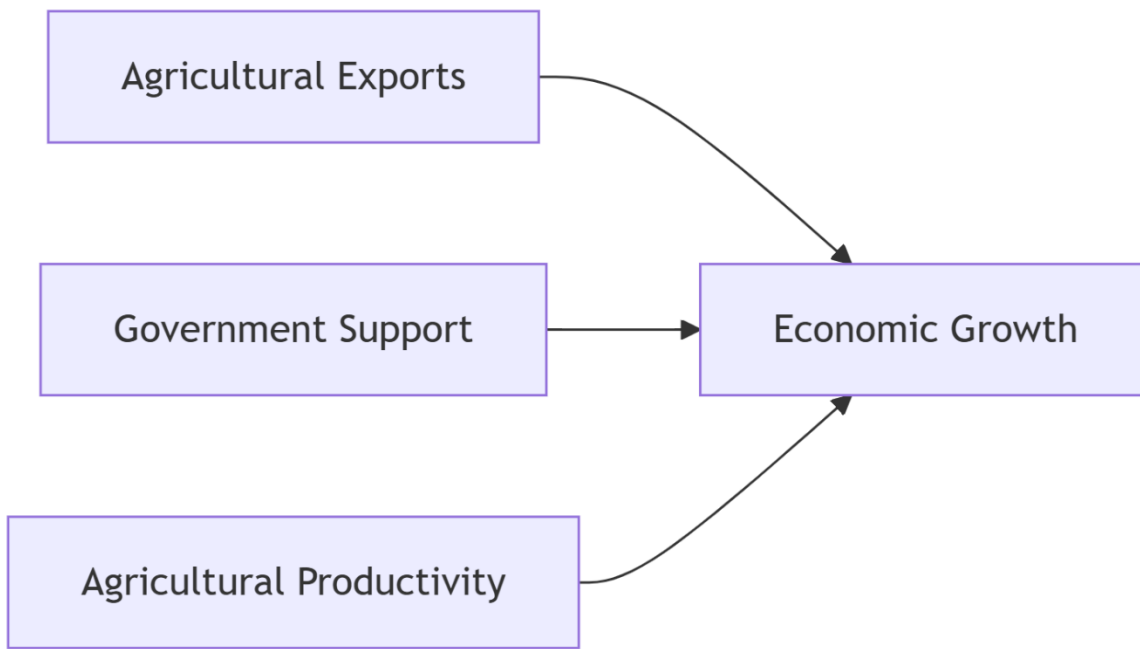


Figure 1: Conceptual Model

The conceptual framework is supported by prior studies. The finding that export spreading is a vital cause of financial growth has been well documented by Balassa (1978). Feder (1983) discovered that export activities stimulate productivity and the general performance of the economy. Krueger (2000) pointed out that the government policy role in boosting export growth is vital. Importance of productivity and innovation in economic growth was stressed by Grossman and Helpman (1993).

The model of the study was given as follows:

$$EG = \beta_0 + \beta_1 AE + \beta_2 GS + \beta_3 AP + \varepsilon$$

Where:

EG = Economic Growth (Dependent Variable)

AE = Agricultural Exports

GS = Government Support

AP = Agricultural Productivity

β_0 = Intercept

$\beta_1, \beta_2, \beta_3$ = Coefficients

ε = Error term

The value of the intercept term (β_0) represents the average economic growth when all the independent variables are both equal to zero. The coefficients indicate the effect that an increase of 1 unit in agricultural exports, government support and agricultural productivity, respectively, have on the country's economic growth (Anghelache et al., 2019). Error term (ε) refers to any other factors that may influence the model, but were not specifically included in the model (Wen et al., 2023).

Social and Cultural Factors

The conceptual framework was justified based on previous studies such as:

- **Balassa Bela (1978)** – established that export expansion significantly promotes economic growth
- **Feder Gershon (1983)** – found that export sectors enhance productivity and overall economic performance

- **Krueger Anne O. (1995)** – highlighted the importance of government policies in supporting export growth
- **Grossman Gene M. & Helpman Elhanan (1991)** – emphasised the role of productivity and innovation in economic growth

Data Analysis Techniques

Data were analysed using the Statistical Package for Social Sciences (SPSS), which is efficient for working with large data volumes and ensuring accuracy (Ispas et al., 2025). Before analysis, data were coded and entered into the software, and data cleaning was performed to identify and eliminate any incomplete or inconsistent responses (Tanveer & Kalim, 2025).

The following analytical techniques were employed (Bajrami et al., 2025; Nawaz & Iqbal, 2025):

Technique	Purpose
Descriptive Statistics	Provide overview of respondent demographics and response patterns (means, standard deviations, frequencies, percentages)
Reliability Analysis (Cronbach's Alpha)	Assess internal consistency of questionnaire items
Correlation Analysis	Assess the degree and direction of correlations among variables.
Multiple Regression Analysis	Assess the influence of independent variables on economic growth.

Multiple regression analysis was the most important statistical tool for estimating the effect of independent variables on economic growth and measuring their contributions while holding others constant (Celestin, 2016).

Reliability, Validity, and Ethics

Cheung et al. (2024) characterise dependability as the consistency and stability of a measurement instrument. Cronbach's Alpha was employed to assess internal consistency, with a threshold of 0.70 or greater deemed acceptable (Sathyanarayana, 2026). The analysis demonstrated robust internal consistency, evidenced by a Cronbach's Alpha of 0.914 (Youssef et al., 2023).

Validity: Validity is how well the instrument assesses its target (Liza et al., 2025). To ensure content validity, the questionnaire was constructed using evaluated items from current literature (Despotović et al., 2021). Clear variable definitions and questionnaire items that addressed theoretical constructs preserved construct validity (Songling et al., 2018).

According to Saberi and Hamdan (2019), this study was conducted ethically and informed respondents of its goal and objectives. Participants could opt out and their comments were anonymous and confidential (Zhang et al., 2021). No personal information was released; information was summarised. Participants could leave the study at any time without penalty (Maiga, 2024).

Results and Discussion

Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Agricultural Exports	300	12.00	30.00	23.0100	2.37811
Government Support	300	12.00	30.00	22.9200	2.47940
Agricultural Productivity	300	12.00	30.00	22.9867	2.39002

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Economic Growth	300	12.00	30.00	23.1867	2.41757
Valid N (listwise)	300				

According to descriptive statistics (based on 300 valid responses), economic growth (23.19), agricultural exports (23.01), agricultural production (22.99), and government support (22.92) all had reasonably high means. The standard deviations were minimal (2.37-2.48), indicating low dispersion from the average and high favourable evaluations for all study variables (Osabohien et al., 2019).

Reliability Analysis

Cronbach's Alpha	N of Items
.914	24

Cronbach's Alpha (0.914) was considerably above the suggested standard, showing consistency in evaluating the same concepts across 24 items of the four constructs (Runganga & Mhaka, 2021).

Correlation Analysis

	Agricultural Exports	Government Support	Agricultural Productivity	Economic Growth
Agricultural Exports	1	.607**	.617**	.874**
Government Support	.607**	1	.708**	.644**
Agricultural Productivity	.617**	.708**	1	.641**
Economic Growth	.874**	.644**	.641**	1

Note: Correlation is significant at the 0.01 level (2-tailed).

The correlation study revealed a significant positive correlation ($p < 0.01$) among all variables. Agriculture export correlated most with economic growth ($r = 0.874$), whereas government support and agricultural productivity correlated moderately ($r = 0.644$, $r = 0.641$) (Güzel & Akin, 2021).

Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.888 ^a	.788	.786	1.11815

^aPredictors: (Constant), Agricultural Productivity, Agricultural Exports, Government Support

At 0.888, the model had excellent explanatory power, indicating a positive strong link between simulated and observed values. The three independent variables explain 78.8% of economic growth with an R² value of 0.788.

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1377.472	3	459.157	367.251	.000 ^b
Residual	370.075	296	1.250		
Total	1747.547	299			

^aDependent Variable: Economic Growth

^bPredictors: (Constant), Agricultural Productivity, Agricultural Exports, Government Support

The ANOVA results indicate a substantial effect of independent factors on economic growth (F value = 367.251, significance level = 0.000, p < 0.05).

Coefficients^a

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.851	.710		1.199	.231
Agricultural Exports	.749	.036	.737	20.643	.000
Government Support	.127	.039	.130	3.277	.001
Agricultural Productivity	.095	.041	.094	2.339	.020

Dependent Variable: Economic Growth

Agricultural exports have the greatest impact on economic growth ($B = 0.749$, $\beta = 0.737$, $p < 0.001$). Government funding and agricultural productivity have a considerable favourable impact ($B = 0.127$, $\beta = 0.130$, $p = 0.001$ and $B = 0.095$, $\beta = 0.094$, $p = 0.020$).

Estimated Econometric Equation:

$$EG = 0.851 + 0.749AE + 0.127GS + 0.095AP$$

Hypothesis Testing Results

Hypothesis	Statement	Beta (β)	t-value	Sig. (p-value)	Result
H1	Agricultural exports substantially enhance economic growth.	0.737	20.643	0.000	Accepted
H2	Government assistance exerts a substantial favourable influence on economic expansion.	0.130	3.277	0.001	Accepted
H3	Agricultural productivity significantly enhances economic growth.	0.094	2.339	0.020	Accepted

All three hypotheses were accepted, thus agricultural export, support, and productivity all significantly boost economic growth. The main factor is agricultural export, followed by government support and productivity.

Discussion

This study offers solid evidence of export-led expansion in Uzbekistan's agricultural industry. The findings support international research linking agricultural exports to economic growth.

Expanding agricultural exports has a considerable beneficial impact on national income, foreign exchange revenues, and economic performance ($\beta = 0.737$, $p < 0.001$). This agrees with Balassa (1978) and Feder (1983), who believe export growth is crucial to economic progress.

Improving agricultural performance requires effective policies, subsidies, infrastructure development, and institutional support, as shown by the strong influence of government support ($\beta = 0.130$, $p = 0.001$). This is consistent with Krueger (2000), who emphasised export-led growth government programs. Despite having the smallest coefficient among independent variables, agricultural production has a substantial positive impact on economic growth ($\beta = 0.094$, $p = 0.020$). This supports the endogenous growth hypothesis and Grossman and Helpman (1993)'s claim that productivity and innovation drive long-term economic growth.

Conclusion

The study achieved its goals and yielded these results: Agricultural exports, supports, and productivity boost Uzbekistan's economy statistically. Agriculture exports caused the most economic growth, followed by government support and productivity. The model's explanatory strength ($R^2 = 0.788$) and F test value ($F = 367.251$, $p < 0.001$) validate the export-led growth theory.

Results have major policy implications. Policy interventions should emphasise agricultural export performance, access to international markets, export impediments, and value-added agricultural products. Government support should include subsidies, better rural infrastructure, financial aid to farmers and exporters, and expedited export procedures. Modern technology, high-quality inputs, better farming methods, and farmer capacity training should boost agricultural productivity.

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