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Research Article

Does Globalization Enhance Food Security: Empirical Evidence for Latin America and the Caribbean Countries[a]

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Despite significant progress in reducing poverty since the 1990s, many countries still face a significant problem in achieving food security. Nearly 10% of the world's population faced hunger in 2022, and this figure has unfortunately been accelerated because of global developments, such as the COVID-19 pandemic and the Russia-Ukraine war. This study attempts to investigate the impact of globalization on food security in 27 Latin America and the Caribbean (LAC) countries by using annual data covering the 2001-2021 period. The Driscoll & Kraay standard error and panel corrected standard error (PCSE) estimators show that globalization, arable land, population, economic growth, and institutional quality enhance food security, but inflation worsens it.

JEL codes: F15, F62, Q18

Keywords: Food security, Food insecurity, Globalization, Latin America and the Caribbean (LAC), Driscoll & Kraay, PCSE

1 Introduction

Food security (FS) is one of people's basic needs, and improving FS is a crucial priority of less and developing countries. International institutions and governments try to develop policies to combat poverty, hunger, and malnutrition. Achieving FS is also one of the critical Sustainable Development Goals (SDGs) of the United Nations (UN). SDG 2 is called countries "end hunger, achieve food security and improved nutrition and promote sustainable agriculture by 2030." (United Nations, 2024; Barlow et al., 2020). However, the latest data clearly shows that the world is far from achieving FS and ending hunger and poverty in line with the SDGs. The prevalence of undernourishment in the population has declined from 13% to 8% between 2001 and 2018 but rose to 9% in 2021 (World Bank, 2024). FS has gained importance on the international agenda because of the COVID-19

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pandemic and the Russian-Ukraine War. The recent report by FAO et al. (2023) indicated that between 690 and 783 million people worldwide were exposed to hunger in 2022. This exceeds the pre-pandemic level by around 122 million. Furthermore, it is also highlighted that 2.4 billion people, representing approximately 29.6% of the world population, will face moderate or severe food insecurity (FIS) in 2022.[1]

The issue of FS has been a crucial topic for developing countries, where, due to the lack of FS, a significant part of the population is challenged by undernourishment (Sun & Zhang, 2021). In the era of high mutual dependence caused by globalization, its impact on FS has gained significant attention among scholars. In the theoretical background, based on the Heckscher-Ohlin (HO) theory (Heckscher, 1919; Ohlin, 1933), it is well known that countries tend to specialize in abundant factors, such as exporting these goods and importing goods that use factors they are scarce in. In the context of the agricultural sector, to enhance FS, the HO theory suggests that a country should concentrate on its comparative advantage in agricultural products and develop trade policies for self-sufficiency (Shang et al., 2024). On the other hand, trade openness may provide opportunities for accessing required food, promoting an association between the production and consumption of food (Dithmer & Abdulai, 2017). Hence, through the lens of neoliberal globalization, trade liberalization promotes achieving FS.

Globalization, as a debated topic, causes a rise in integration and dependency in terms of economic, political, and social. All components of globalization have a comprehensive effect on economies, and researchers are widely investigating the role of these factors on several macroeconomic aggregates, including income inequality, poverty, environmental quality, technology, and economic growth. However, globalization also affects FS in different ways (Bayar, 2019). According to Awad (2023), food trade can have two opposite effects on FS; it can increase food supply and increase food availability and increasing food supply can reduce food prices and, thus, household income in food exporter countries. As both theoretical and empirical views on the relationship between globalization and FS are ambiguous, we must extend our understanding and investigate the association between globalization and FS for different samples.

Table 1: Undernourishment by Regions

Region	Number		Prevalence	
	2005	2022	2005	2022
Africa	178.2	281.6	19.2	19.7
Asia	551.9	401.6	13.9	8.5
Latin America and the Caribbean	51.9	43.2	9.3	6.5
Ocenia	2.3	3.2	6.9	7.0
World	793.4	735.1	12.1	9.2

Source: FAO et al. (2023).
Note: Number is in millions, and prevalence is the share of the regional population.

The comparison of undernourished people by region is depicted in Table 1. Despite a remarkable improvement in eradicating hunger, poverty, and malnutrition, it is highlighted that a high proportion of the world population is facing severe FIS in the age of globalization; the number of severely food-insecure people was 900 million in the world in 2022 (FAO et al.,

[1] Having FS vs having a healthy diet are two distinct phenomena. Over 3.1 billion people (42% of the world's population) is deprived of a healthy diet in 2021 (FAO et al., 2023).

2023). As depicted in Table 1, although the prevalence of undernourishment declined from 12.1% to 9.2% from 1995 to 2022, more than 735 million people are still undernourished globally. Asia has the highest number of undernourished people, with 401.6 million, followed by Africa (281.6 million) and Latin America and Caribbeans (LAC, 43.2 million) in 2022.[2]

Benites-Zapata et al. (2021) asserted that LAC is the most unequal region in the world and has a low level of economic growth. Although Africa has faced the highest level of FIS globally, it rose faster in LAC. There are two reasons for this phenomenon in LAC countries. Firstly, the share of food expenditures over individuals' budgets is higher in developing countries, including LAC, than in developed countries. Secondly, a daily minimum calorie diet is more expensive in LAC than in developed countries (Hernández-Vásquez et al., 2023). The daily cost of a calorie-sufficient diet for 2017 is \$1.09, \$0.86, \$0.71, and \$0.55 for LAC, Sub-Saharan Africa (SSA), high-income countries, and Europe & Central Asia, respectively (Herforth et al., 2022).

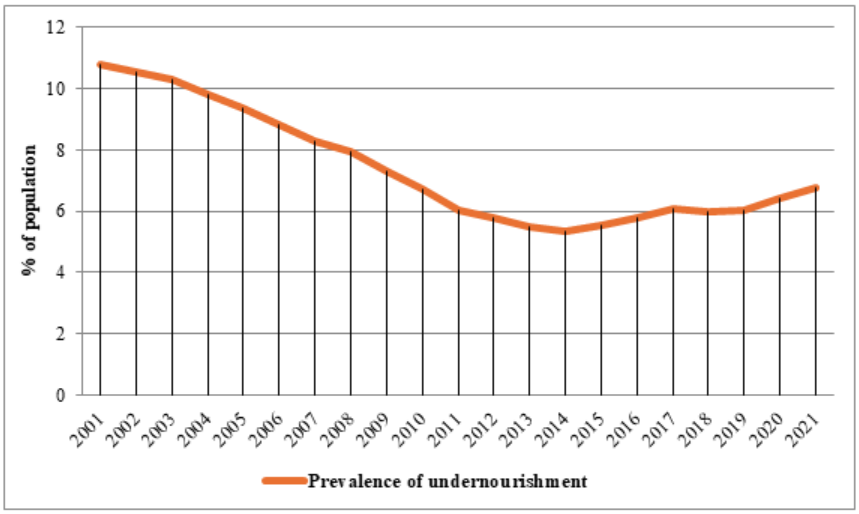

Figure 1: FS in the LAC countries
Source: World Bank (2024)

FS in LAC countries is a remarkable issue. As indicated in Figure 1, the prevalence of undernourishment as a percentage of the total population dropped from 10.8% in 2001 to 5.3% in 2014, but it began to rise in 2015 and reached 6.8% in 2021. Besides, moderate or severe FIS in LAC is more prevalent; it increased from 24.9% in 2014 to 33.2% in 2017 and slightly declined to 31.9% in 2019 (World Bank, 2024).

The LAC countries' process of globalization has progressively increased from 1970 to 2021. The overall globalization index, covering the economic, social, and political sub-indices, has increased since 1970, both in terms of *de facto*, represents actual international economic activities, and *de jure*, denotes the policies promoting international economic activities. In 1970, the *de facto* globalization index was 36.03; it rose to 54.62. Likewise,

[2] LAC countries are Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Uruguay.

the *de jure* globalization index increased from 36.86 to 62.31 from 1970 to 2021 (Gygli et al., 2019). It is well known that the globalization process in the LAC countries has a long history. According to Huber & Stephens (2009), the integration of LAC countries dates back to the late 19^{th} century when they exported raw agricultural materials and imported final products. In the later stage, the economic model is structured based on minimal state intervention. Hence, investment projects in the LAC countries were supported by foreign investors thanks to liberalization. The Washington Consensus has defined the economic structure of the LAC in order to increase globalization (Santiago et al., 2020).

The literature on globalization and FS provides a comprehensive understanding of the challenges and opportunities in ensuring global FS. The impact of globalization on LAC countries has been investigated in several dimensions, including economic growth (Ocampo et al., 2003; Santiago, 2017), income inequality (Gasparini et al., 2009; Huber & Stephens, 2009), environmental degradation (Koengkan et al., 2020; Pata et al., 2023), and migration (Pizarro & Villa, 2005). However, the studies investigating globalization and FS's nexus in LAC countries are limited.[3] Therefore, the current paper aims to fill this gap in the literature in 27 LAC countries by using annual data covering 2001-2021.

The expected contributions of our paper to the literature are twofold. Firstly, we perform the Driscoll & Kraay's (1998) (D&K) standard error and panel corrected standard error (PCSE) estimators that take into consideration cross-sectional dependence (CSD), heteroscedasticity, and autocorrelation. Secondly, in the burgeoning literature, studies on the nexus of globalization and FS consider trade openness as a proxy of globalization. However, we use an overall KOF globalization index that covers economic, social, and political sub-index instead of using narrow indicators.

The rest of the paper is organized as follows. Section 2 explains the data, model, and empirical methodology. Section 3 reports the empirical findings. Finally, Section 4 offers concluding remarks and policy recommendations.

2 Methodological Design

2.1 Data Description

This study empirically investigates the impact of globalization on FS in 27 LAC countries by using annual data covering the period 2001-2021. We collect the data on FS defined as the prevalence of undernourishment (% of the population), arable land (% of land area), economic growth (GDP per capita in constant 2015 US Dollar), population (total) from the World Bank (2024), and globalization (KOF overall index) from Gygli et al. (2019), and institutional quality (institutions index) and inflation (consumer price indices with the base year 2010) from the database of UNCTAD (2024). Table 2 displays all of the variables used in the study, including their definitions, measures, and sources.

The KOF Globalization Index was first introduced by Dreher (2006) and later upgraded by Dreher et al. (2008). It consists of three main dimensions: economic globalization, social globalization, and political globalization. The index provides data from 1970 to the present, allowing for long-term trend analysis. However, the current version of the KOF developed by Gygli et al. (2019) provides *de facto* and *de jure* globalization measures. Furthermore,

[3] A summary of the empirical literature is provided in the Appendix.

Table 2: Data Description

Variable	Definition	Measure	Source
$lnFOOD$	Food security	Prevalence of undernourishment (% of population)	World Bank (2024)
$lnLAND$	Arable land	% of land area	World Bank (2024)
$lnGDP$	Economic growth	GDP per capita (constant 2015 US$)	World Bank (2024)
$lnPOP$	Population	Total	World Bank (2024)
$lnKOF$	Globalization	KOF overall index	Gygli et al. (2019)
$lnINF$	Inflation	Consumer price indices (CPI) with base year 2010	UNCTAD (2024)
$lnINS$	Institutional quality	Institutions index	UNCTAD (2024)

Source: Authors' compilation.

trade and financial globalization have separated from the current version of KOF. Overall, the KOF globalization index has three main components, covering economic, social, and political globalization. Moreover, there are also sub-components of all these three main components. For example, *de facto* economic globalization consists of trade and financial globalization. Social globalization covers interpersonal, informational, and cultural globalization. Political globalization includes embassies, UN peacekeeping missions, and international non-governmental organizations (NGOs) (Gygli et al., 2019). The Institutions Index is a crucial part of the UNCTAD Productive Capacities Index (PCI), assessing a country's institutional framework's effectiveness in supporting economic development. It evaluates the control of corruption, government effectiveness, political stability and absence of violence/terrorism, regulatory quality, rule of law, and voice and accountability. The index uses quantitative and qualitative data to provide policymakers, development practitioners, and investors insights. It helps identify bottlenecks, prioritize reforms, assess institutional changes' impact on economic growth, and inform targeted interventions. However, the index has limitations, including reliance on incomplete data and weighting of indicators. Despite these, the index remains valuable for understanding institutions' role in promoting economic growth (UNCTAD, 2023).

2.2 Empirical Strategy

To measure the impact of globalization on FS, we estimated the following model

$$lnFOOD_{it} = \alpha_0 + \alpha_1 lnLAND_{it} + \alpha_2 lnGDP_{it} + \alpha_3 lnPOP_{it} + \alpha_4 lnKOF_{it} + \alpha_5 lnINF_{it} + \alpha_6 lnINS_{it} + \epsilon_{it}$$

where all variables are in natural logarithm, α refers to coefficients, i donates to cross-section, t refers to the period, and ϵ_{it} is the error term.

In this study, we follow a four-stage empirical strategy. In the first stage, we analyze the descriptive statistics and correlation matrix. In the second stage, we estimate the panel fixed effects (FE) and random effects (RE) models. In the third stage, among the panel diagnostic tests, we apply the LM (Breusch & Pagan, 1980) and CD (Pesaran, 2004) tests of CSD, and then the Wooldridge test for autocorrelation and the Modified Wald test for group-wise heteroskedasticity. In the fourth stage, we use the D&K and PCSE estimators to estimate robust coefficients. Figure 2 illustrates the empirical strategy of our study.

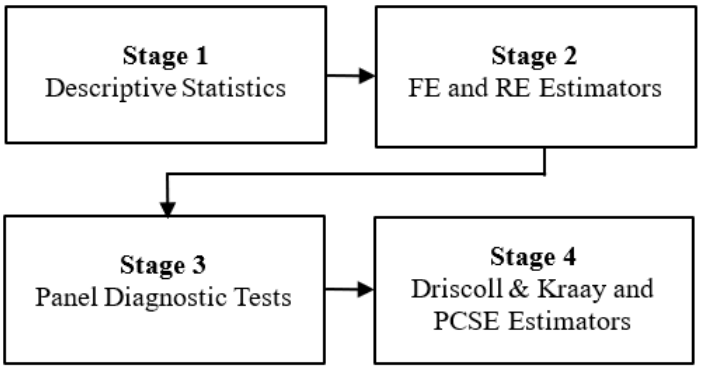

Figure 2: Graphical View of the Empirical Strategy
Source: Authors' compilation

In panel data analysis, the FE and RE models are the two main approaches used to examine individual differences and change over time in data where the same units are observed at different times. The FE controls each unit's unobservable and time-invariant characteristics by adding a constant term to the model. The RE model assumes that these characteristics are included in the model as an error term with zero mean (Wooldridge, 2010; Asteriou & Hall, 2011). The choice of model depends on the results of statistical tests such as the Hausman test. Furthermore, before estimating linear regression models, it is necessary to determine whether or not basic assumptions about the error term are true. The assumptions are as follows: $E(u_{it})^2 = \delta_u^2$ (constant variance), $E(u_{it}u_{js}) = 0$ (cross-sectional independence), and $E(u_{it}u_{it-s}) = 0$ (no autocorrelation) (Baltagi, 2021).

Driscoll & Kraay's (1998) estimator offers more reliable results when the number of cross sections is higher than time dimensions ($N > T$). More importantly, this method is consistent even when error terms are heteroscedastic, auto-correlated, and cross-sectional dependent (Ridwan et al., 2024). In other words, in the presence of heteroscedasticity, CSD, and autocorrelation, Driscoll & Kraay's (1998) robust standard error estimator offers reliable results (Beylik et al., 2022; Akinlo & Dada, 2022; Tekin & Cengiz, 2017).

The power of a modified Wald statistic testing group-wise heteroskedasticity in the residuals of the FE regression model is very low with "large N, small T" panels. FE D&K Model accounts for serial correlation, group-wise heteroskedasticity, and the CSD. When testing the convenient estimator between the RE model and the FE model, the traditional Hausman test cannot be used in the presence of heteroskedasticity or serial correlation within panels because, in this case, the RE-GLS estimator is not fully efficient. So, we apply the robust Hausman test based on bootstrapping, suggesting that time-invariant unobservables are related to our regressors and that the FE model is appropriate.

To check Driscoll & Kraay's (1998) estimates, we performed the PCSE estimator developed by Beck & Katz (1995). The PSCE method estimates the correlation between units and corrects the correlation between units' standard errors and between groups and heteroscedasticity. Since the time dimension rises in the model, the power of the PCSE also increases. More importantly, it provides robust results in the case of CSD, heteroscedasticity, and autocorrelation (Ferreira et al., 2022). Hence, the PCSE is suitable since it addresses the problems that cause biased results (Nawaz & Rahman, 2023).

3 Empirical Findings

In the empirical findings, we analyze the results of descriptive statistics and correlation matrix, FE and RE regression models, panel diagnostic tests, and the D&K and PCSE estimators, respectively.

Descriptive statistics and the correlation matrix give a summary of panel statistics. Table 3 reports the results of descriptive statistics and correlation coefficients for factors potentially affecting FS. Our sample has 567 observations. $lnPOP$ has the highest mean and standard deviation, with 15.42 and 1.94, respectively. In contrast, $lnKOF$ has the lowest standard deviation with 0.15. The correlations show weak negative relationships between $lnFOOD$ and $lnLAND$ at -0.04 and $lnFOOD$ and $lnPOP$ at 0.05, suggesting little linear connection. However, a negative correlation of -0.75 between $lnFOOD$ and $lnGDP$ indicates that higher $lnGDP$ is associated with lower $lnFOOD$, possibly due to dietary shifts in wealthier countries.

Table 3: Descriptive Statistics and Correlation Matrix

Descriptive Statistics							
Variable	**Obs.**	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**Skewness**	**Kurtosis**
$lnFOOD$	567	2.010	0.771	0.916	3.967	0.368	2.354
$lnLAND$	567	1.947	1.023	-1.243	3.757	-0.651	3.836
$lnGDP$	567	8.710	0.655	7.154	9.840	-0.472	2.716
$lnPOP$	567	15.419	1.943	11.130	19.183	-0.429	2.745
$lnKOF$	567	4.054	0.152	3.477	4.342	-0.827	3.779
$lnINF$	567	4.629	0.400	3.547	7.295	1.260	10.186
$lnINS$	567	3.948	0.253	2.936	4.448	-0.206	3.341
Correlation Matrix							
	$lnFOOD$	$lnLAND$	$lnGDP$	$lnPOP$	$lnKOF$	$lnINF$	$lnINS$
$lnFOOD$	1						
$lnLAND$	-0.040	1					
$lnGDP$	-0.749	-0.071	1				
$lnPOP$	0.050	-0.151	-0.144	1			
$lnKOF$	-0.240	0.005	0.107	0.292	1		
$lnINF$	-0.223	-0.051	0.180	0.099	0.280	1	
$lnINS$	-0.620	0.033	0.760	-0.422	0.121	-0.010	1

Source: Authors' compilation.

Table 4 summarizes the results of the FE and RE estimators and the standard and robust Hausman tests to choose which model to employ. The results show that the null hypothesis is rejected at the 1% significance level, indicating that the RE estimator is inconsistent. The FE model is the most consistent and acceptable technique for both models. Based on the standard and robust Hausman tests, we choose the FE model. According to the estimation results of the FE model, arable land ($lnLAND$), gross domestic product per capita ($lnGDP$), total population ($lnPOP$), globalization ($lnKOF$) and the institutional quality ($lnINS$) negatively affect $lnFOOD$ (the prevalence of undernourishment), while the inflation ($lnINF$) positively affects it.

Table 4: FE and RE Estimators Results

Variable	FE			RE		
	Coefficient	**Std. Error**	**Probability**	**Coefficient**	**Std. Error**	**Probability**
$lnLAND$	-0.519	0.085	0.000	-0.270	0.062	0.000
$lnGDP$	-0.905	0.087	0.000	-1.078	0.072	0.000
$lnPOP$	-1.396	0.187	0.000	-0.134	0.048	0.005
$lnKOF$	-0.704	0.228	0.002	-0.637	0.212	0.003
$lnINF$	0.155	0.038	0.000	0.001	0.032	0.968
$lnINS$	-0.387	0.159	0.015	-0.247	0.150	0.100
Constant	36.087	2.833	0.000	17.549	1.119	0.000
Hausman Test: $\chi^2(6)$ test statistics: 60.435***						
Robust Hausman Test: $\chi^2(6)$ test statistics: 11.64*						

Note: * and *** denote statistical significance at the 10% and 1% levels, respectively.
Source: Authors' compilation.

The standard and robust Hausman tests indicate that the FE model is the preferred model; nevertheless, the inferences obtained from it can be biased because the model contains CSD, autocorrelation, and heteroscedasticity. Table 5 provides the results of diagnostic tests.

Table 5: Diagnostic Test Results of the Model

Tests	**Test Statistics**	**Probability**
Breusch & Pagan's (1980) LM test $\chi^2(351)$	1,834.394	0.000
Pesaran's (2004) CD test	3.069	0.002
Wooldridge test for autocorrelation: F(1, 26)	1,183.12	0.000
Modified Wald test for group-wise heteroskedasticity: $\chi^2(27)$	3,184.84	0.000

Source: Authors' compilation.

Table 5 shows the null hypothesis of the Wooldridge autocorrelation test is rejected. The F-statistics in this test are significant at the 1% level, indicating that, there is a serial correlation in the model. Similarly, in the modified Wald test for group-wise heteroscedasticity, the $\chi^2(27)$ statistics in the model are significant at the 1% level and accepted the null hypothesis, suggesting the presence of heteroscedasticity. Therefore, as mentioned previously, in the presence of autocorrelation, CSD, and heteroscedasticity, it is difficult to obtain robust and consistent results. To deal with these problems, we performed the D&K standard error estimator for the FE model and the PCSE estimator, whose results are provided in Table 6.

Table 6: Driscoll & Kraay and PCSE Estimators Results

Variable	Driscoll & Kraay Estimator			PCSE Estimator		
	Coefficient	**Std. Err.**	**Probability**	**Coefficient**	**Std. Err.**	**Probability**
$lnLAND$	-0.519	0.140	0.001	-0.519	0.090	0.000
$lnGDP$	-0.905	0.067	0.000	-0.905	0.091	0.000
$lnPOP$	-1.396	0.209	0.000	-1.396	0.200	0.000
$lnKOF$	-0.704	0.190	0.001	-0.704	0.239	0.003
$lnINF$	0.155	0.037	0.000	0.155	0.040	0.000
$lnINS$	-0.387	0.192	0.058	-0.387	0.164	0.019
Constant	36.087	3.454	0.000	36.087	3.012	0.000

Source: Authors' compilation.

According to the results of both D&K and PCSE estimators in Table 6, arable land ($lnLAND$), gross domestic product per capita($lnGDP$), total population ($lnPOP$), the globalization ($lnKOF$) and the institutional quality ($lnINS$) affect $lnFOOD$ (the prevalence of undernourishment) negatively. In contrast, inflation ($lnINF$) positively affects it. In other words, arable land, gross domestic product per capita, total population, globalization, and institutional quality enhance FS, while inflation threatens it. Our empirical findings for the nexus between globalization and FS are consistent with the studies of Dithmer & Abdulai (2017); Biniaz & Mohamadi (2018); Bayar (2019); Ge et al. (2021), and Koomson et al. (2023).

4 Conclusion and Policy Recommendations

Globalization, a debated topic, causes a rise in economic, political, and social integration and dependency. Along with globalization, it is a fact that a country's integration into the world economy has multidimensional effects. However, globalization also affects FS in different ways. This study investigates the impact of globalization on FS in 27 LAC countries by using annual panel data covering the period 2001-2021. Robust results from the D&K standard error and PCSE estimators show that globalization, arable land, population, economic growth, and institutions enhance FS, but inflation worsens it.

As previously discussed, the impact of globalization on FS plays a vital role in developing countries. Our empirical findings support the approach that claims globalization provides opportunities to access and obtain a large variety of foods in LAC countries. However, empirical findings also highlight the importance of globalization in enhancing FS in LAC countries, it does not mean policy-makers in LAC rush into fully opening the agricultural or food markets to international competition without conditions. Moreover, the specifics of LAC countries are heterogeneous, and one crucial problem in these countries is weak institutional capacities. For example, lack of political stability, government effectiveness, and corruption destabilize the economy. Hence, these factors can cause food prices to fluctuate and dampen access to food.

Policymakers in LAC countries should develop policies to promote trade integration, increase agricultural investment, develop food chains, and make national food systems resilient to fluctuations in the global food system. Also, measures should be taken against the risk of globalization making the agricultural sector dependent on foreign sources. When promoting trade openness in the food sector, it should be remembered that creating an equal competition structure and the role of domestic agricultural self-sufficiency in maintaining basic needs are important. Finally, high inflation is a chronic problem in LAC countries. Inevitably, inflation worsens to achieve FS. In particular, for low-income earners, the government's social protection policies can mitigate the negative influence of inflation on FS. However, in the long run, stable and low inflation is required to realize targeted goals.

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Appendix : Literature Review

Study	Sample	Method	Findings
Shang et al. (2024)	SSA 2001-2021	System GMM	Globalization has an insignificant impact on FS availability, whereas it negatively affects FS accessibility.
Herath (2014)	Sri Lanka and China 1980-2009	Regression analysis	There is no link between FS and TO in China. In contrast, a negative relationship exists between FS and TO in Sri Lanka.
Dithmer & Abdulai (2017)	151 countries 1980-2007	System GMM	TO boost FS.
Biniaz & Mohamadi (2018)	Iran 1999-2013	ARDL	Agricultural TO improves FS.
Tinta et al. (2018)	ECOWAS countries 1995-2012	FE Model	TO positively impacts FS, while regional integration has no significant effect on FS.
Bayar (2019)	MENA 1999-2015	Panel cointegration and causality analysis	All components of globalization (trade, financial, social, and political) contribute to FS.
Ge et al. (2021)	Africa, Asia, and Latin America 2000-2050	Agent-based global trade model	TO improves FS and promotes a healthier diet.
Adelaja et al. (2018)	30 countries2000-2014	Count data models	More food availability promotes terrorism events, while better access conditions reduce it.
Barlow et al. (2020)	132 countries2014-17	Individual-level data	There is no association between TO and FS.
Xu et al. (2023)	86 countries(2001-2030)	Multi-indicator evaluation approach and econometric model	The Russia-Ukraine conflict led to unprecedented food prices, particularly wheat, and a decline in grain security.
Slimane et al. (2016)	55 developing countries (1995-2009)	Panel framework	FDI in agriculture enhances FS, while FDI in secondary and tertiary sectors raises FIS.
Mulyo et al. (2023)	83 developing countries 2002-2020	System GMM	Political stability promotes FS. EG worsens FS in Africa, whereas it enhances FS in LAC.
Chang et al. (2014)	US 2003	Longitudinal survey	Households' budget constraints and insufficient assets increase FIS.
Koomson et al. (2023)	Ghana October 2016-October 2017	Ordinary least squares	Financial inclusion incentives FS.
Balouza (2018)	71 countries 1981-2007	Regression analysis	FDI enhances FS.
Yao et al. (2020)	42 Belt and Road Initiative countries 2006-2015	Two-stage least squares (2SLS)	Agricultural FDI enhances FS.

Note: EG, TO, and FDI mean economic globalization, trade openness, and foreign direct investment, respectively.
Source: Authors' compilation.