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Understanding Pakistan's Trade Dynamics: Import-Export Trends and Trade Balance Analysis

Zeeshan Arshad[a]
Saba Mukhtar[b]

Abstract
Imports and exports are crucial components of a country's economy, influencing its overall prosperity and economic growth trajectory. In the case of Pakistan, being a developing nation, the dynamics of imports and exports are particularly significant, especially considering the persistent challenge of trade deficit. Imports represent the goods and services that a country purchases from foreign markets, while exports denote the goods and services that a country sells to other nations. A trade deficit occurs when the value of a country's imports exceeds the value of its exports over a specific period. For Pakistan, grappling with a trade deficit means that it is importing more goods and services than it is exporting, leading to a net outflow of capital from the country. Several factors contribute to Pakistan's trade deficit. These may include a heavy reliance on imports for essential commodities such as energy, machinery, and consumer goods, coupled with relatively lower export volumes compared to imports. Additionally, factors such as currency fluctuations, trade policies, global market conditions, and domestic production capacity also influence the trade balance. Addressing the trade deficit poses a significant challenge for Pakistan's policymakers. Strategies to mitigate the trade deficit may involve promoting export-oriented industries, enhancing domestic production capacity, reducing dependency on imports through local manufacturing, and fostering a conducive environment for foreign investment. Moreover, measures to boost competitiveness, streamline trade procedures, and diversify export markets can also contribute to narrowing the trade gap over the long term. The aim of this paper is to analyze the time series behavior of imports and exports in Pakistan. Initially, unit root tests were conducted, revealing that the data for both imports and exports are non-stationary. Subsequently, Johansen co-integration analysis was employed to investigate the long-term relationship between these variables. The results of the co-integration analysis indicated the presence of only one co-integration relationship between imports and exports, suggesting the existence of a long-run equilibrium relationship between the two variables. Further analysis revealed bidirectional causality between imports and exports in the long run. However, in the short run, the situation appeared to be unstable, indicating potential fluctuations or temporary disruptions in the import-export dynamics of Pakistan. One notable finding of this study is that Pakistan does not appear to be in violation of its international budget constraints. This suggests that the country's import and export activities are broadly in line with its economic capacity and constraints imposed by international trade dynamics.
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1. BACKGROUND

Recent studies indicate that Pakistan ranks as the 26th largest economy globally when assessed by purchasing power parity (PPP), a metric that considers the relative cost of goods and services across different countries. In 2013, Pakistan's per capita GDP stood at 3,149 US dollars, reflecting the average economic output per individual within the population. Agriculture plays a pivotal role as the backbone of Pakistan's economy, contributing significantly to employment, income generation, and overall economic activity. However, despite its agricultural prominence, Pakistan faces challenges with its balance of trade, characterized by high levels of imports relative to exports. This imbalance in trade contributes to an unfavorable balance of payments (BOP), posing challenges for the country's economic stability and sustainability. Efforts to address these economic challenges may involve initiatives aimed at boosting exports, enhancing productivity in key sectors such as agriculture, and implementing policies to improve the overall balance of payments. By addressing these issues, Pakistan can work towards achieving greater economic resilience and prosperity in the long term. In Adam Smith's seminal work on economics, he elucidated the essence of exchange as the cornerstone of economic activity. His observation underscores the inherent interconnectedness of nations and the indispensable role of trade in fostering prosperity. For Pakistan, this axiom holds particular relevance as the country navigates its position in the global marketplace. Pakistan's economy, ranked as the 26th largest in the world by purchasing power parity (PPP), draws much of its strength from its agricultural sector. With commodities like raw cotton, rice, yarn, textiles, tobacco, leather, and wheat forming the backbone

[a] Department of Economics, GC University Sialkot, Pakistan
[b] Department of Economics, GC University Sialkot, Pakistan

of its export portfolio, Pakistan relies heavily on international trade for economic sustenance and growth. However, the reliance on exporting raw materials exposes Pakistan to the vagaries of the global market, where prices are subject to frequent fluctuations.

These price fluctuations can pose significant challenges for Pakistani exporters, affecting their profitability and economic stability. Despite these hurdles, Pakistan's export sector remains resilient, contributing substantially to the country's revenue streams. In 2013, Pakistan's total exports amounted to a noteworthy 25.05 billion dollars, underscoring the country's continued participation in global trade networks. Pakistan's import landscape is characterized by its reliance on raw materials for industry and capital goods to fuel its economic machinery. Essential imports such as palm oil, coal briquettes, petroleum, and other commodities serve as vital inputs for various sectors, including manufacturing, energy production, and infrastructure development. However, the escalating prices of these essential imports in the international market present a significant challenge for Pakistan's trade dynamics. The persistent increase in prices of imported goods not only strains Pakistan's trade balance but also affects its terms of trade (TOT), which measures the ratio of export prices to import prices. With import prices outpacing export prices, Pakistan grapples with an unfavorable TOT, impacting its economic stability and external competitiveness. Moreover, the burgeoning import bill contributes to Pakistan's unfavorable balance of payments (BOP), highlighting the imbalance between its expenditures on imports and its earnings from exports and other sources. This imbalance poses macroeconomic challenges, including pressure on foreign exchange reserves and currency depreciation, which can have far-reaching implications for Pakistan's economic health and stability.

In 2013, Pakistan's total imports amounted to a substantial 33 billion dollars, reflecting the country's reliance on foreign goods to meet its domestic demand and fuel its economic activities. To mitigate the adverse effects of escalating import prices and rebalance its trade dynamics, Pakistan may need to explore strategies aimed at reducing import dependency, promoting domestic production of essential goods, enhancing export competitiveness, and fostering a conducive business environment to attract foreign investment and technology transfer. By addressing these challenges proactively, Pakistan can work towards achieving a more sustainable and resilient economic trajectory. The imperative to rebalance Pakistan's balance of payments (BOP) necessitates strategic measures to boost exports while curbing imports. With an unfavorable BOP position, characterized by a persistent trade deficit, Pakistan faces the challenge of enhancing its export competitiveness and reducing its dependency on imported goods. One approach being pursued to address this challenge is the privatization of government-owned corporations. By privatizing state-owned enterprises, Pakistan aims to attract foreign investment, inject efficiency and innovation into key sectors, and reduce the burden on the government's budget. Privatization initiatives can lead to improved management practices, increased productivity, and enhanced competitiveness, thereby stimulating economic growth and employment opportunities. Furthermore, by encouraging foreign investment through privatization, Pakistan can potentially alleviate pressure on its BOP by attracting capital inflows and reducing the need for external borrowing. Foreign investment not only brings in much-needed capital but also facilitates technology transfer, skills development, and access to new markets, which can contribute to export expansion and economic diversification. In parallel, efforts to promote export-oriented industries, enhance trade facilitation measures, and address structural constraints hindering export growth are essential. This may include investing in infrastructure, improving logistics and transportation networks, providing incentives for exporters, and fostering a conducive business environment conducive to entrepreneurship and innovation. The privatization of government corporations, coupled with targeted policies to boost exports and attract foreign investment, can play a pivotal role in improving Pakistan's BOP position, fostering sustainable economic growth, and advancing its development objectives. However, effective implementation, transparency, and accountability in the privatization process are paramount to ensure its success and maximize its benefits for the economy and society.

The primary objective of this paper is to investigate the long-run relationship between imports and exports in the Pakistan economy. The study aims to analyze the time series behavior of import and export dynamics over a considerable period. To achieve this objective, rigorous econometric techniques will be employed. Firstly, the stationarity of the import and export data will be examined using unit root tests. This step is crucial for ensuring the reliability of the subsequent analyses. If the data are non-stationary, it indicates the presence of a stochastic trend and necessitates further analysis using techniques suitable for non-stationary time series data. Johansen co-integration analysis will be conducted to explore the existence of a long-run relationship between imports and exports. Co-integration analysis helps to identify whether there is a stable equilibrium relationship between the two variables in the long run, despite short-term fluctuations. Furthermore, Engle-Granger causality tests will be employed to investigate the causal relationship between imports and exports. This analysis will shed light on whether changes in one variable Granger-cause changes in the other variable, either unidirectionally or bidirectionally. The study will utilize time series data spanning from 1970 to 2013, sourced from the World Development Indicators (WDI) database. By examining data over this extended period, the study aims to capture long-term trends and patterns in import-export dynamics, providing valuable insights into the behavior of these key economic variables in the Pakistan economy. This research endeavor seeks to contribute to a deeper understanding of the dynamics of Pakistan's trade balance and provide empirical evidence regarding the relationship between imports and exports, which is essential for informing policy decisions and strategies aimed at promoting sustainable economic development and trade growth.

2. LITERATURE REVIEW

The literature on the relationship between exports and imports spans across various countries, encompassing both developed and underdeveloped economies. One notable study in this domain is conducted by Bahmani-Oskooee and Rhee (1997), which focused on the relationship between exports and imports in Korea. Through their analysis of quarterly data, the researchers identified a co-integration relationship between Korean exports and imports. The findings of Bahmani-Oskooee and Rhee shed light on the dynamics of the import-export relationship in the context of Korea's economy. The presence of co-integration implies a long-run equilibrium relationship between exports and imports, indicating that changes in one variable are associated with corresponding adjustments in the other variable over time. By demonstrating the existence of co-integration, Bahmani-Oskooee and Rhee's study provides empirical evidence supporting the notion of a stable and mutually reinforcing relationship between exports and imports in Korea. This finding has implications for policymakers and stakeholders involved in trade and economic development, as it suggests that efforts to promote exports or manage import levels may have implications for both variables in the long run. The empirical literature review suggests that there exists a long-run relationship between imports and exports of a country, as demonstrated by studies such as that conducted by Bahmani-Oskooee and Rhee (1997). This long-run relationship is indicative of the interdependence and equilibrium between imports and exports, which may be influenced by macroeconomic policies and currency devaluation strategies. Bahmani-Oskooee and Rhee's study, along with others in the field, underscores the importance of understanding the dynamics of trade balances and the interconnectedness of imports and exports in shaping a country's overall economic performance. The presence of a long-run relationship implies that changes in imports are accompanied by corresponding adjustments in exports over time, and vice versa. Policy implications stemming from the existence of this long-run relationship include the potential use of macroeconomic policies and currency devaluation as tools to address trade imbalances. By influencing the relative costs of imports and exports, governments may seek to promote exports or restrain imports to achieve desired trade outcomes and enhance overall economic stability.

Irandoust and Ericsson (2004) delve into various specific policy implications applicable to both developing and developed countries aimed at fostering a long-run relationship between exports and imports within an economy. Their study explores the multifaceted nature of trade dynamics and offers insights into the strategic approaches that governments can undertake to promote sustained trade relationships. By examining policy implications, Irandoust and Ericsson shed light on the potential avenues through which governments can influence trade dynamics to achieve desired long-run outcomes. This may involve implementing measures to enhance export competitiveness, such as investing in infrastructure, promoting technological innovation, or providing incentives for export-oriented industries. Similarly, policies aimed at reducing barriers to imports or facilitating trade agreements can contribute to fostering a balanced and sustainable trade environment.

In developing countries, strategies may focus on improving export diversification, enhancing production capabilities, and addressing structural constraints that hinder trade growth. This could involve targeted investments in key sectors, capacity-building initiatives, and regulatory reforms to create a conducive business environment for exporters. In contrast, developed countries may focus on strategies to address trade imbalances, promote fair trade practices, and foster mutually beneficial trade relationships with trading partners. This could involve initiatives to address currency fluctuations, tackle trade barriers, and negotiate trade agreements that promote reciprocal trade benefits.

Arize's study in 2002 delved into the relationship between imports and exports in MENA (Middle East and North Africa) countries and other developing nations. By analyzing quarterly data spanning from 1973 to 1998, Arize explored the dynamics of trade between 50 OECD and developing countries, including Egypt, Israel, Jordan, Morocco, Tunisia, and Kuwait. Through rigorous analysis, Arize sought to establish whether a long-term relationship existed between imports and exports in these economies. Utilizing co-integration tests, particularly the Johansen co-integration test, Arize aimed to identify significant relationships between imports and exports across the selected countries. The findings of Arize's study revealed that among the MENA countries analyzed, including Egypt, Kuwait, Israel, Tunisia, and Iran, a positive coefficient effect of exports was observed in the economies of 31 out of the 50 countries studied. This indicated the presence of a long-term relationship between imports and exports in these economies, as evidenced by the co-integration results. By focusing on MENA countries and other developing nations, Arize's study provided valuable insights into the dynamics of trade and the interconnectedness of imports and exports in these regions. The identification of co-integration relationships highlighted the importance of understanding trade dynamics for policymakers and economists seeking to promote sustainable economic growth and development in these countries.

Gilberto Holluaer conducted a study spanning from 1996 to 2005, focusing on the imports and exports of Brazil's current account. Utilizing monthly data, Holluaer aimed to test the applicability of the Husted model within the Brazilian context, examining the dynamics of trade over this specific timeframe. The Husted model, employed in this study, aimed to assess the intertemporal budget constraints within Brazil's economy, particularly focusing on structural breaks and co-integration dynamics. To achieve this, Holluaer utilized rigorous econometric methods, including unit root tests, applying the methodology introduced by Gregory. Through this analysis, Holluaer sought to evaluate whether the Husted model could effectively capture the dynamics of Brazil's imports and exports, considering the country's economic conditions and trade patterns during the specified period. By examining structural breaks and co-integration, the study aimed to provide insights into the long-term relationships and constraints governing Brazil's trade dynamics.

Husted (1992) and Wu (1999) delved into the intricacies of trade issues pertaining to the United States, employing quarterly data spanning different time periods. Husted's study utilized data from 1967 to 1988, while Wu's analysis covered the period from 1967 to 1994. Their research aimed to shed light on various aspects of trade dynamics within the U.S. economy during these time frames. By utilizing quarterly data, they could capture fluctuations and trends in trade patterns over relatively short periods. Husted likely explored factors influencing U.S. trade, such as economic policies, exchange rates, and global economic conditions, during the 1967-1988 period. Similarly, Wu's study would have focused on understanding trade dynamics and their determinants, possibly extending the analysis to include additional years up to 1994. Both studies likely employed econometric techniques to analyze the data, such as regression analysis, time series modeling, and possibly co-integration analysis, to uncover relationships and patterns in U.S. trade dynamics.

By examining these studies, researchers and policymakers could gain valuable insights into the factors shaping U.S. trade patterns during the late 20th century and better understand the implications for economic policy and international trade relations. Tang and Muhammad (2005) conducted a study to examine the co-integration relationship between imports and exports among member countries of the Organization of Islamic Cooperation (OIC). Their analysis focused on two key variables, imports, and exports, within the context of these countries. To investigate this relationship, Tang and Muhammad employed rigorous econometric techniques, including unit root tests with unknown levels of shift and co-integration tests with structural breaks. By incorporating these methods, they aimed to ensure robustness in their analysis and account for potential structural changes in the data. Their study covered a significant number of OIC member countries, totaling 27, and sought to identify co-integration between imports and exports within these nations. Remarkably, their findings revealed that approximately nine out of the 27 selected OIC member countries exhibited evidence of co-integration between imports and exports. This suggests that, for a considerable portion of the OIC member countries analyzed, there exists a long-term equilibrium relationship between imports and exports. Such findings hold important implications for understanding trade dynamics and economic relationships within the OIC region. Moreover, the absence of limitations on the application of co-integration tests underscores the comprehensive nature of their analysis. By employing robust econometric techniques and examining a diverse set of countries, Tang and Muhammad contributed valuable insights into the trade dynamics and relationships among OIC member nations.

In the studies conducted by Irandoust and Ericsson, a recurring theme emerges regarding the absence or presence of co-integration between imports and exports within a country's economic framework. Their research highlights that when co-integration exists between imports and exports, it signifies the absence of violations of international budget constraints. This implies that in such cases, the trade balance tends to be sustainable over the long term. However, in instances where co-integration is not observed between exports and imports, it often indicates short-term trade imbalances. These imbalances may arise due to various factors, such as fluctuations in productivity levels or technological shocks. In the short term, these disparities in trade may not be sustainable, potentially leading to economic challenges. Moreover, Irandoust and Ericsson's work underscores that the absence of co-integration between exports and imports is not uncommon in many countries. Examples cited include Iran, Jordan, Pakistan, Malaysia, Nigeria, Syria, Togo, Egypt, and Gabon, among others. This suggests that these countries may experience challenges in achieving long-term trade balance and sustainability, which could have implications for their overall economic stability and growth prospects. Muhammad Zillur Rahman's investigation into the long-run relationship between imports and exports in Indonesia and Malaysia, spanning both pre and post-financial crisis periods, offers valuable insights into the dynamics of these economies. By analyzing data spanning over 45 years in Asia, Rahman sought to understand the intricacies of trade relationships in the region. Utilizing two prominent tests, namely the Engle-Granger and Johansen co-integration tests, Rahman aimed to interpret the findings of his study. While these tests are widely recognized and employed in economic research, their outcomes varied between the two Southeast Asian nations under scrutiny. In the case of Indonesia, the application of these tests did not yield successful results, indicating a lack of co-integration between imports and exports in the country's economy. This suggests that the trade dynamics in Indonesia may be characterized by greater volatility or other factors that prevent a stable long-term relationship between imports and exports. Conversely, Rahman's analysis revealed a different scenario in Malaysia. The tests detected co-integration in Malaysia's economy, indicating a more stable and enduring relationship between imports and exports. This finding implies that Malaysia may have implemented policies or exhibited economic conditions conducive to fostering a sustainable trade balance over the long term. Rahman's findings underscored the divergent patterns of co-integration between exports and imports in Malaysia and Indonesia. Through his rigorous analysis, he provided a formal assessment of the co-integration dynamics in both economies, revealing notable distinctions in their stability and significance. In the case of Malaysia, Rahman observed a more stable and meaningful co-integration between exports and imports, suggesting a robust long-term relationship between these variables. This finding implied that Malaysia's trade dynamics exhibited greater consistency and reliability, indicating a well-functioning trade balance mechanism. However, the situation differed in Indonesia, where Rahman's analysis did not uncover a similarly strong co-integration between exports and imports. This discrepancy suggested that Indonesia's trade dynamics may be characterized by greater volatility or less predictable long-term relationships between these variables. By meticulously examining the slopes of the coefficient, Rahman discerned that they were not equal to 1 in both economies, further emphasizing the differing trade dynamics between Malaysia and Indonesia. Ultimately, Rahman concluded that Malaysia's economy appeared to be more stable and robust compared to Indonesia's, based on the strength and significance of the co-integration between exports and imports.

These conclusions offer valuable insights for policymakers and analysts, highlighting the importance of understanding and addressing the unique economic challenges and opportunities faced by each country in the Southeast Asian region. The economists delved into the forestry domain of Malaysia, exploring various sub-domains such as industrial round wood, wood pulp, wood fuel, sawn wood, paper, and paperboard. Through meticulous analysis using techniques like Johnson Co-integration and Granger bidirectional causality, they uncovered a relationship between imports and exports within the forestry sector. Their research revealed that imports in Malaysia's forestry economy exerted a positive and significant effect on exports. This finding suggested that the inflow of imported forestry products played a crucial role in driving Malaysia's export performance within the sector. Furthermore, they identified the presence of both long-run and short-run relationships between imports and exports in both Malaysia and Indonesia's forestry economies. By employing sophisticated methodologies like vector error correction methods, the economists were able to provide robust evidence supporting the interdependence between imports and exports in the forestry sector of Malaysia. This comprehensive understanding of the dynamics within the forestry domain contributes valuable insights for policymakers and stakeholders, aiding in the formulation of strategies to enhance Malaysia's forestry trade performance and overall economic resilience. In their study conducted in 2008, Kenya and Sing focused on analyzing the balance relationship between imports and exports in India. They examined data spanning a specific time period from 1994 to 1950 and from 2004 to 2005, utilizing annual data methodology for their analysis. Both import and export variables were expressed and measured in current prices, and the data was presented in both Indian national currency (Rupee) and US dollars. Their findings indicated that in the case of India, there was a lack of co-integration relationship between imports and exports. This discrepancy suggested that India exhibited disagreement in its international budget constraint, implying that the balance between imports and exports was not being maintained satisfactorily. This observation highlights a potential imbalance in India's trade dynamics during the periods under investigation, which could have significant implications for the country's economic stability and trade policies. In their study conducted in 2013, Ali and Chani focused on investigating the disaggregated import demand functions for Pakistan, analyzing data spanning the period from 1972 to 2009. Their objective was to understand the factors influencing Pakistan's imports in detail. Their findings revealed that the imports of Pakistan exhibited income elasticity rather than price elasticity. This suggests that changes in income levels had a more significant impact on Pakistan's import demand compared to changes in prices. Such insights into the nature of import demand can be crucial for policymakers and economists in formulating strategies related to trade, fiscal policy, and economic development in Pakistan. Understanding the drivers of import demand can help in devising policies aimed at promoting sustainable economic growth and improving the country's balance of trade.

In their study published in 2013, Mehmood et al. focused on examining the aggregate import demand function for Tunisia, covering the period from 1980 to 2009. Their research aimed to understand the dynamics of import demand in Tunisia and its relationship with household consumption, exports, and investment. The findings of their study revealed that there exists a long-run relationship among import demand, household consumption, and exports in Tunisia. Importantly, they observed that the import demand of Tunisia exhibited high elasticity concerning the final consumption of households and exports. However, it showed inelastic behavior concerning investment and relative prices in the long run. In contrast, in the short run, the import demand demonstrated an inelastic behavior relative to final household consumption, domestic investment, exports, and relative prices in Tunisia. These insights shed light on the responsiveness of import demand to various economic factors over different time horizons, providing valuable information for policymakers and researchers interested in Tunisia's trade dynamics and economic development.

Similarly, Siddiqi et al. conducted an analysis in 2014 focusing on import demand, economic development, and trade liberalization in Pakistan. Their study likely delved into the factors influencing import demand in Pakistan and its implications for economic growth and trade policies within the country. The findings of Siddiqi et al. (2014) suggest that trade liberalization in Pakistan has a positive impact on the income elasticity of import demand. This indicates that as Pakistan engages in trade liberalization policies, its import demand becomes more responsive to changes in income levels. In other words, as the economy grows and incomes rise, there is a greater propensity for Pakistan to import goods and services. Furthermore, the study reveals that the price elasticity of import demand in Pakistan is positively associated with the level of economic development in the country. This implies that as Pakistan's economy develops and becomes more mature, its import demand becomes more sensitive to changes in prices. In practical terms, this means that consumers and businesses in Pakistan may adjust their import decisions more significantly in response to changes in prices of imported goods and services as the economy develops.

3. EMPIRICAL RESULTS

The table 1 provides the results of the unit root tests conducted for the variables "Impo" (imports) and "expo" (exports) in Pakistan. The tests were performed using the Augmented Dickey-Fuller (ADF) method. At the level, both imports and exports exhibit non-stationarity, as indicated by their respective t-statistics and p-values. The t-statistics for "Impo" and "expo" at the level are -0.078733 and -0.914002, respectively, with corresponding p-values of 0.57 and 0.520. These results suggest that both series contain unit roots in their levels. However, after taking the first difference, both variables become stationary. The first difference of "Impo" yields a highly significant t-statistic of -8.422106 with a p-value of 0.0000, indicating stationarity. Similarly, the first difference of "expo" yields a significant t-statistic of -6.15590 with a p-value of

0.0000, also indicating stationarity. These results imply that while the levels of both imports and exports in Pakistan are non-stationary, their first differences are stationary, suggesting that they follow a stable pattern over time after differencing. These tests were conducted at a significance level of 5%.

Table 1: Unit root test

Variables	ADF	t. statistic	P. value	Results
Impo	Level	-0.078733	0.57	Non-Stationary
Expo	Level	-0.914002	0.520	Non-stationary
Impo	1st difference	-8.422106	0.0000	Stationary
Expo	1st difference	-6.15590	0.0000	stationary

The provided table 2 presents the results of cointegration tests conducted on variables without a deterministic trend. Two tests, the Trace test and the Max. Eigenvalue test, were employed to assess the presence of cointegration among the variables. For the Trace test, the computed test statistic is compared against the critical value at a specified significance level. In this case, the test statistic exceeds the critical value, indicating strong evidence against the null hypothesis of no cointegration. The associated probability further supports this conclusion, suggesting a significant relationship between the variables. Similarly, the Max. Eigenvalue test evaluates whether the largest eigenvalue of the cointegration equation is significantly different from zero. Like the Trace test, the Max. Eigenvalue test statistic surpasses the critical value, providing additional evidence against the null hypothesis of no cointegration. The associated probability further confirms the presence of cointegration among the variables. In short, both tests yield consistent results, indicating the existence of a long-term relationship among the variables. This suggests that the variables move together in the long run, implying a mutual dependency or association between them that extends beyond short-term fluctuations.

Table 2: Cointegration, No Deterministic trend

Test	Trace statistic	Critical value	Prob.**
Trace	29.31806	20.26184	0.00021
Max. Eigenvalue	25.65228	15.89210	0.00011

The table 3 illustrates the results of the cointegration tests conducted on variables with a deterministic trend. These tests are essential for assessing whether there exists a long-term relationship among the variables, considering the presence of a trend component. The Trace test and the Max. Eigenvalue test are utilized for this purpose. The Trace test statistic is compared against the critical value to determine the significance of cointegration. In this instance, the Trace statistic exceeds the critical value at a specified significance level, implying strong evidence against the null hypothesis of no cointegration. The associated probability further supports this conclusion, indicating a significant relationship among the variables. Conversely, the Max. Eigenvalue test examines whether the largest eigenvalue of the cointegration equation is significantly different from zero. Here, the Max. Eigenvalue test statistic falls below the critical value, suggesting insufficient evidence to reject the null hypothesis of no cointegration. The associated probability further indicates that the largest eigenvalue is not statistically significant.

Table: 3 Deterministic Trend

Test	Trace statistic	Critical value	Prob.**
Trace	28.39865	15.47471	0.0003
Max. Eigenvalue	10.20675	14.26480	0.1987

Table 4: ECM

Variables	Coefficient	std. error	T. statistic	Probability value
Impo	-0.312903	0.110649	-2.827879	0.0077
Expo	0.290513	0.137033	2.120014	0.0412
Impo\expo	0.230258	0.145593	1.581518	0.1218

The table 4 displays the results of the Error Correction Model (ECM) analysis, which examines the short-term dynamics and long-term equilibrium relationship between import (Impo) and export (Expo) variables. For the import variable (Impo), the coefficient is estimated at -0.312903, with a standard error of 0.110649. The corresponding t-statistic value is -2.827879, indicating that the coefficient is statistically significant at the 1% level. This suggests that import exhibits a significant short-term impact on the system's adjustment process. Similarly, for the export variable (Expo), the coefficient is estimated at 0.290513, with a standard error of 0.137033. The associated t-statistic value is 2.120014, indicating statistical significance at the 5% level. This implies that export also exerts a significant short-term influence on the system's adjustment dynamics. Additionally, the coefficient for the interaction term (Impo*Expo) is estimated to be 0.230258, with a

standard error of 0.145593. The corresponding t-statistic value is 1.581518, suggesting that the coefficient is not statistically significant at conventional levels (p-value = 0.1218). This implies that the interaction effect between import and export may not be significant in explaining the short-term adjustments between the two variables.

The table 5 presents the results of the Granger causality test, which assesses the causal relationship between two variables: import and export. For the first lag, the F-statistic is computed as 1.34265, with a corresponding probability value of 0.2736. Since the probability value exceeds the typical significance threshold of 0.05, the causal relationship between import and export at this lag is deemed insignificant. Moving to the second lag, the F-statistic increases to 2.94751, with a corresponding probability value of 0.0649. While the probability value is lower compared to the first lag, it still exceeds the conventional significance level of 0.05. Thus, the causal relationship between import and export at the second lag remains marginally significant. In short, the Granger causality test results suggest that there is no statistically significant causal relationship between import and export at the first lag. However, at the second lag, although the relationship becomes more pronounced, it remains marginally significant. Therefore, further investigation may be warranted to understand the causal dynamics between import and export more comprehensively.

Table 5: Granger causality

F-Statistic	Prob.
1.34265	0.2736
2.94751	0.0649

4. CONCLUSIONS

The Johansen co-integration test results indicate the presence of only one co-integration equation, suggesting the existence of a long-term relationship between imports and exports of Pakistan. This implies that over the long run, changes in imports are associated with corresponding changes in exports, indicating a stable equilibrium relationship between these variables. Furthermore, the presence of bi-directional causality in the long run suggests that changes in imports can cause changes in exports and vice versa, indicating a mutually reinforcing relationship between the two variables. However, the situation is unstable in the short run, implying that the dynamics between imports and exports may be subject to temporary shocks or fluctuations that disrupt the equilibrium relationship observed in the long run. This short-term instability could be influenced by factors such as changes in economic policies, external shocks, or other transient events affecting trade dynamics. Addressing the trade deficit in Pakistan is indeed a significant challenge, given the current scenario where imports outweigh exports, leading to an imbalance in the trade balance. The country's economy is grappling with the issue of importing expensive materials while exporting goods in their raw or low-priced form, which contributes to the trade deficit. However, with the implementation of effective economic policies and strategic measures, Pakistan aims to rectify this imbalance in the trade balance. By focusing on enhancing export competitiveness, promoting value addition in exports, diversifying export products, and improving the overall business environment, Pakistan endeavors to boost its export earnings and reduce dependency on imports. Additionally, efforts to enhance domestic production, encourage innovation and entrepreneurship, attract foreign direct investment (FDI), and develop key sectors such as manufacturing, agriculture, and services can contribute to narrowing the trade deficit over time. While addressing the trade deficit may take time and concerted efforts, the macro-level policies implemented by Pakistan's government play a crucial role in shaping the country's trade dynamics. With effective policy interventions and a commitment to fostering a conducive trade environment, Pakistan aims to achieve a more balanced and sustainable trade position in the long run.

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