



Corruption, Human Capital and International Trade: Empirical Evidence from Selected SAARC Countries

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ARTICLE INFO	ABSTRACT
Article History: Received: January 19, 2025 Revised: February 28, 2026 Accepted: March 10, 2026 Available Online: March 17, 2026	<i>This study examines the direct and indirect effects of corruption on international trade, with particular emphasis on the mediating role of human capital. Using panel data from selected SAARC countries over the period 1990–2022, the analysis employs a Seemingly Unrelated Regression (SUR) framework within a mediation approach to capture both channels of influence. The empirical findings indicate that corruption adversely affects international trade, while human capital plays a mitigating role by offsetting some of these negative effects. Specifically, higher levels of human capital enhance trade performance and weaken the detrimental impact of corruption. The results highlight the importance of institutional quality and human capital development in promoting trade openness. Based on these findings, the study suggests that policymakers should prioritize anti-corruption measures alongside investments in education and skill development to foster sustainable growth in international trade.</i>
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Introduction

It is the age of globalization, where higher economic growth and trade flows are closely interconnected. When nations specialize in producing commodities in which they have a comparative advantage, the production possibility frontier shifts outward. This means that the same quantity of goods can be produced at a lower cost. As a result, the standard of living for all trading partners increases. The significance of trade dates back to 1776, when Adam Smith recognized its importance for achieving production efficiency on a global scale. Between 1776 and 1826, many researchers emphasized the importance of free trade for global prosperity. During this period, individuals studied the effects of international trade on the global economy both theoretically and empirically. A major contribution during this time was to revise traditional trade theories with the doctrine of new trade, which limited the assumptions of perfect competition, the

absence of economies of scale, and homogeneous products. The core idea of the new trade theory is that markets are imperfect, products are differentiated, and better economies of scale can be achieved (Salvatore, 2013).

Considering returns to scale in production affects both the predictability in the pattern of trade and the benefits that are achieved by the nations (Appleyard and Field, 2001). The effectiveness of international trade on economic growth becomes more important with the introduction of free trade policies in developing economies. The history of trade shows that trade affects the culture, political, social, and economic structure of different economies. It leads to full utilization of economic resources, achieves a division of labor and economies of scale by expanding markets, and acts as a vehicle in the transmission of knowledge (Salvatore, 2013; Umair et al., 2024a; Umair et al., 2024b). But the question is to identify the factors that affect international trade. Recent studies show that effective population, infrastructure, multinational corporations, and technological advancement contribute significantly to international trade. There is also evidence that international trade affects economic growth through the channels of capital accumulation, industrial structure, and institutional quality (Dollar, 1992; Lee, 1995; Wagner, 2007). Human capital is considered the most effective tool in the trading system.

Similarly, there is debate among people about the relationship between the trading system and human capital accumulation. Pigou (1929) first considered the role of human capital in the economic system. When there is higher economic growth, people decide either to invest their savings in physical capital accumulation or human capital. Branson and Junz (1971) observed that there exists a weak relationship between physical capital and exports, while a strong association was observed between human capital and real exports in the USA. Latter' Schultz (1961) encompassed the notion and observed that more preferences for investment yield higher returns. Schultz and Becker (1960) examined the lifetime effect of investment in education on lifetime income. They observed that educational investment is beneficial for the economic conditions of individuals. It improves the efficiency of labor, which in turn affects the trade pattern because higher efficiency means lower cost of production and higher exports. Mincer (1958) observed that when individuals spend their time in training for some periods, they receive higher returns for the remaining life. Education is a form of capital that has not depreciated and increases the productivity of labor (Schultz, 1961).

Corruption is widely recognized as one of the most persistent challenges to economic development, particularly in developing economies where institutional frameworks are relatively weak (Ahmad and Hussain, 2024; Wang et al., 2024). It generally refers to the misuse of public authority for private gain, which manifests in various forms such as bribery, embezzlement, and favoritism (Ahmad and Hussain, 2023; Si et al., 2025). Corruption distorts market mechanisms by increasing transaction costs, reducing efficiency, and misallocating resources, thereby undermining economic performance (Habib et al., 2024). In the context of international trade, corruption can act as a hidden tax on firms by raising the cost of doing business, creating uncertainty, and discouraging foreign investment (Huang et al., 2025). Moreover, it weakens institutional credibility and reduces the effectiveness of policies aimed at promoting trade and growth (Fu et al., 2025). As a result, understanding the role of corruption and its transmission channels has become crucial for designing policies that enhance economic efficiency and global trade integration.

Chaung (2000) studied the importance of human capital for international trade and economic growth in Taiwan. He concluded that on one side, improvement in human capital accelerates growth through the channel of increase in exports, while on the other side, higher exports improve human capital, which in turn is beneficial for long-run economic growth. Narayan and Smyth (2004) also confirmed the hypothesis that human capital is beneficial for exports. International

trade enhances human capital and increases the nation's wealth, which reduces the constraint to invest in human capital. When more funds are available for education, it enriches the stock of human capital. Free trade increases the skills of people through the integration and diffusion of technology. It increases the mobility of factors among the trading partners. By the mobilization of factor inputs and final outputs, the people's knowledge increases. Interacting ideas create more knowledge, which creates a positive externality for the creation of new knowledge (Solow, 1997).

Some factors reduce the effectiveness of international trade in the accumulation of human capital. When people use their power for private gains, it creates an extra constraint to the provision as well as the adoption of knowledge. There are very limited studies that observed the effect of corruption on the accumulation of human capital. Ehrlich and Lui (1999) investigated the link between corruption and human capital in a theoretical way. The results revealed that corruption harms the accumulation of human capital. When there is a misuse of power, then more resources are devoted to developing the bureaucratic authority instead of trying to make educational institutions productive. It means that countries with more corruption lead to incompetence in the addition of human capital. Along with human capital, corruption also affects the country's ability to trade. When government officials give preferences to their own benefits instead of collective welfare, it creates misallocation of resources. The misallocation and inefficiency in the utilization of resources increases the cost of production, which in turns decreases the ability of firms to compete in the international market.

Lambsdorff (1998 and 1999) observed the consequences of corruption on the geographical structure of the trade. There is confusion in the results about the competitiveness of trade. Comparison of countries based on corruption and trade creates uncertain results. Some countries achieve a competitive advantage while others attain a disadvantage. Wei (1999) examined the response of imports and international trade to corruption. The results revealed that corruption acts significantly to change the propensity to import, while the total response of international trade is very little. There are different channels through which corruption affects international trade, but the most prominent are market regulation, the efficiency channel, contract awarding, and transaction costs. An important instrument to regulate trade patterns is restrictions on trade. Corruption and trade restrictions, such as customs duties, have a close relationship. When there is diversification in trade barriers, then it surges corruption because people are willing to give money to avoid tariff payments. The officials change the classification of imported goods to give incentives to people who give them money to avoid tariff payments. So, the focus on avoiding corruption is on uniform duties on imports (Gatti, 1999). When the customs rates are low, it is difficult to inspect goods at the border. So, people avoid that for a little amount to be consumed much time. In this situation, individuals convert to corrupt behavior and offer to importers to cross goods without paying tariffs.

From the perspective of the efficiency channel, it has been argued that corruption improves efficiency. The reason is that when there is bribery among Government employees, they work hard to earn more money. Acceleration in the money improves efficiency and helps in better economic growth. On the other hand, bribes enable people to avoid unnecessary delays caused by bureaucratic behavior. When economies perform efficiently, they tend to enhance international trade (Huang et al., 2025). It may be possible that corruption creates inefficiency in the economy. When the purpose of officials is to earn money instead of improving efficiency. Myrdal (1968) examined that when people make delays in administrative issues instead of working fast, it enhances bribery. Kaufmann and Wei (1999) observed that when firms pay more in the shape of corrupt practices, it increases the cost of capital. When the cost of capital increases, it enlarges production cost which reduces the efficiency in the production sector. Inefficiency in the market creates problems of competitiveness among trading partners.

Shleifer and Vishny (1993) examined that corruption also affects international trade through the channel of transaction costs. When the amount of bribery is less than the tax, then an increase in corruption reduces transaction costs, and it improves international trade. If the individuals pay the official tax along with illegal payments, then it increases transaction cost and acts as a hidden tax. Therefore, trade volume decreases among the countries. (Anderson and Marcouiller, 1999). When officials apply their power in contract awarding, it creates an advantage for some firms. When the contract of a commodity is awarded to persons based on bribery, it affects the trade volume among nations. The firms that are engaged in corruption obtained a comparative advantage in imports and exports in comparison with firms that are unwilling to pay the competitive bribe (Lambsdorff, 1998). It has been examined that corruption affects the volume of international trade, but it is ambiguous whether corruption promotes or decreases the volume of trade in developing countries. An important channel that was missing in previous literature about the significance of human capital in the corruption and international trade relationship. So, this research mainly focusses to check the direct and indirect effect of corruption through the channel of human capital on international trade among selected SAARC countries.

Data and Methodology

The current study indicates that corruption affects international trade in two ways: directly and indirectly via the channel of human capital. To capture these direct and indirect impacts, the study uses a mediation analysis approach following Preacher et al. (2007) and Muller et al. (2005).

The model is:

$$HC_{it} = \alpha_1 + \alpha_2 CORR_{it} + \alpha'_3 Z_{1it} + \mu_{1it} \quad (1)$$

$$TOP_{it} = \beta_1 + \beta_2 CORR_{it} + \beta_3 HC_{it} + \beta'_4 Z_{2it} + \mu_{2it} \quad (2)$$

Where, HC is human capital, $CORR$ indicates the level of corruption, the vector Z_1 consists of control variables such as population (POP), investment (GCF), and unemployment rate (UNE) and μ_1 is the error term in equation (1). TOP is international trade reflected as the dependent variable in the equation 2, Z_2 is the vector of control variables, such as inflation (INF), and Exchange rate (EXR) and μ_2 is the error term.

In equation (1), corruption affects the human capital along with the other variables, while the combined effect of corruption and human capital on international trade in equation (2). The indirect effect of corruption on international trade via the channel of human capital is calculated from the above equations (1) as,

$$\frac{\delta TOP_{it}}{\delta CORR_{it}} = \frac{\delta HC_{it}}{\delta CORR_{it}} * \frac{\delta TOP_{it}}{\delta HC_{it}} = \alpha_2 \beta_3 \quad (3)$$

The strength of the indirect effect of corruption and international trade depends on the strength of the effects of corruption on human capital and the effects of human capital on international trade. Similarly, the sign of indirect effects is influenced by the sign of α_2 and β_3 . Whereas the direct effect of corruption on international trade capture from equation (2) is:

$$\frac{\delta TOP_{it}}{\delta CORR_{it}} = \beta_2 \quad (4)$$

The total effect would be:

Total Effect = Direct Effect + Indirect Effect

$$TE = \beta_2 + \alpha_2\beta_3 \quad (5)$$

The above equation (5) indicates the net effect of corruption on international trade, which is simply the sum of the indirect effect ($\alpha_2\beta_3$) and direct effect (β_2). The study employs the SUR (seemingly unrelated regression) method to capture these direct and indirect impacts for panel data as recommended by Biorn (2004).

Seemingly Unrelated Regression (SUR) Method

The current study uses the mediation analysis approach, comprised of the above equations (1) and (2). Every Single equation has a different independent variable. So, each equation is estimated independently because it has a valid regression; therefore, this system of equations is known as seemingly unrelated regression. The Seemingly Unrelated Regression (SUR) method was developed by Zellner (1962), and it estimates each equation independently, which is linked with each other with the fact that their error terms are correlated. This correlation comes from different sources, like economic booms and shocks. SUR method is more suitable than that of other like OLS, in two main motivations, the first one is to gain efficiency in estimation by combining two seemingly unrelated but different equations, and the second is to impose or test restrictions (Zellner, 1962). So, we use the SUR model instead of OLS to estimate equations (1) and (2).

Data

We investigate the panel data of selected SAARC countries¹ from 1990 to 2022. The selection of countries depends on the availability of data. We employed panel data because it contains more information and variation compared to the time series data, and it also lessens the estimation biases that may arise from aggregating groups into a single time series. The employed data is taken from the World Development Indicators (WDI) and the Penn World Table. The description of variables is attached in Table A1 in the Appendix.

Results and Discussion

The current section consists of the results. The first section includes the summary statistics of the included variables, and then the direct and indirect effects of corruption on international trade are explained. The descriptive statistics of variables are attached in the Appendix (Table A2). The highest standard deviation (39.54) is found in the consumer price index rate, which means that it has huge fluctuations in the selected set of countries, while the mean value of inflation is 68.59. The exchange rate also has a high standard deviation (28.36), and the mean value is 62.85. GCF has a mean value of 25.04 and a standard deviation of 6.68. The average unemployment rate in the selected countries is 4.39, with a standard deviation of 3.24. The mean value of the human capital and corruption is 1.99 and 2.37, respectively, and both have lesser fluctuations. Further, the mean value of trade openness is 0.35 with a 0.14 standard deviation.

We estimate the equation 1 to 5 by employing the SUR methodology, and the results are presented in the following table (1). In panel A (results of equation 1), the dependent variable is human capital, and the regressors are corruption and other control variables. The coefficient of corruption has a positive sign and indicates that one point increase in corruption leads to a fall in human capital of at least 2 points in the selected countries. These results are significant at 5% level and in line with Bryant and Javalgi (2016). Population used as control variable, and its coefficient value indicates that 1% increase in population will surge the human capital by 105 units, the result is

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significant at 1% level and in line with Kuznets (1967). Gross capital formation is used as another control variable, and its coefficient value indicates that a 1% increase in GCF increases human capital by 0.3 units. GCF has a lower coefficient value because we use general investment, not the specific human capital investment. Hence, our results are significant at 5% level and in line with Oluwatobi and Ogunrinola (2011). The coefficient of UNE indicates the inverse relationship between unemployment and human capital. The 1% increase in unemployment decreases the human capital by 0.7 units, which is significant at 5% level, and in line with Kodde (1988).

Table 1: Corruption Effects on International Trade through Human Capital

	Coefficient	Standard Err.	P- values
A. Dependent Variable: Human Capital (HC)			
CORR	0.021*	0.011	0.055
POP	1.057***	0.046	0.000
GCF	0.003**	0.001	0.042
UNE	-0.007**	0.003	0.015
B. Dependent Variable: International Trade (TOP)			
CORR	0.022*	0.012	0.068
HC	0.465***	0.042	0.000
CPI	0.001***	0.000	0.000
EXR	-0.003***	0.001	0.000
C. Indirect Effect: Dependent Variable: International Trade (TOP)			
$\alpha_2 \cdot \beta_3$	0.01*	0.005	0.054
D. Total Effect: Dependent Variable: International Trade (TOP)			
$\beta_2 + \alpha_2 \cdot \beta_3$	0.032*	0.014	0.025

Note: ***, **, and * show significance level at 1%, 5%, and 10% respectively.

The results of equations 2 and 4 are presented in the above table 1 (Panel-B). The dependent variable is the international trade, and the regressors are corruption and human capital, along with other major determinants of TOP like inflation and exchange rate. The coefficient value of corruption indicates a positive sign and describes the inverse relationship between corruption and international trade. One unit increase in corruption decreases the TOP by 2%, and it is significant at a 10% level. It means that corruption creates hurdles in international trade, and our results are in line with Jong and Bogmans (2011). While the human capital works as grease in international trade. The coefficient value (0.465) of human capital means that one unit increase in it surges the international trade by 46.5%. These results are significant at 1% level and in line with Findlay and Kierzkowski (1983).

Inflation is also boosting international trade. The coefficient value of inflation indicates that a 1% increase in inflation surges the international trade up to 0.1%, and it is significant at a 1% level of significance. Hence, there is a positive relationship between inflation and international trade, and our results are in line with Stockman (1985). Further, the exchange rate has a negative and significant relationship with international trade. The coefficient value of the exchange rate indicates that a 1% increase in the exchange rate decreases international trade by up to 0.3%. Our result is significant at 1% level and in line with Nicita (2013).

Our focus was to check the indirect impact of corruption on international trade via the channel of human capital. It is captured through equation 3, and the results are placed in the above table 1 (panel C). As discussed above the corruption is a hurdle while human capital is the grease for international trade. Hence, indirectly, human capital decreases the negative effect of corruption on

international trade. Directly, one unit increase in corruption decreases international trade by 2%, while indirectly, the decrease in international trade is 1%. So, human capital reduces the negative effects of corruption on international trade, and it is significant at a 10% level of significance.

The total effect (direct plus indirect) of corruption on international trade is captured by using equation 5, and the results are presented in the above table 1 in panel D. The coefficient value of the total effect indicates that one unit increase in corruption leads to a fall in international trade by 3%, and it is significant at 5% level of significance.

Conclusion

This study examined the direct and indirect effects of corruption on international trade, with particular emphasis on the mediating role of human capital in selected SAARC countries over the period 1990–2022. By employing a Seemingly Unrelated Regression (SUR) framework within a mediation analysis, the study provided empirical evidence on the interaction between institutional quality and human capital in shaping trade outcomes. The results showed that corruption significantly undermined international trade by increasing transaction costs, creating inefficiencies, and distorting the allocation of resources, thereby reducing the competitiveness of economies in global markets.

In contrast, human capital emerged as a key determinant of trade performance, as it enhanced productivity, facilitated technological adoption, and improved labor efficiency. Importantly, the findings indicated that human capital partially mitigated the adverse effects of corruption on international trade. However, this mitigating effect was not sufficient to fully offset the negative impact of corruption, suggesting that institutional weaknesses remained a significant constraint on trade expansion.

Overall, the study highlights that strengthening institutional quality and investing in human capital are essential for achieving sustainable growth in international trade. The findings contribute to the existing literature by emphasizing the role of human capital as an important transmission channel in the corruption–trade nexus, particularly in the context of developing economies.

Policy Implications

The findings of this study suggest several important policy implications for enhancing international trade in developing economies. First, there is a need to strengthen anti-corruption frameworks by improving transparency, accountability, and governance mechanisms. Effective enforcement of anti-corruption laws, along with the adoption of digital systems in public administration and customs procedures, can significantly reduce opportunities for rent-seeking behavior. Second, policymakers should prioritize investment in human capital through increased spending on education, vocational training, and skill development programs, as a more skilled workforce enhances productivity and international competitiveness.

Third, improving institutional quality, particularly in trade-related sectors such as customs authorities and regulatory bodies, is essential to reducing inefficiencies and transaction costs associated with corruption. Fourth, simplifying trade procedures and reducing regulatory complexity can limit discretionary power and minimize corruption in trade activities. Finally, regional cooperation among SAARC countries should be encouraged to promote governance reforms, share best practices, and enhance human capital development, thereby strengthening trade integration and economic performance across the region.

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Appendix:

Table A1. Description of Variables

Variable	Characteristic	Source
TOP	Trade openness ($X + M / GDP$)	WDI, WB
CORR	Corruption Index 0-6 (0 mean low corruption and 6 mean	ICRG

	high corruption)	
HC	Human capital index, based on years of schooling and returns to education	Pen World Table
POP	Log of total Population	WDI, WB
GFC	Gross fixed capital formation (% of GDP)	WDI, WB
UNE	Unemployment rate	WDI, WB
CPI	Consumer price index (2010 = 100) (proxy for inflation rate)	WDI, WB
EXR	Exchange rate	WDI, WB

Table A2. Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
HC	1.99	0.50	1.36	2.90
CORR	2.37	0.69	0.08	4.00
POP	18.78	1.44	16.67	21.00
GCF	25.04	6.68	14.12	41.93
UNE	4.39	3.24	0.00	14.66
TOP	0.35	0.14	0.09	0.57
CPI	68.59	39.54	14.49	155.95
EXR	62.85	28.36	17.50	145.58