

Exploring the Drivers of Trade Openness in GCC Economies: New Insights from Theory-Driven Approach

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ABSTRACT

This research examines the macro factors affecting trade openness (TOP) in GCC economies from 1995 to 2020 using advanced panel regression methods, including Fully Modified Ordinary Least Squares (FMOLS), Pedroni cointegration, and Granger causality. The study investigates the relationships between TOP and six key variables: trade reserves (TR), total investment (TIN), trade balance (TB), per capita income (PCI), gross national savings (GNS), and net FDI flow. Findings reveal that TOP is unidirectionally influenced by TIN, TB, PCI, and GNS, while TOP Granger causes only FDI. Regression analysis shows that PCI and FDI are the most significant determinants, with coefficients of 5.35 and 2.74, respectively, whereas TR has a smaller effect size. The study underscores the importance of trade policy in promoting openness, suggesting that policies encouraging FDI, export promotion, and reduced trade barriers can enhance trade openness and improve the trade balance. Infrastructure investments are also crucial for boosting trade capacity and competitiveness, offering valuable guidance for policymakers in the GCC and beyond.

ملخص

تهدف هذه الدراسة إلى تحليل العوامل الاقتصادية الكلية المؤثرة على انفتاح التجارة (TOP) في اقتصادات دول مجلس التعاون الخليجي خلال الفترة من 1995 إلى 2020، وذلك باستخدام أساليب تحليل متقدمة في بيانات البانل، بما في ذلك طريقة المربعات الصغرى المعدلة بالكامل (FMOLS)، واختبار التكامل المشترك لبدروني، واختبار السببية لغرانجر. تستقصي الدراسة العلاقة بين انفتاح التجارة وستة متغيرات رئيسية: الاحتياطيات التجارية (TR)، إجمالي الاستثمار (TIN)، الميزان التجاري (TB)، نصيب الفرد من الدخل (PCI)، الادخار القومي الإجمالي (GNS)، وتدفقات الاستثمار

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الأجنبي المباشر الصافية (FDI). أظهرت النتائج أن انفتاح التجارة يتأثر بشكل أحادي الاتجاه بكل من TIN ، TB ، PCI ، و GNS، في حين أن TOP يُعد سبباً لتغيرات FDI فقط. كما كشفت نتائج الانحدار أن كلا من نصيب الفرد من الدخل والاستثمار الأجنبي المباشر هما المحددان الأكثر تأثيراً على انفتاح التجارة، بمعاملات بلغت 5.35 و 2.74 على التوالي، بينما كان تأثير الاحتياطي التجارية أقل نسبياً. وتؤكد الدراسة على أهمية السياسات التجارية في تعزيز الانفتاح الاقتصادي، حيث توصي بتبني سياسات داعمة للاستثمار الأجنبي المباشر، وترويج الصادرات، وتقليل الحواجز التجارية. كما تشير إلى أن الاستثمارات في البنية التحتية تُعد ضرورية لتعزيز القدرة التجارية والتنافسية، مما يوفر إطاراً توجيهياً مهماً لصانعي السياسات في دول الخليج وغيرها من الاقتصادات.

RESUMÉ

Cette étude examine les facteurs macroéconomiques qui ont influencé l'ouverture commerciale (TOP) des économies du CCG entre 1995 et 2020 à l'aide de méthodes avancées de régression par panel, notamment les moindres carrés ordinaires entièrement modifiés (FMOLS), la cointégration de Pedroni et la causalité de Granger. Elle étudie les relations entre la TOP et six variables clés : les réserves commerciales (TR), l'investissement total (TIN), la balance commerciale (TB), le revenu par habitant (PCI), l'épargne nationale brute (GNS) et les flux nets d'IDE. Les résultats révèlent que le TOP est influencé de manière unidirectionnelle par le TIN, le TB, le PCI et le GNS, tandis que le TOP Granger n'influence que les IDE. L'analyse de régression montre que le PCI et les IDE sont les déterminants les plus significatifs, avec des coefficients de 5,35 et 2,74 respectivement, tandis que les TR ont un effet plus faible. L'étude souligne l'importance de la politique commerciale dans la promotion de l'ouverture, suggérant que les politiques encourageant l'IED, la promotion des exportations et la réduction des barrières commerciales peuvent renforcer l'ouverture commerciale et améliorer la balance commerciale. Les investissements dans les infrastructures sont également essentiels pour stimuler la capacité commerciale et la compétitivité, offrant ainsi des orientations précieuses aux décideurs politiques du CCG et au-delà.

Keywords: Trade openness, Trade drivers, International trade, Granger causality, GCC

JEL Classification: F1, F4, F14, C23

1. Introduction

Trade openness (TOP) plays a pivotal role in fostering economic growth and structural transformation, particularly for resource-dependent economies like those of the Gulf Cooperation Council (GCC)—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. Historically reliant on oil exports, these countries are undergoing significant economic diversification, with the International Monetary Fund (IMF, 2018) emphasizing that enhancing trade openness is essential for sustaining this transition. Trade openness is widely recognized for promoting resource efficiency, employment, innovation, competitiveness, and long-term productivity gains (Ajayi & Araoye, 2019; Kabbani & Mimoune, 2021; Keho, 2017; Ollero et al., 2019). Against this backdrop, identifying the determinants of trade openness is increasingly relevant for policymakers striving to design effective strategies to integrate into the global economy.

While extensive literature has explored the relationship between trade openness and growth, relatively few studies have examined the macroeconomic factors influencing trade openness in the GCC region, a context characterized by high-income status, oil-dependence, and varied regulatory environments (Khan et al., 2020; GCC-STAT, 2018). Existing studies focus primarily on liberalization policies, trade costs, reforms, and growth implications (Hashim et al., 2024; Lee & Rabago, 2024; Kalu & Joy, 2015; Musila & Yiheyis, 2015; Ju et al., 2010; Le & Tomasi, 2023; Linarello, 2018; Miller & Upadhyay, 2000; Kovak, 2013; Mukhtar, 2012), leaving a gap in understanding the specific economic drivers of openness in resource-rich, developing economies. This study addresses that gap by examining six theoretically grounded macroeconomic variables, trade reserves (TR), total investment (TIN), trade balance (TB), GDP per capita income (PCI), gross national savings (GNS), and foreign direct investment (FDI), and their long-run influence on trade openness in the GCC.

Trade openness has been consistently linked to improved economic growth and higher income levels (Hashim et al., 2024; Huchet-Bourdon et al., 2018; Hye & Lau, 2015; Idris et al., 2016; Lee & Rabago, 2024; Seyfullayev, 2022; Tahir & Khan, 2014; Dollar & Kraay, 2004; Ju et al., 2010; Keho, 2017; Sumon & Miyan, 2017). Identifying key drivers helps policymakers enhance competitiveness, attract FDI, and strengthen export

capacity (Ajayi & Araoye, 2019; Ali et al., 2022; Kouwoaye, 2021). For GCC countries, advancing trade agreements, removing non-tariff barriers, and improving facilitation can deepen regional integration and economic diversification (Mishrif & Al Balushi, 2018).

While methodologically, this study adopts a robust empirical strategy, combining cointegration techniques (Pedroni and Johansen), Granger causality testing, and advanced panel estimators, including stepwise regression, pooled OLS, and Fully Modified Ordinary Least Squares (FMOLS), over a 26-year period (1995–2020). This approach ensures methodological fit for assessing long-term relationships and causality and accommodates cross-sectional dependence and heterogeneity typical of macro-panel data. By doing so, this research not only contributes to international trade theory by empirically validating the roles of investment, savings, and income as facilitators of openness but also offers actionable insights for policymakers in the GCC and comparable economies seeking to deepen their global trade integration.

This study is structured into five segments: a literature review, research methodology, results and findings, implications, and conclusion with future research directions.

2. Review of Literature

2.1 Underpinning theories

This research is underpinned by a variety of classical and modern theoretical frameworks that explain the dynamics of global trade. The earliest conceptual foundations of free trade can be traced back to mercantilism, an economic doctrine dominant from the 16th to 18th centuries. Mercantilist thought emphasized the accumulation of trade surpluses through increased exports and restricted imports, positioning exports as the cornerstone of national economic strength.

Subsequently, Adam Smith's (1776) theory of absolute advantage marked a paradigm shift by advocating that countries should specialize in producing goods they can manufacture more efficiently than others. Building upon this, David Ricardo (1817) introduced the principle of comparative advantage, which argues that trade decisions should be based not on absolute cost differences but on relative opportunity costs.

According to Ricardo, countries benefit from focusing on the production of goods they can produce relatively more efficiently and trading for others, thereby enhancing national income through specialization and exchange.

Further extending trade theory, the Heckscher-Ohlin (H-O) model—also known as the factor endowment theory; explains trade patterns in terms of a country's relative abundance of production factors such as labor, capital, and land. Countries are expected to export goods that intensively use their abundant factors and import goods that require scarce resources. This theory highlights how trade enables optimal resource allocation and promotes national economic welfare through specialization (Subasat, 2003).

In the context of long-term growth and trade participation, the Solow Growth Model (Solow, 1956, 1957) provides additional insight. It attributes economic growth to labor force expansion, capital accumulation, and most importantly, technological progress. As argued by Solow and later supported by Boskin & Lau (2000), technological advancement enhances productivity and efficiency, which, in turn, stimulates international trade by increasing competitiveness and encouraging capital inflows. These inflows often take the form of foreign reserves and contribute to favorable trade balances, where export revenues exceed import expenditures, an important determinant of currency strength and macroeconomic stability.

The gravity model of trade, initially formulated by Isard (1954) and empirically developed by Tinbergen (1962), offers a more empirical approach by estimating bilateral trade flows based on countries' economic sizes and geographical distances. The model predicts that trade volume is directly proportional to the economic mass (GDP) of the trading nations and inversely proportional to the distance between them. This framework has been widely validated in recent studies (Golovka & Sahin, 2018; Gupta et al., 2019; Boudou, 2022), emphasizing the significant roles of market size and proximity in shaping trade intensity.

Together, these theories provide a robust conceptual foundation for analyzing trade openness and its determinants, and they inform the empirical exploration undertaken in this research.

2.2 Review of Empirical Studies

In recent years, there has been a notable surge in empirical research examining trade openness and its macroeconomic determinants across various economies. This literature review critically analyzes key studies, focusing on their variables, methodologies, findings, and implications. Despite this growing body of literature, research specifically addressing the relationship between trade drivers and trade openness (TOP) in the context of Gulf Cooperation Council (GCC) countries remains scarce. This study aims to bridge that gap by examining trade and its key determinants within the GCC framework.

Among the notable studies, Suleman et al. (2023) investigated macroeconomic determinants of trade openness in GIPSI countries (Greece, Ireland, Portugal, Spain, and Italy) from 1995 to 2020 using FMOLS, cointegration, and Granger causality methods. They found that trade reserves were the most influential factor, while per capita income (PCI) had the least impact. PCI, a widely recognized measure of economic well-being in the context of trade liberalization, has shown a consistent positive relationship with trade openness in several studies (Sachs et al., 1995; Dollar & Kraay, 2004; Ezeani, 2013; Tahir & Azid, 2015; Tahir et al., 2016; Marelli & Signorelli, 2011; Nowbutsing, 2014).

FDI has also been closely linked to trade dynamics (Rashid et al., 2021). Kumari et al. (2023) identified a bidirectional causality between FDI and economic growth in India, although no such relationship was found between trade openness and growth. Similarly, Shah and Lavanya (2022) observed that trade openness significantly enhances FDI inflows, whereas Slesman (2023) reported the opposite effect in Cambodia. These mixed findings suggest the influence of country-specific contexts.

Several studies also underscore the role of labor and human capital (Arooj et al., 2024; Asadullah & Mansor, 2021). Vo and Nguyen (2021) highlighted the benefits of trade liberalization on China's labor force, and Motha et al. (2022) found that labor force growth contributed positively to economic growth and trade in India through increased remittances. Hakimi and Hamdi (2016) emphasized a strong positive relationship between trade openness and human capital in the MENA region. Additionally, trade openness has been found to promote productivity and

development in member countries (Hoang & Nguyen, 2022; Le & Tomasi, 2023).

Exchange rate dynamics further complicate the picture (El Khoury et al., 2024). Senadza and Diaba (2017) discovered that exchange rate volatility in Sub-Saharan Africa negatively affects exports in the short run but positively in the long run. Hung (2022) found that exchange rate risks negatively affect economic growth in Vietnam but positively impact inflation and FDI. Calderón and Kubota (2018) differentiated trade effects, noting that manufacturing trade reduces volatility, while non-manufactured goods increase it.

Another crucial factor is international reserves. Research by Aizenman and Riera-Crichton (2008), Lane and Burke (2001), Boateng et al. (2015), Rashid et al., 2021, and Uddin et al. (2019) indicates that trade openness significantly impacts reserve accumulation. Bastourre et al., (2009) noted that a one standard deviation increase in trade openness raises the reserves-to-GDP ratio by 44%, with smaller and economically volatile countries holding relatively larger reserves compared to their more stable or heavily indebted counterparts.

Altogether, while the existing literature provides valuable insights into trade openness determinants, there remains a distinct lack of research focusing on the GCC region. Therefore, this paper contributes to the literature by investigating the trade openness drivers specific to GCC economies, helping to advance regional understanding.

3. Research Methodology

3.1 Variables and Data

This study uses panel data from 1995 to 2020 to examine the relationship between macroeconomic factors and trade openness (TOP) in GCC countries. Panel data enables analysis across both time and cross-sections, offering a more robust understanding. The focus on GCC nations is due to three main reasons: their distinct political and economic structures influencing trade drivers, reduced sample heterogeneity, and the availability of reliable data. The starting year, 1995, was chosen based on data availability, with key variables sourced from the World Development Indicators (WDI) (see, Table 1).

3.2 Estimation Procedure

To ensure analytical validity, the study used Akaike Information Criterion (AIC) for model selection and stepwise regression to identify six key variables: TR, TIN, TB, PCI, GNS, and FDI. Robustness was enhanced using FMOLS and POLS estimators, while F-statistics assessed overall model fitness. These methods ensured the reliability of results linking trade openness to macroeconomic factors in GCC nations. Subsequently, cointegration and causality were tested using the Granger causality framework for short-run dynamics, and the Engle–Granger (1987), Johansen (1991), and Pedroni test (2004) for long-run relationships. The Pedroni test, which accommodates heterogeneity, fixed effects, and serial correlation, confirmed stable long-term associations between trade openness and the selected variables.

3.3 Econometric Model

Our econometric model where trade openness (TOP) is the dependent variable, and its influencing determinants are specified on the left-hand side of Equation 1 to assess their incremental effects.

$$\begin{aligned} \text{TOP}_{it} = & \beta_0 + \beta_1 (\text{TR}_{it}) + \beta_2 (\text{TIN}_{it}) + \beta_3 (\text{TB}_{jt}) + \beta_4 (\text{PCI}_{it}) + \beta_5 (\text{GNS}_{it}) \\ & + \beta_6 (\text{FDI}_{it}) \\ & + \mu_{it} \text{-----} (1) \end{aligned}$$

In this study, trade openness is measured by the ratio of total trade to GDP. The “i” denotes individual countries, while “t” represents specific yearly periods. The analysis includes several variables: trade reserves, total investment, trade balance, per capita income, gross national savings, and net foreign direct investment (FDI) flow. In the panel regression within a multiple regression model, these variables are examined due to their theoretical capacity to impact trade openness. The parameters are expected to show significant associations with trade openness, with β and μ representing the coefficients and the model’s error term, respectively. Table 1 outlines the variables and measurements included in this study.

Table 1: Variables and Measurement with Data Sources

Variables	Measurement	Sign	Sources
Trade openness	(Export + Import)/GDP	TOP	WDI
Trade reserve	Total reserve minus gold/GDP	TR	WDI
Total Investment	Gross capital formation/GDP	TIN	WDI
Trade balance	(Export – Import)/GDP	TB	WDI
GDP per capita incomes	Total GDP/Total Population	PCI	WDI
Savings	Gross National Savings/GDP	GNS	WDI
Net FDI flow	FDI Net Inflow/ GDP	FDI	WDI

Table 2 presents the descriptive statistics for the dependent and independent variables across GCC countries from 1995 to 2020. Trade openness averages 107.06, with values ranging from 49.71 to 191.87, indicating a substantial proportion of trade relative to GDP among GCC nations. Net foreign direct investment (FDI) has an average of 2.49, fluctuating between -2.76 and 15.75. The average trade reserve stands at 827.47, with a range from 5.68 to 4719. Trade balance averages 20.67, with values ranging from -4.38 to 48.45. Total investment ranges from 12.83 to 36.47, with an average of 24.62. Per capita income averages 66.17, varying between 3.92 and 4.86. Gross national savings have an average of 42.39, with a range from 7.43 to 75.54.

Table 2: Descriptive Statistics of GCC Economies

Variables	Mean	Median	Max	Min	Std. dev	J-B	Obj.
TOP	107.06	95.88	191.87	49.71	31.63	15.18***	156
TR	827.47	28.36	4719.85	5.68	1322.2	42.19***	156
TIN	24.62	24.89	36.47	12.83	5.05	0.34	156
TB	20.67	20.12	48.45	-4.38	11.71	2.68***	156
PCI	4.45	4.37	4.86	3.92	0.24	6.06***	156
GNS	42.39	39.72	75.54	7.43	15.66	2.81***	156
FDI	2.49	1.66	15.75	-2.76	2.85	86.73***	156

Note: J-B represents the Jerqu Bera normality test.
Source: Authors' work.

4. Findings and Discussion

4.1 Diagnostic Test

The Variance Inflation Factor (VIF) test findings are shown in Table 3, where all the variables' VIF values are less than 10, which suggests that multicollinearity is not present in our model.

Table 3: Multicollinearity Test (VIF)

Variables	T	VIF
TR	0.22	4.27
TIN	0.68	1.64
TB	0.30	3.29
PCI	0.47	2.10
GNS	0.23	4.27
FDI	0.82	1.21

Note: VIF value of 10 or less indicates no multicollinearity.

Source: Authors' work.

Table 4 displays the results of the unit root tests for the variables at both the level and first difference, using individual intercepts. The test statistics indicate that all variables exhibit non-stationarity at the level. However, they become stationary when evaluated at their first differences, suggesting that these variables are integrated of order one, or I(1).

With the confirmation that the variables are first-difference stationary, the next step is to determine the appropriate lag length for the GCC economy. This step is crucial for applying advanced econometric techniques, such as Granger causality tests and the Pedroni and Johnson cointegration tests. The selected lag criteria are detailed in Table 5.

Table 4: Panel Unit Root Results

	ADF-Fisher chi-square		PP-Fisher chi-square		Im, Pesaran, Shin		Levin, Lin and Chu	
	Intercept		Intercept		Intercept		Intercept	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
TOP	32.27***	41.62***	25.27**	48.17***	-3.03***	-4.40***	-3.22**	-5.17***
TR	11.30	30.48***	11.19	51.16***	-0.42	-3.51***	-0.97***	-3.33***
TIN	16.49	33.54***	18.45	61.74***	-1.33*	-3.54***	-0.68***	-2.30***
TB	10.66	29.68***	8.68	52.24***	-0.39	-3.07***	-0.34	-3.17***
PCI	19.49**	24.56***	19.82*	40.69***	-2.46***	-2.04***	-3.73***	-1.68***
GNS	9.68	29.32***	7.35***	47.97***	-0.12	-2.99***	-0.06	-1.94***
FDI	17.58***	30.56***	15.33***	63.34***	-1.2	-3.16***	-05.1***	-7.54***

Note: The notation ***p < 0.01; **p < 0.05; *p < 0.1 represents the corresponding significance levels.

Source: Authors' work.

4.2 Lag selection and Cointegration test

Following Miyan and Biplob (2019), the lag order selection results for GCC countries are presented in Table 5. The study applied five criteria, likelihood ratio (LR), final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SIC), and Hannan-Quinn information criterion (HQ) to determine the optimal lag length. Most criteria indicated Lag 1 as the most appropriate choice.

Table 5: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SIC	HQ
0	-1781.854	NA	8.97e+12	49.69040	49.91174	49.77852
1	-1351.414	765.2269	2.26e+08	39.09484*	40.86558*	39.79978*
2	-1320.302	49.26188	3.85e+08	39.59171	42.91185	40.91347

Source: Authors' work.

Several testing approaches have been developed for panel integration, including Fisher-type tests that use the Johansen methodology (Maddala & Wu, 1999) and Pedroni test (Pedroni, 2004). The Johansen tests are aggregated into the Fisher test, as introduced by Fisher (2006). Table 6

summarizes the results of the Pedroni panel cointegration test applied to GCC economies.

The Pedroni (2004) panel cointegration test assesses the potential for a long-term relationship between the variables in GCC economies. This test builds on Engle's two-step residual-based cointegration approach to determine if a stable long-term link exists among the variables. The results presented in Table 6 indicate a significant long-term relationship among the variables under study.

Table 6: Pedroni Cointegration Result

Measurement	Statistics	P-value	Weighted statistics	P-value
Within dimension				
Panel- v statistic	-0.58	0.72	0.07	0.47
Panel- rho statistic	1.57	0.94	1.81	0.96
Panel- PP statistic	-2.81	0.00	-4.23	0.00
Panel- ADF statistic	-2.35	0.00	-3.17	0.00
Between-Dimension				
Group- rho statistic	2.58	0.99	-	-
Group- PP statistic	-7.76	0.00	-	-
Group-ADF statistic	-3.21	0.00	-	-

Note: The notation *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ represents the corresponding significance levels.

Source: Authors' work.

Maddala and Wu (1999) propose an alternative approach for assessing cointegration in panel data, where individual cross-sectional tests are aggregated to form a test statistic for the entire panel. Fisher's method combines independent test outcomes from individual sections. The results of the Johansen–Fisher cointegration test (Johansen, 1991; Johansen & Juselius, 1990) are summarized in Table 7. According to Table 7, the trace test reveals multiple cointegration relationships among the variables, all significant at the 1% level. Both the trace and maximum eigenvalue tests show statistically significant Fisher statistics (p -value = 0.00), indicating robust evidence of cointegration across the variables, irrespective of the trend's inclusion. This finding suggests that the variables maintain long-term equilibrium relationships. Additionally, the Granger causality test was employed to explore the predictive relationships between the variables. It is important to note that while the cointegration test identifies long-term relationships, it does not account for the influence of past

values of one variable on the current values of another. Hence, the Granger (1969) causality test was used to investigate these potential predictive relationships shown in table 8.

Table 7: Johansen Panel Co-Integration Results

Hypotheses No. of integration	With trend				Without trend			
	Fisher Stat.* (from trace test)	p- value	Fisher Stat.* (from the max eigen test)	p- value	Fisher Stat.* (from trace test)	Prob	Fisher Stat.* (from the max eigen test)	p- value
None	1505***	0.00	2296* **	0.00	1850* **	0.00	1206***	0.00
At most 1	1490***	0.00	786.1* **	0.00	1452* **	0.00	731.20* **	0.00
At most 2	938.50* **	0.00	56.65* **	0.00	56.65* **	0.00	460.20* **	0.00
At most 3	73.68** *	0.00	73.68* **	0.00	120.5* **	0.00	82.33** *	0.00
At most 4	95.63** *	0.00	59.71* **	0.00	70.18* **	0.00	49.29** *	0.00
At most 5	65.13** *	0.00	49.74* **	0.00	33.53* *	0.00	32.27** *	0.00
At most 6	35.11** *	0.00	35.11* **	0.00	9.69** *	0.00	9.69***	0.00

Note: The notation ***p < 0.01; **p < 0.05; *p < 0.1 represents the corresponding significance levels.

Source: Authors' work.

Table 8: Granger Causality Results

Hypothesis		F-Statistic	Prob.
Null (H ₀)	Alternate(H ₁)		
TR $\nrightarrow$ TOP	TR $\rightarrow$ TOP	0.67	0.50
TOP $\nrightarrow$ TR	TOP $\rightarrow$ TR	0.20	0.81
TIN $\nrightarrow$ TOP	TIN $\rightarrow$ TOP	2.61**	0.05
TOP $\nrightarrow$ TIN	TOP $\rightarrow$ TIN	0.69	0.50
TB $\nrightarrow$ TOP	TB $\rightarrow$ TOP	3.00**	0.04
TOP $\nrightarrow$ TB	TOP $\rightarrow$ TB	0.63	0.53
PCI $\nrightarrow$ TOP	PCI $\rightarrow$ TOP	3.96***	0.00
TOP $\nrightarrow$ PCI	TOP $\rightarrow$ PCI	0.21	0.80
GNS $\nrightarrow$ TOP	GNS $\rightarrow$ TOP	3.10***	0.00
TOP $\nrightarrow$ GNS	TOP $\rightarrow$ GNS	1.06	0.35
FDI $\nrightarrow$ TOP	FDI $\rightarrow$ TOP	0.53	0.58
TOP $\nrightarrow$ FDI	TOP $\rightarrow$ FDI	2.82**	0.05

Note: $\nrightarrow$ represents no Granger cause while $\rightarrow$ represents Granger cause; ***p < 0.01; **p < 0.05; *p < 0.1

Source: Authors' calculation.

The Granger causality test results for GCC economies, shown in Table 8, offer significant insights. Notably, the absence of causality between trade reserves (TR) and trade openness (TOP) suggests that TR does not impact TOP. This finding aligns with previous studies by Maysami and Koh (2000) and Suleman et al. (2023), who also found no causative relationship between TR and TOP in their analyses of GIPSI and Asian economies. The null hypothesis that total investment (TIN) does not cause trade openness (TOP) is rejected at a 5% significance level, with a p-value of 0.05. This indicates that TIN Granger-causes TOP. Conversely, the null hypothesis that TOP does not Granger-cause TIN is accepted, with a p-value of 0.69. Thus, TIN has a unidirectional influence on TOP, consistent with findings by Nelson et al. (2018) and Chiappini (2011), who observed similar unidirectional causal links between investment and trade openness in Nigeria and European economies, respectively. Our analysis also reveals a significant unidirectional causal relationship from trade balance (TB) to TOP at the 5% level, indicating that an increase in TB leads to greater trade openness. This result is consistent with Suleman et al. (2023), who found a similar one-way causality between TOP and TB in GIPSI nations.

The hypothesis that per capita income (PCI) does not affect trade openness (TOP) is rejected, with a p-value of 0.00, demonstrating a significant causal link from PCI to TOP at the 1% level. However, the hypothesis that TOP does not cause PCI cannot be rejected, with a p-value of 0.21. This implies a unidirectional relationship where PCI influences TOP. This finding aligns with Zaman (2012), who observed similar causality from PCI to TOP. In contrast, Suleman et al. (2023) found that TOP Granger-causes PCI. Gross national savings (GNS) is causally related to TOP, with GNS Granger-causing TOP unidirectionally at a 1% significance level. This suggests that increases in GNS lead to greater trade openness in GCC economies, a result consistent with Odhiambo's (2007) study on South Africa. Additionally, our study finds a significant unidirectional causal link from TOP to foreign direct investment (FDI) at the 1% level, indicating that increased trade openness attracts more FDI. This result aligns with Nelson et al. (2018), who observed a similar causality between TOP and FDI in Nigeria. However, Suleman et al. (2023) identified a bidirectional causal relationship between FDI and TOP.

Table 9: Panel Regression Results

Dependent Variable TOP	SR	POLS	FMOLS
TR	0.05** (2.04)	0.05** (2.04)	0.18*** (2.62)
TIN	1.44** (2.25)	1.44** (2.25)	0.73*** (6.32)
TB	1.30*** (3.40)	1.30*** (3.40)	0.89*** (35.57)
PCI	5.35*** (3.35)	5.35*** (3.35)	2.07*** (5.973)
GNS	1.71*** (5.23)	1.71*** (5.23)	1.29*** (114.59)
FDI	2.74*** (2.90)	2.74*** (2.90)	1.85*** (5.973)
Constant	-140.92*** (-1.88)	-140.92*** (-1.88)	
Adj R²	0.44	0.44	0.39
F-test	9.01***	9.01***	

Note: Parentheses () represent t-statistics; ***p < 0.01; **p < 0.05; *p < 0.1 represents significance levels.

Source: Authors' work.

Table 9 summarizes key findings from the panel pooled data regression analysis, categorizing results into three groups. Among these, the stepwise regression (SR) model emerges as the most reliable, with an F-test value of 9.01 and a p-value of less than 0.01, indicating a strong fit. The model's adjusted R-squared value of 44% reflects a moderate degree of explained variation of dependent variable TOP. Meanwhile, Per capita income (PCI) has a substantial impact on TOP, with a coefficient of 5.35 at 1% significant level. A one-unit increase in PCI corresponds to a 5.35-unit increase in TOP, indicating that higher income levels significantly drive trade openness. This is consistent with earlier studies by Ezeani (2013) and Tahir et al. (2016), which identified income as a major determinant of trade openness. Additionally, Foreign direct investment (FDI) also demonstrates a strong positive relationship with TOP, having a coefficient of 2.74. This suggests that increased FDI is associated with higher trade openness. GCC countries with more liberal trade policies attract more FDI, which enhances global trade. This supports findings by Asiedu (2006), who emphasized the positive impact of trade openness on FDI inflows. While Gross national savings (GNS) shows a significant positive association with TOP, with a coefficient of 1.71. This implies that

a 1-unit increase in GNS results in a 1.71-unit increase in TOP, suggesting that higher savings lead to greater trade openness. This finding aligns with previous research, such as Sinha and Sinha (2004), which highlighted a positive correlation between GNS and trade openness. Similarly, Total investment (TIN) significantly boosts trade openness (TOP) with a coefficient of 1.44 ($p < 0.05$), highlighting its positive macroeconomic influence in GCC economies. Moreover, Trade balance (TB) shows a positive and significant correlation with TOP, with a coefficient of 1.30 ($p < 0.01$). This suggests that a better trade balance is associated with greater trade openness. This result aligns with research by Suleman et al. (2023), which found a positive link between trade balance and trade openness. Interestingly, Trade reserves (TR) exhibit a positive relationship with trade openness (TOP), with a coefficient of 0.05, statistically significant at the 5% level. This suggests that higher trade reserves are modestly associated with increased trade openness. Although the relationship is relatively weak, it aligns with the findings of Boateng et al. (2015) and other scholars, who argue that robust trade reserves can facilitate international trade by enhancing a country's ability to manage trade surpluses and attract foreign capital inflows.

On the other hand, to further validate our results, we conducted additional tests using Pooled OLS and FMOLS estimators. The FMOLS approach, developed by Phillips and Hansen (1990), is particularly effective in addressing endogeneity and serial correlation, offering efficient and consistent long-run parameter estimates under cointegration conditions. The findings remain consistent and robust across these methods. Notably, the coefficient for trade reserves remained consistently small across all three techniques (SR, Pooled OLS, and FMOLS). Thus, the application of alternative methodologies does not alter our main conclusions, reinforcing the reliability of our results.

4.3 Theoretical Implications

Theoretically, this study enriches the understanding of trade openness by confirming that macroeconomic fundamentals—such as gross national savings (GNS), foreign direct investment (FDI), total investment (TIN), trade balance (TB), and per capita income (PCI)—are critical drivers of trade openness (TOP) in GCC economies. The consistent significance of these variables across models (SR, POLS, FMOLS), with strong coefficients especially for PCI and FDI, reinforces the theoretical link

between capital accumulation, income levels, and international trade flows. The findings substantiate classical and endogenous growth theories, which posit that investment, savings, and productivity-enhancing capital inflows (like FDI) are essential for expanding trade capacity. Additionally, the limited causal relationship between trade reserves (TR) and trade openness challenges conventional assumptions, inviting theoretical refinement on the role of monetary buffers in open economies. By demonstrating strong long-run cointegrating relationships and unidirectional causality patterns, the study provides empirical validation for structuralist trade theories, emphasizing that internal macroeconomic stability and development-oriented investment are foundational for sustained openness. These theoretical insights not only contribute to the literature on trade and development but also underscore the importance of context-specific models tailored to resource-rich, emerging economies like the GCC.

4.4 Policy Implications

This study offers vital policy implications for the GCC economies by highlighting the pivotal role of trade openness in driving long-term economic growth. Policymakers should craft targeted trade strategies that promote openness through increased foreign direct investment (FDI), robust trade reserves, higher gross national savings, and enhanced per capita income. FDI, in particular, can inject capital and technical expertise into domestic industries, enabling market expansion, job creation, and productivity growth. High savings rates provide the financial foundation for investing in trade infrastructure—such as ports, transportation, and logistics systems—which strengthens the region's capacity for international trade and enhances its global competitiveness. Moreover, rising per capita income fuels demand for imports and supports investments in trade-related sectors, including marketing and research & development. Infrastructure development, especially in energy and logistics, should remain a top priority in policy agendas to attract capital inflows and facilitate efficient trade. Implementing a resilient trade reserve policy can help stabilize exchange rates and mitigate external shocks, fostering a predictable trading environment that supports cross-border transactions. Ultimately, greater trade openness improves trade balances by boosting exports and attracting foreign investment, setting off a positive cycle of growth. Policymakers across the GCC, and similarly positioned emerging economies, should promote exports, reduce trade

barriers, and pursue structural reforms that reinforce this virtuous cycle, ensuring sustainable economic development.

5. Conclusion

This study investigates the macroeconomic determinants of trade openness (TOP) in GCC economies over the period 1995 to 2020. Initially, ten explanatory variables were considered; however, only six: trade reserves (TR), total investment (TIN), trade balance (TB), per capita income (PCI), gross national savings (GNS), and net FDI flow were found to be statistically significant. The analysis reveals that TOP is unidirectionally influenced by TIN, TB, PCI, and GNS, while its Granger-causes only FDI, with no causal effect observed on the remaining variables. Notably, trade reserves (TR) exhibit no causal relationship with TOP in either direction. Using stepwise regression and Fully Modified Ordinary Least Squares (FMOLS), along with Pedroni and Johansen cointegration tests, the study identifies PCI ($\beta = 5.35$) and FDI ($\beta = 2.74$) as the most significant long-run determinants of trade openness, whereas trade reserves have a comparatively limited impact. These findings align with the existing literature, confirming robust long-term associations between trade openness and key macroeconomic indicators. The research underscores the critical role of trade policies that facilitate FDI, promote exports, and reduce trade barriers, alongside investments in infrastructure to strengthen trade capacity and competitiveness. These insights provide valuable guidance for policymakers in the GCC and other emerging economies seeking to enhance global trade integration.

Like any empirical study, this research has certain limitations that offer directions for future exploration. One key limitation lies in the unavailability of comprehensive macroeconomic data for the GCC countries before 1995, which limits the historical depth of the analysis. In this regard, future researchers could expand the dataset to include trade-related records from sources like the Uruguay Round (1985–2020) or UNCTAD (1964–2023) could also uncover new dimensions of trade policy impacts and structural factors influencing trade openness. This study focuses on the 1995–2020 period and applies selected econometric models, which, while robust, may benefit from comparison with alternative methodological frameworks such as dynamic panel models or machine learning approaches. Moreover, the proxy used for trade openness could be broadened beyond traditional trade-to-GDP ratios by

incorporating composite indices like the Squalli and Wilson (2011) or Tang (2011) measures, which account for both size and openness. Future research could enhance generalizability by applying the models to other regional contexts such as ASEAN, SAARC, MENA, or OECD economies, enabling comparative analysis.

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