The Impact of International Trade to Maintain Sustainable Economic Growth: Evidence from Iran

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1. Introduction

This article analyzes the nexus between international trade and Sustainable Economic Growth (SEG) in Iran, as an oil-dependent developing country. The mainstream literature mostly holds government spending, technological innovation, human capital, and international trade as the main driver of economic growth. The literature on the impact of these variables on SEG provides evidence of an asymmetric impact. This raises two specific questions regarding the potential impact of trade on SEG and the way that policymakers can implement effective trade policies. In the global environment, export-oriented countries promote at least three Sustainable Development Goals (SDGs) indicators, namely, decent work, economic growth, and poverty reduction [1]. This motivates policymakers to expand international trade in their economies to achieve both the SEG and SDGs.
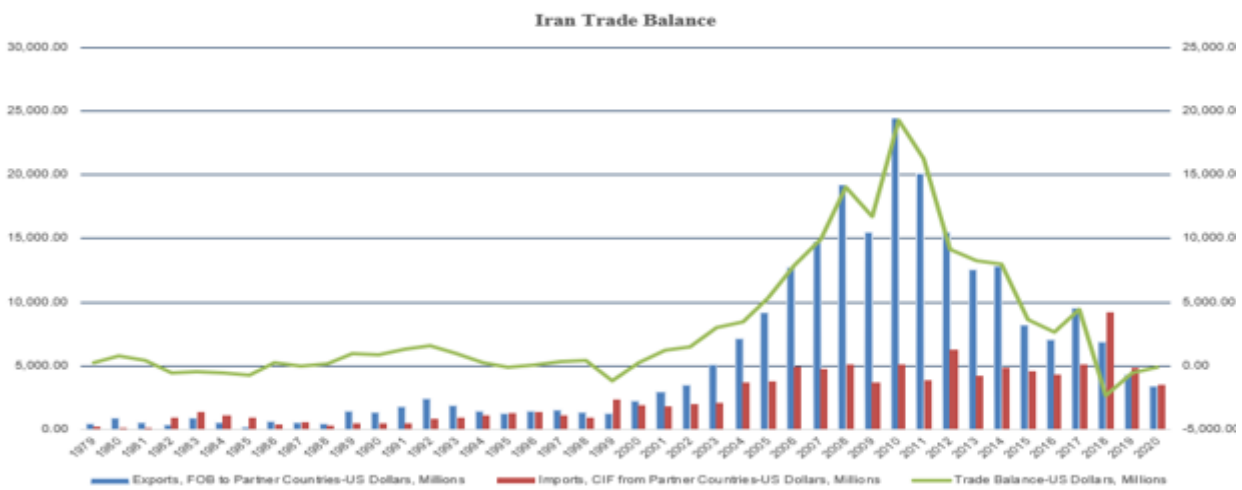
The motivation for international trade is similar to those of domestic trade, though, in times of economic crisis it could secure SEG. Export-oriented economies could acquire much more capital and technology leading to more specialization, efficient resource distribution, and increased productivity which contributes to SEG. Moreover, as international trade and GDP expand, more revenue would be available to import intermediate goods for manufacturing, enhance comparative advantage, scale economies, and technological advances [2]. According to Frankel and Romer [3] trade has a robust impact on the acceleration of economic growth by increasing comparative advantages, in both advanced and developing counties [4]. Nevertheless, there is empirical evidence which counteracts these findings arguing that this is not the case for all developing countries due to the fundamental differences among countries [5]. Related literature on the impact of international trade on SEG in Iran suggests that the impact is more import-led by increasing the value added to the manufacturing, mineral, and agricultural sectors [6].

These raise an important question: why hinging on international trade is so crucial for Iran? To investigate this question, the study employs time-series annual data on the real GDP, exports, and imports from 1979-2020 to conduct statistical analysis, and compute both the long and short-run equilibrium relationship between foreign trade and SEG. Finally, a causality analysis is performed to determine the direction and strength of the causality between international trade and growth. These analyses could provide key insight for both academics and policymakers to design policies to promote key sectors of Iran's industries towards export-led manufacturing. The paper is structured as follows. The next section describes the state of Iran's international trade. Section 3 provides a brief discussion of the literature on the nexus between international trade and SEG. The empirical model and results are discussed in section 4. Section 5 concludes the study and provides policy recommendations.

2. Trends of Iran`s International Trade

Figure (1) presents the international trade balance in Iran from 1979-2020. Data are collected from the Direction of Trade (DoT). As can be observed, Iran's trade balance over the course demonstrates fluctuations, though can be divided mainly into two different eras: 1) during the war between Iran and Iraq (1980-1988), and 2) during Iran`s six economic development plans which concentrate on industrial resilience and improvement to speed up the transmitting process of an oil-based to a manufacturing economy. While increasing integration can boost the economy and benefit countries through risk-sharing and consequently stability, it could make countries more vulnerable to external shocks which for Iran mainly concerns oil revenues and the imposed sanctions by the USA. Thus, the downward trend in Iran's trade balance is related to a significant decline in Iran's oil revenue which dominates both the export and import leading to a fall in economic growth. This implies that an SEG for Iran required a strong international trade policy.

Figure 1. Iran`s International Trade Indicators

Source: DoT statistics

3. Literature on Nexus between Trade and SEG

The impact of international trade on economic growth first was discussed by Mercantilisms, arguing that a positive trade balance would lead to economic growth and prosperity. However, there are different and sometimes contradictory opinions on this issue. Theories on the effect of foreign trade on economic growth are mainly divided into two categories. The first group are pro-international trade and considers international trade as the engine of economic growth, as is established by Adam Smith, namely the Theory of Absolute Advantage, and then was further developed by David Ricardo and presented as the Theory of Comparative Advantage. Then, Stuart Mill discussed that international trade improves the production process by expanding markets. The second category includes the opponents of international trade who believe that trade can lead to a reduction in economic growth in developing countries. For example, Singer, argues that international trade policy is suitable for

developing countries only if their products were in high demand, otherwise, free trade policy cannot help them [7].

Literature suggests that the way that foreign trade can impact the SEG depends on two factors. 1) the way that economic growth affects the growth rate of exports and import production, namely the production effect. 2) the way that a country's consumption pattern changes due to economic growth, namely the consumption effect. In general, changes in the volume of trade in the growth process depended on the net effects of consumption and production. If production and consumption are both in favour of trade, pro-trade growth occurs. Otherwise, anti-trade growth is happening. If production is against trade and consumption is in favour of trade or vice versa, changes in the volume of trade depend on the net effect of these two opposing forces [7]. This controversy in opinion on the application of the theories to the real world requires a data-driven analysis and empirical investigation, thus the next section provides more depth analysis of Iran's international trade impact on SEG.

4. Empirical Model and Discussion

To investigate the way that international trade may contribute to SEG in Iran, this section provides some data-driven insights. A preliminary explanation might relate the necessity of expanding Iran`s international trade to the vulnerability of oil revenue and political instability which leads to a severe fluctuation in Iran's foreign trade, emphasizing that a steady and long-run international trade policy needs to be considered as the main pillar of maintaining the SEG. For this purpose, the study employs time series annual data on the real GDP, real exports, and real imports, (all in USD and 2015 as the based year, obtained from the World Bank data, spanning 1979-2020. First, data analysis and diagnostic tests are conducted to ensure the stationarity of data for cointegration analysis. Then, a cointegration modelling approach is used to compute the long-run equilibrium relationship together with the Vector Error Correction Model (VECM) technique to estimate the short-run relationship between foreign trade and SEG. Finally, a causality analysis is performed to determine the existence and direction of the causality between international trade and growth.

4.1. Model Specification and Diagnostics Tests

For the cointegration relationship between variables to be valid, data needs to be stationary in their first difference, denoted as I (1). Note that a cointegration relationship posits that the focused variables are integrated in a way that cannot deviate from equilibrium in the long-run. Thus, first, the integrated order of variables must be checked. Table (1) presents the stationarity properties of variables using the Augmented Dickey-Fuller (ADF) test, which shows that all three focused variables are stationary in their first difference. Note that all the variables are transformed into natural logarithm forms allowing us to interpret the estimated coefficients as elasticities.

Table 1. Stationarity Properties of the Variables-ADF test:			
Variable	**Level**	**First Difference**	**Cointegration order**
ln GDP (real GDP)	-1.895	-4.449*	I (1)
ln EX (real Export)	-2.518	-5.444*	I (1)
ln IM (real Import)	-1.976	-4.674*	I (1)
Source: Research Findings, * Significant at the 5% confidence level. According to the McKinnon critical values, the critical values of ADF are -2.620 in level and -2.662 in first difference.			

Now it is possible to proceed to investigate the equilibrium dynamism of variables. According to Engel and Granger (1987) [8] under a cointegration relationship, the residuals can represent the

dynamic of equilibrium relations to study both the causality between international trade and GDP growth, which can be written as Equation (1).

$$e_t = lnGDP_{t-1} - \alpha lnEX_{t-1} - \beta lnIM_{t-1} = ECT_{t-1} \tag{1}$$

Also, to capture the short-run relationship between variables, the VECM as described by Engel and Granger (1987) [8] can be estimated based on Equation (2).

$$\Delta ylnGDP_t = \alpha_1 + \sum_{i=1}^{k-1}\delta_{1i}\Delta ylnGDP_{t-i} + \sum_{i=1}^{k-1}\beta_{1i}\Delta ylnEX_{t-i} + \sum_{i=1}^{k-1}\varphi_{1i}\Delta ylnIM_{t-i} + \lambda_i ECT_{t-1} + v_{1t} \tag{2}$$

Note that k-1 equals to lag length minus 1, δ_{1i}, β_{1i}, φ_{1i} represents the short-term coefficients, and $\lambda_i ECT_{t-1}$ denote the speed of the adjustment parameter to equilibrium.

4.2. Long and Short Run Equilibrium Relationships

Table (2) presents the results for relationships between GDP, export and imports and the speed of adjustment to equilibrium. The results show that both the long and short-run relationships between economic growth and international trade are statistically significant. According to the results, in the long-run, a one percent increase in export can induce an increase of around 0.5 percent in GDP. The same interpretation applies to imports, as a one percent increase in imports could induce around a 0.33 fall in GDP. The table also indicates short-run responses, as any 1 percent increase in export can induce around a 0.29 rise in GDP while for imports each one per cent increase in import may induce around of -0.11 fall in GDP. It seems that the response of international trade is more pronounced in the long-run as it takes time to build up and expand the trade networks to influence the SEG.

Table 2. Long and Short-run Equilibrium Relationships				
	Long-run Equilibrium Relationships		Short-run Equilibrium Relationships	
Variable	Coefficient	t Statistics	Coefficient	t Statistics
Constant	1.609	2.66*	0.0283	5.12*
Real Export	0.5416	5.33*	0.2913	9.03*
Real Import	-0.3998	- 6.20*	-0.1166	- 4.30*
Error Correction Term (ECT)	-	-	-0.1129	-3.24*
	Adj R-squared = 0.6770		Adj R-squared = 0.7222	
Source: Research Findings, * Significant at the 5% confidence level.				

Furthermore, the Error Correction Term (ECT) which indicates the speed of adjustment to equilibrium in the short-run, is negative and statistically significant. A negative ETC indicates convergence, while a positive coefficient indicates divergence. Thus, the results show that in case there were fluctuations in international trade, the speed of adjustment to equilibrium is around -0.1129 annually. Although the adjustment speed to return to equilibrium is rather small, it converges to its equilibrium amount. Note that to ensure the robustness of the estimated cointegration relationships, both the normality and heteroscedasticity tests have been conducted that validate the robustness of the results. The final question concerns the causality effect between these variables which is investigated using the Granger causality as follows.

4.3. Granger Causality Discussion

Table (3) presents the results for the Granger causality test to identify both the existence and direction of causality among GDP, exports and imports in Iran.

Table 3. Results of the Granger Causality Wald Test		
Direction of Causality	**F Statistic for Granger causality Test**	**P Value**
Exports cause GDP	0.426	0.516
Imports cause GDP	**4.147***	**0.046**
Export and Imports cause GDP	2.469	0.093
GDP cause Export	0.335	0.565
Import cause Export	1.540	0.219
GDP and Imports cause Export	0.852	0.432
GDP cause Import	**5.558***	**0.021**
Export cause Import	**5.145***	**0.027**
GDP and Export cause Import	**3.403***	**0.040**
Source: Research Findings, * Significant at the 5% confidence level.		

As can be seen, there is bidirectional causation between GDP and Import, suggesting that economic growth in Iran is import-led. The intuition for these results may be related to the fact that economic activities in all sectors highly rely on intermediate goods that are mainly imported. Furthermore, it can be observed that unidirectional causality exists from export to import which implies the connectedness between export and import. And finally, both the GDP and export cause imports which indicate these two finances the cost of imports.

5. Conclusion and Policy Recommendation

This paper focused to contribute to the empirical literature on the impact of international trade on SEG in Iran, along with analytical insight into Iran`s international trade with its trade partners.

According to the results, five main finding stands out. First, there is both a long and short-run relationship between economic growth and international trade during 1979-2020. Second, it is evident that in both the long-run and short-run impact of export is more pronounced on the SEG compared with imports which highlight the importance of exports for Iran to maintain steady growth. Third, the speed of adjustment to equilibrium is negative and statistically significant indicating that in case there were fluctuations in international trade, the speed of adjustment to equilibrium is -0.1129 annually. Fourth, there is bidirectional causation between GDP and Import, suggesting that economic growth in Iran seems to be import-led. The intuition for these results may be related to the fact that economic activities in all sectors highly rely on intermediate goods that are mainly imported. Fifth, both the GDP and export cause imports which indicates these two finances the cost of imports.

To point out some potential key policy insights, it seems that export expansion would contribute to GDP growth through positive economic externalities. Simultaneously, GDP could have a prominent role in the import expansion, leading to further international trade through enabling domestic industries and facilitating technological advancements and boosting industries which in turn promote SEG. This mechanism would provide a solid ground to recommend policymakers to encourage and facilitate Iranian industries to transfer towards export-led manufacturing and promote an international entrepreneurship environment.

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