**India-Africa Trade Diversification: Analyzing the Shift from Traditional to Non-Traditional Partners (2013-2017)**

**Abstract**

This study investigates the shifting trade dynamics between India and Africa from 2013 to 2017, with a specific focus on the impact of traditional versus non-traditional trade partners on trade diversification. India, which has long maintained robust trade relationships with South Africa, its traditional partner, has increasingly sought to expand its trade with non-traditional African countries such as Angola, Gabon, Madagascar, and Malawi. Also, it is worthwhile to look at her trade with certain economies who have not been major partners where trade is concerned. Furthermore, the recent shifts towards these non-traditional partners have become central to its trade strategy. Using advanced econometric techniques, including Fixed Effects (FE) and Difference-in-Differences (DiD) models, the study evaluates the changing patterns of India's exports and imports over this period, while accounting for time-related factors and partner type. The findings reveal a notable decline in exports to South Africa post-2015, suggesting a shift in India’s export strategies, while imports from South Africa have remained relatively stable, indicating continued reliance on key commodities from this partner. In contrast, trade with non-traditional partners has not shown substantial growth, highlighting the challenges faced by India in diversifying its trade relationships beyond established markets. Despite the limited expansion with these non-traditional partners, the study underscores the importance of diversifying trade as part of India’s broader economic strategy in Africa. By examining the implications of these trends, the paper contributes valuable insights for policymakers aiming to foster stronger and more diversified India-Africa trade relations through targeted policies, capacity-building efforts, and regional economic integration.

Keywords: Trade Relations, Trade Diversification, Traditional and Non-Traditional Partners, Trade Shift.

1. Introduction

International trade plays a central role in shaping the economic landscape of nations. It plays a crucial role in the global economy by facilitating access to resources, technologies, and products that may not be available within a particular country. The importance of international trade has grown exponentially in recent decades due to globalization, technological advancements, and the reduction of trade barriers such as tariffs and quotas. International trade fosters economic growth, improves the standard of living, and increases interdependence among nations.

India's trade with Africa has seen significant growth over the past few decades, emerging as a key component of India's foreign economic relations. Africa, with its rich natural resources, rapidly growing economies, and large consumer markets, presents ample opportunities for India to strengthen its economic ties. India’s trade with Africa is mutually beneficial, with significant potential for further growth. It is increasingly becoming a focal point of India's broader strategy to enhance its global trade footprint and strengthen South-South cooperation. As countries seek to enhance their global economic standing, trade diversification has emerged as a critical strategy. Trade diversification refers to the practice of expanding trade relationships to include a wider array of partners, reducing the risks associated with relying on a single or a few trading nations. The concept of trade diversification has been widely explored in the literature, with scholars emphasizing its importance for reducing economic dependency on a limited set of trade partners (Hummels, 2001; Nixson & Walters, 2007). The diversification strategy not only minimizes economic risks but also positions countries to capitalize on emerging markets (Sachs & Warner, 2001). The shift towards non-traditional partners, particularly within Africa, highlights a growing recognition of new opportunities outside traditional trading zones (Sahu, 2017). This is particularly significant in the context of India, which, over the last few decades, has sought to diversify its trade portfolio, particularly with Africa. Economic diplomacy and trade agreements have been central to expanding India-Africa trade relations (Sridharan & Sushil, 2018).

Traditionally, India’s trade relations have been centred on Western nations and developed economies like the United States and the European Union (EU) (Chandra & Singh, 2017; Bharadwaj & Wadhwa, 2019). However, it is important to compare India’s trade with its non- traditional partners of Africa as it is worthwhile to look at her trade with certain economies who have not been major partners where trade is concerned. A **non-traditional partner country** refers to a nation with which a country has not historically had significant trade relations or economic ties, but with whom trade relations are growing or being newly established. India’s trade with Africa between 2013 and 2017 has exhibited significant patterns of change. Exports to traditional partners have declined, especially in the post-2015 period; whereas imports from these partners have remained relatively stable (Gupta & Sharma, 2015). On the other hand, India’s trade with the non-traditional African partners has been growing, albeit at a slower pace compared to trade with the traditional partner country (Sankaran, 2016). Ghani et al. (2012) argue that countries often seek to diversify their trade relationships as a strategy to enhance economic resilience by accessing a broader range of markets, which is becoming increasingly relevant for emerging economies like India (Kumar & Das, 2020).

The main purpose of the paper is to examine the changes in trade dynamics between India and Africa, concentrating on the effect of partner type (traditional vs. non-traditional) on trade volumes (exports and imports) from 2013 to 2017. The selected traditional partner country of India is South Africa, while the non-traditional trading partners include Angola, Gabon, Madagascar and Malawi. Specifically, this paper focuses on how India’s trade with Africa has evolved over time and how partner type plays a role in these shifts. The primary research questions are: (i) what is the impact of partner type on India’s export and import patterns with the selected countries of Africa? (ii) How have time-related factors (such as changing global economic conditions) influenced trade dynamics with these partners?

Furthermore, this study aims to offer a nuanced understanding of the trade dynamics between India and the selected countries of Africa. By investigating the impact of partner type and time on trade values, the study will provide useful insights for policymakers in both India and African nations to formulate trade strategies that address regional imbalances and foster stronger economic ties. Understanding the effects of partner diversification will also assist in assessing the potential for future growth in India-Africa trade relations (Sanghvi & Shukla, 2014).The FE panel data model which is chosen due to its ability to control for unobserved country-specific characteristics that do not vary over time may influence trade outcomes. The FE model is particularly suitable for this study because it accounts for country-specific factors that could potentially bias the results in a Random Effects (RE) model (Achen, 2005; Wooldridge, 2010). By using FE model, this study isolates the within-country variation over time, providing a clearer understanding of how time and partner type affect trade volume.

In this paper, the first section starts with the brief profile of India and the selected African countries. In this section, the various key economic indicators of India and the selected African countries are discussed. A comparative analysis of merchandise trade as a percentage of GDP and the trade performance of India with its traditional and non-traditional partner countries of Africa from 2013 to 2017 is also discussed. The second section will cover the review of literature. Then, the next section will cover research gap of the study. The fourth section of this paper discusses the research methodology and the data collection sources. The selected econometric models used in the study are discussed in this section. The fifth section of this paper analyses and discusses the results. The sixth section of the paper studies the limitations of the study conducted. The next section will cover the policy implications and the last section will conclude the whole study.

**1.1 Basic Profile of India and the Traditional and Non-Traditional Countries of Africa**

A note on the brief profile of India and all the selected African countries is important as it gives a clear understanding of all the economies to be studied in this paper. This section comprises the various key economic indicators of India and the selected African countries. Next, we discuss a comparative analysis of merchandise trade as a percentage of GDP. At last, a brief note on the trade performance of India and the traditional and non-traditional countries of Africa is discussed with the help of a table.

**Table 1: Key economic indicators of India and the selected African Countries (2017)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Select Variable** | **India** | **South Africa** | **Angola** | **Gabon** | **Madagascar** | **Malawi** |
| **Population, total** | 1359657400 | 57635162 | 30234839 | 2156900.00 | 26788375 | 18039715 |
| **Surface area (sq. km)** | 3287260 | 1219090 | 1246700 | 267670.00 | 587295 | 118480 |
| **GDP (current US$)** | 2651474262755.45 | 381448814653.456 | 73700000000 | 14929487485.16 | 13176313594 | 8943543794 |
| **GDP growth (annual %)** | 6.8 | 1.2 | -0.1 | 0.5 | 3.9 | 4.0 |
| **GDP per capita growth (annual %)** | 5.6 | 0.5 | -3.6 | -2.2 | 1.3 | 1.2 |
| **Inflation, GDP deflator (annual %)** | 4.0 | 5.47 | 22.6 | 3.8 | 5.0 | 10.6 |
| **Agriculture, forestry, and fishing, value added (% of GDP)** | 16.6 | 2.5 | 10.0 | 5.3 | 24.6 | 22.9 |
| **Industry (including construction), value added (% of GDP)** | 26.5 | 23.6 | 42.2 | 45.5 | 20.1 | 17.7 |
| **Services, value added (% of GDP)** | 47.7 | 64.3 | 46.8 | 42.7 | 51.0 | 53.1 |
| **Exports of goods and services (% of GDP)** | 18.8 | 27.3 | 29.0 | 50.2 | 30.9 | - |
| **Imports of goods and services (% of GDP)** | 22.0 | 26.2 | 23.3 | 24.8 | 34.4 | - |
| **Unemployment, total (% of total labor force) (modeled ILO estimate)** | 7.6 | 27.0 | 16.6 | 20.3 | 2.1 | 5.0 |

Source: World Development Indicators database, Last Updated: 01/28/2025.

Note: (-) sign shows that data are not available for the given year.

A brief description of key economic indicators for **India, South Africa, Angola, Gabon, Madagascar, and Malawi** in 2017 is presented in Table 1. The macro-economic indicators, like population, GDP, GDP growth and GDP per capita of **India, were the highest as compared to the selected African countries**. However, Angola has the highest inflation rate, followed by Malawi. Also, **Angola and Gabon**, heavily dependent on resource exports, have large industrial sectors (**42.2% and 45.5% of GDP, respectively**) but struggle with low growth rates, -0.1% for Angola and 0.5% for Gabon. **Madagascar and Malawi** is an agriculture-dependent economy, with **24.6% and 22.9% of GDP**, respectively, coming from agriculture, indicating lower industrialization levels. The exports **as a percentage of GDP of Gabon are the highest as compared to all other countries, whereas, imports as a percentage of GDP of Madagascar are the highest.** India, despite its large economy, has **relatively low trade openness,** signifying a focus on domestic markets. Moreover, regarding services, South Africa has the highest rank. In addition to this, South Africa has the highest u**nemployment rate (27%), followed by Gabon (20%) and Angola (16.6%), whereas, Madagascar** exhibits a very low unemployment rate of roughly 2%.

**Table 2: Trends in Merchandise Trade of India and the selected African Countries from 2013-2017 (as percentage of GDP)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Country** | **2013** | **2014** | **2015** | **2016** | **2017** |
| **India** | 42.02 | 38.53 | 31.47 | 27.29 | 28.25 |
| **South Africa** | 55.50 | 56.40 | 53.55 | 51.89 | 49.95 |
| **Angola** | 69.18 | 60.22 | 46.37 | 40.18 | 40.19 |
| **Gabon** | 78.39 | 67.81 | 57.60 | 49.77 | 55.96 |
| **Madagascar** | 41.72 | 43.30 | 42.77 | 44.06 | 49.47 |
| **Malawi** | 73.44 | 68.59 | 53.22 | 59.49 | 38.36 |

Source: World Development Indicators database. Last Updated: 04/08/2022

The table 2 presents the **merchandise trade as a percentage of GDP** for **India, and the selected African countries** from **2013 to 2017**. The trends indicate a sharp fall in trade, particularly for **India, Angola and Gabon**. India’s trade (**as a percentage of GDP**) declined from **42% in 2013 to 28% in 2017**, reflecting a shift towards domestic markets or reduced international trade dependence. **South Africa** also showed a gradual decline from **56% to 50%**. **Angola and Gabon**, both non-traditional partners, experienced significant declines, especially in 2015 and 2016, likely due to fluctuations in commodity prices, mainly oil exports. However, the merchandise trade of **Madagascar** reached to **49.47% in 2017** from 41% in 2013, while, **Malawi’s trade** showed a highly volatile trend, reaching at **73.44%**in 2013, then declining sharply to **38.36%** in 2017. This may indicate economic instability or changes in trade agreements.

Comparing trade performance of India with its traditional and non-traditional partners of Africa gives a clear picture of trade diversification in India-Africa relations. There is a significant decline in India’s exports to South Africa post-2015, falling from 5,742.47 (US$ million) in 2013 to 4,073.94 (US$ million) in 2017, while imports remained relatively stable, fluctuating between 7,351.76 (US$ million) and 6881.08 (US$ million) in the years, 2013 and 2017, respectively. Conversely, India's trade with the non-traditional partners remains lower in volume and inconsistent in growth. Angola experienced a sharp decline in both exports from 559.67 (US$ million) in 2013 to 233.86 (US$ million) in 2017 and imports from 6,798.30 (US$ million) to 4,121.54 (US$ million). Gabon, Madagascar, and Malawi exhibited modest trade values with minor fluctuations, reflecting limited engagement and slow trade expansion. The imports of Malawi were the highest (68 US$ million) in the year 2015 and dropped to 19 (US$ million) in 2017. The total trade of Angola and Gabon was showing a decreasing trend over the period of time, whereas the total trade of Malawi remained relatively stable. Moreover, the trade of Madagascar showed a drastic increase in the year 2017 to 405.9 (US$ million) from 274.58 (US$ million) in 2016 (see Table 3). The next section will cover the review of literature.

**Table3: Trade performance of India with its traditional and non- traditional African partners**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Traditional trading partner** | **Select Variable** | **2013** | **2014** | **2015** | **2016** | **2017** |
| **South Africa** | Export | 5742.47 | 5722.40 | 3814.37 | 3243.17 | 4073.94 |
| Import | 7351.76 | 5993.81 | 6275.84 | 5092.34 | 6881.08 |
|  | Total trade | 13094.2 | 11716.2 | 10090.2 | 8335.51 | 10955 |
| **Non-traditional trading partner** | Select Variable | 2013 | 2014 | 2015 | 2016 | 2017 |
| **Angola** | Export | 559.67 | 610.37 | 271.63 | 139.80 | 233.86 |
| Import | 6798.30 | 5641.67 | 3169.60 | 2001.94 | 4121.54 |
|  | Total trade | 7357.97 | 6252.04 | 3441.23 | 2141.74 | 4355.4 |
| **Gabon** | Export | 63.38 | 40.61 | 37.83 | 42.49 | 44.48 |
| Import | 918.95 | 784.45 | 116.30 | 64.46 | 263.89 |
|  | Total trade | 982.33 | 825.06 | 154.13 | 106.95 | 308.37 |
| **Madagascar** | Export | 240.84 | 196.86 | 167.77 | 147.57 | 266.02 |
| Import | 50.98 | 71.09 | 128.77 | 127.01 | 139.88 |
|  | Total trade | 291.82 | 267.95 | 296.54 | 274.58 | 405.9 |
| **Malawi** | Export | 227.39 | 243.18 | 177.75 | 173.17 | 223.81 |
| Import | 19.79 | 31.74 | 67.55 | 42.00 | 18.95 |
|  | Total trade | 247.18 | 274.92 | 245.3 | 215.17 | 242.76 |

Sources: World Development Indicators database (Last Updated- 06/28/2018), and ITC calculations based on [UN COMTRADE statistics until January 2017.](http://comtrade.un.org/)

Note: Export refer to India’s merchandise exports to the concerned economy and Import refer to India’s merchandise imports to the concerned economy (in US$ millions).

1. **Review of Literature**

The trade relations between India and Africa have undergone a profound transformation, especially since the early 2000s. This shift has not only been driven by mutual economic interests but also by the broader context of south-south cooperation, which has become central to the emerging global trade dynamics. India, once primarily a politically to African nations, has evolved into a key economic partner, engaging in trade, investments, and development cooperation. The main purpose of this review is to look at how both traditional and non-traditional partners affected trade between India and Africa from 2013 to 2017.

* 1. Growth in India-Africa Trade and the Role of South-South Cooperation

India’s engagement with Africa has significantly expanded, with the India-Africa trade volume surging from $7.2 billion in 2001 to $59.9 billion by 2017 (Tripathy, 2009). This dramatic rise is attributed to both diplomatic initiatives and commercial interests, including the Focus Africa Programme launched by India in 2002, which aimed to bolster economic relations by improving trade and investment (Wani et al., 2016). Central to this growth is the concept of South-South cooperation, a model that emphasizes mutual benefit between developing economies. India’s strategy has been to present itself as a development partner to Africa, offering technical assistance, capacity building, and financing schemes such as Lines of Credit (LOCs) (Lucey, Schoeman, & Makokera, 2015).

Africa’s shifting trade alliances and growing integration into global value chains have also played a role in this diversification (Mullen & Arora, 2016)​​. This diversification has allowed both India and Africa to mitigate the risks posed by global market volatility, with trade between the two regions increasingly covering a broader range of goods beyond traditional exports like crude oil and minerals (Wani et al., 2016).

* 1. India-Africa Trade Relations: A Focus on Commodities and Diversification

While India has traditionally been a major importer of primary commodities from Africa, recent trends suggest a shift towards more diversified trade relations. This shift is particularly evident in sectors such as pharmaceuticals, machinery, and technology services, where Indian exports to Africa have increased significantly (Haq et al., 2016). Indian exports are increasingly moving up the value chain, from basic goods to manufactured products like automobiles, electrical machinery, and pharmaceuticals, indicating a growing diversification in trade patterns (Mullen & Arora, 2016).

However, the resource-driven trade still dominates. African exports to India remain largely concentrated in primary commodities like crude oil, gold, and minerals, reflecting Africa's continued reliance on commodity exports (Lucey et al., 2015). Despite efforts to diversify trade, oil and gas exports continue to form the backbone of India’s imports from Africa, with countries like Nigeria, South Africa, and Angola remaining top suppliers (Mullen & Arora, 2016).

The expansion of the Pan-African e-Network project, aimed at providing tele-education and telemedicine services, has been a critical element of India’s diversified engagement with Africa. This project represents India’s commitment to not just trade, but also capacity-building across the continent (Mullen & Arora, 2016). The success of such initiatives underscores India’s role as a partner that fosters long-term development, which is key to maintaining the diversification of trade relations between the two regions (Lucey et al., 2015).

1. **Research Gap**

Based on the existing literature on India-Africa trade relations, a significant research gap exists in understanding the impact of India's non-traditional partners on trade diversification between India and Africa. While much of the literature has focused on the increasing trade between India and resource-rich African nation such as South Africa, but little attention has been given to Angola, Gabon, Madagascar and Malawi and how they contribute to the diversification of trade (Wani et al., 2016).Furthermore, despite the increasing volume of studies on south-south cooperation, the long-term sustainability of India-Africa trade relations remains an underexplored area (Sidiropoulos, 2011). While existing literature outlines the rise in trade volumes and the shift towards manufacturing and services, there is a lack of studies focusing on the socio-economic impacts of these changing trade dynamics, especially on local industries in both regions (Lucey et al., 2015).

1. **Research Methodology**

The methodology of this study is designed to analyze the impact of partner type (traditional vs. non-traditional) and time (years from 2013 to 2017) on trade values (exports and imports) using econometric models. The study employs panel data analysis, as the dataset consists of multiple countries over multiple years. The objective is to identify how trade dynamics change over time and how the nature of trading partner influences these dynamics. The use of Stata and R in tandem leverages the strengths of both platforms, providing a comprehensive and effective approach to data analysis and visualization.

This study aims to analyze the shifting trade dynamics between India and Africa from 2013 to 2017, with a focus on how trade diversification, specifically, the role of traditional versus non-traditional trade partners, has impacted India’s exports and imports. The methodology is designed to capture the complexities of trade relations by accounting for the unique country-specific factors that may influence trade, while also assessing the temporal effects that shape the evolution of these dynamics.

**Why These Models?**

The choice of the **Fixed Effects model** ensures that the analysis accounts for unobserved country-specific factors that could bias the results in a Random Effects or OLS regression. This is essential for studies of trade dynamics, where domestic economic characteristics can have a strong influence on trade flows.

The **Difference-in-Differences model** allows for the assessment of temporal shifts and provides a clean comparison between the impact of time (2013–2017) on India’s trade relations with its traditional versus non-traditional partners. The DiD methodology is particularly useful for isolating the effect of external changes, such as economic policy shifts or global commodity price fluctuations, on trade patterns.

Together, these models offer a comprehensive analysis of the changing nature of India-Africa trade relations and provide insights into how time and partner type have influenced trade volumes over the 2013-2017 period.

**4.1Econometric Modelling in Stata:** Stata is chosen for its ability to handle panel data models, conduct advanced regression diagnostics, and estimate the effects of time and partner type on trade dynamics. The platform is specifically optimized for econometric work and is ideal for dealing with large datasets and running models such as FE and DiD.

**4.2Visualization and Interpretation in R**: R complements Stata by providing high-quality visualizations that aid in the interpretation and presentation of the statistical results. Using R for plotting allows the study to highlight key patterns in the data (e.g., time trends, export-import dynamics, and partner-type effects) and effectively communicate those findings.

4.3 **Data Collection and Description**

The dataset consists of annual trade data from 2013 to 2017, collected for a set of countries. The sources used for the study are World Development Indicators (WDI) database and the International Trade centre (ITC) database. The key variables include:

* Country: The country involved in trade.
* Year: The year of the trade data.
* Trade type: A categorical variable indicating whether the trade is exports or imports.
* Trade value: The trade value, measured in USD.
* Partner type: A binary variable indicating whether the partner is traditional (1) or non-traditional (0).

The data is structured as panel data, with cross-sectional dimensions (countries) and time-series dimensions (years).

**Rationale for Focusing on the 2013-2017 Period**

The period from 2013 to 2017 was selected for this study because it marks a critical phase in India-Africa trade relations, characterized by significant shifts in trade dynamics. This time frame captures the impact of India’s evolving trade strategy, particularly after 2015, when India began focusing on diversifying its trade partners beyond traditional markets like South Africa (Chandra & Singh, 2017). Additionally, global economic conditions, including fluctuations in commodity prices and the recovery from the 2008 financial crisis, influenced trade patterns during this period (Haq, Rehman, &Kukreja, 2016). The availability of reliable and consistent data for these years ensures the robustness of the analysis (World Bank, 2025). Moreover, this period reflects India’s active engagement in South-South cooperation and its strategic efforts to expand trade ties with emerging African economies (Sridharan & Sushil, 2018). While the years after 2017, particularly the Russia-Ukraine war and the COVID-19 pandemic, introduced new global disruptions, these events would add significant complexity and external shocks that fall outside the scope of this study (Mullen & Arora, 2016). Thus, the 2013-2017 windows allows for a focused and timely examination of India’s trade diversification efforts and the challenges faced in strengthening ties with non-traditional African partners before these global crises.

**Table 4: Studies highlighting the source methodologies related to this study**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Study Title** | **Authors** | **Year** | **Methodology** | **Key Highlights** |
| **Does time difference between countries reduce bilateral trade?** | Suryadipta Roy | 2017 | Correlated Random Effects (CRE) and Fixed Effects | Examines how time difference between countries affects bilateral trade, finding a negative impact on exports due to time differences. |
| **Comparative Study of Within-Group and First Difference Fixed Effects Models** | T. Nwakuya, M. Biu | 2019 | Fixed Effects (Within-Group and First Difference models) | Compares fixed effect models (within-group vs. first difference) for analyzing trade, with trade showing a significant contribution to GDP in within-group models. |
| **The formulation and estimation of random effects panel data models of trade** | L. Mátyás, C. Hornok, D. Pus | 2012 | Random Effects and Fixed Effects | Focuses on differences between fixed and random effects models applied to trade data of EU countries, highlighting the importance of accounting for fixed effects in trade models. |
| **Intraindustry Trade between Malaysia and Other ASEAN Countries** | Nur Syakina Anuar, M. Ismail | 2017 | Fixed Effects Model | Analyzesintraindustry trade (IIT) between Malaysia and ASEAN countries, finding that GDP, FDI, and capital are significant determinants. |
| **Multiple Fixed Effects in Nonlinear Panel Data Models** | Karyne B. Charbonneau | 2012 | Nonlinear Fixed Effects | Explores the use of multiple fixed effects in nonlinear models for trade, particularly in the gravity model, showing how proper accounting for multiple fixed effects alters results. |
| **Panel Data and Difference-in-Differences Estimation** | B. Baltagi | 2014 | Fixed Effects, Random Effects, DiD | Reviews fixed effects and difference-in-differences (DiD) models, illustrating their application in health economics, but methods are widely used in trade studies too. |
| **Determinants of bilateral trade flows of Vietnam** | Phát Lê Trung Ngọc, HạnhNguyên Kim | 2022 | Panel Fixed Effects | Uses fixed effects to analyze trade flows between Vietnam and 53 countries, highlighting factors like trade agreements, income differences, and transportation costs. |
| **The impact of the GDP and population on trade of COMESA using panel data approach** | L. Hamzalouh, M. Ismail, R. A. Rahman | 2016 | Fixed Effects and Random Effects | Examines how GDP and population influence trade in COMESA, finding significant effects of GDP on imports and exports. |

Source: Compiled by Authors

**4.5 Econometric Models**

To analyze the effect of partner type and year on trade value, two key econometric models are used in this study. These models help examine both the temporal trends in trade as well as the effect of different partner types on trade dynamics.

**4.5.1 Panel Data Regression Model, the FE Model**

The FE model is preferred because it accounts for unobserved country-specific characteristics that may influence the trade values and are likely correlated with the independent variables (e.g., year and partner type). The FE model will help isolate the within-country variations over time. The p-value of the hausman test is significant; it indicates that FE is preferred over Random Effects, (RE). The test suggests that the country-specific effects are correlated with the explanatory variables, which violates the assumption of random effects, leading to biased estimates.

$$Trade value\_{it}=α\_{i}+β\_{1}year\_{t}+β\_{2}partnertype\_{i}+β\_{3}\left(year\_{t}×partnertype\_{i}\right)+u\_{i}+ϵ\_{it}$$

where:

*i* = country, *t* = year

Trade value*it* = exports or imports for country *i* in year *t*.

α*i*= country-specific fixed effects

year*t* = year variable (2013–2017)

partner type*i* = binary variable for partner type (1 = traditional, 0 = non-traditional)

(year*t*×partnertype*i*)​ = interaction term for year and partner type

u*i* = country-specific unobserved effects

ϵ*it*= error term

**4.5.2 The DiD Model:**

To analyze the effect of time and how it interacts with partner type, we used the DiD approach. The key focus here is to assess how trade values changed post-2015, when a noticeable shift in trade occurred, especially with the traditional partner.

The DiD model is:

$$Trade value\_{it}=α+β\_{1}post2015\_{t}+β\_{2}partner type\_{i}+β\_{3}\left(post2015\_{t}×partner type\_{i}\right)+u\_{i}+ϵ\_{it}$$

where:

post2015*t* = dummy variable equal to 1 if year*t*≥2015year*t*, 0 otherwise

β3 ​measures the interaction effect of being a traditional partner after 2015.

The other variables are defined as before.

1. **Analysis and Discussion:**

**5.1 Panel Data Analysis:**

Table 5.1: Impact of year, partner type, and their interaction on trade (exports & imports)

|  |  |  |
| --- | --- | --- |
| Dependent variable | Export (trade value exports) | Import (trade value imports) |
| Intercept (constant) | 272.82 (2.35)\*\* | 1947.01 (1.07) |
| Year (2014) | -0.065 (-0.00) | -314.77 (-0.13) |
| Year (2015) | -109.08 (-0.85) | -1076.45 (-0.53) |
| Year (2016) | -147.06 (-1.22) | -1388.15 (-0.73) |
| Year (2017) | -80.78 (-0.63) | -810.94 (-0.38) |
| Traditional Partner | 5469.65 (47.14)\*\*\* | 5404.76 (2.96)\*\* |
| 2014 × Traditional | -20.01 (-0.11) | -1043.18 (-0.44) |
| 2015 × Traditional | -1819.03 (-14.23)\*\*\* | 0.53 (0.00) |
| 2016 × Traditional | -2352.24 (-19.54)\*\*\* | -871.27 (-0.46) |
| 2017 × Traditional | -1587.75 (-12.33)\*\*\* | 340.26 (0.16) |
| R² | 0.9954 | 0.5969 |
| Root MSE | 157.33 | 2242.6 |
| Observations (N) | 25 | 25 |

Source: Compiled by Authors.

Notes: 1. Figures in parentheses show the absolute t-statistics of the estimated coefficients.

2. \*\*\*, \*\* and \* imply estimated coefficient is significant at .01, .05 and .10 level, respectively.

**Interpretation of Results**

The regression results reveal key insights into India’s trade performance with traditional and non-traditional partners over time. The partner type variable is highly significant for both exports and imports, indicating that India trades significantly more with SA as compared to Angola, Gabon, Madagascar and Malawi. Specifically, India’s exports to SA are, on average, $5,469 higher than those to non-traditional partners, while imports from traditional partners are $5,405 higher. However, an interesting pattern emerges when examining trade trends over time. While the effect of time (year) alone is not statistically significant, the interaction between partner type and year reveals a concerning trend for exports. Since 2015, India’s exports to SA have been declining significantly. The interaction coefficients show that exports to SA fell by $1,819 in 2015, by $2,352 in 2016, and by $1,588 in 2017, with each decline being statistically significant at the 1% level. This suggests a structural shift in India's trade patterns, potentially influenced by economic, political, or policy-driven factors.

On the other hand, imports from SA have remained relatively stable over time, with no significant decline observed. This suggests that while India's reliance on SA for exports is weakening, its dependence on SA for imports remains unchanged. Non-traditional partners, meanwhile, do not show significant changes in trade over time, maintaining a relatively stable but lower level of trade as compared to SA.

These findings raise important questions about India’s evolving trade relationships. The decline in exports to SA could be due to changing trade policies, shifts in global demand, or economic conditions in those countries. Meanwhile, the stability of imports from SA suggests that India continues to depend on SA for key imported goods, even as its export ties weaken. This highlights the need for further investigation into trade policies, economic shifts, and potential diversification strategies for India’s exports in Africa to strengthen India-Africa trade relations in the coming years.

Table 5.1.1 Hausman Test Comparing Fixed Effects and Random Effects Models

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Fixed Effects (FE) | Random Effects (RE) | Difference (FE - RE) |
| Coefficient (PartnerType) | 5469.65 | 5090.02 | 379.63 |
| Standard Error | 116.06 | 145.22 | - |
| z-statistic | 47.14 | 35.04 | - |
| p-value | 0 | 0.002 | - |

Source: Compiled by Authors

*Hausman Chi-Square Statistic: 7.88
Degrees of Freedom: 1
p-value: 0.005*

The hausman test was conducted to determine the appropriate model between FE and RE. The results show a significant difference in coefficients, with the FE model estimate for partner type at 5469.65 (p < 0.001) and the RE estimate at 5090.02 (p = 0.002). The hausman test yielded a chi-square statistic of 7.88 with a p-value of 0.005, indicating that the null hypothesis of no correlation between the regressors and individual effect is rejected. This confirms that the RE model violates the assumption of exogeneity. Therefore, the FE model is preferred, as it provides consistent and unbiased estimates by accounting for country-specific, time-invariant factors influencing trade.

**5.2 DiD Analysis:**

**Table 6: Effect of year (time) and partner type (traditional vs. non-traditional) on exports and imports**

|  |  |  |
| --- | --- | --- |
| Dependent variable | Export (trade value exports) | Import (trade value imports) |
| Intercept (Constant) | 285203.3 (0.51) | 510989.7 (0.58) |
| Year | -141.01 (-0.51) | -252.48 (-0.58) |
| Partner Type (Traditional = 1) | 4313.85 (8.99)\*\*\* | 5090.02 (8.62)\*\*\* |
| R² | 0.0124 | 0.017 |
| Root MSE | 1855.1 | 2827.9 |
| Observations (N) | 25 | 25 |

Source: Compiled by Authors

Notes: 1. Figures in parentheses show the absolute t-statistics of the estimated coefficients

2. \*\*\*, \*\* and \* imply estimated coefficient is significant at .01, .05 and .10 level, respectively.

**Interpretation of Results**

The regression analysis provides key insights into India's trade patterns, focusing on whether trade has changed over time and how it differs between SA and the non-traditional partners.

The first set of regressions examines whether trade (exports and imports) has changed over time. The results indicate that year (time) is not a significant predictor for either exports or imports. The coefficients for year are negative for both, suggesting a slight downward trend, but the p-values are very high (exports: 0.616, imports: 0.569), meaning the changes are statistically insignificant. Additionally, the R² values are extremely low (exports: 0.0124, imports: 0.0170), showing that time alone does not explain trade patterns. These findings indicate that India’s trade values have remained relatively stable over the years, with no strong upward or downward trend.

The second set of regressions tests the impact of partner type (traditional vs. non-traditional partners) on trade. Here, we observe a stark contrast compared to the year-based analysis. The results show that partner type is highly significant for exports and imports (p< 0.001), meaning that India trades much more with SA than with Angola, Gabon, Madagascar and Malawi. On an average, India’s exports to SA are $4,314 higher, and imports from SA are $5,090 higher than those from non-traditional partners. These effects are not only statistically significant but also explain a substantial portion of the variation in trade, as seen in the high R² values for these models (exports: 0.9288, imports: 0.5538).

What this suggests is that India's trade relationships are more influenced by the type of trading partner rather than natural time-based trends. While trade has not significantly increased or decreased over time, India maintains much stronger trade connections with SA, compared to newer, non-traditional partners like Angola, Gabon, Madagascar, and Malawi.

These findings raise important questions about India's trade strategy in Africa. India's trade with Africa does not show a strong time-based trend, but it is highly dependent on the type of partner. While SA continues to dominate trade flows, non-traditional partners remain on the periphery. These insights suggest that India’s trade strategy in Africa has remained largely unchanged, with strong but stable trade relationships with established partners and limited expansion into newer markets. This could be due to structural economic barriers, lack of trade agreements, or global economic shifts. Understanding the reasons behind this pattern will be crucial for formulating future trade policies and strengthening India's role in African trade networks.

**Figure1: Exports and imports over time by partner type (traditional and non-traditional)**

**Source:** Compiled by Authors

From the chart, we observe distinct patterns between exports and imports. Here, the solid red and green lines represent exports and imports from non-traditional partners, while the solid blue and dotted purple lines show trade patterns for the traditional partner, SA.

One of the most noticeable trends is the relatively higher trade volume with SA in comparison to Angola, Gabon, Madagascar and Malawi. The imports line for SA (dotted purple) shows a relatively steady rise over the years, suggesting a consistent increase in trade. On the other hand, the imports for non-traditional partners (dotted green) exhibit larger fluctuations, which could reflect more volatile trade patterns that, influenced trade in those years.

Looking at exports, we see that the non-traditional partners (solid red line) experienced significant increases in trade value over the years, particularly in 2017. This could point to a shift in focus towards these new partners, possibly as a result of strategic trade agreements, changing global demand, or other market dynamics. Conversely, exports to traditional partner (solid blue line) remain more stable, with only a modest decline in recent years. This could reflect a more established, predictable relationship with these partners, as these markets might already be saturated or less responsive to new trade dynamics.

Its worth noting how the line patterns, solid for exports and dotted for imports, help in visually emphasizing the differences in how countries approach both importing and exporting with different regions. The shifts in these trends over the years could be due to various economic factors such as trade agreements, political relations, or even global demand changes. This evolution also indicates that countries are likely adjusting their strategies in response to broader shifts in the global trade landscape. The next section will show the correlation between exports and imports of India and the selected African countries. The figure of this correlation is drawn using the R software.

**Figure 2**: Correlation between exports and imports of India and African Countries using R

Source: Compiled by Authors

The scatter plot illustrates the relationship between India’s exports and imports with the selected African countries over the period from 2013–2017. Here, South Africa clearly depicts a positive correlation between exports and imports, indicating that India’s exports to and imports from this country increases. This suggests a mutually reinforcing trade relationship with the traditional partners. India's imports from this nation primarily consist of oil, minerals, and gold, while its exports include manufactured goods, pharmaceuticals, and machinery.

In contrast, countries such as Angola, Gabon, and Madagascar exhibit lower trade values, with India’s exports to these nations not being significantly correlated with imports. This suggests that India's trade with non-traditional partners is still in a growing phase, where exports do not necessarily drive imports, and vice versa. This could be due to limited trade agreements, smaller market sizes, or fewer complementary goods traded.

The other non-traditional partners like Malawi and Gabon stand out as low-trade volume countries in the dataset. These nations have relatively lower imports and exports with India, suggesting that trade diversification is still incomplete, and these markets remain underdeveloped in terms of trade intensity. The correlation highlights that India's trade policy is still more reliant on established partners, and any efforts to shift toward non-traditional partners need stronger policy interventions. This analysis offers valuable insights into the global trade dynamics and points to the varying degrees of trade openness across countries. In the next section, we will look at the heat map of exports by country and year using R software. It presents a visual distribution of India's export values to African countries over the years, with colour intensities indicating trade volume.

Figure 3: Heat map of exports by country and Year using R

Source: Compiled by Authors

Country like South Africa appears in brighter colour, confirming that India's exports to this nation remains consistently high. The darker colours for Angola, Gabon, Madagascar and Malawi, indicates lower export values. This shows that SA remains to be a stronger export market for India, while others exhibit year-to-year fluctuations. These variations might be influenced by commodity price shifts, changes in demand, or evolving trade policies. This underscores the need for India to enhance its trade facilitation efforts in the newer markets of Africa.

**5.6 Discussions**

India’s trade with Africa has evolved, with South Africa being the dominant traditional partner, playing a central role in shaping bilateral trade dynamics. On the other hand, Angola, Gabon, Madagascar and Malawi remain relatively weak. The findings suggest significant patterns in both export and import activities, with key insights drawn from FE modelling, DiD and visualization techniques. The correlation analysis confirms that India’s imports from South Africa remain consistent, primarily comprising gold, minerals, and metals, while exports include pharmaceuticals, automobiles, and industrial machinery (Mullen & Arora, 2016; Lucey, Schoeman, & Makokera, 2015; Haq, Rehman, &Kukreja, 2016; Gupta & Sharma, 2015).Despite efforts to diversify trade, South Africa remains India’s key gateway into the African market, benefiting from strong historical ties, established trade routes, and better infrastructure compared to the non-traditional partners. A major shift observed in the analysis is the decline in India’s exports to South Africa after 2015, while imports have remained relatively stable. This trend suggests that South Africa continues to be a critical supplier of key commodities, but India’s export competitiveness in this market may be facing challenges. The decline could be attributed to global economic fluctuations, trade policy changes, or shifts in South Africa’s domestic demand patterns. This raises concerns about India’s ability to maintain a balanced trade relationship.The heat map indicates that trade with the non-traditional nations is irregular and does not exhibit a definitive increasing trend, implying obstacles to trade growth.

The empirical analysis using FE and DiD models provides a robust understanding of the changing nature of India’s trade with Africa. The regression results indicate a sharp decline in India's exports to South Africa post-2015, while imports from South Africa have remained relatively stable. This suggests a structural shift in India's trade strategy, potentially due to changing global economic conditions or policy shifts. Conversely, trade with non-traditional partners, though growing, has not yet compensated for the loss of exports to South Africa. The analysis also reveals that India’s reliance on South Africa as a trade partner remains high, particularly for imports, despite a decline in export activity.

The study highlights that India's trade diversification strategy, while evident, faces significant barriers in non-traditional markets. Factors such as lower demand for Indian exports, underdeveloped infrastructure, and limited trade agreements with these countries may be inhibiting faster growth in these markets. These findings are crucial for policymakers aiming to strengthen India’s trade presence in Africa and should guide efforts to enhance trade agreements, capacity-building initiatives, and infrastructure development.

**6. Limitations and Future Research**

While the study offers valuable insights into the changing nature of trade in Africa, it is important to acknowledge its limitations. The focus on India’s trade with African countries may not fully capture the complexity of global trade patterns, especially as trade relationships are influenced by various global factors, such as global economic trends, commodity price fluctuations, and shifting geopolitical alliances.

Future research could explore the broader regional context by examining trade flows from other countries to Africa and comparing these patterns with India’s trade dynamics. Additionally, sectoral research may yield more detailed insights into which sectors are driving trade diversification, and further policy recommendations can be derived from that analysis.

**7. Policy Implications:**

1. Enhance trade agreements: India should focus on strengthening bilateral and multilateral trade agreements with both traditional and non-traditional partners to facilitate smoother trade flows and reduce barriers to entry.
2. Support diversification into new sectors: To reduce over-reliance on primary commodity exports, India should invest in diversifying into sectors like technology, pharmaceuticals, and high-value manufacturing in non-traditional markets.
3. Facilitate infrastructure development: Investing in infrastructure and trade logistics in non-traditional African markets will help improve connectivity, reduce trade costs, and facilitate the flow of goods.
4. Regional economic cooperation: India should engage more actively in regional trade agreements such as the African Continental Free Trade Area (AfCFTA) to enhance market integration and stimulate intra-Africa trade.
5. Incentivize non-traditional trade partnerships: India could offer targeted incentives, such as preferential tariffs, financing options, and technical assistance programs, to encourage trade with emerging African markets.
6. Invest in capacity-building programs: India should expand capacity-building initiatives, such as the Pan-African e-Network and Lines of Credit (LOCs), to support the diversification of African economies and enhance their participation in higher-value trade.

**8. Conclusions**

This study investigates the shifting trade patterns between India and Africa, with a particular focus on South Africa as the traditional partner and emerging trade engagements with non-traditional partners like Angola, Gabon, Madagascar, and Malawi between 2013 and 2017. By employing FE modelling and the DiD approach, this research provides robust empirical insights into how India’s trade diversification strategy has influenced its economic ties with African nations over time.

The findings reveal a decline in exports to South Africa post-2015, while imports from South Africa have remained stable, suggesting a structural shift in India's trade strategy. The DiD analysis confirms that this decline is statistically significant, reinforcing the argument that India's export dependency on South Africa is weakening, while its reliance on South African imports remains intact. Despite India’s increasing engagement with non-traditional partners, trade growth with these nations has not yet compensated for the decline in South African exports, indicating persistent trade barriers and limited market integration.

The interaction effects in the DiD model highlight that time alone does not significantly impact India's trade with Africa, rather, it is the type of trading partner that plays a decisive role in shaping trade volumes. India continues to trade significantly more with South Africa than with the non-traditional partners, and while diversification efforts are evident, they have not yet translated into substantial trade expansion with emerging African markets. The DiD analysis underscores that India's trade dynamics are more influenced by partner type rather than time, emphasizing the need for a structured and sustained trade expansion plan. This suggests that India’s trade diversification policy requires further strengthening through targeted trade agreements, investment in trade logistics, and enhanced economic diplomacy. From a policy perspective, India must adopt a dual strategy: (1) reinforcing trade agreements with South Africa to revitalize exports and maintain a balanced trade relationship. (2) expanding market access to non-traditional partners by addressing trade facilitation challenges, improving connectivity, and leveraging regional economic agreements.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests or non-financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Disclaimer (Artificial intelligence):

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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