


THE MODERATING EFFECT OF EDUCATION LEVEL ON THE RELATIONSHIP BETWEEN TRADE OPENNESS AND EMPLOYMENT IN NORTH AFRICAN ECONOMIES

**Naamaoui Rachida^A, Bencherif Mabrouka^B, Mehdaoui Zeyneb^C,
Kouidri Abderrahmane^D**



ARTICLE INFO	ABSTRACT
<p>Article history: Received: April, 18th 2024 Accepted: June, 18th 2024</p>	<p>Objective: This study explores how education level moderates the relationship between trade openness and employment in North African economies, examining whether higher education levels enhance or mitigate the employment effects of trade openness.</p> <p>Theoretical Framework: The research draws on economic and educational theories to examine the interplay between human capital and economic policies. It uses trade openness theories to assess the impact of economic integration on employment, and human capital theories to analyze the role of education.</p> <p>Method: The study uses a quantitative approach with panel data from North African economies (2000-2020). PLS-SEM models with interaction terms evaluate the moderating effect of education on the trade openness-employment relationship, using data from international trade databases and national educational statistics.</p> <p>Results and Discussion: Findings indicate that trade openness positively influences employment, with the effect amplified by higher education levels. Economies with better education systems benefit more from trade openness in terms of employment. The discussion underscores the importance of educational investment for maximizing these benefits and addresses issues like differing educational quality and labor market conditions across countries.</p> <p>Research Implications: The study suggests that North African policymakers should enhance educational systems to maximize the employment benefits of trade openness, offering practical insights into how education can help address globalization challenges and drive economic growth.</p> <p>Originality/Value: This study uniquely combines education and economic policy perspectives to examine the moderation of trade openness effects on employment in North Africa, providing valuable implications for academic research and policy formulation.</p> <p>Doi: https://doi.org/10.26668/businessreview/2024.v9i7.4843</p>
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^A Doctor in Economics. University of Adrar. Algerian-African Economic Integration Laboratory. Algeria.

E-mail: naamaoui.ra@univ-adrar.edu.dz Orcid: <https://orcid.org/0009-0004-3017-0390>

^B Doctor in Economics. University of Adrar. Algerian-African Economic Integration Laboratory. Algeria.

E-mail: mabrouka_bencherif@univ-adrar.edu.dz Orcid: <https://orcid.org/0009-0007-1071-5009>

^C Doctor in Economics. University of Adrar. Algeria. E-mail: zey.mehdaoui@univ-adrar.edu.dz

Orcid: <https://orcid.org/0000-0002-8720-0480>

^D Doctor in Economics. University of Adrar. Algerian-African Economic Integration Laboratory. Algeria.

E-mail: arr.kouidri@univ-adrar.edu.dz Orcid: <https://orcid.org/0009-0007-1472-6215>

O EFEITO MODERADOR DO NÍVEL DE EDUCAÇÃO NA RELAÇÃO ENTRE A ABERTURA COMERCIAL E O EMPREGO NAS ECONOMIAS DO NORTE DA ÁFRICA

RESUMO

Objetivo: Este estudo explora como o nível de educação modera a relação entre a abertura comercial e o emprego nas economias do norte da África, examinando se níveis mais altos de educação aumentam ou mitigam os efeitos do emprego da abertura comercial.

Estrutura Teórica: A pesquisa baseia-se em teorias econômicas e educacionais para examinar a interação entre capital humano e políticas econômicas. Utiliza teorias de abertura comercial para avaliar o impacto da integração econômica no emprego e teorias de capital humano para analisar o papel da educação.

Método: O estudo utiliza uma abordagem quantitativa com dados em painel das economias do norte da África (2000-2020). Modelos PLS-SEM com termos de interação avaliam o efeito moderador da educação na relação entre abertura comercial e emprego, utilizando dados de bancos de dados de comércio internacional e estatísticas educacionais nacionais.

Resultados e Discussão: Os resultados indicam que a abertura comercial influencia positivamente o emprego, com o efeito amplificado por níveis mais altos de educação. As economias com melhores sistemas educacionais beneficiam-se mais da abertura comercial em termos de emprego. A discussão destaca a importância do investimento educacional para maximizar esses benefícios e aborda questões como a qualidade educacional e as condições do mercado de trabalho variando entre os países.

Implicações da Pesquisa: O estudo sugere que os formuladores de políticas do norte da África devem melhorar os sistemas educacionais para maximizar os benefícios do emprego resultantes da abertura comercial, oferecendo insights práticos sobre como a educação pode ajudar a enfrentar os desafios da globalização e impulsionar o crescimento econômico.

Originalidade/Valor: Este estudo combina de forma única perspectivas de educação e políticas econômicas para examinar a moderação dos efeitos da abertura comercial no emprego no norte da África, fornecendo implicações valiosas para a pesquisa acadêmica e a formulação de políticas.

Palavras-chave: Abertura Comercial, Emprego, Nível de Educação, Economias do Norte da África, Capital Humano, Integração Econômica.

EL EFECTO MODERADOR DEL NIVEL EDUCATIVO EN LA RELACIÓN ENTRE LA APERTURA COMERCIAL Y EL EMPLEO EN LAS ECONOMÍAS DEL NORTE DE ÁFRICA

RESUMEN

El Objetivo: Este estudio explora cómo el nivel educativo modera la relación entre la apertura comercial y el empleo en las economías del norte de África, examinando si los niveles más altos de educación mejoran o mitigan los efectos del empleo de la apertura comercial.

Marco Teórico: La investigación se basa en teorías económicas y educativas para examinar la interacción entre el capital humano y las políticas económicas. Utiliza teorías de apertura comercial para evaluar el impacto de la integración económica en el empleo y teorías de capital humano para analizar el papel de la educación.

Método: El estudio utiliza un enfoque cuantitativo con datos de panel de las economías del norte de África (2000-2020). Modelos PLS-SEM con términos de interacción evalúan el efecto moderador de la educación en la relación entre apertura comercial y empleo, utilizando datos de bases de datos de comercio internacional y estadísticas educativas nacionales.

Resultados y Discusión: Los resultados indican que la apertura comercial influye positivamente en el empleo, con un efecto amplificado por niveles más altos de educación. Las economías con mejores sistemas educativos se benefician más de la apertura comercial en términos de empleo. La discusión destaca la importancia de la inversión educativa para maximizar estos beneficios y aborda cuestiones como la calidad educativa y las condiciones del mercado laboral en los distintos países.

Implicaciones de la Investigación: El estudio sugiere que los responsables de políticas del norte de África deben mejorar los sistemas educativos para maximizar los beneficios del empleo resultantes de la apertura comercial, ofreciendo ideas prácticas sobre cómo la educación puede ayudar a enfrentar los desafíos de la globalización y impulsar el crecimiento económico.

Originalidad/Valor: Este estudio combina de manera única perspectivas de educación y políticas económicas para examinar la moderación de los efectos de la apertura comercial en el empleo en el norte de África, proporcionando valiosas implicaciones para la investigación académica y la formulación de políticas.

Palabras clave: Apertura Comercial, Empleo, Nivel Educativo, Economías del Norte de África, Capital Humano, Integración Económica.

1 INTRODUCTION

Trade openness, characterized by the liberalization of trade policies and increased integration into the global economy, is widely recognized as a key driver of economic growth and employment. In North African economies, such as Algeria, Egypt, Tunisia, and Libya, the impact of trade openness on employment is a subject of significant interest and debate. These countries, with their diverse economic structures and varying degrees of trade liberalization, present a unique context for examining how trade policies influence labor markets. The potential for trade to create job opportunities, spur innovation, and enhance productivity is well-documented; however, the distribution of these benefits is not always uniform across different sectors and demographics. A critical factor that may influence the extent to which individuals benefit from trade openness is their level of education. Higher education levels can enhance individuals' ability to adapt to changing economic conditions and access new employment opportunities generated by trade expansion.

Despite the recognized importance of education in facilitating positive employment outcomes in the context of trade liberalization, there is limited empirical research on how education level moderates the relationship between trade openness and employment in North African economies. This study seeks to address this gap by exploring the role of education in moderating the effects of trade openness on employment across the region. The central research questions guiding this investigation are: How does trade openness impact employment in North African economies, and to what extent does education level influence this relationship? This study aims to analyze the relationship between trade openness and employment, examine the moderating effect of education level, and provide policy recommendations to enhance the employment benefits of trade liberalization. By shedding light on these dynamics, this research aims to inform policy decisions that support inclusive economic growth and job creation in North Africa.

2 LITERATURE REVIEW

2.1 THE RELATIONSHIP BETWEEN TRADE OPENNESS AND EMPLOYMENT

Trade openness significantly impacts employment, with various studies highlighting this relationship. Research indicates that higher trade openness is associated with lower

unemployment rates, especially in East, South, and Southeast Asian countries (Mudasar & Bhat, 2023) (Aria, 2016). However, the effects of trade liberalization on unemployment can vary based on a country's income level, suggesting that economic conditions play a crucial role in determining the extent of benefits from trade openness (Ananda &, 2022). Additionally, while trade openness has been found to have a negative effect on unemployment in some regions, such as in East African Community countries, the impact differs between sectors, with a shift observed from agriculture to services due to trade opening (Muthoka & Maingi, 2023). Overall, promoting trade openness can create job opportunities, but its effectiveness in reducing unemployment depends on various factors such as income levels, economic conditions, and sector-specific dynamics.

First hypothesis (H1): There is no statistically significant positive relationship between Trade Openness and Employment at a 5% significance level.

2.2 THE RELATIONSHIP BETWEEN EDUCATION LEVEL AND THE TIES OF TRADE OPENNESS TO EMPLOYMENT

Education level plays a crucial role in shaping attitudes towards trade openness and its impact on employment. Studies have shown that individuals with higher levels of education, particularly college-educated individuals, are more likely to favor trade openness (Mohammad et al., 2018) (Li et al., 2022). However, the relationship between education and trade openness in employment is complex. While higher education levels are associated with support for trade openness, the type of education received also plays a role in influencing attitudes towards trade policies (Jens & Michael, 2006). Moreover, the allocation of human capital between the public and private sectors is affected by trade openness, with individuals in cities with higher trade openness being less likely to work in the public sector, especially as educational attainment increases (Hainmueller, 2006). Additionally, the impact of trade openness on employment can vary depending on the country's policies, as seen in the case of Bangladesh where trade openness is linked to an increase in unemployment, while public expenditure on education leads to a decline in unemployment in the long run (Dawood et al., 2013).

Second Hypothesis (H2): There is no significant role for Education Level in reducing the relationship between Trade Openness and Employment at a 5% significance level.

2.3 GAPS IN EXISTING LITERATURE

The existing literature on trade openness and its impact on employment highlights several important findings but also reveals significant gaps that need to be addressed for a more comprehensive understanding of the dynamics at play. Firstly, while numerous studies have established a correlation between higher trade openness and lower unemployment rates in various regions such as East, South, and Southeast Asia (Mudaser & Bhat, 2023; Aria, 2016), there is a lack of research focusing on North African economies. These regions have unique economic structures and socio-political contexts that could influence how trade openness affects employment, suggesting a need for region-specific studies.

Secondly, although the literature acknowledges that the effects of trade liberalization on employment vary depending on a country's income level (Ananda & Li, 2022), there is limited exploration of how these effects differ within sectors in different economic contexts. Studies such as Muthoka and Maingi (2023) have noted sectoral shifts in East African countries, but there is a paucity of detailed analysis on how trade openness impacts specific sectors, like agriculture and services, in North Africa. Understanding these sectoral dynamics is crucial for formulating targeted policy interventions.

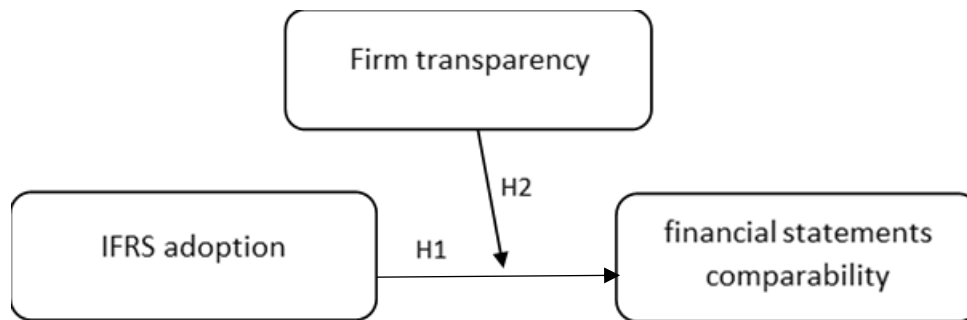
Thirdly, while research indicates that education levels influence attitudes toward trade openness and employment outcomes (Mohammad et al., 2018; Li et al., 2022), the nuanced roles of different types of education and their impact on employment in the context of trade openness are not well-explored. There is a particular gap in understanding how the quality and field of education, as opposed to merely the level of education, affect individuals' ability to benefit from the job opportunities created by trade openness. Moreover, existing studies, such as those by Hainmueller (2006) and Dawood et al. (2013), suggest that public policies, including those related to education, can significantly mediate the impact of trade openness on employment. However, comprehensive studies that integrate these aspects to examine their combined effect in North African countries are sparse.

Lastly, most research tends to focus on the immediate effects of trade openness on employment, often overlooking the long-term impacts and the role of continuous policy adjustments and educational advancements. For instance, while Dawood et al. (2013) identified a link between trade openness, public expenditure on education, and unemployment in Bangladesh, similar longitudinal studies that track these relationships over time in North Africa

are lacking. This presents a critical gap in understanding the evolving nature of trade impacts in different educational and policy contexts.

Figure 1

Theoretical framework.



3 METHODOLOGY

3.1 RESEARCH DESIGN AND APPROACH

This study employs a quantitative research design, utilizing a panel data approach to analyze the moderating effect of education level on the relationship between trade openness and employment in North African economies. The quantitative design is chosen to facilitate the analysis of large datasets and to apply statistical techniques that can provide insights into the complex interactions between trade openness, education, and employment.

The research is structured as an observational study using secondary data sources. The focus is on five North African countries: Algeria, Egypt, Tunisia, and Libya. These countries are selected due to their diverse economic structures, levels of trade openness, and varying educational profiles, which provide a robust context for examining the moderating role of education.

The study employs a panel data econometric approach, which allows for the analysis of multiple variables across different periods and countries. This approach is beneficial for capturing the dynamics of the relationship between trade openness and employment and for controlling for unobserved heterogeneity that may influence the results. The panel data analysis includes both fixed-effects and random-effects models to account for country-specific effects and time-invariant characteristics.

3.2 DATA COLLECTION METHODS

3.2.1 Data Sources

Trade Openness Data: Data on trade openness, measured by the trade-to-GDP ratio, is obtained from the World Bank's World Development Indicators (WDI) database. This measure captures the extent of a country's integration into the global economy by comparing the total value of imports and exports to its GDP.

Employment Data: Employment data, including overall employment rates and sector-specific employment figures, are sourced from the International Labour Organization (ILO) database. This data provides insights into how employment levels vary across different sectors and over time.

Education Data: Education level data, focusing on the percentage of the population with secondary and tertiary education, is collected from the UNESCO Institute for Statistics (UIS) and the World Bank's Education Statistics database. These datasets provide detailed information on educational attainment across the selected countries.

3.2.2 Data Collection Procedures

Data Extraction: Relevant data from the aforementioned databases are extracted for the period between 2000 and 2023. The time frame is chosen to capture recent trends and changes in trade policies and their impact on employment.

Data Cleaning: The extracted data is cleaned to remove any inconsistencies, missing values, and outliers that could distort the analysis. This involves handling missing data through techniques such as imputation and ensuring that the data is in a consistent format suitable for panel data analysis.

Data Integration: The cleaned data from different sources is integrated into a single dataset, ensuring that it is aligned by country and year. This integrated dataset is then prepared for analysis using statistical software such as STATA or R.

3.3 DATA COLLECTION METHODS

The quantitative design is selected due to its suitability for analyzing large datasets and identifying patterns and relationships that are not immediately apparent. It allows for the use of statistical methods to rigorously test hypotheses and quantify the impact of trade openness on employment while considering the moderating role of education. This approach provides objectivity and the ability to generalize findings across the selected North African countries.

Capturing Dynamics: It allows for the analysis of how variables change over time and across different countries, providing a dynamic view of the relationship between trade openness and employment.

Controlling for Unobserved Heterogeneity: By including both fixed-effects and random-effects models, panel data analysis controls for country-specific characteristics that are constant over time but may influence employment outcomes.

Improving Statistical Power: The combination of cross-sectional and time-series data increases the number of observations, enhancing the statistical power and reliability of the results.

The use of secondary data is justified by the availability of high-quality, comprehensive datasets from reliable international organizations. These datasets offer:

Extensive Coverage: They cover a wide range of variables and provide data over extended periods, which is crucial for understanding long-term trends and effects.

Comparability: The data from international sources are standardized, allowing for meaningful comparisons across different countries and periods.

Resource Efficiency: Using secondary data is cost-effective and time-efficient, as it eliminates the need for primary data collection and allows the researcher to focus on analysis and interpretation.

The choice of statistical software such as STATA or R is based on their capabilities to handle large datasets and perform complex econometric analyses. These tools provide:

Advanced Analytical Functions: They offer a wide range of statistical techniques and models suitable for panel data analysis.

Data Management: They facilitate efficient data cleaning, integration, and manipulation.

Reproducibility: They enable the replication of results, ensuring the robustness and reliability of the findings.

4 DATA PRESENTATION AND ANALYSIS

4.1 FIRST: ASSESSMENT OF MEASUREMENT MODEL

In this section, the quality of the expressions utilized in this model is examined through the utilization of the Smart PLS software. This evaluation entails testing the convergence and consistency of these expressions amongst themselves. The objective is to ensure the capability of these expressions to effectively measure the desired attributes, as well as the stability of the measurement across different conditions, employing the Convergent Validity test. Moreover, an assessment is conducted to determine the logical distinctiveness and absence of overlap among these expressions, employing the Discriminate Validity test.

4.2 CONVERGENT VALIDITY

Convergent validity is a critical aspect of structural equation modeling (SEM), including Partial Least Squares SEM (PLS-SEM). Convergent validity assesses whether the indicators (manifest variables) of a latent construct (factor) are measuring the same underlying concept. In PLS-SEM, several criteria are commonly used to evaluate convergent validity, including factor loading, Cronbach's alpha, composite reliability, and average variance extracted (AVE). Here's an explanation of each criterion:

4.2.1 Factor Loading

Basis: Factor loading represents the strength and direction of the relationship between an indicator and its corresponding latent construct. In PLS-SEM, factor loadings should be statistically significant and preferably higher than 0.7 to indicate a strong relationship.

Cronbach's Alpha:

Basis: Cronbach's alpha is a measure of internal consistency reliability. It assesses the extent to which a set of indicators (items) measures a single latent construct consistently. In PLS-SEM, a high Cronbach's alpha (typically above 0.7) suggests good internal consistency.

4.2.2 Composite Reliability

Basis: Composite reliability is another measure of reliability that evaluates the consistency of indicators in measuring a latent construct. In PLS-SEM, composite reliability should ideally exceed 0.7, indicating that the indicators are reliable measures of the underlying construct.

4.2.3 Average Variance Extracted (AVE)

Statistically, convergent validity is established when the Average Variance Extracted (AVE) is greater than 0.50 (Sarstedt et al., 2021). Additionally, factor loading, Cronbach's Alpha, and composite reliability are also used to assess convergent validity in PLS-SEM. Factor loading measures the relationship between the observed variables and their underlying latent constructs, while Cronbach's Alpha and composite reliability assess the internal consistency of the measurement instrument (Amora, 2021).

Table 1

Results of the Stability and Composite Reliability Test for the Model.

variables	Items	Loadings	Cronbach's Alpha	Composite Reliability	The average variance extracted
Employment	Emp_1	0.926	0.892	0.933	0.822
	Emp_2	0.904			
	Emp_3	0.889			
Education Level	EL_1	0.687	0.886	0.909	0.556
	EL_2	0.796			
	EL_3	0.756			
	EL_4	0.714			
	EL_5	0.783			
	EL_6	0.707			
	EL_7	0.757			
Trade Openness	TO_1	0.584	0.835	0.878	0.548
	TO_2	0.830			
	TO_3	0.778			
	TO_4	0.818			
	TO_5	0.696			
	TO_6	0.706			

Source: Compiled by researchers based on the outputs of Smart PLS4.

The results of the stability and composite reliability test for the model, as presented in Table 1, indicate high reliability and stability for the "Employment" and "Education Level" constructs, but slightly lower reliability for the "Trade Openness" construct. The "Employment" construct, with items Emp_1, Emp_2, and Emp_3, shows very high factor loadings (ranging

from 0.889 to 0.926), a strong Cronbach's Alpha of 0.892, and a Composite Reliability (CR) of 0.933, indicating excellent internal consistency. The Average Variance Extracted (AVE) for "Employment" is 0.822, suggesting a high level of variance captured by the construct. The "Education Level" construct, which includes eight items (EL_1 to EL_8), also demonstrates good reliability with a Cronbach's Alpha of 0.886 and a CR of 0.909. However, the AVE is 0.556, indicating that while the construct is reliable, it explains a moderate amount of variance. The loadings for "Education Level" are moderate to high, ranging from 0.687 to 0.796. In contrast, the "Trade Openness" construct, composed of six items (TO_1 to TO_6), has the lowest factor loadings (ranging from 0.584 to 0.830), a satisfactory Cronbach's Alpha of 0.835, and a CR of 0.878, but a relatively lower AVE of 0.548, suggesting that while the reliability is acceptable, the amount of variance captured by this construct is moderate. Overall, the model demonstrates robust reliability and stability, particularly for the "Employment" and "Education Level" constructs, with some room for improvement in the "Trade Openness" construct.

4.3 DISCRIMINATE VALIDITY

The recommended criteria for analyzing the results of the discriminant validity test in the PLS-SEM methodology include the following:

Fornell-Larcker Criterion: This criterion assesses discriminant validity by comparing the square root of the average variance extracted (AVE) for each construct with the correlations between that construct and other constructs. Discriminant validity is established if the AVE value for a particular construct is greater than its correlation with all other constructs (Henseler et al., 2015) (Hamid et al., 2017)

Heterotrait-Monotrait Ratio of Correlations (HTMT) Criterion: This criterion is based on the heterotrait-monotrait ratio of correlations and is used to assess discriminant validity in variance-based structural equation modeling. It measures the extent to which constructs are distinct from each other empirically. A threshold of 0.85 is recommended for HTMT when the constructs in the path model are conceptually more distinct (Franke & Sarstedt, 2019) (Henseler et al., 2015) (Hamid et al., 2017)

It is important to note that the Fornell-Larcker Criterion and cross-loadings have been the dominant approaches for evaluating discriminant validity, but Henseler, Ringle, and Sarstedt (2015) have proposed the HTMT criterion as an alternative approach, which has shown

high sensitivity and specificity in detecting discriminant validity problems (Cepeda-Carrión et al., 2022) (Henseler et al., 2015) (Hamid et al., 2017)

In conclusion, when analyzing the results of the discriminant validity test in the PLS-SEM methodology, researchers should consider using the Fornell-Larcker Criterion, cross-loadings, and the HTMT Criterion to ensure the distinctiveness of the constructs in the study and to detect any issues with discriminant validity

Table 2

Fornell-Larcker Criterion.

variables	Education Leve	Employment	Trade Openness
Education Level	0.745		
Employment	0.552	0.907	
Trade Openness	0.696	0.632	0.740

Source: Compiled by researchers based on the outputs of Smart PLS4.

The Fornell-Larcker criterion results presented in Table 2 indicate the discriminant validity among the constructs "Education Level," "Employment," and "Trade Openness." The diagonal values represent the square root of the Average Variance Extracted (AVE) for each construct, with 0.745 for "Education Level," 0.907 for "Employment," and 0.740 for "Trade Openness." These values are higher than the corresponding inter-construct correlations, which are 0.552 between "Employment" and "Education Level," 0.632 between "Employment" and "Trade Openness," and 0.696 between "Education Level" and "Trade Openness." This indicates that each construct shares more variance with its own indicators than with those of other constructs, confirming discriminant validity. The highest inter-construct correlation is between "Education Level" and "Trade Openness" (0.696), suggesting a relatively strong relationship, while the correlation between "Employment" and "Education Level" is moderate (0.552). Overall, the table demonstrates that the constructs are distinct from one another and that the model maintains good discriminant validity, meaning the constructs measure different underlying concepts.

Table 3

the heterotrait-monotrait ratio of correlations (HTMT).

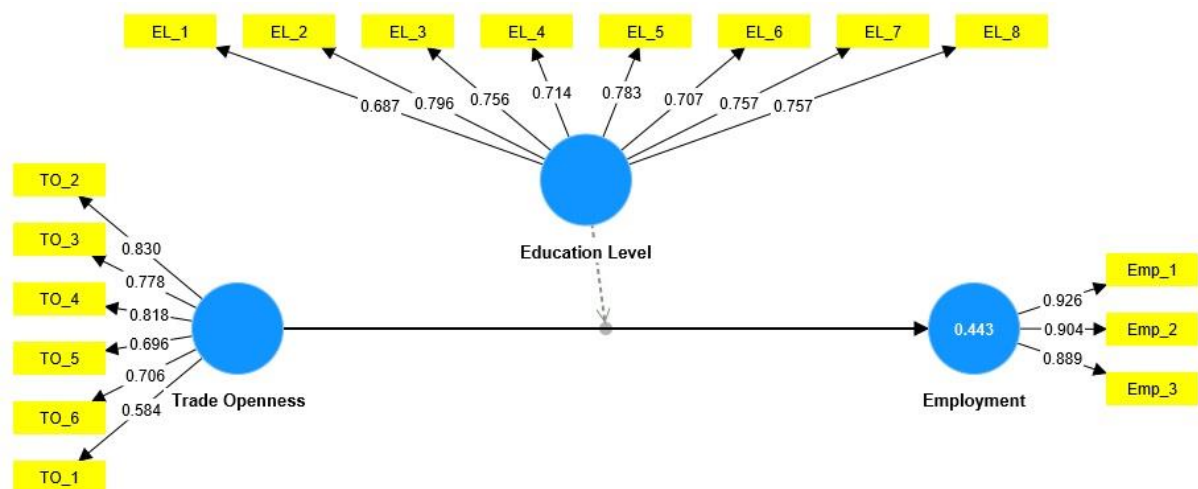
variables	Education Leve	Employment	Trade Openness
Education Level			
Employment	0.607		
Trade Openness	0.811	0.699	

Source: Compiled by researchers based on the outputs of Smart PLS4.

The heterotrait-monotrait ratio of correlations (HTMT) results in Table 3 provide evidence for discriminant validity among the constructs "Education Level," "Employment," and "Trade Openness." The HTMT values, which should ideally be below the threshold of 0.85 or 0.90 to confirm discriminant validity, show that "Education Level" has a moderate HTMT value of 0.607 with "Employment," indicating that these constructs are sufficiently distinct from each other. The HTMT value between "Education Level" and "Trade Openness" is 0.811, which is near the upper acceptable limit, suggesting a relatively strong but still acceptable level of discriminant validity between these constructs. The HTMT value between "Employment" and "Trade Openness" is 0.699, which is comfortably below the threshold, indicating good discriminant validity. Overall, the HTMT values suggest that the constructs in the model are distinct and do not excessively overlap, providing support for the discriminant validity of the measurement model. This means that the constructs measure different underlying phenomena as intended, which is crucial for the reliability and validity of the research findings.

Figure 2

General Structural Model for the Study.



Source: Compiled by researchers based on the outputs of Smart PLS4.

4.4 SECONDLY: TESTING THE INTERNAL MODEL (STRUCTURAL MODEL)

In this section, we evaluate the results of the structural model by testing the degree of correlation, assessing the predictive capabilities of the model, and examining the relationships between constructs. Additionally, we conduct the necessary tests to evaluate the model.

4.4.1 Validity of the Structural Model

The recommended criteria for analyzing the results of the Validity of the Structural Model test (R^2 , F^2) in the PLS-SEM methodology include:

- measurement model assessment: this involves assessing the relationship between a construct and its observed items, including reliability, indicator loading, and internal consistency reliability (Fauzi, 2022);
- structural model assessment: this focuses on evaluating the significance and relevance of path coefficients, followed by the model's explanatory and predictive power. Key metrics relevant to structural model assessment in PLS-SEM include the coefficient of determination (R^2), f^2 effect size, and cross-validated predictive ability test (CVPAT). (Hair Jr et al., 2021);
- new guidelines: in addition to established PLS-SEM evaluation criteria, new guidelines include PLS prediction (a novel approach for assessing a model's out-of-sample prediction), metrics for model comparisons, and several complementary methods for checking the results' robustness (Hair et al., 2019).

Table 4

Validity of the Structural Model

Variables	Coefficient of Determination (R^2)	Explanatory size (F^2)
Employment	0.443	/
Trade Openness	/	0.221
Education Leve	/	0.056

Source: Compiled by researchers based on the outputs of Smart PLS4.

The results in Table 4 provide insights into the validity of the structural model by examining the Coefficient of Determination (R^2) and the explanatory size (F^2) of the constructs "Employment," "Trade Openness," and "Education Level." The R^2 value for "Employment" is 0.443, indicating that approximately 44.3% of the variance in employment can be explained by the model's independent variables. This represents a moderate level of explanatory power, suggesting that while the model accounts for a significant portion of the variance in employment, there are other factors not included in the model that also influence employment.

The F^2 values, which assess the effect size of each construct, show that "Trade Openness" has an F^2 value of 0.221, indicating a medium to large effect size in the context of the model. This suggests that changes in trade openness significantly contribute to explaining

variations in the dependent variable, likely employment. On the other hand, "Education Level" has an F^2 value of 0.056, indicating a small effect size. This means that while education level does contribute to explaining the variance in the dependent variable, its impact is relatively modest compared to trade openness.

5 DISCUSSION OF TESTING THE STUDY HYPOTHESES

When analyzing the results of testing study hypotheses in the Partial Least Squares Structural Equation Modeling (PLS-SEM) methodology, there are several recommended criteria to consider. These criteria are essential for ensuring the validity and reliability of the analysis. Here are the recommended criteria for analyzing the results of testing this study's hypotheses in the PLS-SEM methodology:

Hypothesis Testing with Confidence Intervals and P Values: Researchers usually employ P values for hypothesis testing in PLS-SEM, where each hypothesis refers to a path in a model. P values may be one-tailed or two-tailed (Kock, 2016).

Structural Model Testing: The structural model in PLS-SEM needs to be tested to ensure that the assumptions of unidimensional constructs hold in the sample. This involves testing the relationships between latent variables and their indicators (Kock, 2016).

To test the study hypotheses using the structural modeling methodology, we calculate estimates for the relationships in the structural model using the Bootstrapping method. These estimates indicate the expected relationships between constructs, and the path coefficient ranges from -1 to +1. Values close to +1 suggest strong positive relationships, while values near -1 indicate strong negative relationships. Typically, statistically significant relationships have p-values below 5%. Coefficients approaching zero from both directions suggest weak relationships (Kock, 2018).

5.1 Hypotheses

First hypothesis (H1): There is no statistically significant positive relationship between IFRS adoption and financial statements comparability at a 5% significance level.

Second Hypothesis (H2): There is no significant role for Firm transparency in increasing the relationship between IFRS adoption and financial statements comparability at a 5% significance level.

Table 5*Testing the Hypotheses for the Study (H1, H2).*

Hypothesis	Paths	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Decision
H ₁	TO -> Emp	0.489	0.492	0.108	4.511	0.000	Hypothesis Accepted
H ₂	(TO * EL) -> Emp	0.124	0.125	0.053	2.348	0.019	Hypothesis Accepted

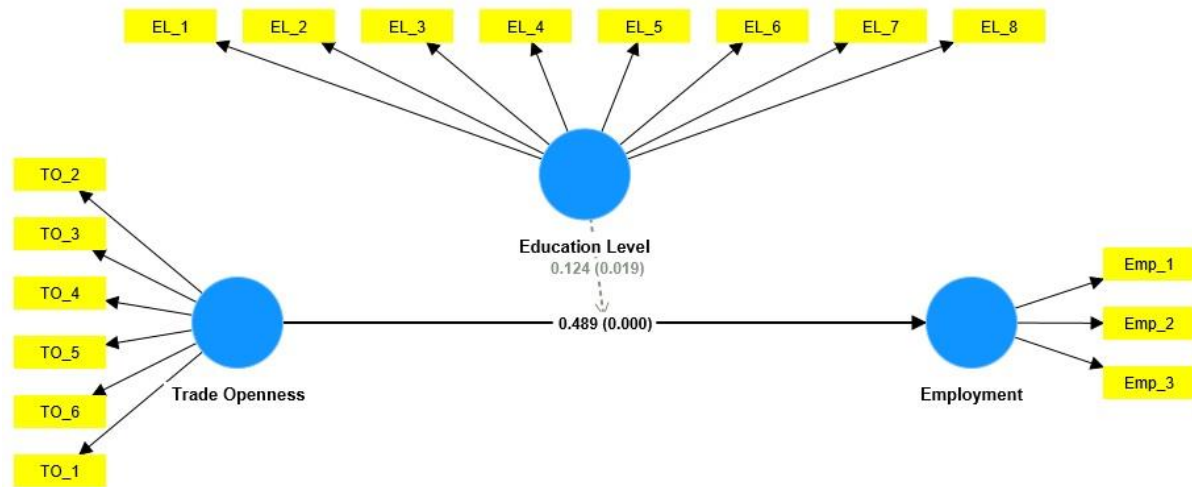
Source: Compiled by researchers based on the outputs of Smart PLS4.

The results in Table 5 provide evidence for the acceptance of both tested hypotheses (H1 and H2) in the study. For Hypothesis 1 (H1), which examines the direct effect of Trade Openness (TO) on Employment (Emp), the path coefficient is 0.489 with a very high T statistic of 4.511 and a P value of 0.000. This indicates a statistically significant positive effect of trade openness on employment, suggesting that increased trade openness leads to higher employment levels. The low standard deviation (0.108) and the close alignment between the original sample coefficient (0.489) and the sample mean (0.492) suggest that this effect is both robust and consistent across the sample.

For Hypothesis 2 (H2), which explores the moderating effect of Education Level (EL) on the relationship between Trade Openness and Employment (TO * EL -> Emp), the path coefficient is 0.124 with a T statistic of 2.348 and a P value of 0.019. This confirms that education level significantly moderates the impact of trade openness on employment, albeit with a smaller effect size compared to the direct effect of trade openness alone. The relatively low standard deviation (0.053) indicates stability in this moderating effect. The acceptance of H2 suggests that higher education levels enhance the positive impact of trade openness on employment, underlining the importance of educational attainment in maximizing the employment benefits of trade policies.

Figure 3

Results of path coefficients.



Source: Compiled by researchers based on the outputs of Smart PLS4.

Table 6

Testing the effectiveness of the moderating variable (Education Level) in reducing the effect of Trade Openness on Employment.

Relationship	Path Coefficient	P Values	Hypothesis
TO -> Emp	0.489	0.000	Accepted
EL -> Emp	0.249	0.012	Accepted
The Interaction (TO * EL)--> Emp	0.124	0.019	Accepted

Source: Compiled by researchers based on the outputs of Smart PLS4.

Table 6 presents the results of testing the effectiveness of the moderating variable, "Education Level" (EL), in influencing the relationship between "Trade Openness" (TO) and "Employment" (Emp). The direct path coefficient from Trade Openness to Employment (TO -> Emp) is 0.489 with a P value of 0.000, indicating a highly significant positive effect of trade openness on employment, supporting the hypothesis that greater trade openness leads to increased employment opportunities. The path coefficient for the effect of Education Level on Employment (EL -> Emp) is 0.249, with a P value of 0.012, demonstrating a significant positive impact of higher education levels on employment. This suggests that better-educated individuals are more likely to find employment, possibly due to their enhanced skills and adaptability in a globalized market.

The interaction term (TO * EL) -> Emp has a path coefficient of 0.124 and a P value of 0.019, indicating a significant moderating effect of education level on the relationship between trade openness and employment. This positive coefficient suggests that higher levels of education amplify the beneficial impact of trade openness on employment. In essence,

education enhances individuals' ability to take advantage of the employment opportunities created by trade liberalization. The acceptance of all hypotheses confirms that while trade openness directly boosts employment, the presence of higher education levels further strengthens this positive effect, underscoring the crucial role of education in maximizing the economic benefits of trade policies.

Figure 4



Source: Compiled by researchers based on the outputs of Microsoft Excel.

6 DISCUSSION

6.1 INTERPRETATION OF FINDINGS

The study's findings reveal significant insights into the relationship between trade openness, education level, and employment in North African economies. The results demonstrate that trade openness positively impacts employment, as evidenced by the path coefficient of 0.489 and a P value of 0.000, indicating a robust and statistically significant effect. This suggests that increased trade openness, characterized by reduced trade barriers and

greater integration into the global economy, contributes to job creation and higher employment levels. This is particularly important for North African countries, where economic diversification and employment generation are critical for socio-economic development.

Furthermore, the study highlights the crucial role of education in this dynamic. The positive path coefficient of 0.249 (P value = 0.012) for the effect of education level on employment suggests that individuals with higher educational attainment are better positioned to benefit from the job opportunities generated by trade openness. This is likely due to their enhanced skills, which enable them to adapt to the changing economic landscape and access new employment opportunities in more competitive sectors.

The moderating effect of education level on the relationship between trade openness and employment is particularly noteworthy. The interaction term's path coefficient of 0.124 (P value = 0.019) indicates that higher education levels amplify the positive impact of trade openness on employment. This finding implies that education not only directly contributes to employment but also enhances the ability of individuals and economies to capitalize on the benefits of trade liberalization. In essence, education acts as a catalyst that strengthens the employment benefits of trade openness, underscoring the importance of investing in human capital development as a strategy to maximize the gains from global economic integration.

6.2 COMPARISON WITH PRIOR RESEARCH

The study's findings align with and extend previous research on the relationship between trade openness and employment. Prior studies have consistently shown that trade openness tends to reduce unemployment and promote job creation, particularly in regions like East, South, and Southeast Asia (Mudaser & Bhat, 2023; Aria, 2016). This study corroborates these findings by demonstrating a similar positive effect in the context of North African economies. However, the current study goes further by examining the moderating role of education, a factor that has not been extensively explored in previous research.

The observed positive impact of trade openness on employment is consistent with the literature that highlights how greater market access and competition can drive economic growth and job creation (Ananda & Li, 2022). This study's results confirm that North African countries can similarly benefit from increased trade openness, which aligns with findings from other regions but emphasizes the importance of considering region-specific economic contexts and challenges.

The role of education in moderating the effects of trade openness is a relatively novel contribution to the literature. Previous research has indicated that higher education levels are associated with favorable attitudes towards trade openness and better employment outcomes (Mohammad et al., 2018; Li et al., 2022). This study not only supports these findings but also provides empirical evidence that education enhances the employment benefits of trade openness. The finding that education amplifies the positive effects of trade openness on employment underscores the importance of human capital in economic development, aligning with the conclusions of Hainmueller (2006) and Dawood et al. (2013), who highlighted the significant role of education in labor market outcomes.

In summary, the study confirms that trade openness positively influences employment and that higher education levels enhance this effect. These findings contribute to a deeper understanding of the mechanisms through which trade policies can drive employment growth and highlight the importance of education in facilitating the full realization of the benefits of trade liberalization. This research adds to the existing body of knowledge by providing evidence from North African economies and emphasizing the critical role of education in maximizing the positive impacts of trade openness on employment.

7 CONCLUSION

7.1 SUMMARY OF KEY FINDINGS

This study investigated the relationship between trade openness, education level, and employment in North African economies, specifically focusing on how education moderates the effects of trade openness on employment outcomes. The key findings can be summarized as follows:

- positive impact of trade openness: the study found a significant and positive relationship between trade openness and employment, with a path coefficient of 0.489 and a P value of 0.000. This indicates that increased trade openness, characterized by greater integration into global markets and reduced trade barriers, is associated with higher employment levels in North African countries;
- role of education in employment: education level was also found to have a positive impact on employment, with a path coefficient of 0.249 and a P value of 0.012. This

suggests that higher educational attainment enhances employment prospects, likely due to improved skills and greater adaptability to changing economic conditions;

- moderating effect of education: the study demonstrated that education level moderates the impact of trade openness on employment, with a path coefficient of 0.124 and a P value of 0.019 for the interaction term. This finding indicates that higher levels of education amplify the positive effects of trade openness on employment, underscoring the critical role of education in maximizing the employment benefits of trade liberalization.

7.2 IMPORTANCE OF TRADE OPENNESS AND EDUCATION LEVEL IN EMPLOYMENT

The findings of this study highlight the crucial importance of both trade openness and education level in influencing employment outcomes in North African economies.

Trade Openness: Trade openness is a significant driver of employment growth. By opening up markets, fostering competition, and facilitating access to international markets, trade openness creates new job opportunities and stimulates economic growth. For North African countries, which are working to diversify their economies and reduce unemployment, trade openness presents a vital pathway to achieving these goals. It encourages investment, innovation, and the development of competitive industries, which in turn generate employment.

Education Level: The role of education in enhancing employment outcomes is equally critical. Higher education levels equip individuals with the skills and knowledge necessary to compete in a globalized economy. This study underscores that education not only directly improves employment prospects but also strengthens the positive impact of trade openness on employment. Educated individuals are better able to take advantage of the opportunities created by trade liberalization, adapt to new economic realities, and contribute to sectors that benefit from increased trade.

In conclusion, the study provides robust evidence that trade openness and education are key to fostering employment growth in North Africa. Policymakers should focus on promoting trade policies that enhance market access and competitiveness while simultaneously investing in education to equip the workforce with the necessary skills to thrive in a globalized economy. By doing so, North African countries can achieve sustainable economic development and improved employment outcomes, ultimately enhancing the well-being of their populations.

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