

How Macroeconomic Indicators Drive Food Production in OIC Countries?

Faishol Luthfi^{1*}, Aya Sofia Ardelia², Diah Arminingsih³

^{1,2,3}Faculty of Economics and Business, Universitas Tanjungpura, Indonesia
E-mail: ¹faishol.luthfi@ekonomi.untan.ac.id, ²aya.sofia@ekonomi.untan.ac.id,
³diah.arminingsih@ekonomi.untan.ac.id

*Corresponding author

JEL Classification:

C31
E23
O13

Received: 02 April 2025

Revised: 22 July 2025

Accepted: 04 August 2025

Available online: October 2025

Published regularly: October 2025

ABSTRACT

Research Originality: This research prioritizes a more in-depth analysis of OIC member countries with different income categories. The research also focuses on developing a more robust and integrated modeling framework that can capture the dynamic interactions between inflation, economic growth, and food production.

Research Objectives: This study investigates the impact of economic growth and inflation on food production in both the short and long term.

Research Methods: This study uses panel data from 40 OIC member countries from 1992 to 2021. This study employs Panel Autoregressive Distributed Lag (PARDL) and categorizes OIC member countries based on income classifications: High-Income, upper-middle, lower-middle, and Low-Income countries.

Empirical Results: The findings indicate that economic growth and inflation substantially impact food production over the long term. Certain countries exhibit a beneficial impact, whereas others demonstrate a detrimental effect.

Implications: This research can provide new insights into the complex relationship between macroeconomic indicators and food availability, and it can be used to inform policymaking recommendations. In addition, the findings can support policymakers in formulating more effective strategies to shift policy towards sustainability.

Keywords:

food production; inflation; economic growth; panel autoregressive distributed lag

How to Cite:

Luthfi, F., Ardelia, A. S., & Arminingsih, D. (2025). How Macroeconomic Indicators Drive Food Production in OIC Countries: A Panel ARDL Analysis. *Signifikan: Jurnal Ilmu Ekonomi*, 14(2), 325-338. <https://doi.org/10.15408/sjie.v14i2.45673>.

INTRODUCTION

Understanding the complex dynamics between inflation, economic growth, and food production is crucial in the context of effective economic policy planning and implementation, especially in countries that depend on the agricultural sector as the backbone of their economy (Destiningsih et al., 2019; Latif & Mustani, 2020; Liszbinski et al., 2020; Shkliarevsky, 2023). Furthermore, understanding the dynamics of this relationship will also play a crucial role in global policies, particularly those related to zero hunger (Sustainable Development Goal 2). Inflation, defined as a general increase in the prices of goods and services in an economy over a period of time, can undermine consumer purchasing power and increase production costs for producers, including farmers (Widagdo et al., 2020). Economic growth, on the other hand, reflects an increase in a country's capacity to produce goods and services over time, which can lead to rising incomes and living standards (Wajeetongratana, 2020; Zainurossalamia et al., 2021). Its implications for food production are far-reaching, affecting the availability, accessibility, and stability of food supply. A comprehensive understanding of the relationship between inflation, economic growth, and food production is therefore vital for maintaining food security and sustainable economic development.

Numerous academics have produced empirical data about the dynamic impact of macroeconomic conditions on food production. Several significant research gaps hinder a comprehensive understanding of the complex relationship between inflation, economic growth, and food production. Specific research yields conflicting outcomes, with some indicating a positive correlation and others demonstrating a negative effect. Positive economic expansion typically results in an augmentation of disposable income, fostering heightened demand for food, both quantitatively and qualitatively (Khayer et al., 2023; Mustafa et al., 2022). Moreover, economic expansion frequently stimulates investment in agricultural research and development, resulting in advancements in crop yields, pest management, and irrigation methods (Pathak, 2023), thus increasing food production.

Empirical evidence on inflation also suggests different results. Some studies show that inflation has a positive effect, while others show a negative effect. Inflation itself is one of the significant challenges for the agricultural sector as it affects production costs, market mechanisms, and long-term viability (Eslami & Baghestany, 2020; Mekonen, 2020). Research by Headey & Hirvonen (2023) explains that in the short term, inflation causes food prices to increase due to the absorption of food crop production into the market. When food prices increase, farmers' profits increase, allowing them to increase food production. Another result explained that elevated inflation rates can destabilize agricultural production by increasing the costs of essential inputs such as fertilizers, pesticides, fuel, and labor, thereby reducing food production (Girdzijauskas et al., 2022; Iddrisu & Alagidede, 2020). Similarly, inflation can lower consumers' purchasing power and raise farmers' input costs, which can lead to lower food production and greater food insecurity (Panda et al., 2020).

In certain countries of the Organization of Islamic Cooperation (OIC), the correlation among economic growth, inflation, and food production frequently lacks coherence. The agricultural industry, a pillar of the food sector, is not the cornerstone of the economy. Regarding the economy, some countries, especially OIC member countries in the Middle East, still rely on the oil and gas sector (Yusof & Bahlous, 2013). Excessive dependence on oil revenues in many OIC countries, especially in the Middle East, can lead to the emergence of unsustainable economic models. Therefore, it is necessary to diversify the economy to reduce reliance on oil revenues, with one potential area for diversification being food production (Tuama, 2018).

The inconsistency of the empirical evidence presented makes studies on the influence of macroeconomic indicators on food production relevant for further investigation. This study is conducted in OIC member countries because some of them still rely on oil-based economic sectors and have not focused on the food sector, even though food availability is fundamental for sustainability. Therefore, the purpose of this study is to analyze macroeconomic indicators, namely inflation and economic growth, in relation to food production in OIC member countries. The research stands out from previous studies by focusing more deeply on OIC member countries with various income categories and by developing a more robust and integrated modeling framework capable of capturing the dynamic interactions between inflation, economic growth, and food production. This research can provide new insights into the complexity of the relationship between macroeconomic indicators and food availability and can be used as recommendations for policy making. In addition, the findings can support policymakers in formulating more effective strategies to shift policy towards sustainability.

METHODS

This research uses a quantitative approach. This approach will comprehensively analyze the influence of variables (Mohajan, 2020). A more detailed explanation of the operational variables used in this study is shown in Table 1.

This study uses panel data available for all countries that are members of the OIC. This study will analyze data from 57 countries for the period from 1992 to 2021. The OIC member countries consist of Afghanistan, Albania, Azerbaijan, Bahrain, Bangladesh, Benin, the United Arab Emirates, Brunei Darussalam, Burkina Faso, Algeria, Djibouti, Chad, Indonesia, Morocco, Ivory Coast, Palestine, Gabon, Gambia, Guinea, Guinea-Bissau, Guyana, Iraq, Iran, Cameroon, Qatar, Kazakhstan, Kyrgyzstan, Comoros, Kuwait, Libya, Lebanon, Maldives, Malaysia, Mali, Egypt, Mauritania, Mozambique, Niger, Nigeria, Uzbekistan, Pakistan, Senegal, Sierra Leone, Somalia, Sudan, Suriname, Syria, Saudi Arabia, Tajikistan, Togo, Tunisia, Türkiye, Turkmenistan, Uganda, Oman, Jordan, and Yemen.

Table 1. Operational Variables

Variables	Proxy	Code	Unit	Description	Data Source
Food	Food Production Index	fpi	Index	The Food and Agriculture Organization of the United Nations (FAO) defines the Food Production Index as the index of edible food crops that possess nutritional value. Coffee and tea are omitted due to their lack of nutritional benefit.	
Economic Growth	Gross Domestic Product Growth	gg	Percent	Economic growth is defined as a rise in the production of products and services within a region's economy. Economic growth is calculated as follows: $\frac{(GDP_t - GDP_{t-1})}{GDP_{t-1}} \times 100$	SESRIC
Inflation	Consumer Price Index	cpi	Index	Inflation generally uses an indicator called the Consumer Price Index (CPI). The change in the CPI reflects the price movement of a package of goods and services used by the people.	

Due to the availability of data, filtering was necessary, which resulted in the elimination of some countries' data. This brings the total number of OIC member countries that are the object of research to 40 countries, which is a reasonably representative number for this study. This data (from 40 countries and spanning 1992 to 2021) was chosen for its completeness to ensure the data obtained forms a balanced panel category. The completeness of the data is considered sufficient to see the dynamics of changes and data patterns. In addition, the completeness of this data is also part of the balanced panel data formulation. Teal & Eberhardt (2010) emphasize the use of panel ARDL when $T > 10$, particularly for detecting long-run cointegration. Balanced panel data, where observations are available for each cross-sectional unit across all time periods, offer significant advantages over unbalanced panel data, where some observations are missing (Gutiérrez et al., 2024). While unbalanced panels are more common in practice due to attrition, missing data, or staggered entry into the study, balanced panels provide a more straightforward and robust framework for many econometric techniques (Fitzmaurice & Ravichandran, 2008).

In more detail, the sample is analyzed into several groups in specific models as shown in Table 2. Panel data is employed because it examines effects in groups rather than individual units; therefore, very little information is lost (Moufidi & Mansouri, 2021; Shanti et al., 2023). Moreover, panel data analysis mitigates the disruptions arising from individual time series, and heteroscedasticity is not a concern (Lillo & Torrecillas, 2018). Panel data is most appropriate when data availability is an issue, especially in poor countries with limited temporal variables (Ahn et al., 2013; Hidhiir et al., 2024).

Table 2. Research Model

Model (Group)	Observation
Model I: High-Income Countries (Bahrain, Brunei, Guyana, Oman, Qatar, Saudi Arabia, United Arab Emirates)	N=7, T=29 N*T = 203
Model II: Upper Middle-Income Countries (Albania, Algeria, Gabon, Indonesia, Iran, Libya, Malaysia, Maldives, Türkiye)	N=9, T=29 N*T = 261
Model III: Lower Middle-Income Countries (Bangladesh, Benin, Cameroon, Comoros, Cote d' Ivoire, Djibouti, Egypt, Jordan, Lebanon, Morocco, Pakistan, Senegal, Tunisia)	N=13, T=29 N*T = 377
Model IV: Low-Income Countries (Burkina Faso, Chad, Gambia, Guinea-Bissau, Mali, Mozambique, Niger, Sierra Leone, Togo, Uganda, Yemen)	N=11, T=29 N*T = 319
Total	1160

It can be written simply as follows:

$$fpi_{it} = \alpha_{it} + \beta_1 gg_{it} + \beta_1 cpi_{it} + \varepsilon_{it} \tag{1}$$

Where *fpi* is the food production index, which is a proxy for the agricultural sector. *Fpi* is the dependent variable that will be influenced by the independent variables of economic growth and inflation.

This research uses Panel Autoregressive Distributed Lag (PARDL) analysis. When examining each model that has been formed, the four models indicate that $N < T$, making the PARDL model appropriate for use in this study. In addition, the PARDL model allows generating a combination of integrated variables with various orders after the stationarity test (Boateng & Lew, 2025). The PARDL model can provide short-run and long-run coefficients for inference (Bentzen & Engsted, 2001; Mcnown et al., 2018; Ngoma & Yang, 2024; Nkoro & Uko, 2016; Ramos-Herrera, 2024; Zardoub, 2023).

Autoregressive Distributed Lag models have become a mainstay in econometrics for analyzing time series data, particularly when investigating the relationships between variables with mixed orders of integration (Sheikh et al., 2020). Within the ARDL framework, two prominent variations exist: Panel ARDL (PARDL) and Nonlinear ARDL (NARDL), each designed to address specific data characteristics and research questions (Shanti et al., 2023). PARDL models extend the traditional ARDL approach to panel data settings, accommodating cross-sectional dimensions and allowing for the examination of both short-run and long-run relationships across multiple entities, while NARDL models, on the other hand, relax the linearity assumption inherent in standard ARDL models, enabling the capture of asymmetric effects and nonlinear dynamics within a single time series or panel data context. This study uses the PARDL model instead of NARDL because of the linearity assumption. Linearity indicates the strength of the theory that is the basis for analyzing the relationship between variables.

In general, the PARDL model for High-Income, Upper Middle-Income, Lower Middle-Income and Low-Income countries is as follows:

$$fpi_{it} = \alpha_{it} + \sum_{j=1}^p \beta_j fpi_{i,t-j} + \sum_{j=0}^p \gamma_j gg_{i,t-j} + \sum_{j=0}^p \delta_j cpi_{i,t-j} + \varepsilon_{it} \quad 2$$

Description:

$fpi_{i,t}$: Food Production Index for country i at time t

$gg_{i,t}$: Economic Growth for country i at time t

$cpi_{i,t}$: Inflation for country i at time t

α_{it} : Individual fixed effects

β_j, γ_j : Lag coefficient of each variable

ε_{it} : Error Term

RESULTS AND DISCUSSION

The final results of extensive research efforts often yield several complex findings, each of which contributes uniquely to a comprehensive understanding of the topic under study. These findings, which are carefully collected and rigorously analyzed, form the basis for interpretations, conclusions, and subsequent recommendations. The initial phase of this empirical investigation involves examining the data, necessitating the application of descriptive statistical analysis. The purpose of presenting descriptive statistics is to provide a summary of the data set, including measures such as mean, variability, and the shape of the distribution.

Table 3. Descriptive Statistics

Model	Var	Mean	Max	Min	SD
Model I	FPI	82.76638	185.23	25.87	31.84269
	GG	4.493095	43.48	-4.96	5.591884
	CPI	98.27438	266.12	31.83	47.10341
Model II	FPI	86.78096	169.04	34.79	22.50247
	GG	3.828667	86.83	-50.34	8.963176
	CPI	100.9321	561.61	0.35	77.78331
Model III	FPI	82.53454	181.33	33.19	24.78141
	GG	4.295385	16.21	-25.91	3.893032
	CPI	93.05744	516.84	9.4	54.5255
Model IV	FPI	79.325	147.47	27.2	27.87232
	GG	4.722364	37.23	-36.06	6.804404
	CPI	123.7203	2123.49	2.92	193.8958

Table 3 elucidates that the outcomes of descriptive statistical analyses indicate that the mean score of the food production index ranges from 79.32 to 86.78 across all models in High-Income, upper-middle, lower-middle, and Low-Income Countries.

The average economic growth ranges from 3 to 4 percent, indicating a stable growth rate. Upper Middle-Income and Low-Income countries exhibit inflation, as their average Consumer Price Index is above 100, whereas High-Income and Lower Middle-Income countries demonstrate deflation, with indices below 100. The most significant changes in economic growth, as indicated by the data, occurred in higher middle-income countries, with a peak growth of 86.83 percent and a trough of -50.34 percent. In High-Income countries, economic growth was robust, with a maximum rate of 43.48 percent and a minimum of -4.96 percent.

Stationarity tests show consistent mean, variance, and covariance structures across time periods. This result indicates that the probability distribution of the data does not change over time. This property is critical to enable proper forecasting, modeling, and inference, as it allows past observations to predict future behavior with a reasonable degree of confidence (Milly et al., 2015; Omosehin et al., 2021). Table 4 shows the result of the unit root test.

Table 4 explains that stationarity tests using the Im, Pesaran, and Shin W-stat, the Augmented Dickey-Fuller (ADF) - Fisher Chi-square, and the Phillips-Perron (PP) - Fisher Chi-square tests show stationary data at different levels. The agricultural sector and inflation variables are at *first difference*, while economic growth is at the level. For this reason, the ARDL panel model is appropriate because the stationarity level is at a different order.

The cointegration test is used to analyze the presence or absence of long-run effects. Cointegration analysis is a subset of modern time series econometrics that offers rigorous analyses to investigate long-run equilibrium relationships among non-stationary variables. Unlike traditional regression methods, which can produce spurious results when applied to trending data, cointegration techniques explicitly take into account the non-stationary nature of economic time series, thus providing a more reliable basis for inference (Usman et al., 2022).

Table 4. Unit Root Test

Variables	Model I		Model II		Model III		Model IV		Remarks	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Intercept & Trend		
Δfpi	Im, Pesaran and Shin W-stat	-6.13128*** (0.0000)	-5.96802*** (0.0000)	-7.57576*** (0.0000)	-6.29133*** (0.0000)	-11.2990*** (0.0000)	-9.99281*** (0.0000)	-8.68324*** (0.0000)	-7.03751*** (0.0000)	I(0)
	ADF - Fisher Chi-square	63.6048*** (0.0000)	59.1880*** (0.0000)	90.3559*** (0.0000)	72.1496*** (0.0000)	164.891*** (0.0000)	137.718*** (0.0000)	115.586*** (0.0000)	89.4801*** (0.0000)	
	PP - Fisher Chi-square	159.662*** (0.0000)	200.073*** (0.0000)	182.780*** (0.0000)	416.456*** (0.0000)	300.520*** (0.0000)	1222.50*** (0.0000)	244.227*** (0.0000)	736.314*** (0.0000)	
	Im, Pesaran and Shin W-stat	-4.21181*** (0.0000)	-3.61497*** (0.0002)	-8.54884*** (0.0000)	-7.38391*** (0.0000)	-3.76804*** (0.0001)	-1.67590** (0.0469)	-8.15646*** (0.0000)	-7.65845*** (0.0000)	I(0)
gg	ADF - Fisher Chi-square	45.2032*** (0.0000)	41.5240*** (0.0001)	103.905*** (0.0000)	84.3828*** (0.0000)	62.4924*** (0.0001)	42.0651** (0.0242)	108.723*** (0.0000)	95.4612*** (0.0000)	
	PP - Fisher Chi-square	74.1574*** (0.0000)	72.4324*** (0.0000)	154.416*** (0.0000)	857.105*** (0.0000)	136.942*** (0.0000)	121.244*** (0.0000)	198.746*** (0.0000)	488.631*** (0.0000)	
	Im, Pesaran and Shin W-stat	-2.46718*** (0.0068)	-0.52230 (0.3007)	-2.54687*** (0.0054)	-1.73222** (0.0416)	-4.50201*** (0.0000)	-3.68412*** (0.0001)	-5.28087*** (0.0000)	-5.13077*** (0.0000)	I(0)
	ADF - Fisher Chi-square	27.0046** (0.0192)	14.0259 (0.4478)	67.4060*** (0.0000)	55.6187*** (0.0000)	96.3575*** (0.0000)	74.4034*** (0.0000)	98.5698*** (0.0000)	82.8542*** (0.0000)	
Δcpi	PP - Fisher Chi-square	47.3467*** (0.0000)	31.1008*** (0.0054)	67.6668*** (0.0000)	53.8708*** (0.0000)	100.381*** (0.0000)	97.1639*** (0.0000)	104.907*** (0.0000)	110.504*** (0.0000)	

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.
Source: The results of the author's data processing

Table 5. Cointegration Test

	Hypothesized No. of CE(s)	No. of CE(s)	None	At most 1	At most 2
Model I	Fisher Stat.*	(from trace test)	58.47 (0.0000***)	24.01 (0.0457**)	19.30 (0.1539)
		(from max-eigen test)	48.37 (0.0000***)	21.24 (0.0956*)	19.30 (0.1539)
Model II	Fisher Stat.*	(from trace test)	86.18 (0.0000***)	26.87 (0.0815*)	11.53 (0.8707)
		(from max-eigen test)	79.3 (0.0000***)	29.24 (0.0455**)	11.53 (0.8707)
Model III	Fisher Stat.*	(from trace test)	116 (0.0000***)	49.59 (0.0035***)	40.16 (0.0376**)
		(from max-eigen test)	93.06 (0.0000***)	42.24 (0.0232**)	40.16 (0.0376**)
Model IV	Fisher Stat.*	(from trace test)	155.5 (0.0000***)	59.67 (0.0000***)	23.30 (0.385)
		(from max-eigen test)	124.4 (0.0000***)	60.98 (0.0000***)	23.30 (0.385)

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Source: The results of the author's data processing

Table 5 explains the results of the cointegration panel test using the Johansen Fisher Test, where all models are significant at the 1%, 5%, and 10% levels. This indicates that there is a long-term influence between the variables studied in models I, II, III, and IV. These results only explain the presence or absence of long-term influence but do not provide a detailed estimate of its magnitude on the models formed.

The estimation outcomes of the PARDL model are presented in Table 6. Table 6 presents the coefficients and probability values for each variable across all models: Model I (High-Income Countries), Model II (Upper Middle-Income Countries), Model III (Lower Middle-Income Countries), and Model IV (Low-Income Countries).

Model I: In the long term, economic expansion exerts a substantial adverse impact on food production, although inflation has a negligible negative effect. In the medium run, neither economic growth nor inflation significantly impacts food production.

Model II: Over the long term, economic growth and inflation exert a substantial positive impact on food production. In the short term, inflation is the sole factor exerting a major negative impact on food production.

Model III: Over the long term, economic growth and inflation exert a substantial positive influence on food production. In the short run, economic growth and inflation exert a negligible influence on food production.

Model IV: In the long term, economic growth exerts an insignificant beneficial influence on food production, whereas inflation has a considerable positive impact. In the medium run, neither economic growth nor inflation significantly impacts food production.

Table 6. PARDL

Variables	Model I		Model II		Model III		Model IV	
	Coeff	Prob	Coeff	Prob	Coeff	Prob	Coeff	Prob
Long-Run								
gg	-4.883723	0.0643*	5.099422	0.0338**	0.989478	0.0048***	1.806976	0.1151
cpi	-0.288972	0.1061	0.418931	0.0103**	0.609495	0.0000***	1.624271	0.0000***
C	193.4962	0.0000	94.17356	0.0000	37.77922	0.0000	22.58913	0.0939
Short-Run								
COINTEQ	-0.103509	0.1359	-0.040261	0.0002	-0.170416	0.0405	-0.046176	0.0028
D(fpi(-1))	-0.090031	0.4669	-0.132512	0.1878			-0.132262	0.2662
D(fpi(-2))	0.129607	0.0992*						
D(fpi(-3))	0.184837	0.1482						
D(gg)	0.560678	0.1412	-0.063047	0.5021	0.089603	0.5405	0.315368	0.2516
D(gg(-1))							0.076307	0.7078
D(gg(-2))							0.187194	0.2755
D(cpi)			-0.288361	0.0843*				
D(cpi(-1))			-0.029513	0.6756				

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Source: The results of the author's data processing

The estimation results indicate that economic expansion positively influences food production in the long term among Upper-Middle, Lower-Middle, and Low-Income Countries. This outcome aligns with the studies conducted by (Khayer et al., 2023; Mustafa et al., 2022; Pathak, 2023). Positive economic growth will undoubtedly result in a rise in individuals' income. The rise in wealth stimulates heightened demand for food, both quantitatively and qualitatively (Khayer et al., 2023; Mustafa et al., 2022). This increase in demand can boost food production by enhancing agricultural output, prompting farmers to implement more efficient technology to meet the needs of an expanding market. Moreover, economic expansion frequently stimulates investment in agricultural research and development, resulting in advancements in crop yields, pest management, and irrigation methods (Pathak, 2023). The results indicate a long-term influence due to the involvement of technology investment in this process. As farmers' income rises, they require time to advance the agricultural industry in alignment with market demand. The integration of technology in agriculture and the short timeframe from planting to harvest necessitate quick decisions.

In High-Income Countries, economic growth diminishes the productivity of the agriculture sector. Over time, agriculture's significance as the primary catalyst for economic growth diminishes in tandem with economic progress (Poláčková, 2020; Sulasni et al., 2022). This result is consistent with the findings of Sulasni et al. (2022), which elucidate a long-term transition in the economic sector from agriculture to industry. Gollin (2023) asserts in his research that this behavior is natural.

The estimation results indicate that inflation has a positive influence on food production. Inflation works as a double-edged sword for agricultural output, yielding both detrimental and beneficial effects. The effect of inflation will be detrimental when the

costs of production goods or input materials, such as fertilizers, agricultural implements, seeds, and similar items, rise. This results in a decrease in agricultural sector productivity. Inflation can have a positive influence when price increases affect production goods or harvested products. This can enhance farmers' income, enabling them to advance their agricultural practices in both quality and quantity. This analysis reveals a beneficial effect prevalent across most countries, including Upper-Middle, Lower-Middle, and Low-Income Countries. This finding is consistent with the results of Headey & Hirvonen (2023), which indicate that inflation prompts an agricultural supply response. Inflation drives up food costs, leading to the transfer of food crop production from the agricultural sector to the market. The increase in food prices increases farmers' income, thereby encouraging agricultural development and consequently increasing food production.

In High-Income countries, inflation has a negative relationship, although it is not significant. Inflation increases the price of output goods, resulting in a gap between the price received by farmers and the price paid for inputs, which in turn affects real incomes and potentially losses (Girdzijauskas et al., 2022; Iddrisu & Alagidede, 2020; Panda et al., 2020). Furthermore, the observed insignificant relationship may be attributed to the transition of the economic sector from agriculture to manufacturing.

CONCLUSION

This study contributes to the literature by illustrating the impact of inflation and economic growth on food production. The findings indicate that economic growth and inflation significantly influence food production. In low- to middle-income countries, these factors tend to increase food production through agricultural output, but in High-Income countries, they tend to decrease it. Furthermore, the study examines how economic expansion can increase people's incomes. This growth in income drives up demand for food, both in quantity and quality. Farmers will respond to increased food demand by boosting the agricultural industry. This result also agrees with the Solow-Swan neoclassical theory of economic growth. Similarly, inflation influences food production. Although inflation has both a negative and a positive impact on agricultural output, this study found that it is positive in many countries. Inflation raises food prices, absorbing food crop production from the agricultural sector into the market. When food prices rise, farmers' earnings rise. This farmer's profit drives the development of the agriculture sector and its impact on increasing food production.

There are recommendations from the research conducted. First, policymakers should consider the complexity of the relationship between macroeconomic indicators and food production to construct effective strategy formulations. Second, policymakers (especially OIC countries) should also formulate more effective strategies to shift policies towards sustainability.

Acknowledgement

This research is funded by the Research Grant Scheme by LPPM Universitas Tanjungpura in decree number 2355/UN22.2/PT.01.05/2025.

REFERENCES

- Ahn, S. C., Lee, Y. H., & Schmidt, P. (2013). Panel Data Models with Multiple Time-Varying Individual Effects. *Journal of Econometrics*, 174(1), 1–14. <https://doi.org/10.1016/j.jeconom.2012.12.002>.
- Bentzen, J., & Engsted, T. (2001). A Revival of The Autoregressive Distributed Lag Model in Estimating Energy Demand Relationships. *Energy*, 26(1), 45–55.
- Boateng, A., & Lew, B. (2025). Corporate Social Responsibility Expenditures and Bank Performance : Role of Size Among Listed Banks in Ghana. *Journal of Risk and Financial Management*, 18(3), 127. <https://doi.org/https://doi.org/10.3390/jrfm18030127>.
- Destiningsih, R., Sugiharti, R. R., & Achsa, A. (2019). Food Commodity Competitiveness and Accessibility in Barlingmascakeb. *Jejak: Jurnal Ekonomi dan Kebijakan*, 12(1), 218-230. <https://doi.org/10.15294/jejak.v12i1.18783>.
- Eslami, M., & Baghestany, A. A. (2020). Modeling the Impact of Inflation Uncertainty on Food Sector Growth. *Journal of Nutrition and Food Security*, 5(1), 85-92. <https://doi.org/10.18502/jnfs.v5i1.2322>.
- Fitzmaurice, G. M., & Ravichandran, C. (2008). A Primer in Longitudinal Data Analysis [Review of A Primer in Longitudinal Data Analysis. *Circulation*, 118(19). <https://doi.org/10.1161/circulationaha.107.714618>.
- Girdzijauskas, S., Štreimikienė, D., Griesienė, I., Mikalauskiene, A., & Kyriakopoulos, G. L. (2022). New Approach to Inflation Phenomena to Ensure Sustainable Economic Growth. *Sustainability*, 14(1), 518. <https://doi.org/10.3390/su14010518>.
- Gollin, D. (2023). Agricultural Productivity and Structural Transformation: Evidence and Questions for African Development. *Oxford Development Studies*, 51(4), 375. <https://doi.org/10.1080/13600818.2023.2280638>.
- Gutiérrez, C., Negrão, J., Dias, A. M. P. G., & Guindos, P. (2024). Bibliometric Review of Prefabricated and Modular Timber Construction from 1990 to 2023: Evolution, Trends, and Current Challenges. *Sustainability*, 16(5), 2134. <https://doi.org/10.3390/su16052134>.
- Headey, D., & Hirvonen, K. (2023). Higher Food Prices can Reduce Poverty and Stimulate Growth in Food Production. *Nature Food*, 4, 699-706. <https://doi.org/https://doi.org/10.1038/s43016-023-00816-8>.
- Hidhiir, M. H. b., Ahmad, Z., Junoh, M. Z. M., & Yusof, M. F. b. (2024). Discover the Sustainability Dynamics of Economic Growth in ASEAN-5 Countries: A Panel ARDL Approach. *Discover Sustainability*, 5, 145. <https://doi.org/10.1007/s43621-024-00351-x>.
- Iddrisu, A., & Alagidede, P. (2020). Monetary Policy and Food Inflation in South Africa: A Quantile Regression Analysis. *Food Policy*, 91, 101816. <https://doi.org/10.1016/j.foodpol.2019.101816>.
- Khayer, N., Rahul, J. K., & Chakraborty, S. (2023). Strategy Adjustments for FMCG Supply Chains in Bangladesh to Counter Future Pandemic Disruptions. *Journal of The Institution of Engineers Series C*, 104(3), 613. <https://doi.org/10.1007/s40032-023-00923-2>.
- Latif, A., & Mustani, M. (2020). Analysis of Seed and Fertilizer Assistance Programs on Improving Corn Farmers. *Gorontalo Development Review*, 3(1), 1-10. <https://doi.org/10.32662/golder.v3i1.735>.

- Lillo, R. L., & Torrecillas, C. (2018). Estimating Dynamic Panel Data. A Practical Approach to Perform Long Panels. *Revista Colombiana de Estadística*, 41(1), 31-40. <https://doi.org/10.15446/rce.v41n1.61885>.
- Liszbinski, B. B., de Mello, E. S., Brizolla, M. M. B., Brum, A. L., Patias, T. Z., & Baggio, D. K. (2020). Sustainability in Soybean Production from the Perspective of the Producers. *Canadian Center of Science and Education*, 10(1), 138-150. <https://doi.org/10.5539/jms.v10n1p138>.
- Mcnown, R., Sam, C. Y., & Goh, S. K. (2018). Bootstrapping the Autoregressive Distributed Lag Test for Cointegration. *Applied Economics*, 50(13), 1509-1521. <https://doi.org/10.1080/00036846.2017.1366643>.
- Mekonen, E. K. (2020). Agriculture Sector Growth and Inflation in Ethiopia: Evidence from Autoregressive Distributed Lag Model. *Scientific Research Publishing*, 8(6), 2355–2370. <https://doi.org/10.4236/ojbm.2020.86145>.
- Milly, P. C. D., Betancourt, J. L., Falkenmark, M., Hirsch, R. M., Kundzewicz, Z. W., Lettenmaier, D. P., Stouffer, R. J., Dettinger, M. D., & Krysanova, V. (2015). On Critiques of “Stationarity is Dead: Whither Water Management? *Water Resources Research*, 51(9), 7785. <https://doi.org/10.1002/2015wr017408>.
- Mohajan, H. (2020). Quantitative Research: A Successful Investigation in Natural and Social Sciences. *Journal of Economic Development Environment and People*, 9(4), 52-79. <https://doi.org/10.26458/jedep.v9i4.679>.
- Moufidi, N., & Mansouri, A. (2021). The Longitudinal Method: Study of the Change Process in Qualitative Studies in Management Sciences. *EDP Sciences*, 119, 1005. <https://doi.org/10.1051/shsconf/202111901005>.
- Mustafa, G., Huo, W., Pervaiz, A., Ullah, M. R., & Zulfiqar, M. (2022). Validating LA/AIDS Model in the Food Market of Pakistan. *Heliyon*, 8(9), e10699. <https://doi.org/10.1016/j.heliyon.2022.e10699>.
- Ngoma, J. B., & Yang, L. (2024). Forest Policy and Economics: Does Economic Performance Matter for Forest Conversion in Congo Basin Tropical Forests? FMOLS-DOLS approaches. *Forest Policy and Economics*, 162, 103199. <https://doi.org/10.1016/j.forpol.2024.103199>.
- Nkoro, E., & Uko, A. K. (2016). Autoregressive Distributed Lag (ARDL) Cointegration Technique: Application and Interpretation. *Journal of Statistical and Econometric Methods*, 5(4), 63–91.
- Omosehin, O., Ekundayo, B. P., Aturamu, O. A., & Olutumise, A. I. (2021). Price Variation and Transmission in Beans Consuming Market of Southwest, Nigeria. *Jurnal Perspektif Pembiayaan dan Pembangunan Daerah*, 8(6), 609-620. <https://doi.org/10.22437/ppd.v8i6.10870>.
- Panda, C. K., Karn, A., & Sohane, R. K. (2020). Agriculture for Poverty Alleviation: The Changing Role of Agricultural Extension in Developing Nations. *International Journal of Current Microbiology and Applied Sciences*, 9(3), 492-500. <https://doi.org/10.20546/ijcmas.2020.903.057>.
- Pathak, H. (2023). Transforming the Agri-food Sector in India for Achieving the Sustainable Development Goals. *Anthropocene Science*, 2(1), 1–10. <https://doi.org/10.1007/s44177-023-00044-6>.

- Poláčková, H. (2020). Socio-economic Consequences of Globalization in Agriculture in Relation to Social Responsibility. *SHS Web of Conferences*, 74, 4020.
- Ramos-herrera, M. D. C. (2024). Economic Growth and Deviations from the Equilibrium Exchange Rate: A Panel ARDL and Panel NARDL Approach. *Applied Economic Analysis*, 33(98), 118-139. <https://doi.org/10.1108/AEA-02-2024-0065>.
- Shanti, R., Siregar, H., Zulbainarni, N., & Tony, T. (2023). Role of Digital Transformation on Digital Business Model Banks. *Multidisciplinary Digital Publishing Institute*, 15(23), 16293. <https://doi.org/10.3390/su152316293>.
- Sheikh, M. A., Malik, M. A., & Masood, R. Z. (2020). Assessing the Effects of Trade Openness on Sustainable Development: Evidence from India. *Asian Journal of Sustainability and Social Responsibility*, 5, 1. <https://doi.org/10.1186/s41180-019-0030-x>.
- Shkliarevsky, G. (2023). Inflation and Value Creation: an Economic and Philosophic Investigation. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4320076>.
- Sulasni, P., Irwansyah, M. R., & Suwena, K. R. (2022). Economic Growth during Covid-19: Empirical Evidence from Buleleng, Bali. *International Journal of Scientific and Management Research*, 5(1), 153-160. <https://doi.org/10.37502/ijsmr.2022.5109>.
- Teal, F., & Eberhardt, M. (2010). Productivity Analysis in Global Manufacturing Production. *Economics Series Working Papers 515*. University of Oxford.
- Tuama, H. H. (2018). Economic Diversification and Oil Revenues in the Arab Gulf Countries - The Case of Saudi Arabia. *Journal of Economics and Development Studies*, 6(4), 122–130. <https://doi.org/10.15640/jeds.v6n4a15>.
- Usman, M., Loves, L., Russel, E., Ansori, M., Warsono, W., Widiarti, W., & Wamiliana, W. (2022). Analysis of Some Energy and Economics Variables by Using VECMX Model in Indonesia. *International Journal of Energy Economics and Policy*, 12(2), 91-102. <https://doi.org/10.32479/ijeep.11897>.
- Wajeetongratana, P. (2020). Economic Growth and Its Key Factors: An Alternative View on The Factors Stimulating Agriculture Growth. *E3S Web of Conferences*, 175, 13028. <https://doi.org/10.1051/e3sconf/202017513028>.
- Widagdo, N., Aidid, M. K., & Sudarmin, S. (2020). Multivariate Adaptive Regression Splines pada Kasus Inflasi di Indonesia Tahun 2005-2018. *VARIANSI Journal of Statistics and Its Application on Teaching and Research*, 2(3), 110-120. <https://doi.org/10.35580/variensium14639>.
- Yusof, R. M., & Bahlous, M. (2013). Islamic Banking and Economic Growth In GCC & East Asia Countries. *Journal of Islamic Accounting and Business Research*, 4(2), 151–172. <https://doi.org/10.1108/jiabr-07-2012-0044>.
- Zainurossalamia, S. Z., Amalia, S., Darma, D. C., & Azis, M. (2021). Spurring Economic Growth in Terms of Happiness, Human Development, Competitiveness, and Global Innovation: the ASEAN Case. *ASEAN Journal on Science and Technology for Development*, 38(1), 653. <https://doi.org/10.29037/ajstd.653>.
- Zardoub, A. (2023). Exploring the Links between Financial Flows and Economic Growth: A Panel ARDL Approach. *PSU Research Review*, 7(2), 2399–1747. <https://doi.org/10.1108/PRR-05-2020-0016>.