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Egyptian Imports from Food Groups in Light of COVID-19: An Econometric Study

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ABSTRACT

This study aims to identify the extent to which COVID-19 impacted Egyptian imports. It includes two main sections. The first section identifies the repercussions of COVID-19 on some global and local economic indicators – especially the recession that most of the world's economies are experiencing in light of the continuing COVID-19 outbreaks. The Egyptian economy achieved a general growth rate in 2020, at a time when the entire world was experiencing economic stagnation; this was due to the Egyptian government's set of measures and a lack of direction towards a complete closure. The second part examines demand determinants for Egyptian imports of meat, dairy, oils, cereals, sugar and wheat using ARDL models according to the bounds testing approach to cointegration. This was accomplished by studying the extent to which dependent variables have a long-term equilibrium relationship, as well as the value of imports with lag periods, gross domestic products, relative prices, effective real exchange rates, liberalisation policies, COVID-19 effects on imports and forecasting demand for Egyptian imports.

KEYWORDS

ARDL-UECM, economic growth, exchange rate, relative prices, SARIMA, trade policies

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1. Introduction

The coronavirus 'COVID-19' outbreak occurred globally in several waves. Because most countries implemented ban, closure and social distancing policies to confront the virus's spread on a human level, the repercussions of that crisis included the financial, economic, social and human fields. Many economic sectors, such as tourism and aviation, were also negatively affected. Other sectors, such as the digital economy and the manufacture of medicines and masks, nonetheless, achieved many gains. In addition, the environment benefitted directly from the suspension of thousands of factories that used fossil fuels, resulting in a decline in carbon dioxide (CO_2) emissions. Although COVID-19 containment measures abruptly disrupted international merchandise trade and affected food trade (Vickers *et al.*, 2020), the Egyptian economy has proven resilient to the immense human and financial costs caused by the global COVID-19 pandemic. This is explained by the successful implementation of the economic reform programme since 2016, which has provided more fiscal space to withstand the adverse impact of the COVID-19 crisis. In addition, the Egyptian government's rapid response and proactive measures to limit the virus's impact, which have been implemented since March 2020, enabled the country to avoid a full lockdown (IFPRI, 2020).

Despite this containment, the weak global trade during COVID-19 is a major reason to reduce Egypt's exports. Furthermore, some countries have taken protectionist trade measures, while others have issued tenders for more purchases, and many major exporters have imposed various forms of trade restrictions to increase local food security. Therefore, this study intends to answer the following questions: (1) What impact has the COVID-19 pandemic had on Egypt's total imports, particularly meat, dairy, oils, grains and sugars, as well as wheat imports? (2) Does the policy of economic liberalisation have a positive or negative role in Egyptian foreign trade during the COVID-19 pandemic, especially in meat, dairy, oils, cereal and sugars, as well as wheat imports?

This research mainly aims to investigate the determinants of demand for Egyptian imports from certain food groups in light of COVID-19, through the following methods:

- Recognising the repercussions of COVID-19 on some global and local economic indicators.
- Reviewing the Egyptian economic policies used to face the repercussions of the spread of COVID-19.
- Studying the short-term impact of the value of imports of some studied food groups with a lag period, gross domestic product, relative prices, effective real exchange rates, liberalisation policy and COVID-19.
- Investigating the extent to which the studied variables in the total import demand model and the demand models for each of the groups – meat, dairy, oils, grains, wheat and sugar – have a stable long-term relationship.
- Forecasting demand for Egyptian imports from certain studied food groups.

2. Materials and Methods

2.1. Research Method:

The unit root test of the augmented Dickey–Fuller Test was conducted using the following equations:

- $\Delta Y_t = \gamma Y_{t-1} + \sum_{j=1}^{p}(\delta_j \Delta Y_{t-j}) + e_t \rightarrow \; H_0; \gamma = 0,\; H_0; \gamma < 0 \rightarrow$ *without* intercept(η_μ)
- $\Delta Y_t = \propto + \gamma Y_{t-1} + \sum_{j=1}^{p}(\delta_j \Delta Y_{t-j}) + e_t \;\rightarrow\; H_0; \gamma = 0,\; H_0; \gamma < 0 \rightarrow$ *with* intercept(η_μ)
- $\Delta Y_t = \propto + \beta t + \gamma Y_{t-1} + \sum_{j=1}^{p}(\delta_j \Delta Y_{t-j}) + e_t \;\rightarrow\; H_0; \gamma = 0,$ $H_0; \gamma < 0 \rightarrow$ *with* trend and intercept ($\eta_{\mu\tau}$)

It was found that some of the studied variables were stationary at level and others with first difference. Therefore, the autoregressive distributed lag [ARDL (p, q)] approach and the unrestricted equilibrium correction model (ARDL-UECM) were both used in order to show the equilibrium relationship of the determinants of demand for Egyptian imports. Particular attention was given to imports of certain food groups in the short and long term, and the elasticity of short and long term was estimated by using economic theory in terms of acceptance and interpretation of the results.

The determinants of import demand from some food groups were studied using the bound test from January 2010–April 2021 according to the World Trade Classification (CAPMAS Statistical and

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UN Comtrade databases).

The following are the estimated model variables (Rihan, 2021; AMIS, 2020; Vickers *et al.*, 2020; Aljebrin, 2012):

$$Y_t \uparrow = \mathcal{F}\big(Y_{(t-P)} \uparrow RGDP_{(t-q1)} \uparrow Pall_{(t-q2)} \uparrow REER_{(t-q3)} \uparrow Dex_{(t-q4)} \uparrow DC19_{(t-q5)} \downarrow\big)$$

$$YM_t \uparrow = \mathcal{F}\big(YM_{(t-P)} \uparrow RGDP_{(t-q1)} \uparrow Pmeat_{(t-q2)} \uparrow REER_{(t-q3)} \uparrow Dex_{(t-q4)} \uparrow DC19_{(t-q5)} \downarrow\big)$$

$$YD_t \uparrow = \mathcal{F}\big(YD_{(t-P)} \uparrow RGDP_{(t-q1)} \uparrow Pdairy_{(t-q2)} \uparrow REER_{(t-q3)} \uparrow Dex_{(t-q4)} \uparrow DC19_{(t-q5)} \downarrow\big)$$

$$YO_t \uparrow = \mathcal{F}\big(YO_{(t-P)} \uparrow RGDP_{(t-q1)} \uparrow Poils_{(t-q2)} \uparrow REER_{(t-q3)} \uparrow Dex_{(t-q4)} \uparrow DC19_{(t-q5)} \downarrow\big)$$

$$YC_t \uparrow = \mathcal{F}\big(YC_{(t-P)} \uparrow RGDP_{(t-q1)} \uparrow Pcereals_{(t-q2)} \uparrow REER_{(t-q3)} \uparrow Dex_{(t-q4)} \uparrow DC19_{(t-q5)} \downarrow\big)$$

$$YWH_t \uparrow = \mathcal{F}\big(YWH_{(t-P)} \uparrow RGDP_{(t-q1)} \uparrow Pcereals_{(t-q2)} \uparrow REER_{(t-q3)} \uparrow Dex_{(t-q4)} \uparrow DC19_{(t-q5)} \downarrow\big)$$

$$YS_t \uparrow = \mathcal{F}\big(YS_{(t-P)} \uparrow RGDP_{(t-q1)} \uparrow Psugar_{(t-q2)} \uparrow REER_{(t-q3)} \uparrow Dex_{(t-q4)} \uparrow DC19_{(t-q5)} \downarrow\big)$$

Where:

Y_t	; The total value of Egyptian imports in million dollars.
YM_t	; The value of Egyptian imports of meat.
YD_t	; The value of Egyptian imports of dairy products.
YO_t	; The value of Egyptian imports of oils.
YC_t	; The value of Egyptian imports of cereals.
YWh_t	; The value of Egyptian imports of wheat and meslin.
YS_t	; The value of Egyptian imports of sugars.
$RGDP_t$	; GDP in millions of dollars at constant prices (2015 = 100).
$Pall_t$	; Relative prices (world price index/consumer price index in Egypt) (2015 = 100).
$Pmeat_t$	; The relative prices of meat.
$Pdairy_t$	; The relative prices of milk.
$Poils_t$	; The relative prices of oils.
$Pcereals_t$	; The relative prices of cereals.
$Psugar_t$	; The relative prices of sugars.
$REER38_t$	; Effective real exchange rate for trading partners.
Dex_t	; Dummy variable that expresses the liberalisation of the exchange rate for the local currency.
$Dc19_t$	; Dummy variable that expresses COVID-19.

Based on the results in Table 1, the ARDL (p, q) has been applied as proposed by Pesaran *et al.* (2001) by using the bounds testing approach to cointegration to estimate the long- and short-term elasticity; based on the study variables, the ARDL models (p, q1, q2, ..., qn) can be estimated using the following formulas:

$$\begin{aligned} lnY_t = {} & \beta_0 + \pi_1 lnY_{t-1} + \pi_2 lnRGDP_{t-1} + \pi_3 lnPall_{t-1} + \pi_4 lnREER_{t-1} + \pi_5 Dex_{t-1} + \pi_6 DC19_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta lnY_{t-i} \\ & + \sum_{i=1}^{q1} \delta_1 \Delta lnRGDP_{t-i} + \sum_{i=1}^{q2} \delta_2 \Delta lnPall_{t-i} + \sum_{i=1}^{q3} \delta_3 \Delta lnREER_{t-i} + \sum_{i=1}^{q4} \delta_4 \Delta Dex_{t-i} + \sum_{i=1}^{q5} \delta_5 \Delta DC19_{t-i} + \varepsilon_t \\ & \rightarrow \text{Total Import Model} \end{aligned}$$

$$\begin{aligned} lnYM_t = {} & \beta_0 + \pi_1 lnYM_{t-1} + \pi_2 lnRGDP_{t-1} + \pi_3 lnPmeat_{t-1} + \pi_4 lnREER_{t-1} + \pi_5 Dex_{t-1} + \pi_6 DC19_{t-1} \\ & + \sum_{i=1}^{p} \gamma_i \Delta lnYM_{t-i} + \sum_{i=1}^{q1} \delta_1 \Delta lnRGDP_{t-i} + \sum_{i=1}^{q2} \delta_2 \Delta lnPmeat_{t-i} + \sum_{i=1}^{q3} \delta_3 \Delta lnREER_{t-i} \\ & + \sum_{i=1}^{q4} \delta_4 \Delta Dex_{t-i} + \sum_{i=1}^{q5} \delta_5 \Delta DC19_{t-i} + \varepsilon_t \rightarrow \text{Meat Model} \end{aligned}$$

$$\begin{aligned} lnYD_t = {} & \beta_0 + \pi_1 lnYD_{t-1} + \pi_2 lnRGDP_{t-1} + \pi_3 lnPdairy_{t-1} + \pi_4 lnREER_{t-1} + \pi_5 Dex_{t-1} + \pi_6 DC19_{t-1} \\ & + \sum_{i=1}^{p} \gamma_i \Delta lnYD_{t-i} + \sum_{i=1}^{q1} \delta_1 \Delta lnRGDP_{t-i} + \sum_{i=1}^{q2} \delta_2 \Delta lnPdairy_{t-i} + \sum_{i=1}^{q3} \delta_3 \Delta lnREER_{t-i} \\ & + \sum_{i=1}^{q4} \delta_4 \Delta Dex_{t-i} + \sum_{i=1}^{q5} \delta_5 \Delta DC19_{t-i} + \varepsilon_t \rightarrow \text{Dairy Model} \end{aligned}$$

$$\begin{aligned} lnYO_t = {} & \beta_0 + \pi_1 lnYO_{t-1} + \pi_2 lnRGDP_{t-1} + \pi_3 lnPoils_{t-1} + \pi_4 lnREER_{t-1} + \pi_5 Dex_{t-1} + \pi_6 DC19_{t-1} \\ & + \sum_{i=1}^{p} \gamma_i \Delta lnYO_{t-i} + \sum_{i=1}^{q1} \delta_1 \Delta lnRGDP_{t-i} + \sum_{i=1}^{q2} \delta_2 \Delta lnPoils_{t-i} + \sum_{i=1}^{q3} \delta_3 \Delta lnREER_{t-i} \\ & + \sum_{i=1}^{q4} \delta_4 \Delta Dex_{t-i} + \sum_{i=1}^{q5} \delta_5 \Delta DC19_{t-i} + \varepsilon_t \rightarrow \text{Oils Model} \end{aligned}$$

$$\begin{aligned} lnYC_t = {} & \beta_0 + \pi_1 lnYC_{t-1} + \pi_2 lnRGDP_{t-1} + \pi_3 lnPcereals_{t-1} + \pi_4 lnREER_{t-1} + \pi_5 Dex_{t-1} + \pi_6 DC19_{t-1} \\ & + \sum_{i=1}^{p} \gamma_i \Delta lnYC_{t-i} + \sum_{i=1}^{q1} \delta_1 \Delta lnRGDP_{t-i} + \sum_{i=1}^{q2} \delta_2 \Delta lnPcereals_{t-i} \\ & + \sum_{i=1}^{q3} \delta_3 \Delta lnREER_{t-i} + \sum_{i=1}^{q4} \delta_4 \Delta Dex_{t-i} + \sum_{i=1}^{q5} \delta_5 \Delta DC19_{t-i} + \varepsilon_t \rightarrow \text{Cereals Model} \end{aligned}$$

$$\begin{aligned} lnYWH_t = {} & \beta_0 + \pi_1 lnYWH_{t-1} + \pi_2 lnRGDP_{t-1} + \pi_3 lnPcereals_{t-1} + \pi_4 lnREER_{t-1} + \pi_5 Dex_{t-1} + \pi_6 DC19_{t-1} \\ & + \sum_{i=1}^{p} \gamma_i \Delta lnYWH_{t-i} + \sum_{i=1}^{q1} \delta_1 \Delta lnRGDP_{t-i} + \sum_{i=1}^{q2} \delta_2 \Delta lnPcereals_{t-i} \\ & + \sum_{i=1}^{q3} \delta_3 \Delta lnREER_{t-i} + \sum_{i=1}^{q4} \delta_4 \Delta Dex_{t-i} + \sum_{i=1}^{q5} \delta_5 \Delta DC19_{t-i} + \varepsilon_t \rightarrow \text{Wheat Model} \end{aligned}$$

$$\begin{aligned} lnYS_t = {} & \beta_0 + \pi_1 lnYS_{t-1} + \pi_2 lnRGDP_{t-1} + \pi_3 lnPsugar_{t-1} + \pi_4 lnREER_{t-1} + \pi_5 Dex_{t-1} + \pi_6 DC19_{t-1} \\ & + \sum_{i=1}^{p} \gamma_i \Delta lnYS_{t-i} + \sum_{i=1}^{q1} \delta_1 \Delta lnRGDP_{t-i} + \sum_{i=1}^{q2} \delta_2 \Delta lnPsugar_{t-i} + \sum_{i=1}^{q3} \delta_3 \Delta lnREER_{t-i} \\ & + \sum_{i=1}^{q4} \delta_4 \Delta Dex_{t-i} + \sum_{i=1}^{q5} \delta_5 \Delta DC19_{t-i} + \varepsilon_t \rightarrow \text{Sugar Model} \end{aligned}$$

Where β_0 expresses the intercept parameter; ε_t represents the random error term; π_i denotes the long-term coefficients; γ_i, δ_j stand for the short-term coefficients; and the long-term effect of the variable $lnRGDP_{t-1}$, for example, is $[-\pi_2/\pi_1]$, as the short-term effect of the real GDP variable is the first difference coefficient δ_1. The ARDL-UECM models were estimated using the following formulas:

$$\Delta lnY_t = \beta_0 + \delta_1 \Delta lnRGDP_t + \delta_2 \Delta lnPall_t + \delta_3 \Delta lnREER_t + \delta_4 \Delta Dex_t + \delta_5 \Delta DC19_t + \psi ECT_{t-1}$$

$$\Delta lnYM_t = \beta_0 + \delta_1 \Delta lnRGDP_t + \delta_2 \Delta lnPmeat_t + \delta_3 \Delta lnREER_t + \delta_4 \Delta Dex_t + \delta_5 \Delta DC19_t + \psi ECT_{t-1}$$

$$\Delta lnYD_t = \beta_0 + \delta_1 \Delta lnRGDP_t + \delta_2 \Delta lnPdairy_t + \delta_3 \Delta lnREER_t + \delta_4 \Delta Dex_t + \delta_5 \Delta DC19_t + \psi ECT_{t-1}$$

$$\Delta lnYO_t = \beta_0 + \delta_1 \Delta lnRGDP_t + \delta_2 \Delta lnPoils_t + \delta_3 \Delta lnREER_t + \delta_4 \Delta Dex_t + \delta_5 \Delta DC19_t + \psi ECT_{t-1}$$

$$\Delta lnYC_t = \beta_0 + \delta_1 \Delta lnRGDP_t + \delta_2 \Delta lnPcereals_t + \delta_3 \Delta lnREER_t + \delta_4 \Delta Dex_t + \delta_5 \Delta DC19_t + \psi ECT_{t-1}$$

$$\Delta lnYWH_t = \beta_0 + \delta_1 \Delta lnRGDP_t + \delta_2 \Delta lnPcereals_t + \delta_3 \Delta lnREER_t + \delta_4 \Delta Dex_t + \delta_5 \Delta DC19_t + \psi ECT_{t-1}$$

$$\Delta lnYS_t = \beta_0 + \delta_1 \Delta \text{lnRGDP}_t + \delta_2 \Delta \text{lnPsugar}_t + \delta_3 \Delta \text{lnREER}_t + \delta_4 \Delta \text{Dex}_t + \delta_5 \Delta \text{DC19}_t + \psi \text{ECT}_{t-1}$$

Since ECT_{t-1} expresses the error-correction limit, ψ represents the speed of the correction, and the most significant statistical formula that is consistent with economic logic and with different lag periods has been reached, the model formula ARDL (p, q) is appropriate via the lowest value of information criteria, such as AIC, SC and HQ. According to the boundary test, the F-distribution is non-standard, where the two critical values are taken from the Pesaran table.

It had predicted according to the parameters estimated from the cointegration models, as well as the forecast based on the seasonality of demand using SARIMA, where the time series can be clarified $\{Z_t | t = 1,2,\ldots,k\}$ with the $SARIMA(p,d,q)(P,D,Q)_S$ model and mean μ, as well as with the Box–Jenkins model (Abdel Rahman, 2002), as shown below:

$$\Phi(B^S)\varphi(B)(1-B)^d(1-B^s)^D(Y_t-\mu) = \Theta(B^S)\theta(B)\varepsilon_t \dashrightarrow SARIMA(p,d,q)(P,D,Q)_S$$

AR	$\varphi(B) = 1 - \varphi_1 B - \varphi_2 B^2 - \cdots - \varphi_p B^p$	Polynomials of the order p
Seasonal AR	$\Phi(B^S) = 1 - \Phi_1 B^S - \Phi_2 B^{2S} - \cdots - \Phi_P B^{PS}$	Polynomials of the order P
MA	$\theta(B) = 1 - \theta_1 B - \theta_2 B^2 - \cdots - \theta_q B^q$	Polynomials of the order q
Seasonal MA	$\Theta(B^S) = 1 - \Theta_1 B^S - \Theta_2 B^{2S} - \cdots - \Theta_Q B^{QS}$	Polynomials of the order Q

p	: Non-seasonal AR model rank	P	: Seasonal AR Model Rank
d	: Non-seasonal integration (number of differences)	D	: Seasonal integration (number of seasonal differences)
q	: Non-seasonal MA model rank	Q	: Seasonal MA model rank
S	: Period of seasonal pattern recurrence equal to 12 for monthly data	Y_t	: actual time series data during period t
		B	: lag factor

ε_t : It is the white noise process under the hypothesis of $\varepsilon_t \sim \text{WN}(0,\sigma^2)$, and the root of each $\varphi(Z) = 0, \theta(Z) = 0$ must lie outside the unit circle.

2.2. Data:

To solve the above problem, this study uses macroeconomic indicator data from the World Bank, the Organisation for Economic Cooperation and Development and the Arab Monetary Fund. The Egyptian economic policies implemented to confront the COVID-19 repercussions from 14 February 2020 to 20 December 2021 were obtained through the Ministry of Planning and Economic Development, IFPRI, Egypt and the World Trade Organization.

The data for the food groups studied from January 2010–April 2021 were related to joint integration models obtained from the Comtrade database, the Food and Agriculture Organization of the United Nations (FAO), the Central Agency for Public Mobilisation and Statistics, the Bruegel database, the UNCTAD and other relevant studies.

3. Literature Review

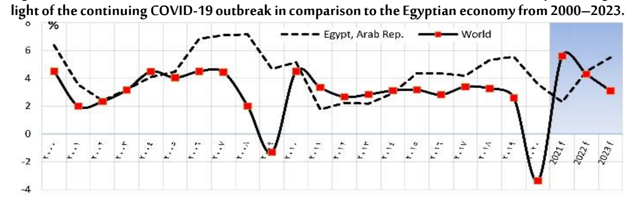
3.1. The Impact of COVID-19 on Some Global Macroeconomic Indicators:

The pandemic is causing massive economic disruptions at the international level through concurrent shocks, including decreased domestic and external demand, lower oil prices, disruptions in trade and global value chains and tightened financial conditions due to lower global demand. Commodity prices fell; the Egyptian economy stumbled as a result of the Egyptian government's rapid response and proactive measures to limit the virus's impact, which were implemented in March 2020 (IFPRI, 2022).

3.1.1. GDP Growth Responses at the Global Economy Level During the COVID-19 Pandemic

The global economy witnessed a recession during the emergence of COVID-19 – the 'deepest global recession' since World War II – with the contraction rate reaching about 3.5% in 2020. However, economists expect a strong recovery in economic growth. The World Bank anticipates that in 2021 the economy will expand by about 5.6% at the global level, and about 5.4% in advanced economies, while the International Monetary Fund (IMF, 2021), expects the global economy will grow by 5.9% and 4.9% in 2021 and 2022, respectively. In addition, the global recession's economic impact will largely occur in emerging markets and other developing countries that depend on global trade, tourism and remittances from abroad (World Bank, 2021; 2022; Figure 1).

Figure 1: The evolution of the recession state that most of the world's economies are experiencing in light of the continuing COVID-19 outbreak in comparison to the Egyptian economy from 2000–2023.



Source (data collected and calculated):
- www.worldbank.org
- World Bank (2021) Global Economic Prospects, Washington, DC, World Bank. https://doi.org/10.1596/978-1-4648-1665-9

In this context, World Bank experts (World Bank, 2021; 2022) believe that there are two scenarios for global economic growth beyond 2021. The first is a 'faltering recovery', in which the global economy slows in response to the possibility of another COVID-19 outbreak, leading to increasing inflationary pressures and a sharp tightening in global financial conditions over the next two years. The second scenario is 'sustainable expansion', which simulates COVID-19 containment due to a vaccine and reopening, implying that current signs of recovery may be fleeting and that policymakers must exploit one of the current opportunities to implement reforms that enhance economic growth.

The Fund also warns of the consequences of different paths of recovery among countries based on vaccine availability. A rapid return to normal economic activity is expected in advanced economies. The rise in inflationary pressures is one of the most serious challenges facing both advanced and developing economies (Arab Monetary Fund, 2021). According to the Organisation for Economic Cooperation and Development (OECD statistical databases), the global economy will grow by 2.56% in 2021 and 4.458% in 2022. These expectations are attributed to the global economy's strong recovery as a result of accommodative fiscal and monetary policies, as well as the steady increase in the number of vaccinators. However, this recovery is uneven, with several countries still facing various challenges that threaten the recovery's sustainability.

3.1.2. GDP Growth Responses at the Egyptian Economy Level During the COVID-19 Pandemic

The Egyptian economy is an exceptional case during the emergence of COVID-19. At a time when the rest of the world was experiencing economic stagnation, the Egyptian economy grew in 2020, as shown in Figure 1. However, Egypt's GDP growth rate in 2019 was about 5.6%, indicating that it still decreased by about 1.9% points in 2020 and 3.3% points in 2021, ending with 3.6% and 2.3%, respectively. This is due to a set of measures implemented by the Egyptian government to address the COVID-19 repercussions, which is a part of the economic reforms that succeeded in confronting the crisis. The stimulation of internal demand for goods and services, as well as the lack of a trend towards complete closure also aided the country's GDP during the pandemic (Arab Monetary Fund, 2021).

In 2022, the World Bank (2021) expects the growth rate to increase to about 4.5%, while the Arab Monetary Fund (2021) anticipates it to rise to about 5.4%. This indicates an increase in the overall growth rate, which could be due to a rise in the number of vaccine recipients in Egypt and the second phase of the structural economic reform programme. The Egyptian government programme aimed at making all commercial, agricultural, industrial and economic activities flexible, as well as the possibility of increasing the number of tourists, as shown in Figure 1.

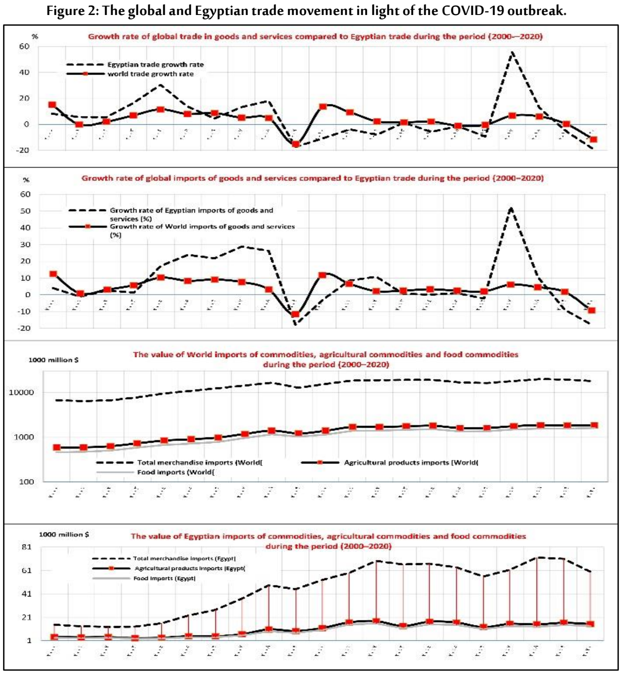
3.1.3. World Trade Volume in Relation to Egyptian Trade

The global health crisis caused by the COVID-19 outbreak has had severe repercussions on the level of economic activity (International Monetary Fund, 2020), with general bans and widespread closures being implemented to slow the spread of the virus. Ninety-three countries applied temporary export measures, while 105 countries implemented temporary import measures to facilitate access to essential medical supplies or food (International Trade Centre, 2020).

Consequently, world exports and imports were affected by the COVID-19 outbreak and the closure of borders between some countries, including China, the European Union and the United States, as shown in Figure 2. In 2020, The World Trade Organization expected a 13% to 32% decline in commodities in global trade due to the pandemic. In 2021, international trade was expected to recover at rates ranging from 21% to 24%, and the state adopted appropriate policies to support it and controlled the rates of disease outbreaks by receiving vaccines (International Monetary Fund, 2020).

In 2022, a relative recovery of the international trade exchange was expected (Arab Monetary Fund, 2021; International Monetary Fund, 2021), including at the level of merchandise trade or some services trade activities, as a result of increased levels of flexibility in global supply chains, the benefits of digital transformation in trade exchange processes and the liberalisation of international trade flows. Countries with an increasing share of tourism and travel in GDP are expected to witness a significant decline, with travel restrictions and ongoing fears of contagion likely to affect tourism activity.

Figure 2: The global and Egyptian trade movement in light of the COVID-19 outbreak.



At the local level, the Information and Decision Support Centre (2021) indicated that Egypt's five largest trading partners account for 41% of Egyptian imports in 2020, with China in the lead with about 18%, followed by America, Germany, Italy and Turkey at 7%, 6%, 5% and 5%, respectively. However, the volume of Egypt's non-oil imports from China fell to $11.6 billion in 2020, compared to $12.4 billion in 2019. In terms of Egyptian exports, the United Arab Emirates (UAE), Saudi Arabia, Turkey, America and Italy accounted for 35% of them in 2020. Also, Egypt's non-oil exports to the UAE increased by about $2.9 billion in 2020, compared to $2.1 billion in 2019.

3.2. Egypt's COVID-19 Economic Policy Responses in Comparison:

Despite the Egyptian government's ban and social distancing measures, certain economic policies were needed to withstand the repercussions of the COVID-19 outbreak from 14 February 2020 to 20 December 2021 (IFPRI, 2022; Ministry of Planning and Economic Development, 2021; World Trade Organization, 2021):

3.2.1. Implemented Egyptian Trade Policies

The Egyptian government has banned the export of pulses twice, the first was on 28 March 2020, and the second was in October 2020, each of which lasted for three months. To achieve self-sufficiency in strategic food products, the import of white sugar was banned for three months to protect the local industry from fluctuations in international sugar prices.

The Egyptian government has changed the policies of import tenders for wheat, in which suppliers, starting on 3 April 2020, were required to replace any shipments affected by COVID-19 transport restrictions with wheat from another location and bear the cost. A shipment of wheat that had already been sold to an Egyptian buyer was suspended by Romania, due to its ban on grain exports to countries outside the European Union, including Egypt.

3.2.2. Some of the Implemented Egyptian Fiscal and Monetary Policies

The Central Bank of Egypt implemented two policies. The first focused on expanding investment opportunities to relieve expected pressures on the currency by issuing certificates of deposits at a new rate of 15% for one year. The second centred on the reduction in interest rates, which resulted in a 3% drop in borrowing rates to stimulate industries and increase demand.

In conjunction with the state's monetary policy, on 15 March 2020, the Central Bank and the Prime Ministry implemented a set of fiscal policies directed to private companies in the form of financial support, without specifying a time for these policies to end, as well as rural income assistance. They aided Egyptian farmers by extending the moratorium on agricultural land taxation for two years and deferring the payment of farmers' debts for six months. The wheat price was set at 700 pounds/ardab (1 ardab = 155 kg) to support farmers and increase wheat reserves, covering seven months.

4. Results and Discussion

4.1. Demand Determinants for Some Egyptian Food Imports in Light of COVID-19:

4.1.1. Unit Root Test Results (Augmented Dickey–Fuller Test)

The unit root was tested to determine the cointegration rank (Shrestha and Chowdhury, 2005) of the previously described models' studied variables and choose the analysis method. If all variables are stationary at level, the OLS–VAR method is used, but if all the variables are un-stationary at level, the VECM method or the causality test is used. Moreover, if some of the variables are stationary at level and the others with first difference, the ARDL models are used (Table 1).

Table 1: Unit root test of the determinants of Egyptian food import demand during the COVID-19 pandemic from January 2020 – April 2021 using the augmented Dickey–Fuller test. The results of first differences.

variable	Intercept(η_{μ})		Trend and intercept ($\eta_{\mu\tau}$)		Decision
	Test statistic	AIC	Test statistic	AIC	
Y_t	(-12.64)***	15.72	(-12.61)***	15.73	I(1)
YM_t	(-12.13)***	9.58	(-12.12)***	9.59	I(1)

YD_t	(-14.44)***	7.93	(-14.39)***	7.94	I(1)
YO_t	(-19.46)***	10.17	(-19.39)***	10.19	I(1)
YC_t	(-10.39)***	11.85	(-10.36)***	11.87	I(1)
YWh_t	(-11.49)***	12.68	(-11.53)***	12.69	I(1)
YS_t	(-17.05)***	9.73	(17.01)***	9.74	I(1)
$RGDP_t$	(-15.18)***	19.04	(-14.75)***	19.06	I(1)
$Pall_t$	(-7.66)***	-2.95	(-7.63)***	-2.93	I(1)
$Pfood_t$	(-7.46)***	-3.52	(-7.43)***	-3.51	I(1)
$Pmeat_t$	(-10.44)***	-4.15	(-10.52)***	-4.15	I(1)
$Pdairy_t$	(-8.99)***	-3.50	(-9.01)***	-3.49	I(1)
$Poils_t$	(-8.26)***	-2.66	(-6.82)***	-2.68	I(1)
$Pcereals_t$	(-9.77)***	-2.94	(-9.75)***	-2.92	I(1)
$Psugar_t$	(-7.81)***	-1.54	(-6.43)***	-1.96	I(1)
$REER38_t$	(-10.28)***	6.71	(-10.24)***	6.73	I(1)

Notes: ***, ** and * denote significance at 1%, 5% and 10% levels, respectively.
Critical values 10% 5% 1%
Withconst (n = 135): -2.578 -2.883 -3.479
Withconst & time (n = 135): -3.147 -3.444 -4.027
Source: Authors' results were obtained using the EViews9.5 econometrics package.

Table 1 shows the unit root test results (using the augmented Dickey–Fuller test), highlighting the stationarity of some study variables after obtaining the first differences. In the Egyptian Total Imports model, some independent variables (i.e. $RGDP_t$, $Pall_t$, $REER38_t$) were non-stationary at level but stationary in the first differential, integrated at order one [I (1)]. Moreover, in the meat group model, some independent variables (i.e. $RGDP_t$, $Pmeat_t$, $REER38_t$) were non-stationary at level but stationary in the first differential. In the dairy group model, some independent variables (i.e. $RGDP_t$, $Pdairy_t$, $REER38_t$) were also non-stationary at level but stationary in the first differential. Similarly, in the oil group model, several of the independent variables (i.e. $RGDP_t$, $Poils_t$, $REER38_t$) were non-stationary at level but stationary in the first differential.

With the cereal and wheat models, the independent variables $RGDP_t$, $Pcereals_t$ and $REER38_t$ were found to be non-stationary at level but stationary in the first differential. It was also found that in the sugar model, the independent variables $RGDP_t$, $Psugar_t$ and $REER38_t$ were non-stationary at level but were stationary in the first differential. Therefore, one of the solutions to the series' instability is to take the difference.

4.1.2. Discussing the Results of the Estimated Models

Table 2 shows that the explanatory variables studied (i.e. the value of imports with a lag period, GDP, relative prices, the effective real exchange rate, the liberation policy and COVID-19) explain about 46% of the changes in the total demand for Egyptian imports. This percentage improved at the level of the meat group and dairy models, while it decreased at the level of the cereals group. This required studying the demand for wheat alone, without the other cereals, resulting in a high interpretation rate of about 92%.

It was found that the error correction limit coefficient was negative and statistically significant for the studied models. This means that the determinants of demand for total Egyptian imports and the imports of the studied food groups cointegrate when the value of imports is a dependent variable; this effect is supported in short- and long-term dynamic models (Table 2).

Furthermore, the estimated intercept parameter of the two models of demand for meat and sugar imports was found to be positive, indicating that there is a part of the import at the level of those two groups that does not depend on the studied factors, particularly consumer response to import prices. This may be due to the seasonality of demand for meat during Eid al-Adha and for sugar during the holy month of Ramadan each year. In addition, the state's support for some imported food groups obscures the consumers' real demand for sugar in response to prices, especially wheat, which accounts for the largest share of the Egyptian food import basket (Table 2).

It was also revealed that the explanatory variables studied were integrated at a significant level of 1%. The F-statistic value was greater than the critical values for the corresponding upper bound at the 1% level of significance for each of the total imports of meat, dairy, oil, cereals and sugar, while there is a cointegration between the studied variable of wheat demand at a significant level of 5%. This means that there is a long-term equilibrium relationship between the variables studied in those models (Table 2).

4.2. Discussion of the Results in Relation to the Estimated Variables:

4.2.1. Real GDP

The real GDP variable had a positive and statistically significant impact on total Egyptian imports in both the short and long term. According to economic theory, an increase in real GDP always leads to an increase in import level, as the coefficient of elasticity was about 1.11 and 1.77 in the short and long term, respectively (Table 2).

For the studied food group, the impact of the real GDP variable on dairy, oils, cereals and wheat imports was positive. However, it was not significant at the level of the wheat model alone. A 1% increase in real GDP will result in an increase in dairy, oils, cereals and wheat imports by 3.58%, 10.04%, 1.63% and 0.26% in the short term, and about 7.31%, 7.73%, 2.33% and 2.4% in the long term, respectively. In contrast, a 1% increase in real GDP will lead to a decrease in meat and sugar imports by 2.76% and 6.2% in the short term, and about 7.57% and 10.6% in the long term, respectively (Tables 2, 3 and 4).

4.2.2. Relative Prices

To obtain suitable time series for relative prices, the same base year was used for the studied consumer price indices (2015 = 100), and the index numbers for food groups were taken from the FAO data. The relative prices (Monthly Bulletin of Statistics [MBS] Online) of the demand model for total Egyptian imports were estimated by dividing the world price index by the consumer price index in Egypt. Moreover, the relative prices of the demand model for meat imports were estimated by dividing the meat price index (taken from the FAO data) by the consumer price index for the food and drink section of Egypt (CAPMAS); a similar formula was employed for the rest of the relative prices of the food group models studied.

The effect of relative prices on total Egyptian imports was positive in the short and long term, with elasticity coefficients of 0.045 and 0.072, respectively, but it was statistically insignificant (Table 2).

At the food group level (Tables 2, 3 and 4), it was found that the relative prices of dairy, oils, cereals and wheat had a positive and statistically significant effect on their total imports in the long term, with elasticity coefficients of 0.82, 1.53, 0.48 and 0.844, respectively. Meanwhile, the relative prices of meat and sugar had a negative and statistically significant effect on their total imports in the long term, with elasticity coefficients of -2.74 and -1.33, respectively. This means that imports of milk, oils, cereals and wheat are less sensitive to price increases than imports of meat and sugar.

It was also discovered that the relative prices of meat, dairy, oils, wheat and sugar had a negative impact on their total imports in the short term, with elasticity coefficients of -0.35, -0.99, -0.63, -0.31 and -0.78, respectively. This means that imports of these food groups are more sensitive to price increases in the short term, but meat and oils were statistically insignificant (Tables 2, 3 and 4).

Table 2: Cointegration estimation using the bound test for total, meat and dairy imports from January 2020–April 2021.

Dependent Var	Total import, $Ln(Y_t)$		Meat import, $Ln(YM_t)$		Dairy import, $Ln(YD_t)$	
	Coef.	t	Coef.	t	Coef.	t
$\Delta Ln(RGDP_t)$	1.11	2.80***	-2.76	-2.2**	3.58	3.6***
$\Delta Ln(Pall_t)$	0.045	0.816				
$\Delta Ln(Pmeat_t)$			-0.35	-0.451		
$\Delta Ln(Pmeat_{t-1})$			1.72	2.19**		
$\Delta Ln(Pdairy_t)$					-0.99	-1.89*
$\Delta Ln(reer38_t)$			0.68	3.1***	-1.15	2.36**
ΔDex_t	-0.084	-1.77*			-0.54	-2.5**
$\Delta Dc19_t$	-0.152	-3.3***	-0.158	-1.82*	-0.04	-0.43
ETC_{t-1}	-0.626	-7.4***	-0.37	-5.5***	-0.49	-6.5***

$Ln(RGDP_t)$	1.77	3.05***	-7.57	-2.3**	7.31	3.9***
$Ln(Pall_t)$	0.072	0.820				
$Ln(Pmeat_t)$			-2.74	-3.0***		
$Ln(Pdairy_t)$					0.82	2.5**
$Ln(reer38_t)$			1.88	3.7***	-0.85	-1.23
Dex_t	-0.133	-1.83*			-1.10	-2.8***
$Dc19_t$	-0.24	-3.87***	-0.43	-1.92*	-0.08	-0.43
C	-13.75	-1.87*	91.34	2.2**	-84.1	-3.7***
$\bar{R}^2$	0.46		0.696		0.49	
F-statistic	24.03***		44.45***		17.3***	

Notes: ***, ** and * denote significance at 1%, 5% and 10% levels, respectively.
F-bounds test = 10.46, 5.12, 6.88 for total, meat and dairy imports, respectively, Critical Value [I (1)] = 5.06 (1%), [I (0)] = 3.74 (1%)
Source: Authors' results were obtained using the EViews9.5 econometrics package and Gretl

4.2.3. Effective Real Exchange Rate

Effective real exchange rates for 38 of Egypt's trading partners were obtained from Bruegel databases during the study period; since it is a case of depreciation of the local currency, the economic theory refers to an increase in exports and a decrease in import volume. For this reason, an overvaluation of the local currency can artificially make imports less expensive when compared to locally exchangeable products, increasing imports.

At the level of the studied food group (Table 2), the effective real exchange rate had a positive and statistically significant effect on meat imports in both the short and long term. This implies a deterioration of the local currency value against a rise of the foreign currency value as a result of higher demand for meat imports and the consequent price increases. This is because the short- and long-term elasticity were at about 0.68 and 1.88, respectively.

It was also found that the effective real exchange rate had a negative impact on dairy, oils and wheat imports in the short and long term, with elasticity coefficients of -1.15, -3.92 and -0.39 in the short term and about -0.85, -0.49 and -0.65 in the long term, respectively. However, it was statistically insignificant in the long term (Tables 2, 3 and 4).

4.2.4. The Impact of the Economic Reform Policy

Egypt's great dependence on global markets for food imports led to high import costs; nonetheless, the macroeconomic situation has significantly improved as a result of the immediate responses implemented by the Egyptian government with the support of the International Monetary Fund since November 2016 (Ali and Attala, 2021; USDA, 2020). Accordingly, it was necessary to include a dummy variable in the studied models to express the economic reform policy as one during the period (November 2016–April 2021) and zero otherwise.

In the short term, the economic reform policy had a negative and significant impact on total, dairy, oils and wheat imports. Their elasticity coefficients were -0.084, -0.54, -2.07 and -0.20, respectively. Moreover, the policy had a positive yet insignificant effect on sugar imports, with an elasticity coefficient of 0.49 (Tables 2, 3 and 4).

In the long term, it was found that the economic reform policy had a negative and significant impact on total and dairy imports, with elasticity coefficients of -0.133 and -1.10, respectively. In addition, the policy had a positive yet insignificant impact on imports of oils, cereals, wheat and sugar, with elasticity coefficients of 0.219, 0.10, 0.24 and 0.84, respectively (Tables 2, 3 and 4).

4.2.5. Impact of COVID-19

COVID-19-induced shocks (AMIS, 2020; USDA, 2020; Mohamed, 2015) began to affect food markets in April 2020. This led to a decline in oil prices and a slowdown in feed demand. Also, despite sufficient global supplies, many major exporters imposed various forms of trade restrictions to increase domestic food security. Accordingly, a dummy variable was introduced in the studied models to express the impact of COVID-19 on Egyptian imports, especially food groups, with a value of one during the period (March 2020–April 2021) and zero otherwise.

According to the estimates (Tables 2, 3 and 4), COVID-19 had a negative impact on total Egyptian imports and all the studied imported food groups. The elasticity coefficients for total, meat, dairy, oil, cereal, wheat and sugar imports were -0.152, -0.158, -0.04, -0.33, 0.088, -0.01 and 0.71, respectively, in the short term. In the long term, these were about -0.24, -0.43, -0.08, -0.62, -0.125, 0.08, and -1.2, respectively. This shows the significance of total Egyptian, meat, oil and sugar imports.

Table 3: Cointegration estimation for oil and sugar imports using the bound test during the period (January 2020–April 2021).

Dependent Var	Oils import, $Ln(YO_t)$		Sugar import, $Ln(YS_t)$	
	Coef.	t	Coef.	t
$\Delta Ln(RGDP_t)$	10.41	2.7***	-6.2	-2.6**
$\Delta Ln(Poils_t)$	-0.63	-0.83		
$\Delta Ln(Psugar_t)$			-0.78	-2.1**
$\Delta Ln(reer38_t)$	-3.92	-2.1**		
ΔDex_t	-2.07	-1.97*	0.49	1.59
$\Delta Dc19_t$	-0.33	-1.7*	-0.71	-2.4**
ETC_{t-1}	-0.54	-6.8***	-0.59	-7.4***
$Ln(RGDP_t)$	7.73	2.3**	-10.6	-2.6**
$Ln(Poils_t)$	1.53	3.5***		
$Ln(Psugar_t)$			-1.33	-2.1**
$Ln(reer38_t)$	-0.49	-0.37		
Dex_t	0.219	0.286	0.84	1.63
$Dc19_t$	-0.62	-1.7*	-1.2	-2.6**
C	-91.1	-2.4**	138	2.7***
$\bar{R}^2$	0.45		0.42	
F-statistic	7.94***		18.5***	
F-Bounds Test Critical Value	8.02*** [I(1)] = 4.68 (1%), [I (0)] = 3.41 (1%)		11.12*** [I(1)] = 5.06 (1%), [I (0)] = 3.74 (1%)	

Notes: ***, ** and * denote significance at 1%, 5% and 10% level, respectively.
Source: Authors' results were obtained using the EViews9.5 econometrics package and Gretl.

Table 4: Cointegration estimation for cereal and wheat imports using the bound test during the period (January 2020–April 2021).

Dependent Var	Cereal import, $Ln(YC_t)$		Wheat import, $Ln(YWh_t)$	
	Coef.	t	Coef.	t
$\Delta Ln(Pcereals_t)$	0.337	2.03**	-0.31	-3.1***
$\Delta Ln(reer38_t)$			-0.39	-2.1**
ΔDex_t	0.07	0.786	-0.20	-1.9*
ΔDex_{t-1}			-0.09	-1.9*
$\Delta Dc19_t$	-0.088	-0.95	-0.01	-0.47
ETC_{t-1}	-0.70	-8.3***	-0.11	-3.9***
$Ln(RGDP_t)$	2.33	2.06**	2.4	1.29
$Ln(Pcereals_t)$	0.48	2.1**	0.844	2.7***
$Ln(reer38_t)$			-0.65	-0.97
Dex_t	0.10	0.786	0.24	0.603
$Dc19_t$	-0.125	-0.97	-0.08	-0.47
C	-23.7	-1.66	-19.4	-0.90
$\bar{R}^2$	0.19		0.922	
F-statistic	6.12***		145.4***	
F-Bounds Test Critical Value	13.93*** [I(1)] = 5.06 (1%), [I (0)] = 3.74 (1%)		4.31** [I(1)] = 3.79 (5%), [I (0)] = 2.62 (5%)	

Notes: ***, ** and * denote significance at 1%, 5% and 10% levels, respectively.
Source: Authors' results were obtained using the EViews9.5 econometrics package and Gretl.

4.3. Expected Demand for Egyptian Imports from Specific Food Groups:

Forecasting the value of Egyptian imports from some of the studied food groups during the period (January 2022–December 2023) can be studied using parameters estimated from ARDL models, as well as forecasting based on demand seasonality using SARIMA models. The following are the prediction results (Tables 5 and 6):

- Total Egyptian imports are expected to reach their lowest level during April 2022 (about $5,643 million, compared to about $5,624 million in April 2023). The maximum is expected in December 2022 with about $6,608 million, compared to about $6,928 million in December 2023 ($ARIMA(1.1.1)X(2.0.2)_{12}$). The average is about $6,253 million per month in 2022, and about $6,429 million per month in 2023 (ARDL model).
- According to the seasonality forecast, total Egyptian imports from the meat group would reach a low in February 2022 at about $135.2 million, and a high of about $266.8 million in July 2022. The average is about $77 million per month in 2022 and about $97.15 million per month in 2023.
- According to the seasonal forecast, total Egyptian imports of the dairy group would reach a low in October 2022 at about $26.7 million, and a high of about $73.4 million in April 2022. The average is about $119.3 million per month in 2022 and about $175 million per month in 2023.
- At the level of the total Egyptian imports of oils, the values estimated from the ARDL model increased when compared to the prediction via the $ARIMA(2.0.0)X(2.1.2)_{12}$ model. According to the seasonal forecast, it would reach a low of about $30.7 million in December

2022, and a high of about $157 million in May 2022.

- On the level of total Egyptian wheat imports, it has been found that the best model that can be relied upon in future prediction is Brown's linear exp.; thus, the total value of Egyptian imports is expected to reach a minimum of $169.7 million in July 2022 and a maximum of about $255.9 million in January 2023.
- It was found that the total Egyptian imports of sugar would reach a low of about $6.78 million in March 2023, and a high of about $38.9 million in September 2022. The expected average is about $41.4 million per month in 2022 and about $58.7 million per month in 2023.

Table 5: Forecasting the value of Egyptian meat, dairy and total imports in million dollars during the period (January 2022–December 2023).

Appreciation method	Total Imports		Meat Imports		Dairy Imports	
	ARDL,F	SARIMA	ARDL,F	SARIMA	ARDL,F	SARIMA
2022M01	6002	5852	88.1	151.8	86.1	49.6
2022M03	6268	6377	72.4	137.1	105.9	67.1
2022M05	6303	5987	73.0	166.3	118.9	72.5
2022M07	6298	6253	74.4	266.8	125.8	50.4
2022M09	6280	6051	75.5	228.8	128.8	38.8
2022M11	6271	6052	81.3	197.7	139.4	39.4
2023M01	6420	5849	83.0	165.7	157.0	53.6
2023M03	6459	6632	83.8	171.8	167.5	67.6
2023M05	6442	6027	90.8	164.9	173.8	66.6
2023M07	6439	6310	99.7	183.1	176.4	49.1
2023M09	6420	6175	103.9	197.3	177.9	37.2
2023M10	6411	6411	109.5	175.6	173.4	31.2
2023M11	6398	6230	114.3	184.4	191.5	41.5
2023M12	6384	6928	123.4	145.4	195.1	50.1
ThaiL coef.	0.06	-	0.19	-	0.33	-

Notice: -ARDL, F denote prediction using the ARDL Model according to the results in Table 2.
- SARIMA denotes prediction using seasonal ARIMA (SARIMA) models.
Source: Authors' results were obtained using the EViews9.5 econometrics package and STATGRAPHICS.

Table 6: Estimated value of Egyptian imports of oil, sugar, cereal and wheat in million dollars during the period (January 2022–December 2023).

Appreciation method	Oil Imports		Sugars Imports		Wheat Imports	
	ARDL,F	SARIMA	ARDL,F	SARIMA	ARDL,F	SARIMA
2022M01	419.4	96.5	11.56	17.82	256.8	221.6
2022M03	371.0	121.4	6.92	9.53	236.2	235.4
2022M05	376.5	157.0	32.11	15.95	237.7	236.9
2022M07	370.4	77.3	47.14	19.53	172.6	169.7
2022M09	352.2	80.0	77.19	38.88	226.4	225.7
2022M11	391.5	91.1	90.74	33.95	231.9	231.2
2023M01	536.9	101.6	46.68	15.35	256.6	255.9
2023M03	521.2	122.2	29.05	6.78	236.0	235.4
2023M05	542.1	137.8	54.94	13.06	237.5	236.9
2023M07	539.5	90.7	50.64	16.56	172.4	169.7
2023M09	528.4	78.2	94.89	35.87	226.3	225.7
2023M10	488.0	101.0	89.43	32.23	234.0	233.5
2023M11	618.5	96.8	87.67	30.93	231.7	231.2
2023M12	658.2	49.8	60.17	21.57	209.7	209.2
ThaiL coef.	0.50	-	0.38	-	0.08	-

Notice: -ARDL, F denotes prediction using the ARDL Model according to the results in Tables 3 and 4.
- SARIMA denotes prediction using seasonal ARIMA (SARIMA) models.
Source: Authors' results were obtained using the EViews9.5 econometrics package and STATGRAPHICS.

5. Conclusion

The results are as follows:

- When the demand for food commodities, especially wheat and meslin, is studied separately from the demand for the rest of the cereal group, the estimated results improve significantly.
- In addition to the state's support for some imported food groups, the demand for the meat and sugar groups is due to the seasonality of demand, making the consumer's real demand for them in response to prices unclear, especially wheat and meslin, which accounts for the largest share of the Egyptian food import basket.
- An increase in real GDP always leads to a boost in import level.
- Importing meat, dairy, oils, wheat and sugar is more sensitive to price increases in the short term.
- In the long term, importing milk, oils, cereal and wheat is less sensitive to price increases than importing meat and sugar.
- COVID-19 had a negative impact on total Egyptian imports and all imported food groups studied.

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