CANADIAN JOURNAL OF BUSINESS, ECONOMICS AND HEALTH MANAGEMENT

ORIGINAL ARTICLE

CJBEHM. 2025 December; 8(3): 07-22
Published by www.cjbehm.ca

The Effects of Trade Barriers on Export Diversification For Developing Economies: A Case Study of South Africa, Nigeria, Kenya, And Brazil

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Article info
Received: 08 September 2025
Accepted: 16 November 2025
Published: 31 December 2025

Keywords
export diversification, trade openness, trade barriers

Abstract

This study examines the relationship between trade barriers and export diversification in Brazil, Kenya, Nigeria, and South Africa from 2000 to 2022. Using panel data, the study employs a fixed and random effects model to investigate how tariffs, trade openness, and export share affect export diversification for developing economies. Results show that weighted tariffs increase export-concentration while trade openness promotes diversification. Export as a share of GDP raises concentration, which reflects commodity dependency. The study's findings highlight that trade barriers matter mostly in export-concentrated economies, which highlights the need for targeted policies to promote export diversification and economic resilience.

Introduction

For many developing countries, achieving export diversification remains a pressing priority for policymakers seeking sustainable growth. This concern stems from the vulnerabilities associated with an undiversified export range, which typically consists of a small number of primary commodities. Reliance on a narrow range can lead to excessive short-term volatility in national income due to fluctuations in international commodity prices and unstable global demand (Dennis and Shepherd, 2011). For instance, Levchenko and Di Giovanni (2009) show that trade openness is strongly correlated with sectoral and aggregate volatility. The correlation is five times stronger in developing countries compared to developed ones (Dennis and Shepherd, 2011). Beyond this short-term instability, commodity dependence is frequently associated with lower long-run growth rates and high stagnation at low levels of per capita income (Osakwe et al, 2018). As such, export diversification, which provides a broader base of products and markets, serves as an important mechanism to mitigate these risks and propel economic development. However, the imposition of tariffs and other trade barriers can hinder this process by restricting market access and limiting the ability of developing countries to expand into new sectors and destinations. The concept of trade barriers extends far beyond simple tariffs but also includes non-tariff barriers. While multilateral negotiations under the General Agreement on Tariffs and Trade (GATT) have successfully lowered tariff levels, non-tariff barriers have increasingly become the instrument of choice for protection (Lee & Swagel, 2015). This category of murky protectionism includes a wide range of policies. For instance, countries frequently employ temporary trade barriers such as antidumping and countervailing duties, which while potentially consistent with the world Trade Organization (WTO) rules, can act as flexible tools to shield domestic industries. The structures of these barriers are often driven by political and economic factors, with governments tending to protect industries that are in decline or politically important. This defensive protectionism directly impacts a country's diversification prospects by raising the costs for firms to enter new export markets, thereby hindering the introduction of new products (Martincus and Gomez, 2011).

On the contrary, some economists view this type of protection as strategic protectionism, rather than being purely defensive, which can be a tool to actively nurture 'infant industries' and cultivate new areas of comparative advantage, thereby contributing to export diversification (Siddiqui, 2018). Export diversification facilitates a structural transformation of economies by enabling a shift from primary exports to manufactured goods and higher-value-added products, which typically offer a significant incentive for productivity growth and technological advancement (Osakwe et al., 2018). This structural transformation is a great economic boost as it can create jobs, increase revenue, and ultimately improve the overall well-being of the population. Many studies over the years have not closely examined the positive association between export diversity and economic growth in identifying it as a crucial growth determinant for poorer countries (Mora and Olabisi, 2023).

Despite these recognised rewards, many developing countries, particularly those in Sub-Saharan Africa and the Least Developed Countries, have struggled to achieve a significant amount of export diversification (Osakwe et al, 2018). This struggle still arises even with increasing trade openness and liberalisation efforts. This persistent challenge suggests that liberalization alone is insufficient to unlock the potential benefits of global markets. One possible explanation is that trade barriers, both tariff and non-tariff, may constrain the ability of these economies to expand into new export sectors or upgrade the value chain. Studying the impact of trade barriers on export diversification is therefore necessary to identify whether such barriers undermine the effectiveness of liberalization policies, and to provide evidence on how policy reforms could foster more inclusive and sustainable patterns of trade. By uncovering the extent to which trade barriers hinder diversification, the study can inform targeted interventions that not only improve market access but also enhance competitiveness, industrial upgrading, and long-term economic transformation. This study argues that trade barriers significantly impede export diversification in developing countries, because as trade barriers increase, export diversification decreases, which undermines the effectiveness of trade openness and liberalization in promoting structural transformation and long-term economic growth. While previous studies Djankov et al. (2010), Harrigan (1993), and Kehoe and Ruhl (2004), have focused on the effects of trade liberalisation on existing trade flows or on specific regional agreements like NAFTA, there remains a gap in the literature to comprehensively understand how trade barriers affect export diversification. To address this gap, this study investigates the relationship between trade barriers and export diversification in South Africa, Nigeria, Kenya, and Brazil between 2000 and 2022. The selection of South Africa, Nigeria, Kenya, and Brazil is justified because they represent large developing economies with differing export structures offering a comparative lens on how trade barriers shape diversification across resource-dependent and emerging markets. The remainder of this study is structured as follows:

Section 2 reviews the theoretical and empirical literature on export diversification and trade barriers.

Section 3 describes the data and methodology.

Section 4 presents and discusses the results, and

Section 5 concludes with policy implications and directions for future research.

LITERATURE REVIEW

Theoretical literature review

International trade literature offers several theories to explain patterns of specialisation and trade among countries. The two most crucial theories are the Comparative

Advantage theory by David Ricardo and Heckscher-Ohlin (HO) theories, both of which provide distinct perspectives on comparative advantage (Morrow, 2010). The Comparative Advantage theory states that countries specialise in goods where they possess the largest relative advantage in Total Factor Productivity (TFP) (Morrow, 2010). This theory was popularised by David Ricardo in 1817 in his work on the principles of political economy and taxation, which suggests that even if one country is more efficient in producing all goods, both countries can benefit from trade by specialising in what they can produce more efficiently (Murdock, 2020). Ricardo's classic example involved England and Portugal, with England specialising in cloth and Portugal in wine, even if Portugal could produce both more cheaply in terms of labour (Murdock ,2020). However, the application of Ricardo's theory, particularly in today's global economy, comes with significant challenges. The theory itself assumed certain conditions for mutual benefit, which are capital loyalty to the country of origin and adjustments in currency value to resolve trade imbalances (Murdock, 2020). Recent critiques highlight that these assumptions do not hold. Firstly, capital is not loyal to its country of origin but rather flows globally in search of higher returns. This mobility often leads to labour arbitrage, where jobs are moved from importing countries to exporting countries, resulting in significant job losses in the former (Murdock, 2020). In the beginning, the theory's original example also did not account for dual-use technologies with both industrial and military implications, which carry significant implications when transferred across borders (Murdock, 2020). For instance, nations tend to protect industries that are in decline, politically important, or threatened by import competition while providing less protection to industries where exports are important, perhaps out of fear of foreign retaliation (Lee and Swagel, 2020). The Ricardian model is a static theory, which assumes constant returns to scale and no possibility of technological changes affecting factors of production (Ukwandu, 2015). It overlooks the dynamic gains from trade, which are crucial for industrialisation and long-term development. Critics contest that using this model without considering dynamic aspects of political realities can lead to uneven development and unequal exchange, where surplus is transferred from less developed countries (periphery) to more developed countries (core) (Siddiqui, 2018). An example would be the imposition of free trade on Portugal that negatively affected its textile industry while benefiting England's industrial revolution (Siddiqui,2018). Due to these concerns and criticisms, furthermore, models were established, such as the Heckscher-Ohlin Model (HO). In comparison to the Ricardian model, the Heckscher-Ohlin model explains comparative advantage based on differences in factor abundance across countries and factor intensity of goods (Morrow, 2010). It assumes all countries possess the same production function in each industry, which largely ignores the differences in total factor productivity across industries (Morrow, 2010). The main assumption of the HO theory is that countries will produce more of the goods that use their abundant factors, such as capital, skilled labour, relatively intensively. While this principle of factor-based specialisation helps explain concentration of production, understanding export diversification requires turning to theories that explicitly model the role of productivity differences and the impact of trade costs on creating new export linkages at the intensive or extensive margin (Mora and Olabisi, 2023).

Extensive vs Intensive Margin

When analysing export diversification, particularly from a development policy perspective, it is crucial to distinguish between changes that occur in the extensive margin and those at the intensive margin. This distinction provides a theoretical

framework for understanding how trade barriers can either hinder or promote the structural transformation of an economy. The extensive margin of export diversification refers to the introduction of new products into a country's export portfolio or entry into new destination markets (Dennis and Shepherd, 2011). This is widely considered to be the core of export diversification, as it reflects a fundamental shift in a country's production and export composition, such as moving from primary commodities to manufactured goods. Policies that facilitate growth at the extensive margin help broaden a country's economic base, which makes it more resilient to sector-specific shocks (Dennis and Shepherd, 2011). In contrast, the intensive margin to export diversification refers to the relative changes in the value of existing trade flows. This means a country is exporting a larger volume of a product it already sells. While the importance of export growth is recognized, it does not in itself represent a structural diversification into new areas of production. The intensive margin captures the magnitude of trade in existing products or destinations, focusing on changes in the value of products already traded (Dennis and Shepherd, 2011). Many have argued that increasing export values for existing trade linkages can help balance out the export portfolio (Mora and Olabisi, 2023). If a country can achieve higher export values for existing linkages, this effectively leads to lower values for concentration measures such as the Herfindahl-Hirschman Index (HHI) or Theil index. However, from a developmental policy perspective, achieving structural transformation often requires growth at the extensive margin, as shifting away from primary commodities towards manufactured goods involves diversifying into new products (Dennis and Shepherd, 2011). While both the intensive and extensive margins provide insights into export diversification, the extensive margin is more relevant for this study. The intensive margin captures growth in existing products and markets, but evidence suggests that this type of expansion often reinforces dependence on a small number of commodities. By contrast, the extensive margin measures the addition of new products and new trading partners, which reflects structural transformation. As Cadot, Carrere, and Strauss Kahn (2011) note, long-term resilience in developing economies depends less on scaling up existing exports and more on creating new export lines and destinations. Therefore, the extensive margin offers a more accurate lens for assessing how trade barriers either facilitate or hinder meaningful export diversification.

Horizontal vs Vertical Export Diversification

Export diversification can also be understood through two dimensions: horizontal and vertical diversification. These theories describe different ways countries can diversify their export base, moving away from a concentration of a few products (Osakwe et al., 2018). Horizontal diversification refers to the process of expanding the range of products a country exports, often within the same broad category or stage of production (Alemu, 2008). This can be achieved in several ways. Firstly, countries can introduce new products. A country can introduce a new, often non-traditional commodity into its export portfolio (Alemu, 2008). An example of this would be a country traditionally exporting coffee might start exporting cut flowers, as seen in Kenya, Ethiopia, and Uganda (Alemu, 2008). A country can also make market-driven adjustments. Countries may add new commodities or adjust export shares in response to world prices, market niches, or to stabilise export earnings by offsetting price fluctuations in one product with stability in another (Alemu, 2008). The core of this theory is increasing the number of different products exported, which is often referred to in trade literature as expanding the extensive margin. Vertical diversification, in contrast, involves moving up the value chain by processing raw materials and primary commodities into higher value-added products before they are exported. This represents a change in a country's export structure and is closely linked to

industrialisation. Instead of exporting raw materials, a country begins to process them domestically. For example, a country might move from exporting raw cocoa beans to producing and exporting processed chocolate (Ukwandu, 2018). The process also involves shifting resources from less productive sectors (primary commodities) to more productive ones (manufactured goods). This shift is regarded as a normal pattern of structural change in the growth of developing countries. Finally, vertical diversification can stimulate the creation and expansion of other industries through forward and backward linkages, leading to greater dynamic externalities and knowledge spillovers from new production techniques and management practices (Alemu, 2008). Vertical diversification is considered to require more advanced technology and capital investment in comparison to horizontal diversification. However, the experience of East Asian economies, which successfully transformed from exporters of primary goods to manufactured products, exemplifies successful vertical diversification. Building on the distinction between horizontal and vertical diversification, it is equally important to consider the external factors that shape these patterns. Among the most influential are trade barriers, which directly affect the ability of countries to expand and diversify their exports.

Trade Barriers and Their Impact on Export Diversification

Trade barriers consist of a range of policies that restrict international trade, and their impact on export diversification, particularly for developing countries, is a critical area of study. Over the years, tariff levels have generally fallen due to international agreements like GATT/WTO, and non-tariff barriers have become increasingly important for choice of protection. Tariffs are the most recognized trade barrier. They can be defined as direct taxes imposed on imported goods (Lee and Swagel, 1995). While tariffs have historically been significant, they have generally decreased, especially in developed countries (Lee and Swagel, 2025). Developing countries, however, still exhibit higher tariff levels, which often reflect their importance as a source of government revenue. Non-Tariff Barriers (NTBs) include a broad category that includes a variety of measures other than tariffs that restrict trade. Examples include import restrictions, quotas, product standards, customs procedures, and domestic regulations. NTBs are estimated on a tariff equivalent basis and capture all additional costs beyond tariffs in a bilateral trade. Temporary Trade Barriers are a specific type of trade barrier that includes antidumping, countervailing duties, and safeguards. They are often implemented as measures in response to petitions from domestic industries claiming injury from import competition. Their usage has shown an upward trend, particularly in South-South trade, where developing economies impose barriers on imports from other developing economies, including China. These different kinds of trade barriers have significant implications for export diversification.
Over the years, there has been a theoretical consensus that suggests that trade costs are negatively associated with the range of products a country exports. While theoretical literature highlights the mechanisms through which trade barriers and diversification interact, the following section turns to empirical studies that test these relationships using real-world data.

Empirical literature review

Studies on Tariffs and Trade Barriers

Several empirical studies directly examine how tariffs and trade barriers affect export diversification. Volpe & Gomez (2010) particularly focused on the case study of Colombia's exports to the United States of America to assess whether improved market access through lower tariffs affected export diversification. The authors found that

indeed lower tariffs led to greater export diversification. The study, of fundamental importance, used annual, highly disaggregated bilateral import data and tariff data for the United States from the United States International Trade Commission for the period of 1989-2005. The study made use of dynamic panel data models to account for the fact that export decisions depend on past activity and to control for unobserved heterogeneity. The study employed dynamic random effects Poisson models to analyse the number of products exported and a dynamic random effects Probit model to analyse the probability of exporting a particular product. Dennis and Shepherd (2011) also confirm that reducing transaction costs, including tariff-related costs, increases export diversification.

Studies on Export Diversification Indices

Other studies have focused on the measurement of diversification itself. Osakwe, Santos, and Dogan (2018) use the Herfindahl-Hirschman Index to measure export diversification. The study employed HHI as part of its non-parametric analysis to investigate the relationship between trade policy and diversification of exports in developing economies. The authors used the HHI to show the distributional effects of export concentration. They noted that the index takes values between 0 and 1, with values closer to 1 indicating more concentration. A density plot indicated that countries with lower income per capita showed signs of high concentration. Even though the HHI was used for the preliminary analysis, the authors noted that the Theil index of export diversification displayed a pattern of normal distribution and therefore used it as their main parametric analysis. However, for this research, HHI will be used as the main parameter for analysis, as it will be the dependent variable for the study.

Country and Regional Evidence

At the regional level, Osakwe et al. (2018) show that African countries remain highly concentrated despite trade liberalisation, suggesting persistent structural barriers. Agosin, Alvarez, and Ortega (2012) examine 1962-2000 data across countries and find that macroeconomic and institutional conditions shape diversification outcomes. Not all evidence, however, aligns with the liberalisation-diversification hypothesis. Lee and Swagel (1995) caution that tariffs may both protect weak industries and create inefficiencies, making causality difficult to establish. More recent studies also find that tariff protection can increase concentration, supporting political economy perspectives where tariffs are seen as tools for strategic industrial policy rather than pure barriers. Overall, empirical literature suggests that lowering tariffs and reducing trade costs generally promotes diversification, though exceptions do exist. However, most studies examine single countries or a global sample. Very few studies compare multiple developing countries across different regions, and fewer still combine measures of trade barriers such as tariffs, openness, number of export partners, and product counts with panel econometric methods. This study contributes by filling that gap through a comparative analysis of South Africa, Nigeria, Kenya, and Brazil between 2000 and 2022.

RESEARCH METHODOLOGY

This study adopts a positivist research paradigm by employing a quantitative panel data approach to examine the determinants of export concentration for four major developing economies: Brazil, Kenya, Nigeria, and South Africa. These countries represent distinct regional and economic profiles, offering a diverse perspective on the relationship between trade barriers and export diversification. South Africa is considered to be one of the most industrialized and diversified economies in Sub-

Saharan Africa, with a mix of primary exports such as minerals and a manufacturing base. Nigeria, also in Sub-Saharan Africa, is heavily dependent on oil exports, offering a difference in terms of export concentration. Kenya is an East African economy that relies heavily on agricultural products and services, which provides a different insight into trade diversification and agricultural economics. Brazil, on the other hand, is a leading South American economy that presents an example of a large emerging market with diversification in agriculture, mining, and manufactured exports. Through this selection of countries, the study captures a range of economies with different levels of trade integration, export diversification, and structural dependencies, allowing for descriptive insights into factors driving export diversification in developing economies. The panel dataset covers the period from 2000 to 2022, with observations structured by country and year. Data for the analysis will be compiled from COMTRADE and UNCTAD. The study covers this period to capture over two decades of trade policy reforms and globalization dynamics, while ensuring sufficient recent data to reflect contemporary trends in export diversification. Descriptive insights and regression-based evidence will be provided, ensuring that the findings are robust and directly connected to the research objectives.

Variables

Our main dependent variable (y) will be the Herfindahl-Hirschman Index. This index measures concentration and will be the guiding variable for this study. For this study, 7 explanatory variables will be used to determine the link between diversification and trade barriers.

1. Tariff Lines: These are a direct measure of trade barriers and are important for understanding how protectionist policies affect export diversification. Usually, higher tariffs are associated with high costs, therefore reducing entry into new markets.
2. Weighted Tariffs- This captures the effective protection on goods that matter the most to trade. This variable is more reflective of actual trade costs, making it key in understanding export concentration.
3. Export share of GDP: A higher export share of GDP indicates greater reliance on external markets, which can lead to greater concentration if exports are dominated by a few sectors. This helps us understand how export dependency affects diversification.
4. Trade/GDP ratio: This measures trade openness and is important for understanding how integration into global markets promotes diversification. More open economies tend to experience a wider range of exports and lower concentration.
5. Number of products exported: This variable captures the breadth of exports, which is a key indicator for diversification. More products exported can reduce reliance on a small basket of goods.
6. Export Partners: The number of trading partners provides insights into the market diversification of a country. More diverse markets reduce the risk of over-dependence on a single trading partner or region, supporting larger export growth.

WTO Membership: This was initially included as a control variable to capture the effects of multilateral commitments to trade openness. However, because all countries have been WTO members throughout the study period, there was no within-country variation, making it unsuitable for fixed effects estimates. It was therefore excluded from the final models.

Model Specifications

To investigate the effects of trade barriers on export diversification, this research estimates two distinct model specifications. The dependent variable in both models is export concentration, measured using the Herfindahl-Hirschman Index (HHI).

The first model specification tests the relationship between export concentration and a set of core trade policy and structural variables. The model is specified as follows.

E.g.1, $HHI_{it} = \beta_0 + \beta_1 WTariff_{it} + \beta_2 EXPGDP_{it} + \beta_3 PRODNUM_{it} + U_{it}$

HHI_{it}: is the export concentration index for country I at time T.

$WTariff_{it}$: is the import-weighted average tariff rate, serving as the primary measure of tariff protection

$EXPGDP_{it}$: is the share of exports in Gross Domestic Product, representing the economy's reliance on export markets.

$ProdNum_{it}$: is the total number of distinct products exported.

The second model specification explores alternative measures of trade policy and openness to test the robustness of the primary findings. This model is specified as

E.g.2, $HHI_{it} = \beta_0 + \beta_1 TARIFFL_{it} + \beta_2 TRGDP_{it} + \beta_3 PARTNERS_{it} + U_{it}$

Tariff $lines_{it}$: is the nominal count of tariff lines, representing the breadth of tariff application.

Trade GDP $ratio_{it}$: also known as a standard measure of trade openness. (imports+exports/GDP).

$Partners_{it}$: is the number of distinct export partner countries.

This dual approach allows for a comprehensive analysis, assessing both the economic weight of tariff protection (model 1) and the nominal scope of trade barriers and general openness (Model 2). The inclusion of variable such as export share and product numbers is designed to control for structural characteristics of the economies and to test specific hypotheses related to commodity dependence.

Econometrics Estimation Technique

The models are estimated using a panel fixed effects regression. This approach was chosen to control for unobserved, time-invariant country-specific characteristics that could influence export concentration and be correlated with explanatory variables (Dennis and Shepherd, 2011). As the literature suggests, failing to account for omitted variables leads to significant bias in estimation. The inclusion of country fixed effects accounts for stable, nation-specific differences in factors such as geography, deep-seated institutional history, or overall trade regimes that are difficult to measure directly but are constant over the period of study. While this study does not use a full simultaneous-equations framework as seen in some of the literature on trade barrier determination, the use of a fixed effects model is a well-established and plausible method for mitigating endogeneity bias arising from time-invariant unobservable in panel data analysis. This methodology allows for a direct test of the primary research hypothesis while accounting for the significant heterogeneity present in the four-country sample. In summary, this study employs a quantitative approach to determine the relationship between trade barriers and export diversification. This methodological framework provides a solid base of understanding of how trade policies shape export diversification in developing economies.

DISCUSSION OF RESULTS

Having outlined the research design, data sources, data variables, and the estimation techniques, the next section of this study presents the empirical findings. The results of the fixed and random effects are reported and interpreted to assess the relationship between trade barriers and export diversification.

Table 1 shows the descriptive statistics for all the variables used in this study. It shows

the characteristics of the explanatory and dependent variables by producing their statistical mean, standard deviation, minimum value, and maximum value.

Table 1: Descriptive statistics

Variable	Observation	Mean	SD	Min	Max
HHI	92	0.085385	0.049918	0.04	0.24c
Tariff Lines	92	0	3.530086	0	18.76
Weighted Tariff	92	8.59	3.856987	3.87	21.47
Export Share GDP	92	21.59	7.227103	8.12	36.02
Trade GDP	92	43.21	14.02345	16.35	65.97
Export Partners	92	198	48.12336	50	318
NUMP	92	4.268	226.4844	203	4.449

The descriptive statistics in Table 1 show that the average Herfindahl-Hirschman Index (HHI) is 0.085, ranging between 0.04 and 0.24, suggesting moderate but varied levels of export concentration across the sample. Weighted tariffs average 8.59%, with a maximum of 21.47%, reflecting substantial differences in effective protection. Export share of GDP averages 21.6%, with values between 8.1% and 36.0%, highlighting varying export dependence. Trade/GDP ratio averages 43.2%, while the average number of export partners and products are 198 and 226, respectively. This variation across countries and years provides a strong base for panel estimation.

Table 2: Correlation Matrix

Variable	**EXPORT_SHARE_GDP**	**EXPORT_PARTENERS**	**HHI_EXPORT**	**NUM_OF_PRODUCTS_EXPO**	**TARIFF_LINES**	**TRADE_GDP_RATIO**	**WEIGHTED_TARIFF**
EXPORT_SHARE_GDP	1.000						
EXPORT_PARTENERS	-0.027	1.000					
HHI_EXPORT	0.377	-0.427	1.000				
NUM_OF_PRODUCTS_EXPO	-0.007	-0.471	0.500	1.000			
TARIFF_LINES	0.238	0.125	-0.230	-0.194	1.000		
TRADE_GDP_RATIO	0.891	0.047	0.114	-0.184	0.291	1.000	
WEIGHTED_TARIFF	-0.114	-0.632	0.492	0.352	-0.154	-0.157	1.000

Source: Prepared by the Author based on the Eviews 14.0 program

Table 2 shows a correlation matrix that reveals several important relationships. A correlation matrix is a table showing the strengths and direction of linear relationships between multiple variables, with correlation coefficients ranging from -1 to +1. Based on the results from the correlation table, HHI is positively correlated with export share of GDP (0.38) and weighted tariffs (0.49), confirming that greater export dependence and higher tariffs are linked with increased concentration. In contrast, HHI is negatively correlated with export partners (-0.43) and the number of products (-0.50), indicating that broader bases are associated with lower concentration. Trade/GDP ratio is strongly correlated with export share of GDP (0.89), which suggests possible multicollinearity concerns. Weighted tariffs are strongly negatively correlated with export partners (-0.63), implying that more open markets are associated with lower protection.

Panel Data results and discussion

To determine the relationship between the dependent variable and explanatory variable, two regressions were run.
H0: The Random effects model is preferred (random effects are consistent)
H1: The Fixed effects model is preferred (random effects are inconsistent)

Table 3: Model 1a: Explanatory Variables: (WTariff, ExpGDP, ProdNum)

Estimator	Fixed effects model		Random effects model	
	Coefficient	Prob-Value	Coefficient	Prob-Value
WTariff	0.003512	0.0029	0.005335	0.0000
ExpGDP	0.004868	0.0000	0.002895	0.0000
ProdNum	0.0000460	0.0177	0.0000788	0.0000
R^2	0.730511			
R^2 **(Adjusted)**	0.711488			
Prob (F stat)				0.0000
Hausman Test (p-value)				0.0000
Total obs	93			

Source: Prepared by the Author based on the Eviews 14.0 program

Table 3 shows the results of a fixed effects model and a random effects model using Weighted Tariffs, Export Share of GDP, and Number of Products exported as the explanatory variables. In the fixed effects model, weighted tariffs and export share of GDP are statistically significant at 1% level as the prob p-values for their coefficients are less than 0.01 at 1% level. This suggests that both tariff protection and reliance on exports increase concentration. At 5% level, the number of products exported would also be significant and positive (0.000046<0.05), highlighting a commodity trap effect where product counts rise but concentration remains. The model explains a high share of variation with an R^2 of 0.73.

In the random effects model, the signs remain consistent, with slightly larger coefficients for weighted tariffs and product numbers. The Hausman test prob value of 0.0000 strongly favours the fixed effects estimator, suggesting that country-specific

factors are correlated with the regressors. At a one percent level, this means that the Hausman test for both models is statistically significant since the p-value is less than 1%. Therefore, we reject the null hypothesis and conclude at 1% and 5% levels that the fixed effects model is suitable. This method is also consistent with Lee and Swagel (1997), who explicitly use countries' effects to account for differences in the overall trade regime, which are specific to nations. Their analysis of variance also revealed that country-specific effects explain a large part of the structure of non-tariff barriers, underscoring the importance of this modelling choice. Similarly, Morrow (2010) uses country-time fixed effects to absorb country-level factors that are constant across industries.

Table 4: Model 1b Dependent variable: Explanatory Variables (Tariff, Trade GDP, PartN)

Explanatory variables

H0: The Random effects model is preferred (random effects are consistent)
H1: The Fixed effects model is preferred (random effects are inconsistent)

Table 4 below makes use of different explanatory variables in comparison to Table 3, which now makes use of Tariff Lines, Trade GDP ratio, and Number of Export Partners. In the fixed effects model trade GDP ratio is the only positive and significant coefficient, which suggests that openness increases concentration in this sample. Tariff lines and the number of partners are not significant at 1% level.

In the random effects model, all three variables are significant at 1% level: tariff lines (0.0034, $p<0.01$) and partners (0.00042, $p<0.01$) are positive, alongside the Trade GDP ratio. The Hausman test again p=0.0000 indicates that the fixed effects are preferable. Therefore, at 1% level, we reject the null hypothesis and conclude that the fixed effects model is preferred because the p-value of the Hausman test is less than 0.01 at 1% level; however, the lack of robustness in significance suggests weaker explanatory power than in Model 1.

Estimator	Fixed effects model		Random effects model	
	Coefficient	Prob-Value	Coefficient	Prob-Value
TariffL	0.000195	0.8523	0.003372	0.0006
TradeGDP	0.003014	0.0000	0.000708	0.0030
PartN	-0.000149	0.1862	0.000421	0.0000
R^2	0.659719			
R^2 **(Adjusted)**	0.635699			
Prob (F stat)				0.000000
Hausman Test (p-value)				0.0000
Total obs	93			

Source: Prepared by the Author based on the Eviews 14.0 program

These results directly align with findings of Osakwe et.al (2018) for Sub-Saharan African (SSA) countries. They found that while trade is associated with diversification in the short term, higher trade intensity leads to concentration in the long term for SSA

countries (Osakwe et.al, 2018). These results support this long-term view, suggesting that as economies become more integrated into global trade by volume, they may deepen their specialisation in existing sectors rather than branching into new ones. This happens if trade is dominated by a few primary commodities, where increased exports mean selling more of the same products (Osakwe et al, 2018).

Key Findings

The analysis reveals that trade barriers and export dependence significantly increase export concentration across the four countries under study. Weighted tariffs are consistently statistically significant and positive, confirming their role as the most reliable determinant of higher export concentration. The export share of GDP increases concentration, reflecting the commodity dependence of the economies that were used. The number of products exported shows a counterintuitive positive effect, which suggests that simple product expansion does not guarantee diversification. Tariff lines, export partners, and trade openness show weaker or inconsistent effects, depending on the model specification. The Hausman test consistently supports the fixed effects over the random effects, underlining the importance of controlling for country-specific characteristics. Overall, the results show robust evidence that trade barriers, particularly effective tariffs, significantly reduce export diversification, while greater export dependence reinforces concentration. The results are strongest and most consistent for Model 1 variable (WTariff, ExpGDP, ProdNum), while the model provides weaker evidence. These findings do not align with expectations from theory and the literature, but they establish a strong basis for the discussion of policy implications in the next section.

SUMMARY AND CONCLUSIONS

This study has empirically investigated the determinants of export concentration for a panel of developing economies. Using the fixed effects model, which was favoured by the Hausman test, the research yielded several key findings. The most robust results were that higher weighted tariffs are positively and significantly associated with greater export concentration. Similarly, a higher export share of GDP and, counter-intuitively, a higher number of exported products are also linked to increased concentration. In contrast, measures such as trade openness, the number of tariff lines, and the number of export partners demonstrated weaker and less consistent effects. Finally, an unexpected result emerged: a larger number of exported products is linked with higher concentration, suggesting that horizontal diversification without value chain upgrading may trap economies in low-value activities. This section discusses these findings in the context of existing literature, acknowledges the study's limitations, and outlines the resulting policy implications and avenues for future research. The core finding that tariff protection increases export concentration presents a nuanced challenge to conventional trade theory. These results contradict empirical studies by Osakwe et al. (2018) and Volpe Martincus and Gomez (2010), which find that trade liberalisation in the form of lower tariffs promotes export diversification. Findings from this study strongly support the political-economy perspective on trade policy, where tariffs are viewed not merely as barriers but as strategic instruments of industrial policy (Lee and Swagel, 2011). Instead of targeting full trade liberalization, developing countries can strategically enhance trade in various industries, which could lead to low concentration.

The consistent preference for the fixed effects estimator, as indicated by the Hausman test, is a key methodological strength of this study. This method aligns with the best

practices in the empirical trade literature for mitigating omitted variable bias and controlling for unobserved, time-invariant country-specific heterogeneity (Morrow, 2010). Morrow (2010) and Hayakawa and Kimura (2014) both emphasize the importance of using fixed effects to isolate the impact of trade policy from confounding country-specific factors (Morrow, 2010). This robust methodology lends credibility to the findings. This study did come with limitations. They were omitted variables while using the fixed effect model. While fixed effects control for time-invariant factors, the model does not explicitly account for time-varying structural determinants. Literature consistently points to the crucial role of human capital, infrastructure, institutional quality, and foreign direct investment as foundational elements for enabling diversification. The effects of trade policy are likely conditioned by these domestic factors. The analysis also established strong correlations, but causality remains an interpretative challenge. As Lee and Swagel (1995) caution, the relationship between trade barriers and industry conditions can be simultaneous; for instance, protection may cause an industry to be lazy and inefficient rather than weak industries receiving protection. While the use of panel data does mitigate this to some extent, more advanced techniques would be needed to establish a definitive causal direction.

Policy implications

The findings of this study offer important policy implications for developing countries aiming to diversify their export base:

1. A different view of tariffs: Policy makers should move beyond a simplistic view of tariffs as uniformly negative. The results suggest that targeted tariff protection can be a valid component of industrial policy aimed at nurturing high-potential industries. This, however, does not advocate for widespread protectionism but for a selective infant industry approach, a strategy used by almost all developed countries.
2. Focus on Structural Transformation, not just product counts: The commodity trap finding implies that policies should aim for vertical diversification (moving up the value chain) rather than just horizontal diversification (adding more products). This would involve fostering backward and forward linkages from primary sectors into processing and manufacturing, which requires a supportive ecosystem of skills, infrastructure, and investment.

Conclusion

This study contributes to the debate on the effects of trade barriers by providing empirical evidence that challenges the orthodox view of trade liberalisation. The finding that tariff protection is associated with higher export concentration supports a political economy interpretation of tariffs as a tool for industrial policy. The research cautions that greater trade openness, in the absence of strategic domestic policies, may paradoxically reinforce the very export concentration that developing countries seek to escape. In summary, the path to export diversification is not merely a matter of reducing tariffs and embracing openness. It requires both intelligent engagement with the global trading system and a robust commitment to building domestic productive capacities. Trade policy cannot be designed in a vacuum. It must be embedded within a comprehensive national development strategy that prioritises structural transformation and the creation of higher-value economic activities. Future research could build on these findings by disaggregating tariffs to examine the differential impacts of protection on intermediate versus final goods, and by employing more advanced econometric methods to further examine the causal relationship between trade policy and export structure.

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