Evolving Partnerships: Assessing BRICS' Strategic Role in Africa's Socio-Economic Development

Yasmine Mahmoud Elgazzar [1] Youssef Senousy [2]

Abstract

This paper explores the intricate dynamics of BRICS nations' investment strategies in Africa, focusing on their socio-economic and geopolitical impacts. Through a comprehensive analysis of economic data, policy documents, and case studies, the research illustrates how these investments have reshaped Africa's economic landscape. BRICS investments have spurred significant infrastructural development and technological advancements in various African countries. However, these investments also present challenges, such as increased economic dependency and complex socio-political issues. The study employs theoretical frameworks like dependency theory, modernization theory, and world-systems theory to provide a deeper insight into these interactions. The findings suggest that while BRICS investments offer substantial development opportunities, they also require careful management to mitigate the risks associated with economic dependency and geopolitical tensions. This paper contributes to a nuanced understanding of global cooperation and its implications for regional and global economic governance, highlighting the dual nature of opportunities and challenges posed by BRICS investments in Africa.

Keywords: BRICS, Africa, investments, socio-economic impact, geopolitical strategy, dependency theory, modernization theory, world-systems theory, economic dependency, infrastructural development.

[1] Assistant Professor in Economics, Canadian International College, Cairo, Egypt.
[2]Assistant Professor in Software Engineering, Sadat Academy, Faculty of Computers and Information, Cairo, Egypt.

الشراكات المتطورة: تقييم الدور الاستراتيجي لمجموعة البريكس في التنمية الاجتماعية والاقتصادية في أفريقيا

ملخص

تستكشف هذه الورقة الديناميكيات المعقدة لاستراتيجيات الاستثمار التي تنتهجها دول مجموعة البريكس في أفريقيا، مع التركيز على تأثيراتها الاجتماعية والاقتصادية والجيوسياسية. ومن خلال تحليل شامل للبيانات الاقتصادية ووثائق السياسات ودراسات الحالة، يوضح البحث كيف أعادت هذه الاستثمارات تشكيل المشهد الاقتصادي في أفريقيا. لقد حفزت استثمارات مجموعة البريكس التنمية في البنية التحتية والتقدم التكنولوجي بشكل كبير في مختلف البلدان الأفريقية. ومع ذلك، فإن هذه الاستثمارات تطرح أيضًا تحديات، مثل زيادة الاعتماد الاقتصادي والقضايا الاجتماعية والسياسية المعقدة. تستخدم الدراسة أطرًا نظرية مثل نظرية الاعتماد ونظرية التحديث ونظرية الأنظمة العالمية لتوفير نظرة أعمق لهذه التفاعلات. تشير النتائج إلى أنه في حين توفر استثمارات مجموعة البريكس فرصًا تنموية كبيرة، فإنها تتطلب أيضًا إدارة دقيقة للتخفيف من المخاطر المرتبطة بالتبعية الاقتصادية والتوترات الجيوسياسية. تساهم هذه الورقة في فهم دقيق للتعاون العالمي بين البلدان وتداعياته على الحوكمة الاقتصادية الإقليمية والعالمية، وتسلط الضوء على الطبيعة المزدوجة للفرص والتحديات التي تفرضها استثمارات مجموعة البريكس في أفريقيا.

الكلمات المفتاحية: البريكس، أفريقيا، الاستثمارات، الأثر الاجتماعي والاقتصادي، الاستراتيجية الجيوسياسية، نظرية التبعية، نظرية التحديث، نظرية النظم العالمية، التبعية الاقتصادية، التنمية التحتية.

1. Introduction

The interaction between the nations in BRICS and countries in Africa has increasingly come to occupy center stage in contemporary geopolitical and economic analysis. This interaction becomes of particular importance as it occurs in the background of changing global power dynamics and altering development paradigms. The investment and development policies of the BRICS are multifaceted and leave important impacts on the socio-economic landscapes of Africa. What sets BRICS engagement in Africa apart from traditional Western-centric models of development is that the former presents a variant. It combines large economic investments with strategic geopolitical partnerships, which essentially go hand in hand with cultural exchanges at the highest level, enhancing a more diversified. In putting BRICS investments into practice, infrastructural development and trade relationships have been spurred forward, while new technological innovations have also been introduced into several countries on the continent. These will thus come with a set of challenges: further risk of re-enforcement of dependency, the socio-political consequences of which are not known, and the sustainability of such investments in the long term. Such complex interplays can be investigated theoretically with the use of dependency theory, modernization theory, and world systems for a deeper insight into the dynamics.

An avenue to explore whether these investments are those that continue to entrench economic dependence, while modernization theory is criticized for its linear perspective on development, it aids in the grading of progress and integration of African economies in the markets at a global scale. World-systems theory is more concerned with global economic

hierarchies that purport to show that BRICS countries are in a semi-peripheral state and have an important role to play in the challenging process of the dominance of traditional core economies. The paper seeks to dissect the geopolitical, economic, and cultural dimensions of the BRICS-Africa partnership. With scrutiny over policy initiatives, economic data, and some case studies, several opportunities and challenges that the engagement of BRICS in Africa holds are highlighted. The analysis is broad and tries to give an understanding of how those interactions influenced regional development and, in turn, reshaped global governance structures. Lastly, the ever-evolving relationship between the BRICS and African countries is one of the most important issues of the modern world. It offers new lenses through which to view global development—lenses that are grounded in the principles of multipolarity and economic pluralization. This knowledge of the relationship is important for the projection of future trends in global governance and regional development, as well as in designing policies that maximize the benefits of BRICS involvement in Africa against potential downsides. This paper investigates the intricate dynamics of BRICS nations' investment strategies in Africa, focusing particularly on their socio-economic and geopolitical impacts in North African countries. The study aims to provide a comprehensive analysis of how these investments reshape the economic landscape and influence socio-political structures in the region.

2. Research Problem

The central research problem addressed in this study is the lack of a comprehensive understanding of the socio-economic impacts of BRICS investments in North African countries. Despite the significant presence and influence of BRICS nations in Africa, there is a paucity of research exploring the

dual nature of these investments—both as opportunities for infrastructural and technological development and as potential sources of increased economic dependency and socio-political challenges. This study seeks to fill this gap by critically examining these aspects through various theoretical lenses.

To address this problem, the study employs theoretical frameworks such as dependency theory, modernization theory, and world-systems theory. These frameworks are used to critically analyze the complex interactions between BRICS and North African countries, providing a robust foundation for understanding the broader implications of these investments.

3. Literature Review

3.1 Existing Studies on BRICS' Investments in Africa

The dynamic relationship between BRICS nations—Brazil, Russia, India, China, and South Africa—and African countries is multifaceted and evolving. It has taken a toll on the socio-economic landscape of the continent. This literature review captures some research studies conducted on investment and development policies of BRICS in Africa.

Yarygina and Krylova (2023) look at contemporary investment policies under consideration from the BRICS and their economic implications in South Africa and, to a larger degree, the African continent. The research therefore underscores the strategic approach of BRICS countries to economic growth through investments as one way of attaining policy coherence and alignment with the local economic conditions. While the empirical evidence substantiates the fact that investments by BRICS would positively impact economic stability, the analysis is still much more macroeconomic and not microeconomic in content. Also, the issue of whether these investments are

sustainable in the longer term does not form part of the discussion. Also, the paper can have more illustrative case studies.

Tsaurai (2022) investigates the influence of FDI inflows from the BRICS on domestic investment in African countries. The study is a complete analysis of the positive and negative effects that such an investment would impose. Tsaurai stated how FDI can stimulate domestic investment but also cautioned that such benefits may come with possible crowding-out effects. While the paper has raised some good policy recommendations to be recommended for maximum benefits, it is predominantly measured in terms of quantitative data, and there is just a little bit of qualitative analysis. It does not make the point of sectoral impacts or the political and social contexts that are important in making FDI work well.

Duggan et al. (2022) investigate the impact that the New Development Bank led by BRICS is having on multilateral development finance and the changes it is making to global governance. The paper investigates the strategic contribution of the New Development Bank to the international financial system and debates the potential of BRICS to redefine development finance norms. In contrast to these insights into the political dynamics of multilateral finance, the focus on finance is not expanded to deal with broader developmental impacts. It is also, however, lacking in empirical data concerning projects and results of the Bank. Its expert focus may also not be broad enough to appeal to any non-finance practitioner.

A study by Adams and Opoku 2017 undertakes a comparative analysis to assess whether investments from BRICS as against

the OECD countries have any differential impact on the development of Africa. This study is valuable since it will put the effectiveness of BRICS into perspective when compared to OECD investments and offers insights into policy frameworks that enhance FDI benefits. Conversely, the general nature of the study may miss specific elements at the regional level, whereas the comparative approach may end up oversimplifying unique attributes found in individual BRICS and OECD countries. Furthermore, the study will not cover the social and cultural impacts of FDI.

Thompson and de Wet's study, conducted in 2017, examines the concept of BRICS as a community and a collective actor in state-led development initiatives in South Africa. The paper outlines the theoretical framework with which to approach and understand BRICS' collective actions—within that, the socio-political dimensions of BRICS' engagement in South Africa. The paper therefore delves more theoretically into the dynamics of the BRICS group's collective behavior and socio-political dimensions of the group's involvement in South Africa. The conceptual level will be very useful for specialists developing collaborative projects; this theoretical focus may not appeal to practitioners seeking evidence. In addition, the study is also concentrated in South Africa, which may not resonate with the rest of the wider African context.

More specifically, Elkemann and Ruppel (2014) discuss further, within the premise of bilateral investment treaties, the policy implications of China's FDI into Africa on other member countries of the BRICS group of countries. This article analyzes Chinese investment in Africa in general and investment strategies in particular. While discussing impacts that are strategic and economic, the overall thrust is placed at the

backside because the focus happens to be mainly on China, the remaining BRIC members being discussed in passing. Moreover, the legalistic approach may not be appealing to all the readers, and there is a minimum discussion about the social and environmental investments.

Gu, Renwick, and Xue. BRICS Contribution to Green Growth and Sustainable Development in Africa – Renewable Energy As more illustrative of the role of BRICS in promoting green growth and sustainable development in Africa, Gu, Renwick, and Xue focus on renewable energy. The authors assess the contribution of the development bank towards African needs such as clean power, poverty reduction, and job creation. The paper expounds on the contribution of BRICS to sustainable development and clean energy since its formation, including a myriad of case studies showing the performance. However, the environmental focus may neglect more general economic or social impacts, and it deals rather poorly with an analysis of problems encountered in green project implementation. More quantitative data would be useful here.

3.2 Theoretical Frameworks

The interaction between BRICS (Brazil, Russia, India, China, and South Africa) and African countries can be examined through various theoretical lenses, including dependency theory, modernization theory, and world-systems theory. These frameworks help elucidate the complexities of international partnerships and their implications for regional development. Below is a review of selected papers that apply these theories to analyze BRICS-Africa relations.

Özekin (2024) examines the relevance of dependency theory in the modern globalized world, focusing on the BRICS nations'

role. The paper discusses how recent economic developments challenge traditional dependency frameworks and re-evaluates dependency theory considering contemporary global economic shifts. However, the analysis is more conceptual with limited empirical focus and does not provide specific case studies related to BRICS-Africa interactions, focusing more broadly on global implications.

Shitu (2022) evaluates the relevance of underdevelopment and dependency theory in explaining Africa's current economic situation, particularly in the context of globalization and BRICS' investments. The paper reaffirms the applicability of dependency theory in a globalized context, analyzing the economic relationships between BRICS and African countries through a dependency lens. However, it focuses primarily on theoretical discussion without extensive empirical backing and lacks detailed case studies of BRICS investments, limiting the exploration of practical policy implications.

Lisimba (2020) provides a comprehensive literature review on dependency theory, discussing its application in understanding the economic relationship between China and Africa. The paper contrasts dependency theory with other development theories and offers a detailed review of dependency theory in the context of Sino-African relations. However, the focus is predominantly on China, with less emphasis on other BRICS countries, and the discussion is heavily theoretical with limited empirical data, without exploring the practical policy implications of the theoretical findings.

Martins (2019) examines the interplay between dependency, neoliberalism, and globalization, focusing on the experiences of Latin America and drawing parallels to Africa. The paper

discusses how modern world-systems theory can explain these dynamics, providing a nuanced analysis of dependency and development within the modern world system. However, it focuses significantly on Latin America, with less emphasis on Africa, and is highly theoretical with limited empirical analysis, not delving deeply into the specific role of BRICS in Africa.

Boland (2017) revisits world-systems analysis to examine the role of BRICS as emerging global centers. The paper discusses the essential interrelationship between global actors and the implications of BRICS' rise for global economic dynamics. This study revisits and updates world-systems analysis in the context of BRICS' rise, highlighting the strategic economic positioning of BRICS as semi-peripheral states. However, the focus is broad and not exclusively on BRICS-Africa relations, with limited empirical analysis specific to African development.

Imoh-Ita and Amadi (2016) re-engage with world-systems theory to analyze the changing dynamics in international relations, particularly focusing on the role of BRICS in Africa. The paper discusses how BRICS' economic engagements with Africa challenge traditional power structures. It applies world-systems theory to contemporary geopolitical shifts involving BRICS, analyzing the impact of BRICS on Africa's economic position within the global system. However, the theoretical discussion is not supported by extensive empirical data and focuses more on geopolitical shifts than on detailed developmental outcomes.

4. Research Methodology

This study utilizes a mixed-methods approach, combining both deductive and inductive reasoning to analyze the impact of BRICS investments on African socio-economic landscapes. The

deductive approach is employed in reviewing theoretical frameworks such as dependency theory, modernization theory, and world-systems theory. This theoretical analysis forms the basis for understanding the broader context of BRICS' involvement in Africa.

The empirical component involves an inductive approach, utilizing quantitative data from the World Bank and qualitative analysis of policy documents and case studies. The study analyzes socio-economic indicators such as GDP growth rates, employment rates, and FDI inflows across selected North African countries. Descriptive statistics, regression analysis, and content analysis are employed to draw conclusions from the data, with an emphasis on generalizing findings to broader trends in the region.

4.1 Research Design

The mixed-methods approach is especially fitting for this study, as it capitalizes on the advantages of both quantitative and qualitative data. Quantitative methods provide statistical rigor and generalizability, ensuring the data's reliability and broader applicability. In contrast, qualitative methods offer depth and context-specific insights, allowing for a richer, more nuanced understanding of the phenomena under study. This dual approach facilitates a holistic comprehension of the impact of BRICS investments and policies on African nations, capturing both the broad trends and the intricate details of these international interactions.

4.2 Analytical Methods

- **Descriptive Statistics:** The primary source of economic data includes statistics from the World Bank from 2009 to

2022. Descriptive statistical methods summarize and interpret economic data by calculating measures of central tendency (mean, median) and dispersion (standard deviation, range). These statistics provide an overview of the data, helping to identify general trends and patterns in BRICS investments and their economic impacts on African countries.

- **Regression Analysis:** Regression analysis examines the relationship between BRICS investments and socio-economic indicators such as GDP growth rates, employment rates, and poverty levels. This method assesses the causal impact of investments by controlling various factors, with regression models quantifying the extent to which BRICS investments influence these indicators.
- **Content Analysis:** Content analysis is applied to policy documents and case studies to identify key themes and trends. This involves coding textual data to extract relevant information about the strategies, objectives, and outcomes of BRICS investments. The analysis focuses on understanding the qualitative aspects of BRICS-Africa partnerships, including the political and cultural implications of these engagements.

4.3Analysis Procedure

In the analysis process, we utilized Anaconda with Python to efficiently execute the procedure steps. The data analysis adhered to a structured methodology:

- **Data Cleaning and Preparation:** Economic data was cleaned and standardized to ensure consistency, with missing values addressed through imputation methods where appropriate.

- **Descriptive Analysis:** Initial descriptive analyses provided an overview of the data, generating summary statistics and visualizing data through charts and graphs to identify initial patterns.
- **Regression Modelling:** Multiple regression models were developed to test the impact of BRICS investments on various socio-economic indicators. These models included control variables to account for other factors influencing economic outcomes in African countries.
- **Content Coding:** Policy documents and case studies were coded using qualitative data analysis software, with code developed inductively based on the content and emerging themes during the analysis.
- **Synthesis:** Findings from both quantitative and qualitative analyses were synthesized to provide a comprehensive understanding of the impact of BRICS investments in Africa. This synthesis involved integrating statistical results with thematic insights to draw holistic conclusions.

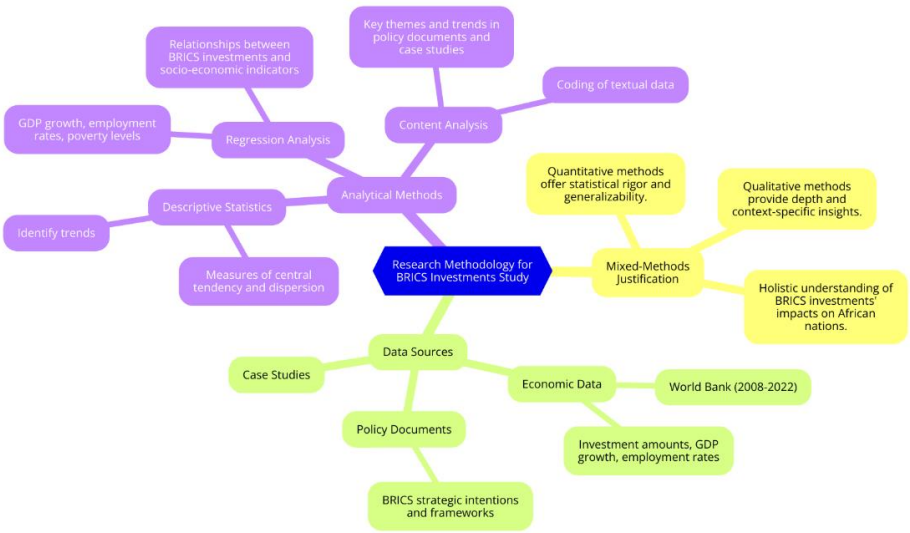

Figure 1: A summary of the research methodology

5. Implementation and Data Analysis

The data used in this study is sourced from the World Bank, spanning the years 2009 to 2022. It provides a comprehensive collection of socio-economic indicators for various African countries. This dataset is crucial for analyzing the impact of BRICS investments on the socio-economic landscape of Africa.

Table 1: Key Features of the Data Source

Feature	Description
Series Name and Code	Includes multiple socio-economic indicators identified by specific series names and codes, e.g., 'Employment in agriculture (% of total employment)' with series code SL.AGR.EMPL.ZS.
Country Coverage	Covers numerous African countries, providing a broad geographic scope for analysis, including South Africa, Morocco, Egypt, Kenya, and Nigeria, among others.
Time Period	Spans from 2009 to 2022, allowing for analysis of trends and changes over a significant period.
Indicators Included	Employment, GDP Growth Rates, and various other indicators relevant to understanding the broader economic context.
Data Format and Structure	Structured in a tabular format, with columns representing different years and rows representing different countries, each cell containing the value of the indicator for a specific year and country.
Data Cleaning and Preparation	Cleaned and standardized to ensure consistency, with missing values addressed through imputation methods where appropriate.
Utilization in Analysis	Descriptive Statistics, Regression Analysis, and Content Analysis applied to summarize, interpret, and extract qualitative insights from the data.

5.1 Data Cleaning and Preparation:

The data cleaning and preparation process involves several critical steps to ensure the data is reliable and ready for analysis. These steps are as follows:

- **Data Extraction:**
  - Extract relevant socio-economic indicators from the dataset.
  - Indicators include population growth, GNI per capita, GDP growth, employment ratio, foreign direct investment, and inflation.
- **Data Conversion and Averaging:**
  - Convert the extracted data to numeric values to facilitate calculations.

$$X_{ij} = to\_numeric(X_{ij}) \qquad (1)$$

where X_{ij} is the value of indicator *i* for country *j*.

  - Calculate the average value for each indicator across multiple years for each country.

$$\overline{X_i} = \frac{1}{n} \sum_{j=1}^{n} X\ ij \qquad (2)$$

where $\overline{X_i}$ is the average value of indicator i and n is the number of years.
- **Handling Missing Values:**
  - Identify and address missing values in the dataset.

$$\text{Missing}\quad X = \sum_{i=1}^{n} 1\ (X_i = \text{NaN}) \qquad (3)$$

Where 1(.) is the indicator function that equals 1 if the condition is true and 0 otherwise.

- Fill missing values with the mean of the respective columns to maintain data integrity.

$$X_{ij} = \begin{cases} \overline{X_i} & if\ xij = NaN \\ X_{ij} & otherwise \end{cases} \qquad (4)$$

- **Data Merging:**
  - Merge the cleaned data for different indicators into a single comprehensive dataset based on the 'Country Name'.
- **Final Cleaning:**
  - Remove any remaining rows with missing values to ensure a complete dataset.
  - Convert all data to numeric format to facilitate analysis.

5.2 Quantitative Analysis

The research focuses on several socio-economic factors—GNI per Capita, GDP Growth, Employment, FDI, Inflation, and Population Growth—to analyze the impact of BRICS investments in African countries. These factors were chosen because they provide a comprehensive overview of the economic health and developmental progress of a nation. By examining these indicators, the study aims to capture the multifaceted effects of BRICS investments, considering both macroeconomic stability and socio-economic development.

5.2.1 Descriptive Statistics

From 2009 to 2015 in "Table 3-A", the average population growth rate across the studied countries remained relatively stable at around 2%. This stability in mean values suggests steady population growth during this period. A notable observation is the consistent decline in the standard deviation,

which decreased from 0.81 in 2009 to 0.48 in 2015. This reduction in variability indicates that population growth rates among these countries became more uniform over time.
The minimum and maximum values show a gradual increase in the minimum growth rates and a slight decrease in the maximum rates, suggesting a convergence in population growth rates. Countries with initially low growth rates experienced increases, while those with higher growth rates saw reductions. The quartile data further supports this trend: the 25th percentile values increased over time, reflecting a rise in the lower end of growth rates, while the 75th percentile values slightly declined, indicating a decrease in the upper range of growth rates. The median values, close to the mean, suggest a symmetric distribution of growth rates across the countries.

Table 3-A: Summary statistics for Population Growth

Year	2009	2010	2011	2012	2013	2014	2015
mean	2.022927	2.018186	2.046642	2.043953	2.025794	2.03009	2.054769
std	0.810149	0.766669	0.710684	0.664167	0.630162	0.559699	0.480507
min	1.189295	1.193036	1.263406	1.329159	1.344234	1.308063	1.253058
25%	1.281106	1.308352	1.342666	1.353772	1.361621	1.576294	2.074017
50%	1.956155	2.02764	2.207643	2.261587	2.315708	2.294178	2.200322
75%	2.727385	2.744379	2.655435	2.525956	2.409931	2.343793	2.20526
max	2.960692	2.817524	2.764062	2.749289	2.697474	2.628124	2.541187

From 2016 to 2021 in “Table 3-B”, the average population growth rate showed a slight declining trend, starting at approximately 1.8% in 2016 and decreasing to around 1.6% by 2021. The standard deviation during this period remained relatively stable with minor fluctuations, indicating consistent variability in growth rates among the countries.

The minimum values for population growth remained relatively stable, while the maximum values gradually decreased,

suggesting a narrowing of disparities in growth rates. The quartile data supports this interpretation: the 25th percentile values remained stable with minor variations, indicating consistent lower-end growth rates, while the 75th percentile values also exhibited stability, reflecting consistent upper-end growth rates. The median values showed a slight decreasing trend, aligning with the overall decline in average growth rates.

The data from 2016 to 2021 indicates a slight downward trend in population growth rates, with less variability and more consistency among different countries. This trend highlights the impact of various socio-economic factors and policies that may be contributing to more uniform population growth rates across the studied regions.

Table 3-B: Summary statistics for Population Growth

Year	2016	2017	2018	2019	2020	2021
mean	1.798131	1.65434	1.754347	1.711864	1.691956	1.611583
std	0.663679	0.8611	0.577522	0.556849	0.5681	0.598459
min	0.972004	0.387278	1.117897	1.043584	1.05316	0.99892
25%	1.22317	1.191629	1.22553	1.295074	1.223179	1.051484
50%	2.086303	1.989768	1.898931	1.794002	1.73313	1.658384
75%	2.202146	2.175708	2.032734	1.978457	2.0097	1.942761
max	2.507034	2.527317	2.496645	2.448201	2.440609	2.406363

From 2009 to 2015 in "Table 4-A", the population growth rates across Egypt, South Africa, Nigeria, Kenya, and Morocco exhibit distinct trends. Egypt shows a steady increase, peaking in 2014 before a slight decline. South Africa's growth rates gradually rise, with a notable increase in 2015. Nigeria consistently maintains the highest growth rates, slightly decreasing towards the end of the period. Kenya's growth rates start high and gradually decline, while Morocco shows the lowest and most stable growth rates throughout the years.

Overall, the data indicates efforts towards population stabilization, with varying success among the countries.

Table 4-A: Population Growth Data after cleaning

Country Name	2009	2010	2011	2012	2013	2014	2015
Egypt, Arab Rep.	1.956155	2.02764	2.207643	2.261587	2.315708	2.343793	2.20526
South Africa	1.189295	1.193036	1.263406	1.329159	1.361621	1.576294	2.074017
Nigeria	2.727385	2.744379	2.764062	2.749289	2.697474	2.628124	2.541187
Kenya	2.960692	2.817524	2.655435	2.525956	2.409931	2.294178	2.200322
Morocco	1.281106	1.308352	1.342666	1.353772	1.344234	1.308063	1.253058

From 2016 to 2022 in “Table 4-B”, population growth rates continue to show unique trends for each country. Egypt's growth rates steadily decline, indicating effective population control measures. South Africa experiences significant fluctuations, with a sharp decline post-2016. Nigeria maintains high growth rates, though with a slight downward trend. Kenya's rates continue to decline gradually, and Morocco maintains the lowest and most stable rates. These trends reflect ongoing demographic policies and socio-economic factors influencing population growth.

Table 4-B: Population Growth Data after cleaning

Country Name	2016	2017	2018	2019	2020	2021	2022
Egypt, Arab Rep.	2.086303	1.989768	1.898931	1.794002	1.73313	1.658384	1.569074
South Africa	0.972004	0.387278	1.22553	1.295074	1.223179	0.99892	0.841058
Nigeria	2.507034	2.527317	2.496645	2.448201	2.440609	2.406363	2.380007
Kenya	2.202146	2.175708	2.032734	1.978457	2.0097	1.942761	1.90951
Morocco	1.22317	1.191629	1.117897	1.043584	1.05316	1.051484	1.023392

Overall, the data and trends reflect the varying success of population management strategies across these countries, with some achieving more stability and control over population

growth than others. The insights gained from these trends can inform future policy decisions to address demographic challenges and promote sustainable development.

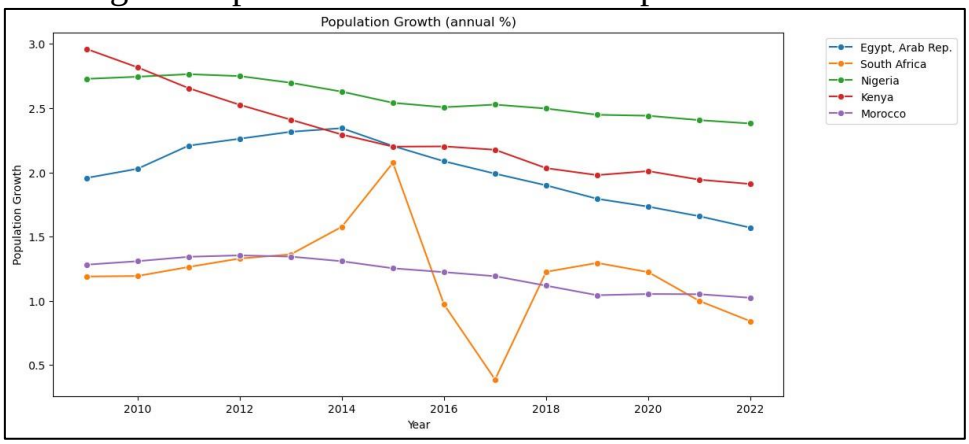

Figure 2: Population Growth

From 2009 to 2015 in "Table 5-A", the data shows a steady increase in the average GNI per capita across the studied countries, reflecting overall economic growth and improved income levels. The mean GNI per capita rose from $2888 in 2009 to $3620 in 2013, followed by a slight decline to $3438 in 2015. This upward trend indicates positive economic development over the period.

Despite the increase in average income, the standard deviation values remained high, indicating persistent income inequality among the countries. The minimum GNI per capita values gradually increased from $830 in 2009 to $1330 in 2015, showing improvements in the lowest income levels. Maximum values fluctuated but remained high, peaking at $8320 in 2012, highlighting significant income levels in some countries.

The quartile values (25%, 50%, and 75%) also increased over the years, reflecting broad-based economic growth across

different income groups. The median values were close to the mean, suggesting a relatively symmetric distribution of income levels. Overall, the data from 2009 to 2015 indicates consistent economic growth and improved GNI per capita, albeit with significant income disparity.

Table 5-A: Summary statistics for GNI per Capita

Year	2009	2010	2011	2012	2013	2014	2015
mean	2888	3062	3316	3550	3620	3590	3438
std	2138.111	2243.729	2579.521	2784.107	2612.795	2248.866	1907.975
min	830	930	1010	1060	1130	1260	1330
25%	2010	2130	2180	2450	2700	2970	2860
50%	2030	2250	2430	2690	2870	3060	3160
75%	3150	3190	3260	3230	3350	3320	3290
max	6420	6810	7700	8320	8050	7340	6550

From 2016 to 2021 in Table “5-B”, the data continues to show an upward trend in GNI per capita, despite some fluctuations. The mean GNI per capita increased from $3264 in 2016 to $3584 in 2021, reflecting ongoing economic improvement. However, the standard deviation values remained relatively high, indicating that income inequality persisted among the countries.

The minimum GNI per capita values showed a steady increase, rising from $1500 in 2016 to $2080 in 2021, which points to improvements in the lowest income levels. The maximum values, while fluctuating, also showed high-income levels in some countries, peaking at $6740 in 2019.

The quartile values continued to rise, indicating broad-based economic growth. The 25th, 50th, and 75th percentile values showed that income levels were improving across different segments of the population. The median values, being close to the mean, suggested a symmetric distribution of income levels.

Table 5-B: Summary statistics for GNI per Capita

Year	2016	2017	2018	2019	2020	2021
mean	3264	3138	3256	3386	3278	3584
std	1661.469	1700.521	1866.797	1975.659	1684.895	1805.071
min	1500	1550	1730	1890	1900	2080
25%	2460	2090	2020	2110	2110	2160
50%	3140	2940	2760	2690	3010	3520
75%	3260	3160	3380	3500	3260	3620
max	5960	5950	6390	6740	6110	6540

The GNI per capita trends for Egypt, South Africa, Nigeria, Kenya, and Morocco from 2009 to 2022, as depicted in Tables 6-A and 6-B, highlight distinct economic patterns and the impact of socio-economic policies across these countries. Egypt's GNI per capita shows a steady and consistent upward trend from $2010 in 2009 to $3160 in 2015, continuing to $4100 in 2022, indicating sustained economic development and improvements in income levels. This steady increase reflects effective economic policies and a growing economy over the period.

South Africa exhibited significant volatility in its GNI per capita. Starting at $6420 in 2009, it peaked at $8320 in 2012 before declining to $6550 in 2015. Despite fluctuations, South Africa's GNI per capita recovered to $6780 in 2022. These fluctuations suggest economic challenges and recovery efforts influenced by both external and internal factors, reflecting the complex economic dynamics of the country.

Table 6-A: GNI per Capita Data after cleaning

Country Name	2009	2010	2011	2012	2013	2014	2015
Egypt, Arab Rep.	2010	2250	2430	2690	2870	3060	3160
South Africa	6420	6810	7700	8320	8050	7340	6550
Nigeria	2030	2130	2180	2450	2700	2970	2860
Kenya	830	930	1010	1060	1130	1260	1330
Morocco	3150	3190	3260	3230	3350	3320	3290

Nigeria faced a downward trend in GNI per capita, decreasing from $2030 in 2009 to $2860 in 2015, and further to $2160 in 2022. This trend highlights economic stagnation and difficulties, underscoring the need for effective economic policies to address these challenges and stimulate growth. The data indicates that Nigeria has struggled to maintain consistent economic progress over the period.

Kenya showed gradual improvement in GNI per capita, increasing from $830 in 2009 to $1330 in 2015, and further to $2170 in 2022. This steady upward trend indicates continuous economic progress and improving income levels, reflecting effective economic policies and development strategies aimed at boosting the country's economic growth.

Morocco demonstrated stable growth in GNI per capita, rising from $3150 in 2009 to $3290 in 2015, and continuing to $3670 in 2022. This stability reflects consistent economic conditions and effective management of economic policies, ensuring steady growth. Morocco's steady increase in GNI per capita underscores the country's ability to maintain economic stability and gradual improvement in income levels.

Table 6-B: GNI per Capita Data after cleaning

Country Name	2016	2017	2018	2019	2020	2021	2022
Egypt, Arab Rep.	3260	2940	2760	2690	3010	3520	4100
South Africa	5960	5950	6390	6740	6110	6540	6780
Nigeria	2460	2090	2020	2110	2110	2160	2160
Kenya	1500	1550	1730	1890	1900	2080	2170
Morocco	3140	3160	3380	3500	3260	3620	3670

Overall, the GNI per capita data from 2009 to 2022 underscores varying degrees of economic growth, stability, and challenges across these countries. Egypt and Kenya show consistent growth, indicating effective economic policies and improvements in income levels. South Africa displays economic volatility with significant fluctuations, reflecting the impact of both positive and negative economic factors. Nigeria faces challenges with a declining trend, highlighting economic stagnation and the need for effective policy interventions. Morocco demonstrates stable growth, maintaining relatively consistent and gradually increasing GNI per capita, reflecting successful economic management and stability.

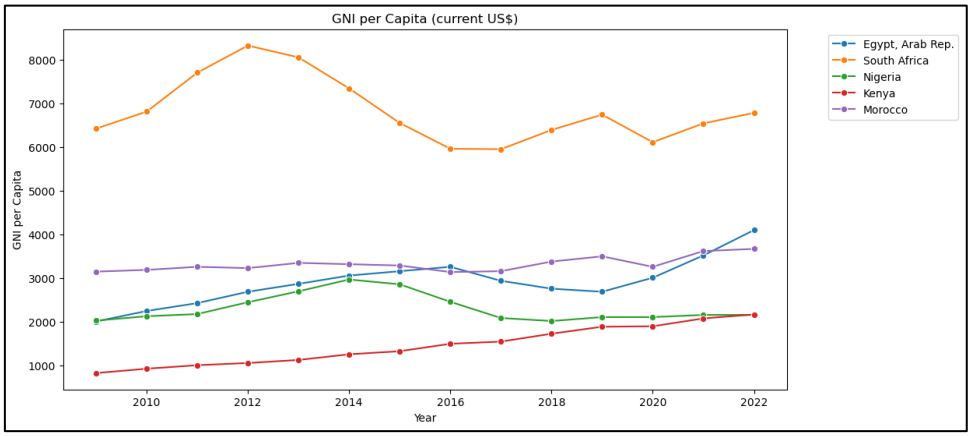

Figure 3: GNI per Capita

From 2009 to 2015 in "Table 7A", the average GDP growth rates for the studied countries reflect varying economic performances. The mean GDP growth rate increased from 3.65% in 2009 to a peak of 5.55% in 2010, before gradually declining to 3.53% in 2015. This indicates an initial recovery post-2009 global financial crisis, followed by moderate growth rates. The standard deviation values highlight significant variability in GDP growth rates among the countries, ranging from 3.44% in 2009 to 1.51% in 2015, suggesting fluctuating economic conditions.

The minimum GDP growth rates ranged from -1.54% in 2009 to 1.32% in 2015, indicating that some countries experienced negative growth or slowdowns during this period. The 25th percentile values show consistent lower quartile growth, while the 50th percentile (median) values indicate that the middle range of countries experienced moderate growth rates. The 75th percentile values show higher growth rates, with the maximum values reaching as high as 8.06% in 2010, reflecting robust economic performances by the top-performing countries.

Table 7-A: Summary statistics for GDP Growth

Year	2009	2010	2011	2012	2013	2014	2015
mean	3.645029	5.550131	4.177361	3.296703	3.852466	3.675762	3.531776
std	3.440054	2.397429	1.644935	1.060758	1.779701	1.959187	1.507076
min	-1.53809	3.039733	1.764572	2.2262	2.185466	1.413826	1.321862
25%	3.30694	3.499557	3.168556	2.396232	2.485468	2.719244	2.652693
50%	3.745769	5.147235	5.121106	3.062344	3.797848	2.915912	4.344583
75%	4.6736	8.005656	5.307924	4.230061	4.122213	5.020111	4.372019
max	8.036925	8.058474	5.524645	4.56868	6.671335	6.309719	4.967721

From 2016 to 2021 in Table 7-B, the average GDP growth rates continue to show variability, with a mean growth rate of 1.63%

in 2016, peaking at 5.45% in 2021. The standard deviation values indicate persistent variability, with significant fluctuations particularly evident in 2020, where the standard deviation was 4.35%, reflecting the economic impacts of the COVID-19 pandemic.

The minimum GDP growth rates show substantial negative values, especially in 2020 with a minimum of -7.18%, indicating severe economic contractions in some countries due to the pandemic. The 25th percentile values reveal that a quarter of the countries experienced negative growth in 2020, while the median values highlight a mix of negative and growth rates over the years. The 75th percentile and maximum values show that some countries managed robust growth rates, particularly in 2021, with a maximum of 8.02%, reflecting strong recoveries in certain economies.

Table 7-B: Summary statistics for GDP Growth

Year	2016	2017	2018	2019	2020	2021
mean	1.625806	3.008182	3.504848	3.205118	-2.33168	5.450474
std	2.586423	1.906526	1.898616	2.174793	4.353216	2.217122
min	-1.61687	0.805887	1.556784	0.259936	-7.17821	3.290646
25%	0.521186	1.157947	1.922757	2.208429	-5.96336	3.647187
50%	0.664552	3.837958	3.065641	2.890975	-1.79425	4.703062
75%	4.213517	4.181221	5.331109	5.114159	-0.27277	7.590489
max	4.346643	5.057898	5.647946	5.552093	3.550165	8.020984

The GDP growth data from 2009 to 2022 for Egypt, South Africa, Nigeria, Kenya, and Morocco, as depicted in Tables 8-A and 8-B, highlight distinct economic performances and the impact of socio-economic policies across these countries.

Egypt's GDP growth rates show a varied but generally positive trend from 2009 to 2022. Starting at 4.67% in 2009, Egypt

experienced fluctuations, with a low of 1.76% in 2011, followed by recovery and consistent growth, reaching 6.59% in 2022. This trend reflects Egypt's economic resilience and recovery efforts, particularly in recent years, indicating successful economic policies and stability.

South Africa's GDP growth rates exhibited significant fluctuations over the period. The growth rate was negative at -1.54% in 2009, recovering to 3.04% in 2010, but experiencing volatility, particularly with a sharp contraction of -5.96% in 2020 due to the COVID-19 pandemic. Despite some recovery to 4.70% in 2021, the growth rate stabilized at a lower 1.91% in 2022. These fluctuations reflect ongoing economic challenges and efforts to stabilize and grow the economy.

Table 8-A: GDP Growth Data after cleaning

Country Name	2009	2010	2011	2012	2013	2014	2015
Egypt, Arab Rep.	4.6736	5.147235	1.764572	2.2262	2.185466	2.915912	4.372019
South Africa	-1.53809	3.039733	3.168556	2.396232	2.485468	1.413826	1.321862
Nigeria	8.036925	8.005656	5.307924	4.230061	6.671335	6.309719	2.652693
Kenya	3.30694	8.058474	5.121106	4.56868	3.797848	5.020111	4.967721
Morocco	3.745769	3.499557	5.524645	3.062344	4.122213	2.719244	4.344583

Nigeria's GDP growth rates show substantial variability. Starting with a high growth rate of 8.04% in 2009, Nigeria saw a gradual decline to 2.65% in 2015. The country experienced a negative growth rate of -1.62% in 2016, followed by moderate recovery, with the growth rate reaching 3.25% in 2022. This trend indicates economic challenges, particularly in the mid-2010s, but also highlights Nigeria's efforts towards economic recovery and stabilization.

Kenya exhibited a generally positive GDP growth trend, with fluctuations. Starting at 3.31% in 2009, Kenya's growth rate

peaked at 8.06% in 2010, followed by consistent growth, reaching 5.65% in 2018. The country experienced a slight contraction in 2020 at -0.27% due to the pandemic, but recovered strongly to 7.59% in 2021, stabilizing at 4.85% in 2022. This positive trend reflects Kenya's robust economic policies and growth strategies.

Morocco's GDP growth rates also show variability. Starting at 3.75% in 2009, Morocco experienced peaks and troughs, with significant growth in some years, such as 5.52% in 2011 and 5.06% in 2017, but also notable contractions, particularly -7.18% in 2020 due to the pandemic. The growth rate rebounded to 8.02% in 2021 but settled at a lower 1.26% in 2022. This trend indicates Morocco's economic resilience and efforts to recover from economic shocks.

Table 8-B: GDP Growth Data after cleaning

Country Name	2016	2017	2018	2019	2020	2021	2022
Egypt, Arab Rep.	4.346643	4.181221	5.331109	5.552093	3.550165	3.290646	6.587846
South Africa	0.664552	1.157947	1.556784	0.259936	-5.96336	4.703062	1.910406
Nigeria	-1.61687	0.805887	1.922757	2.208429	-1.79425	3.647187	3.251681
Kenya	4.213517	3.837958	5.647946	5.114159	-0.27277	7.590489	4.846635
Morocco	0.521186	5.057898	3.065641	2.890975	-7.17821	8.020984	1.258544

The GDP growth trends from 2009 to 2022 reveal the diverse economic challenges and recovery patterns among Egypt, South Africa, Nigeria, Kenya, and Morocco. Egypt and Kenya exhibit resilience and strong recovery measures, particularly post-2016 and post-pandemic. South Africa's economic volatility underscores the need for structural reforms, while Nigeria's dependency on oil highlights its vulnerability to global market fluctuations. Morocco's significant growth variability indicates the impact of external shocks and the importance of economic

diversification. These insights emphasize the varying degrees of success and ongoing challenges in managing economic growth and stability across these countries.

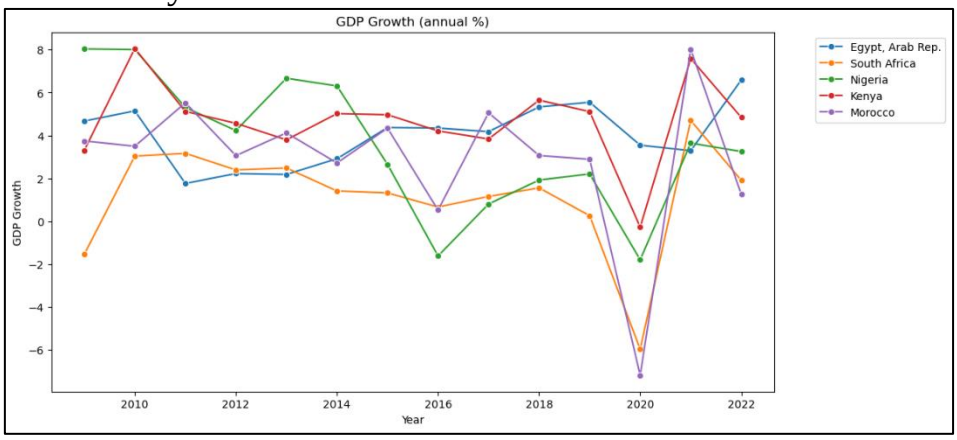

Figure 4: GDP Growth

From 2009 to 2015 in Table "9-A", the employment statistics reveal a slight decline in the mean employment rate, from 52.98% in 2009 to 51.52% in 2015. The standard deviation values indicate increasing variability, from 11.82 in 2009 to 13.19 in 2015, suggesting growing disparities in employment rates among the countries.

The minimum employment rate decreased from 43.55% in 2009 to 40.85% in 2015, indicating that some countries experienced a drop in employment levels. The 25th percentile values remained relatively stable, showing consistent lower quartile employment rates. The median values, close to the mean, indicate a symmetric distribution of employment rates.

The 75th percentile values and maximum employment rates remained high, with slight fluctuations, indicating that the top-performing countries maintained high employment levels throughout this period. The maximum values increased from

71.48% in 2009 to 72.24% in 2015, showing that some countries achieved and maintained high employment rates.

Table 9-A: Summary Statistics for Employment

Year	2009	2010	2011	2012	2013	2014	2015
mean	52.9776	52.3008	52.3796	52.0054	51.8688	51.6154	51.5226
std	11.8153	12.50945	12.50275	12.81311	12.87507	13.07565	13.18988
min	43.546	41.613	43.008	42.38	42.07	41.816	40.849
25%	45.611	45.045	44.138	43.766	43.829	43.398	42.979
50%	46.152	45.1	44.78	44.058	43.851	43.408	44.496
75%	58.098	58.124	58.133	57.845	57.591	57.341	57.054
max	71.481	71.622	71.839	71.978	72.003	72.114	72.235

From 2016 to 2021 in "Table 9-B", the mean employment rate continued to decline, from 51.22% in 2016 to 48.95% in 2021. The standard deviation values remained relatively stable, around 13.25, indicating persistent variability in employment rates among the countries.

The minimum employment rate further decreased from 40.83% in 2016 to 39.72% in 2021, reflecting ongoing challenges in maintaining employment levels in some countries. The 25th percentile values also showed a decline, indicating lower quartile employment rates.

The median values continued to decrease, from 44.05% in 2016 to 40.22% in 2021, highlighting a general downward trend in employment levels. The 75th percentile values and maximum employment rates also showed a declining trend, with maximum values decreasing from 72.36% in 2016 to 69.51% in 2021.

Table 9-B: Summary Statistics for Employment

Year	2016	2017	2018	2019	2020	2021
mean	51.2214	50.664	50.2586	49.986	48.6438	48.948
std	13.38672	13.40177	13.2557	13.01683	13.24685	13.33088
min	40.825	39.659	39.031	38.887	38.303	39.718
25%	42.221	41.092	41.322	41.624	39.442	39.792
50%	44.046	44.679	44.051	43.433	41.386	40.218
75%	56.659	56.293	56.006	55.805	55.026	55.507
max	72.356	71.597	70.883	70.181	69.062	69.505

The employment data from 2009 to 2022 for South Africa, Morocco, Egypt, Kenya, and Nigeria, as shown in Tables 10-A and 10-B, highlights distinct employment patterns and the impact of socio-economic conditions across these countries.

South Africa's employment rates show a declining trend from 2009 to 2022. Starting at 46.15% in 2009, the rate dropped to 44.50% in 2015 and further to 40.52% in 2022. This continuous decline reflects ongoing challenges in the labor market and indicates the need for stronger employment policies and economic interventions to boost job creation and reduce unemployment.

Morocco also experienced a gradual decline in employment rates over the years. From 45.61% in 2009, the rate decreased to 42.98% in 2015 and further to 39.87% in 2022. This trend suggests persistent employment challenges and highlights the necessity for policies focused on economic diversification and labor market improvements.

Table 10-A: Employment Data after cleaning

Country Name	2009	2010	2011	2012	2013	2014	2015
South Africa	46.152	41.613	44.138	43.766	43.829	43.408	44.496
Morocco	45.611	45.1	44.78	44.058	43.851	43.398	42.979

Egypt, Arab Rep.	43.546	45.045	43.008	42.38	42.07	41.816	40.849
Kenya	71.481	71.622	71.839	71.978	72.003	72.114	72.235
Nigeria	58.098	58.124	58.133	57.845	57.591	57.341	57.054

Egypt's employment rates show a significant decline over the period. Starting at 43.55% in 2009, the rate decreased to 40.85% in 2015 and further to 40.97% in 2022. The consistent drop in employment rates indicates structural issues in the labor market, necessitating reforms and initiatives to enhance job opportunities and economic stability.

Kenya exhibited relatively high and stable employment rates compared to the other countries. Starting at 71.48% in 2009, the rate slightly increased to 72.24% in 2015 and remained stable at around 69.51% in 2022. This stability reflects effective labor market policies and economic conditions conducive to maintaining high employment levels.

Nigeria's employment rates show a gradual decline but remained relatively high. From 58.10% in 2009, the rate decreased to 57.05% in 2015 and further to 56.70% in 2022. While the decline is evident, Nigeria maintains a comparatively higher employment rate, suggesting a relatively resilient labor market despite economic challenges.

Table 10-B: Employment Data after cleaning

Country Name	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
South Africa	44.046	44.679	44.051	43.433	41.386	39.718	40.519
Morocco	42.221	41.092	41.322	41.624	39.442	40.218	39.874
Egypt, Arab Rep.	40.825	39.659	39.031	38.887	38.303	39.792	40.967
Kenya	72.356	71.597	70.883	70.181	69.062	69.505	69.506
Nigeria	56.659	56.293	56.006	55.805	55.026	55.507	56.703

The employment data from 2009 to 2022 reveals diverse trends across the studied countries. South Africa, Morocco, and Egypt experienced significant declines in employment-to-population ratios, reflecting labor market challenges and the need for robust employment policies and economic reforms. Kenya's stable and high employment ratios indicate effective labor market management and favorable economic conditions. Nigeria, while showing a gradual decline, maintained relatively high employment ratios, suggesting resilience in its labor market.

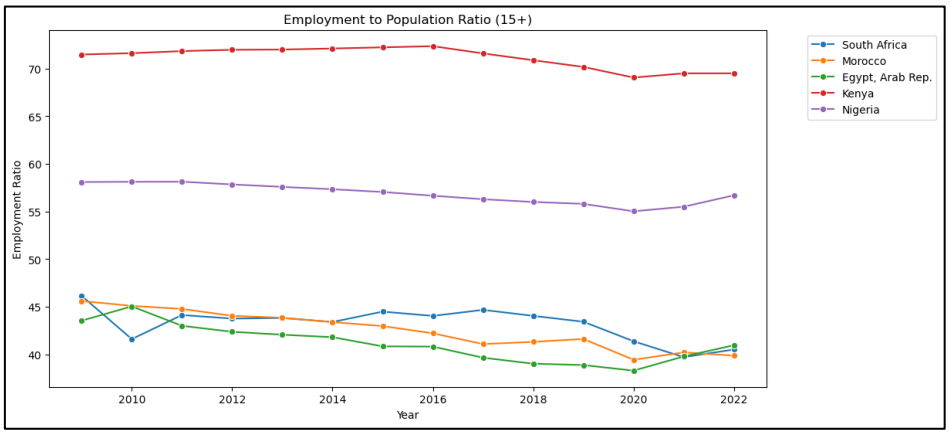

Figure 5: Employment to Population Ratio (15+)

From 2009 to 2015 in “Table 11-A”, the average FDI inflows into the studied countries show significant variability. The mean FDI inflows ranged from $5 billion in 2009 to a peak of $4.49 billion in 2013, followed by a decline to $3.08 billion in 2015. The standard deviation values indicate considerable fluctuations in FDI, ranging from $3.72 billion in 2009 to $2.41 billion in 2015, reflecting varying degrees of investment attractiveness and economic stability among the countries.

The minimum FDI inflows showed a broad range, from as low as -$480 million in 2011 (indicating disinvestment or negative

FDI flows) to $620 million in 2015. The 25th percentile values, median values, and 75th percentile values all exhibited fluctuations, indicating inconsistent investment levels across different countries and years. The maximum FDI inflows reached as high as $8.84 billion in 2011, highlighting significant investments in certain years and countries.

Table 11-A: Summary Statistics for FDI

Year	2009	2010	2011	2012	2013	2014	2015
mean	5E+09	3.5E+09	3.29E+09	3.74E+09	4.49E+09	3.89E+09	3.08E+09
std	3.72E+09	2.78E+09	3.53E+09	2.19E+09	2.64E+09	1.89E+09	2.41E+09
min	1.16E+08	1.78E+08	-4.8E+08	1.38E+09	1.12E+09	8.21E+08	6.2E+08
25%	1.97E+09	1.24E+09	1.45E+09	2.8E+09	3.36E+09	3.53E+09	1.52E+09
50%	6.71E+09	3.69E+09	2.52E+09	2.84E+09	4.19E+09	4.61E+09	3.06E+09
75%	7.62E+09	6.03E+09	4.14E+09	4.63E+09	5.56E+09	4.69E+09	3.25E+09
max	8.56E+09	6.39E+09	8.84E+09	7.07E+09	8.23E+09	5.79E+09	6.93E+09

From 2016 to 2021 in "Table 11-B", the mean FDI inflows show further variability, ranging from $3.28 billion in 2016 to a substantial peak of $10.36 billion in 2021. This sharp increase in 2021 reflects a significant rise in investments, possibly due to post-pandemic economic recovery efforts and improved investor confidence. The standard deviation values remained high, indicating persistent fluctuations, with a notable peak of $17 billion in 2021.

The minimum FDI inflows continued to show a broad range, with the lowest at $426 million in 2020. The 25th percentile values, median values, and 75th percentile values reflect these fluctuations, with significant increases in 2021. The maximum FDI inflows saw a dramatic rise to $40.68 billion in 2021, suggesting exceptionally high investments in certain countries during this period.

Table 11-B: Summary Statistics for FDI

Year	2016	2017	2018	2019	2020	2021
mean	3.28E+09	3.18E+09	3.76E+09	3.72E+09	2.65E+09	1.04E+10
std	2.9E+09	2.42E+09	3.18E+09	3.41E+09	2.06E+09	1.7E+10
min	4.7E+08	1.35E+09	7.68E+08	4.7E+08	4.26E+08	4.63E+08
25%	2.15E+09	2.06E+09	7.75E+08	1.72E+09	1.42E+09	2.26E+09
50%	2.22E+09	2.41E+09	3.54E+09	2.31E+09	2.39E+09	3.31E+09
75%	3.45E+09	2.68E+09	5.57E+09	5.12E+09	3.15E+09	5.12E+09
max	8.11E+09	7.41E+09	8.14E+09	9.01E+09	5.85E+09	4.07E+10

The FDI data from 2009 to 2022 for Egypt, South Africa, Nigeria, Kenya, and Morocco, as shown in Tables 12-A and 12-B, highlight distinct investment patterns and the impact of socio-economic conditions and policies across these countries.

Egypt experienced significant fluctuations in FDI inflows. In 2009, FDI was $6.71 billion, with a sharp decline to negative $480 million in 2011, indicating disinvestment. However, Egypt saw a substantial recovery, with FDI reaching $6.93 billion in 2015 and peaking at $11.4 billion in 2022. This recovery reflects improved investor confidence and effective economic policies post-2011.

South Africa's FDI inflows show high variability. Starting at $7.62 billion in 2009, there were significant fluctuations, including a decline to $1.52 billion in 2015. A dramatic increase to $40.68 billion in 2021 suggests a surge in investment, possibly due to post-pandemic recovery and favorable policies. However, the trend stabilized at $9.19 billion in 2022, reflecting continued efforts to attract and sustain foreign investments.

Table 12-A: FDI Data after cleaning

Country Name	2009	2010	2011	2012	2013	2014	2015
Egypt, Arab Rep.	6.71E+09	6.39E+09	-4.8E+08	2.8E+09	4.19E+09	4.61E+09	6.93E+09
South Africa	7.62E+09	3.69E+09	4.14E+09	4.63E+09	8.23E+09	5.79E+09	1.52E+09
Nigeria	8.56E+09	6.03E+09	8.84E+09	7.07E+09	5.56E+09	4.69E+09	3.06E+09
Kenya	1.16E+08	1.78E+08	1.45E+09	1.38E+09	1.12E+09	8.21E+08	6.2E+08
Morocco	1.97E+09	1.24E+09	2.52E+09	2.84E+09	3.36E+09	3.53E+09	3.25E+09

Nigeria's FDI inflows were also variable, with peaks and troughs. Starting at $8.56 billion in 2009, Nigeria saw fluctuations, with a notable decline to $3.06 billion in 2015. FDI continued to vary, reaching a negative $190 million in 2022, indicating significant disinvestment or economic challenges affecting investor confidence.

Kenya consistently experienced lower FDI inflows compared to other countries. Starting at $116 million in 2009, Kenya saw modest increases, peaking at $1.45 billion in 2011. However, FDI inflows generally declined, reaching $394 million in 2022. This trend highlights ongoing challenges in attracting significant foreign investments.

Morocco exhibited relatively stable FDI inflows with some fluctuations. Starting at $1.97 billion in 2009, Morocco's FDI peaked at $3.54 billion in 2018, followed by a decline to $2.18 billion in 2022. This stability reflects consistent economic conditions and efforts to maintain a favorable investment climate.

Table 12-B: FDI Data after cleaning

Country Name	2016	2017	2018	2019	2020	2021	2022
Egypt, Arab Rep.	8.11E+09	7.41E+09	8.14E+09	9.01E+09	5.85E+09	5.12E+09	1.14E+10
South Africa	2.22E+09	2.06E+09	5.57E+09	5.12E+09	3.15E+09	4.07E+10	9.19E+09
Nigeria	3.45E+09	2.41E+09	7.75E+08	2.31E+09	2.39E+09	3.31E+09	-1.9E+08
Kenya	4.7E+08	1.35E+09	7.68E+08	4.7E+08	4.26E+08	4.63E+08	3.94E+08
Morocco	2.15E+09	2.68E+09	3.54E+09	1.72E+09	1.42E+09	2.26E+09	2.18E+09

The FDI data from 2009 to 2022 reveals diverse trends across the studied countries. Egypt showed a significant recovery and growth in FDI inflows, indicating improved investor confidence and effective economic policies. South Africa experienced high variability, with a notable surge in 2021, suggesting strong recovery efforts and favorable investment conditions. Nigeria's fluctuating FDI inflows, including periods of disinvestment, highlight economic challenges and the need for stable investment policies. Kenya's consistently lower FDI inflows underscore the need for policies to enhance its attractiveness to foreign investors. Morocco's relatively stable FDI inflows reflect effective management of economic conditions and a steady investment climate.

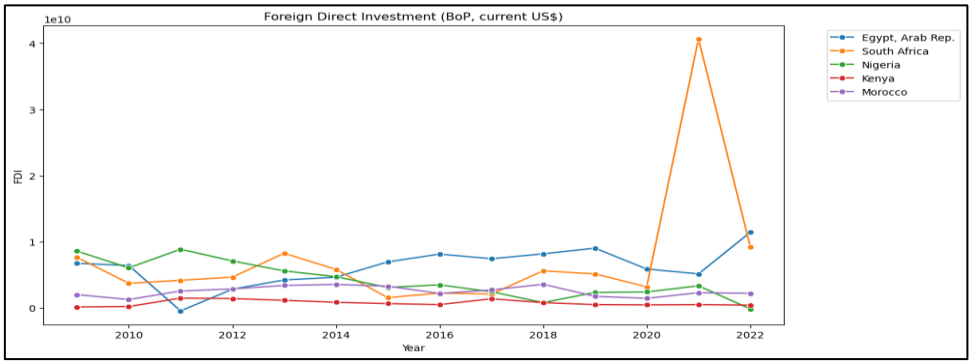

Figure 6: Foreign Direct Investment

From 2009 to 2015 in “Table 13-A”, the inflation statistics reveal significant variability among the studied countries. The mean inflation rate ranged from 5.62% in 2013 to 9.56% in 2009. The standard deviation values indicate considerable fluctuations in inflation rates, with the highest variability in 2009 (11.31) and the lowest in 2013 (2.83), reflecting different economic conditions and monetary policies across the countries.

The minimum inflation rates showed a wide range, from -0.60% in 2011 to 1.26% in 2013, indicating periods of deflation in some countries. The 25th percentile values and median values highlight the distribution of inflation rates, with higher variability in some years. The 75th percentile values and maximum inflation rates reached as high as 27.70% in 2009, demonstrating extreme inflationary pressures in certain countries.

Table 13-A: Summary Statistics for Inflation

Year	2009	2010	2011	2012	2013	2014	2015
mean	9.555788	6.972953	7.289332	8.834373	5.623871	5.825453	6.150335
std	11.30695	6.457327	4.957714	7.092772	2.828492	4.053072	3.311465
min	-0.45256	0.647501	-0.59885	0.533172	1.260262	0.215438	2.863665
25%	0.686099	1.6392	5.539056	4.685206	4.964746	4.662623	3.172935
50%	8.663042	6.128432	9.778458	9.522972	5.844111	5.366546	5.545528
75%	11.18554	10.10687	10.06501	9.947637	7.337562	7.635032	9.238655
max	27.69682	16.34277	11.66298	19.48288	8.712675	11.24763	9.93089

From 2016 to 2021 in "Table 13-B", the mean inflation rates continued to show variability, ranging from 4.88% in 2020 to 10.73% in 2017. The standard deviation values indicate persistent fluctuations, with the highest variability in 2017 (11.26) and the lowest in 2020 (2.88), reflecting diverse economic environments and inflationary pressures.

The minimum inflation rates also exhibited a broad range, from -0.06% in 2017 to 0.14% in 2020, highlighting periods of deflation. The 25th percentile values, median values, and 75th percentile values reflect these fluctuations, with notable increases in 2017 and 2018. The maximum inflation rates saw extreme values, peaking at 29.52% in 2017, indicating severe inflation in some countries.

Table 13-B: Summary Statistics for Inflation

Year	2016	2017	2018	2019	2020	2021
mean	5.912204	10.72635	8.110162	6.741688	4.875383	5.640721
std	3.114912	11.25993	8.042329	5.154459	2.876249	2.906242
min	0.969884	-0.06089	0.939182	0.816805	0.142418	2.394537
25%	5.849629	5.473322	3.993295	4.275234	4.948853	4.330748
50%	6.245663	7.581934	4.215028	4.613525	5.259568	4.847156
75%	6.952172	11.11892	10.22849	10.38478	6.176934	6.500128
max	9.54367	29.51848	21.17482	13.6181	7.849142	10.13103

The inflation data from 2009 to 2022 for Egypt, South Africa, Nigeria, Kenya, and Morocco, as shown in Tables 14-A and 14-B, highlight distinct inflation patterns and the impact of socio-economic conditions and policies across these countries.

Egypt experienced significant fluctuations in inflation rates over the period. Starting at 11.19% in 2009, the rate increased dramatically to 19.48% in 2012, reflecting economic instability. After a period of high inflation, the rate declined to 9.93% in 2015. However, another surge occurred in 2017 with a peak of 29.52%, followed by a decline to 10.43% in 2022. This variability indicates challenges in economic stability and the impact of policy measures on inflation control.

South Africa's inflation rates were relatively stable compared to other countries, with fluctuations within a narrower range. Starting at 8.66% in 2009, the rate declined to 5.55% in 2015, showing effective inflation control. Despite some increases, such as 6.95% in 2016 and 6.50% in 2021, the inflation rate stabilized at 4.76% in 2022, indicating consistent economic policies aimed at maintaining price stability.

Table 14-A: Inflation Data after cleaning

Country Name	2009	2010	2011	2012	2013	2014	2015
Egypt, Arab Rep.	11.18554	10.10687	11.66298	19.48288	8.712675	11.24763	9.93089
South Africa	8.663042	6.128432	5.539056	4.685206	5.844111	5.366546	5.545528
Nigeria	0.686099	16.34277	9.778458	9.947637	4.964746	4.662623	2.863665
Kenya	27.69682	1.6392	10.06501	9.522972	7.337562	7.635032	9.238655
Morocco	-0.45256	0.647501	-0.59885	0.533172	1.260262	0.215438	3.172935

Nigeria's inflation rates showed high variability and persistent inflationary pressures. From a low of 0.69% in 2009, the rate surged to 16.34% in 2010 and fluctuated around high levels, reaching 11.31% in 2022. The consistently high inflation rates highlight ongoing economic challenges and the need for effective monetary policies to control inflation.

Kenya's inflation rates were highly variable, starting at 27.70% in 2009, indicating severe inflationary pressures. The rate decreased to 9.24% in 2015, reflecting efforts to stabilize prices. Despite fluctuations, the inflation rate remained relatively high, with a notable peak at 9.52% in 2017 and stabilizing around 6.01% in 2022. This trend suggests continuous efforts to manage inflation amidst economic challenges.

Morocco exhibited the most stable inflation rates among the studied countries. Starting with a deflationary rate of -0.45% in 2009, the inflation rate remained low, peaking at 3.17% in 2015. Despite some fluctuations, Morocco managed to maintain low inflation rates, with a slight increase to 3.05% in 2022. This stability is reflected in effective economic policies and inflation control measures.

Table 14-B: Inflation Data after cleaning

Country Name	2016	2017	2018	2019	2020	2021	2022
Egypt, Arab Rep.	6.245663	29.51848	21.17482	13.6181	6.176934	4.847156	10.42579
South Africa	6.952172	5.473322	3.993295	4.613525	5.259568	6.500128	4.759484
Nigeria	9.54367	11.11892	10.22849	10.38478	7.849142	10.13103	11.31134
Kenya	5.849629	7.581934	4.215028	4.275234	4.948853	4.330748	6.008764
Morocco	0.969884	-0.06089	0.939182	0.816805	0.142418	2.394537	3.051512

The inflation data from 2009 to 2022 reveals diverse trends across the studied countries. Egypt and Nigeria experienced significant inflationary pressures and high variability, indicating challenges in economic stability and the need for effective policy interventions. South Africa showed relatively stable inflation rates, reflecting consistent economic policies aimed at maintaining price stability. Kenya exhibited high variability and persistent inflationary pressures, highlighting the need for continuous efforts to manage inflation. Morocco demonstrated stable and low inflation rates, indicating successful economic management and effective inflation control measures.

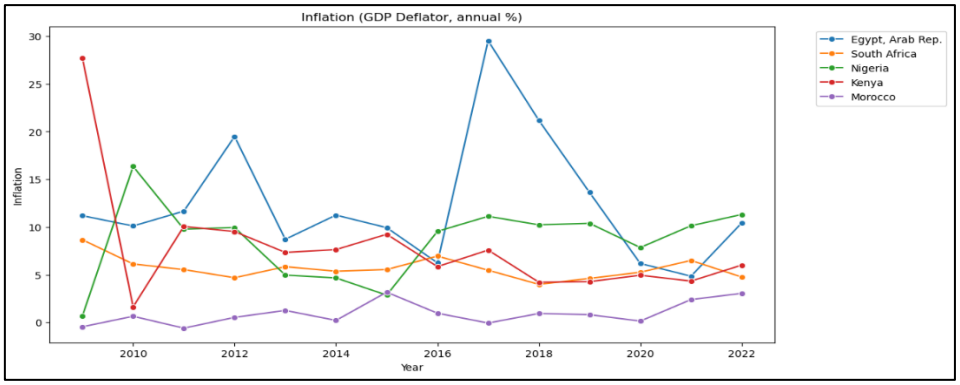

Figure 7: Inflation

5.2.2 Regression Analysis Outcomes

Understanding the relationships between various socio-economic factors is crucial for informed policy-making and economic planning. Correlation analysis is a statistical method used to measure the strength and direction of the linear relationship between two variables. By analyzing the correlations among variables such as GDP growth, foreign direct investment (FDI), inflation, employment rate, and gross national income (GNI) per capita, researchers can gain insights into the underlying dynamics that drive economic performance.

Correlation analysis helps identify the degree to which changes in one variable are associated with changes in another. This method is particularly useful in economic research, as it allows for the examination of complex interdependencies among multiple factors. For instance, understanding how FDI influences GDP growth or how inflation impacts employment rates can provide valuable information for developing effective economic policies.

The first step in conducting a correlation analysis is to formulate a clear research question. This involves defining the objective of the analysis, such as understanding the relationships between key socio-economic indicators. For example, one might aim to explore how FDI and inflation impact GDP growth.

Next, it is essential to select the variables to be included in the correlation matrix. These variables might include GDP growth (annual %), FDI net inflows (current US$), inflation (GDP deflator, annual %), employment to population ratio (15+), GNI per capita (current US$), and population growth (annual %).
Once the variables are selected, the data for each variable must be collected and cleaned. This involves extracting data from

reliable sources such as the World Bank or IMF and handling missing values appropriately. Missing values can be filled using various methods, such as replacing them with the mean of the column. Additionally, all data must be converted to a numeric format to facilitate the calculation of the correlation matrix.

After the data has been cleaned, it must be merged into a single dataset with countries as rows and variables as columns. This merged dataset will include the selected socio-economic indicators for each country.

The correlation matrix is then calculated using Pearson's correlation coefficient, which measures the linear relationship between pairs of variables. The formula for Pearson's correlation coefficient r between two variables X_i and X_j is:

$$r_{ij} = \frac{\sum_{k=1}^{n} \left(X_{ik} - \overline{X_j} \right) \left(X_{jk} - \overline{X_j} \right)}{\sqrt{\sum_{k=1}^{n} \left(X_{ik} - \overline{X_i} \right)^2 \sum_{k=1}^{n} \left(X_{jk} - \overline{X_j} \right)^2}} \quad (5)$$

Where $\overline{X_i}$ and $\overline{X_j}$ are the means of X_i and X_j, respectively, and n is the number of observations (countries). The resulting correlation matrix R will show the correlation coefficients for all pairs of variables, providing a comprehensive view of their linear relationships.

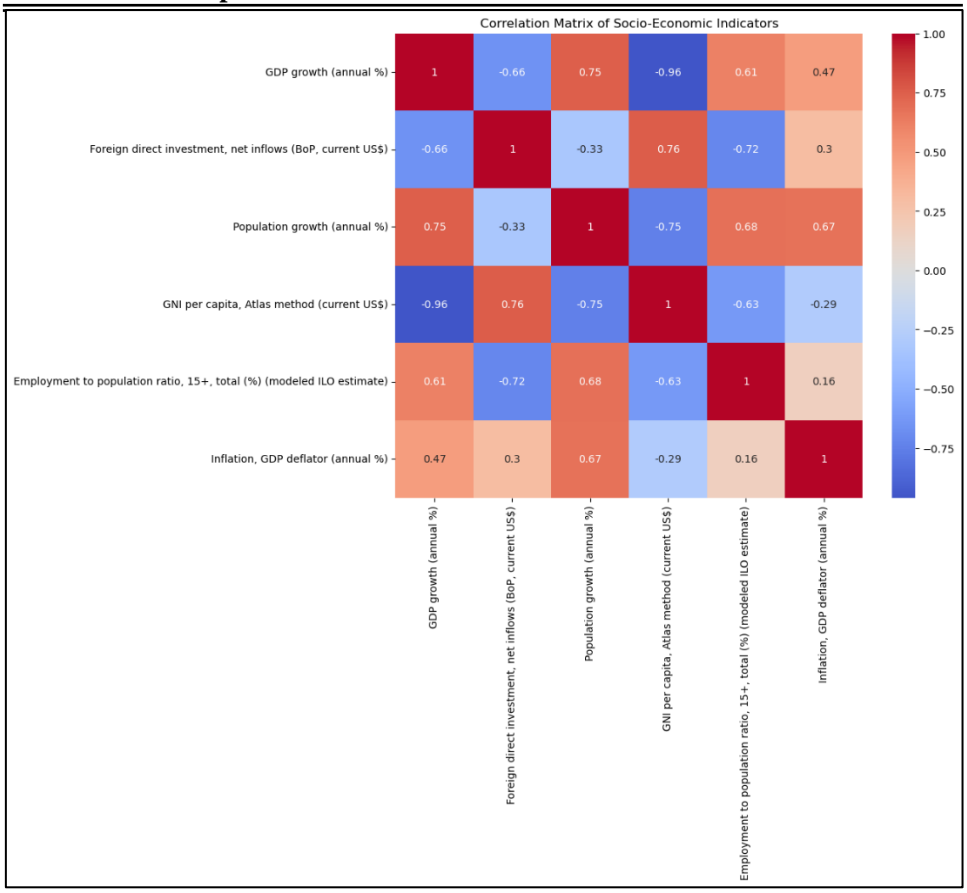

Figure 8: Socio-economic correlation matrix in heatmap

Based on the correlation matrix, the strongest correlation is between GDP growth (annual %) and GNI per capita, with a very strong negative correlation of -0.959480. This indicates that as GNI per capita increases, GDP growth tends to decrease significantly, suggesting a potential inverse relationship between overall national income levels and economic growth rates.

The second strongest correlation is a strong positive correlation of 0.762638 between GNI per capita and foreign direct investment (FDI) net inflows. This suggests that higher levels

of national income are associated with greater foreign investment, reflecting the attractiveness of wealthier economies to foreign investors.

Another strong positive correlation of 0.751826 is observed between GDP growth and population growth (annual %). This indicates that countries with higher population growth rates tend to experience higher GDP growth, highlighting the impact of demographic changes on economic expansion.

Conversely, there is a strong negative correlation of -0.749915 between population growth and GNI per capita, indicating that countries with higher population growth tend to have lower GNI per capita. This suggests that rapid population growth may strain resources and reduce average income levels.

A strong negative correlation of -0.715442 exists between FDI net inflows and the employment to population ratio (15+, total %). This implies that higher foreign investment is associated with lower employment ratios, potentially due to the capital-intensive nature of foreign investments that may not immediately translate into increased employment.

The relationship between population growth and the employment to population ratio is also strong and positive, with a correlation of 0.681834. This indicates that higher population growth is associated with higher employment ratios, suggesting that growing populations may drive labor market expansions.

GDP growth and FDI net inflows have a moderate negative correlation of -0.664143, suggesting that higher GDP growth rates are associated with lower levels of foreign investment.

This could indicate that as economies grow, they may become less reliant on foreign investment.

A moderate positive correlation of 0.613971 is observed between GDP growth and the employment to population ratio, suggesting that higher economic growth is associated with higher employment levels, reflecting the positive impact of economic expansion on job creation.

There is a moderate positive correlation of 0.671114 between population growth and inflation (GDP deflator, annual %), indicating that higher population growth rates are associated with higher inflation rates. This could be due to increased demand for goods and services in rapidly growing populations driving up prices.

GDP growth and inflation have a moderate positive correlation of 0.474164, suggesting that higher economic growth is associated with higher inflation. This relationship may reflect increased consumer spending and investment driving up demand and prices.

The correlation between FDI net inflows and inflation is weak but positive at 0.300695, indicating a slight tendency for higher foreign investment to be associated with higher inflation rates. This could be due to increased economic activity and spending driven by foreign investments.

GNI per capita and inflation exhibit a weak negative correlation of -0.291765, suggesting that higher income levels are slightly associated with lower inflation rates. This could reflect the stabilizing effect of higher incomes on prices.

Finally, there is a very weak positive correlation of 0.159728 between the employment to population ratio and inflation, indicating a minimal relationship between employment levels and inflation rates.

Given the detailed examination of socio-economic factors and their relationships highlighted in the correlation matrix, three regression models can be proposed for further analysis in the research:

Model 1: Determinants of GDP Growth

Dependent Variable: GDP growth (annual %)
Independent Variables:

- Population growth (annual %): Strong positive correlation (0.75)
- GNI per capita (current US$): Strong negative correlation (-0.96)
- Employment to population ratio (15+, total %): Moderate positive correlation (0.61)

Key Metrics and Interpretation:

- R-squared (0.923): This value suggests that 92.3% of the variability in GDP growth can be explained by the model's independent variables. This is typically considered very high, indicating a good fit of the model to the data.
- Adj. R-squared (0.692): Adjusted R-squared is significantly lower than the R-squared, which is concerning. This discrepancy suggests that some of the independent variables might not be contributing

meaningfully to the model, or it might be due to the small sample size which can inflate the R-squared value.

- F-statistic (0.1020) with a Prob (F-statistic) of 0.948: This F-statistic is very low, and the probability of getting such a statistic if the null hypothesis were true is extremely high (94.8%). This indicates that the model is not statistically significant at explaining the variation in GDP growth relative to a model without these predictors.

Coefficients and P-values:

- Constant (4.9717): The coefficient for the constant is not significant (p = 0.770), suggesting it does not significantly differ from zero.
- Population Growth (annual %) Coefficient (0.1625): This coefficient is also not statistically significant (p = 0.944), indicating that changes in population growth do not have a statistically significant impact on GDP growth in this model.
- GNI per Capita Coefficient (-0.0006): This coefficient suggests a very small negative impact of GNI per capita on GDP growth, but like the other coefficients, it's not statistically significant (p = 0.837).
- Employment to Population Ratio Coefficient (-0.0005): This is also not significant (p = 0.998), indicating no clear relationship between the employment ratio and GDP growth based on this model.

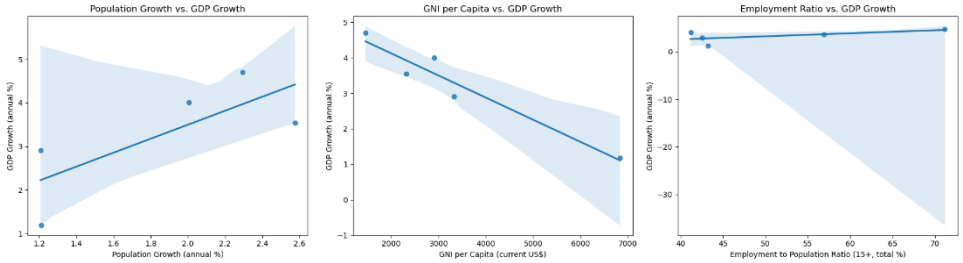

Figure 9: A Screenshot from regression output of Model 1

This model, despite a high R-squared, fails to provide statistically significant results for any of its predictors. The adjustments for robust standard errors (using HC3) show that the initial impressions of a good fit might be misleading, primarily due to the small sample size or potentially non-representative data. The large standard errors relative to the coefficients suggest that the estimates are not precise, likely due to multicollinearity or other issues.

This might imply the need for a reevaluation of the chosen model, consideration of different variables, or a need for more data to produce reliable and generalizable results. Further diagnostic tests for multicollinearity, such as VIF, or reshaping the model might be necessary to enhance its reliability and validity.

<u>Model 2</u>: Determinants of Employment to Population Ratio

Dependent Variable: Employment to population ratio (15+, total %) (modeled ILO estimate)

Independent Variables:

- GDP growth (annual %): Moderate positive correlation (0.61)

- Population growth (annual %): Strong positive correlation (0.68)
- GNI per capita (current US$): Moderate negative correlation (-0.63)

Key Metrics and Interpretation:

- R-squared (0.495): This suggests that approximately 49.5% of the variability in the employment to population ratio can be explained by the independent variables in this model. However, this might be misleading due to the small sample size.
- Adj. R-squared (-1.020): The adjusted R-squared being negative indicates a poor fit of the model, particularly when penalizing for the number of predictors relative to the number of data points. This often occurs with very small datasets or when the model does not actually improve prediction over a simple mean.
- F-statistic (0.01955) with a Prob (F-statistic) of 0.994: This indicates that the overall model is not statistically significant. The probability is extremely high, suggesting that there is about a 99.4% chance that these variables would provide an F-statistic as large as the one observed if they had no actual impact on the employment to population ratio.

Coefficients and P-values:

- Constant (39.4599): Not statistically significant (p = 0.966), indicating it does not contribute meaningfully to the model.
- GDP Growth (annual %) Coefficient (-0.3087): This coefficient is not statistically significant (p = 0.998),

suggesting GDP growth does not impact the employment ratio within the scope of this model.

- Population Growth (annual %) Coefficient (10.0670): Also not statistically significant (p = 0.952), indicating no significant impact on the employment ratio.
- GNI per Capita Coefficient (-0.0018): This is also not statistically significant (p = 0.985). The negative sign suggests a decrease in the employment ratio with an increase in GNI per capita, but the effect is not statistically meaningful.

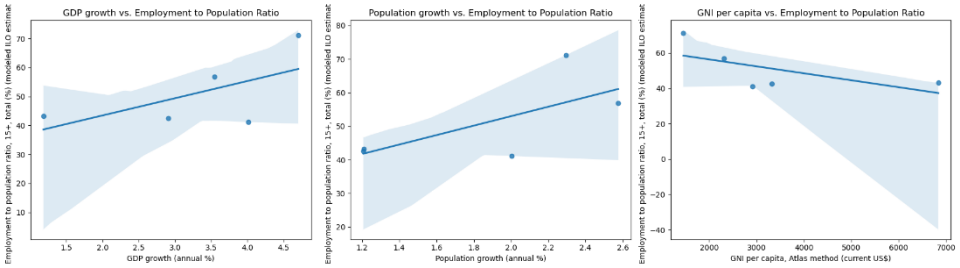

Figure 10: A Screenshot from regression output of Model 2

The model demonstrates very poor statistical significance across all predictors and the overall model, indicated by extremely high p-values and a negative adjusted R-squared. This implies that the model does not effectively explain the variability in the employment to population ratio and is statistically equivalent to a model with no independent variables.

The results suggest that there might be issues with multicollinearity, inappropriate model specification, or simply that the dataset is too small to provide reliable statistical inferences. Diagnostic tests for multicollinearity (like VIF),

using different model specifications, or increasing the dataset size could be steps towards improving the model's reliability.

Model 3: Influence of GNI per Capita on Inflation

Dependent Variable: Inflation (GDP deflator, annual %)
Independent Variables:

- GDP growth (annual %): Moderate positive correlation (0.47)
- Foreign direct investment (FDI) net inflows (BoP, current US$): Weak positive correlation (0.30)
- Population growth (annual %): Moderate positive correlation (0.67)
- GNI per capita (current US$): Weak negative correlation (-0.29)

Key Metrics and Interpretation:

- R-squared (0.944): This value suggests that about 94.4% of the variance in inflation rates can be explained by the model's independent variables. This high R-squared indicates a strong fit of the model to the data.
- Adj. R-squared (0.775): Despite the high R-squared, the adjusted R-squared is significantly lower, though still relatively high. This metric accounts for the number of predictors in the model relative to the number of observations, suggesting that while the model fits well, it might be overfitting given the very small sample size.
- F-statistic (0.8256) with a Prob (F-statistic) of 0.614: The F-statistic is relatively low, and its corresponding p-value is high, indicating that the overall model might not be statistically significant. This means that the data does not provide strong evidence that the model parameters are non-zero.

Coefficients and P-values:

- Constant (-12.7798): This coefficient is not statistically significant (p = 0.780), indicating the intercept does not provide meaningful information in predicting inflation.
- GDP Growth (annual %) Coefficient (2.8210): Not statistically significant (p = 0.863), suggesting that GDP growth does not have a significant impact on inflation within this model.
- Foreign Direct Investment Coefficient (1.566e-09): This coefficient, representing the impact of FDI net inflows on inflation, is also not statistically significant (p = 0.796), indicating that FDI does not have a measurable effect on inflation in this model.
- Population Growth (annual %) Coefficient (2.2099): Like the other variables, this coefficient is not statistically significant (p = 0.889), suggesting that population growth does not significantly influence inflation in the model.

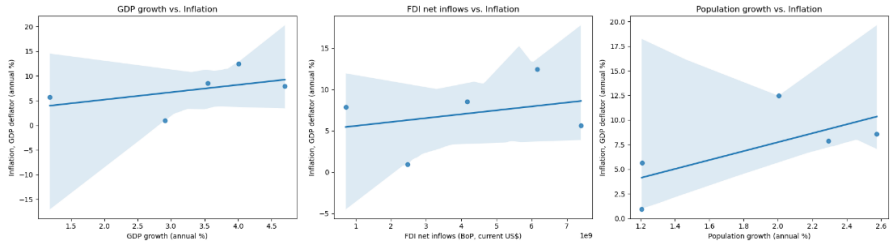

Figure 11: A Screenshot from regression output of Model 3

Although the model shows a high R-squared value, the lack of statistical significance for all independent variables and the overall model suggests that the predictors used do not meaningfully impact inflation. The high R-squared combined with non-significant p-values might indicate potential issues such as overfitting, especially given the very small sample size.

This model would benefit from a larger sample size and possibly a review of model assumptions or the inclusion of different explanatory variables to better understand the determinants of inflation.

Table 15: Summary of the three models results

Metric	Model 1: Determinants of GDP Growth	Model 2: Determinants of Employment to Population Ratio	Model 3: Influence of GNI per Capita on Inflation
R-squared	0.923	0.495	0.944
Adj. R-squared	0.692	-1.02	0.775
F-statistic	0.102	0.01955	0.8256
Prob (F-statistic)	0.948	0.994	0.614

Table 16: Pros and Cons for Models Implementation

Model	Pros	Cons
Model 1: Determinants of GDP Growth	- Highest R-squared (0.923), indicating a high percentage of variance explained by the model. - Relatively high adjusted R-squared (0.692).	- Very high p-values for all variables, indicating none are statistically significant. - The F-statistic is very low, and the associated p-value is high, indicating the overall model is not statistically significant.
Model 2: Determinants of Employment to Population Ratio	- Explains a moderate amount of variance (R-squared = 0.495).	- Negative adjusted R-squared, indicating a poor model fit. - Extremely high p-values for all variables, indicating none are statistically significant. - The F-statistic is very low, and the associated p-value is high, indicating the overall model is not statistically significant.
Model 3: Influence of GNI per Capita on Inflation	- High R-squared (0.944), indicating a high percentage of variance explained by the model. - Relatively high adjusted R-squared (0.775).	- High p-values for all variables, indicating none are statistically significant. - The F-statistic is relatively low, and the associated p-value is high, indicating the overall model is not statistically significant.

5.3 Qualitative Analysis

5.3.1 Auto-code Themes

In the qualitative phase of our research, we utilized NVivo to perform an auto-code analysis on the policy documents and case studies related to BRICS investments in Africa. The purpose of this analysis was to identify key themes and trends within the textual data. The auto-code function in NVivo allowed us to systematically code the documents and extract relevant information regarding the strategies, objectives, and outcomes of BRICS investments.

5.3.2 Visualization of Auto-code Themes

To better understand the distribution and frequency of themes across the documents, we generated a 3D bar chart visualization. This visualization highlights the coding references count for each theme across different documents, providing a clear overview of the key areas of focus.

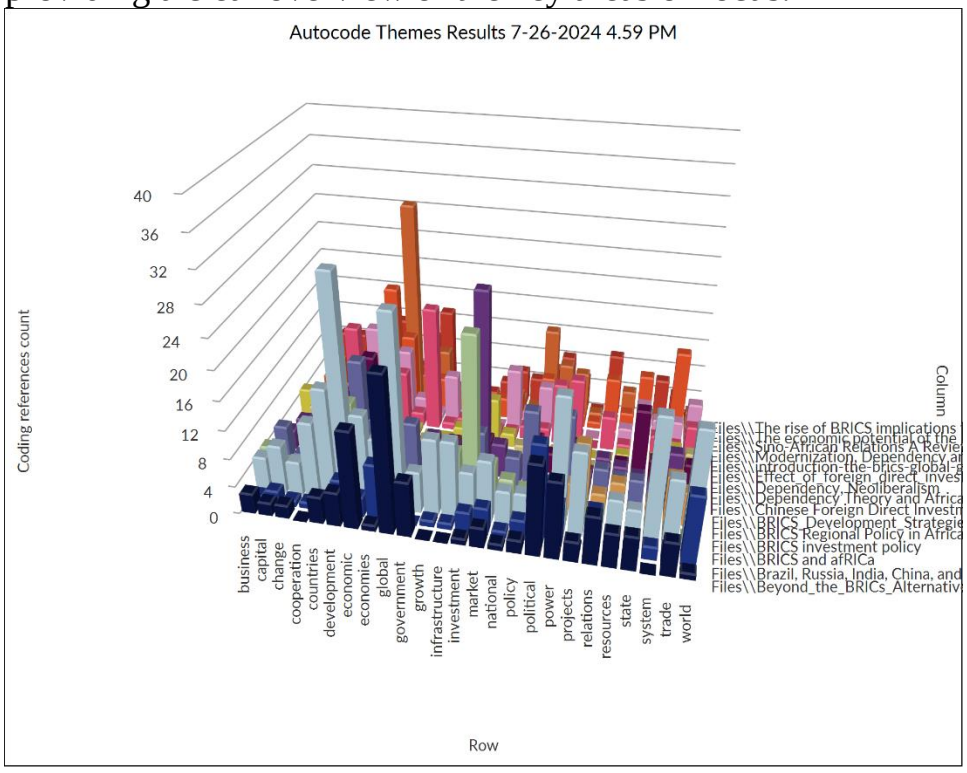

Figure 12: 3D Bar Chart of Auto-code Themes Results

The 3D bar chart illustrates the frequency of references for themes such as business, capital, development, economic, infrastructure, investment, and political among others. This visualization helps in identifying which themes are most prevalent in the documents analyzed.

Auto-code Themes Results:

1. **Document Themes**:

- The documents cover various themes related to business, capital, change, cooperation, countries, development, economic aspects, and more.
- Themes such as 'Development', 'Economic', 'Global', and 'Countries' are prominent across multiple documents, indicating their importance in the context of the data analyzed.

2. **Key Themes and Their Counts**:

- Business: Highest frequency observed in the 3rd document.
- Development: High frequency in most documents, particularly in the 3rd document.
- Global: Consistently mentioned, with the highest frequency in the 3rd document.
- Political and Power: These themes appear significantly across various documents.
- Trade and Relations: Notably present in several documents, reflecting their relevance to the overall subject matter.

Word Frequency Query Results:

1. **Top Words and Their Frequencies**:

- "brics": 2078 occurrences, reflecting its central role in the documents analyzed.
- "africa": 1935 occurrences, indicating a strong focus on Africa within the context of BRICS.
- "development": 1409 occurrences, emphasizing the theme of development.
- "countries": 1198 occurrences, underscoring the importance of different countries in the analysis.
- "south": 970 occurrences, likely referring to South Africa or the global south.

2. **Weighted Percentage**:
   The weighted percentage provides insight into the relative importance of each word within the overall corpus, with "brics" and "africa" being the most prominent.

Table 17: Word Weights in research, policies, and case studies

Word	Count	Weighted Percentage (%)
Brics	2078	1.43
Africa	1935	1.33
Development	1409	0.97
Countries	1198	0.82
South Africa	970	0.67
African	877	0.60
Economic	832	0.57

These findings suggest a strong focus on BRICS countries, their development, and the socio-economic impact on Africa, aligning with the research themes.

6. Findings from Quantitative and Qualitative Analyses

The quantitative analysis of BRICS investments in Africa reveals significant insights into various socio-economic indicators. From 2009 to 2015, the average GDP growth rate in the studied African countries showed an initial recovery following the global financial crisis, peaking at 5.55% in 2010 and gradually declining to 3.53% in 2015. Between 2016 and 2021, GDP growth rates exhibited variability, heavily impacted by the COVID-19 pandemic, leading to severe contractions in 2020 followed by strong recoveries in 2021. Country-specific insights reveal that Egypt demonstrated resilience with steady economic recovery and consistent GDP growth, while South Africa experienced significant volatility, indicating the need for structural reforms. Nigeria's fluctuating growth rates underscored ongoing economic challenges, whereas Kenya's consistent growth highlighted robust economic policies. Morocco exhibited significant variability, emphasizing the importance of economic diversification and resilience.

Foreign Direct Investment (FDI) inflows into African countries showed substantial variability from 2009 to 2015, reflecting fluctuating investment attractiveness and economic stability. The period from 2016 to 2021 continued to exhibit significant FDI fluctuations, with a notable peak in 2021, indicating a post-pandemic recovery. Egypt experienced significant fluctuations but demonstrated substantial recovery and growth in FDI, reflecting improved investor confidence. South Africa's FDI inflows were highly variable, with a dramatic surge in 2021 suggesting strong recovery efforts. Nigeria faced significant

disinvestment, highlighting economic challenges, while Kenya consistently attracted lower FDI inflows, underscoring the need for enhanced investment policies. Morocco's relatively stable FDI inflows reflected effective management of economic conditions.

Employment rates across the studied countries generally declined from 2009 to 2021, indicating growing disparities and persistent labor market challenges. South Africa and Morocco experienced significant declines, reflecting ongoing employment challenges. Egypt showed consistent drops in employment rates, indicating structural labor market issues. In contrast, Kenya maintained high and stable employment rates, suggesting effective labor market policies. Nigeria's employment rates showed a gradual decline but remained relatively high, indicating labor market resilience despite economic challenges.

Inflation rates from 2009 to 2015 exhibited significant variability, with periods of high inflationary pressures. From 2016 to 2021, inflation rates continued to fluctuate, reflecting diverse economic environments and monetary policies. Egypt experienced significant inflationary pressures, indicating economic stability challenges. South Africa managed relatively stable inflation rates, reflecting consistent economic policies. Nigeria showed high variability and persistent inflationary pressures, while Kenya's inflation rates were highly variable, suggesting continuous efforts to manage inflation. Morocco maintained stable and low inflation rates, reflecting successful economic management and effective inflation control measures. Qualitative analyses provide a deeper understanding of the geopolitical and strategic dimensions of BRICS investments in Africa. BRICS nations have combined large economic

investments with strategic geopolitical partnerships, enhancing a diversified and multipolar global order. Cultural exchanges have also played a significant role, fostering mutual understanding and cooperation. Policy initiatives and development projects undertaken by BRICS countries have aimed to align investments with local economic conditions, promoting economic stability and growth. However, these engagements present challenges, such as potential dependency, socio-political consequences, and sustainability concerns.

Theoretical frameworks, including dependency theory, modernization theory, and world-systems theory, offer valuable perspectives on BRICS investments in Africa. Dependency theory explores whether these investments entrench economic dependence or offer real growth, while modernization theory, despite its criticisms, helps grade progress and integrate African economies into global markets. World-systems theory highlights the semi-peripheral role of BRICS in challenging traditional core economies and their strategic economic positioning. Case studies further illuminate the impacts of BRICS-funded projects, revealing significant infrastructural development, trade relationships, and technological innovations across Africa. This empirical evidence suggests that while BRICS investments positively impact economic stability, their long-term sustainability remains a concern.

Synthesizing the findings from both quantitative and qualitative analyses provides a comprehensive understanding of the impact of BRICS investments in Africa. Quantitative analyses highlight trends and patterns in economic growth, FDI inflows, employment rates, and inflation, showcasing the multifaceted effects of BRICS investments. Qualitative analyses add depth and context, examining geopolitical partnerships, policy

initiatives, theoretical frameworks, and case studies. This holistic approach underscores the complex interplay between economic stability, strategic partnerships, and socio-political dynamics, offering valuable insights for future BRICS-Africa cooperation and global governance paradigms.

7. Recommendations

To maximize the benefits and mitigate the risks associated with BRICS investments, the following actionable recommendations are proposed:

- **Policy Framework Development**: African governments should establish robust policy frameworks that regulate foreign investments, ensuring that these investments contribute to sustainable development. This includes setting up regulations that mandate technology transfer and capacity building as part of investment agreements.
- **Economic Diversification Strategies**: To reduce dependency on BRICS investments, African countries should diversify their economies. This can be achieved by investing in other sectors such as technology, agriculture, and tourism, thereby creating a more balanced and resilient economic structure.
- **Strengthening Regional Cooperation**: African nations should enhance regional cooperation to leverage collective bargaining power in negotiations with BRICS countries. Regional bodies can play a critical role in standardizing investment terms and ensuring fair trade practices.
- **Transparency and Accountability**: Implementing mechanisms for transparency and accountability in the management of foreign investments is crucial. This includes regular audits, public disclosure of investment terms, and civil society participation in monitoring projects.

- **Capacity Building and Human Capital Development**: Invest in human capital development to ensure that the workforce can adapt to new technologies and industries introduced by BRICS investments. This involves enhancing educational systems, vocational training programs, and fostering innovation and entrepreneurship.

8. Future Work

The findings and recommendation of this research on the impact of BRICS investments in Africa pave the way for several avenues for future work. To build on the current study, future research should focus on conducting longitudinal studies that track the socio-economic impacts of BRICS investments over an extended period. This approach would provide deeper insights into the long-term effects and sustainability of these investments, helping to understand the temporal dynamics and evolving nature of BRICS-Africa relations.

Sector-specific analyses are another critical area for future research. While the current study provides a broad overview, examining the impacts of BRICS investments in specific sectors such as infrastructure, healthcare, education, and technology can reveal more detailed and nuanced insights into how these investments influence different aspects of socio-economic development. Additionally, future research should focus on microeconomic impact studies to assess how BRICS investments affect local businesses, entrepreneurship, and employment at a granular level, thereby understanding the grassroots-level implications of these investments.

Comparative studies between BRICS and other major global investors, such as the OECD countries, would provide a more

comprehensive understanding of the relative effectiveness and unique contributions of BRICS investments. Such studies could highlight the differences in investment strategies and outcomes. Investigating the role of policy and governance frameworks in mediating the impacts of BRICS investments is also crucial. Future work should examine how different regulatory environments, governance structures, and policy initiatives in African countries influence the effectiveness and sustainability of BRICS investments.

While economic impacts are critical, future research should also explore the cultural and social impacts of BRICS investments. Understanding how these investments affect social cohesion, cultural exchanges, and societal well-being can provide a more holistic view of their implications. Given the global emphasis on sustainable development, future research should assess the environmental impacts of BRICS investments. Analyzing how these investments align with environmental sustainability goals and their effects on natural resources and ecosystems would be valuable.

Incorporating detailed case studies and fieldwork into future research can provide in-depth qualitative insights into specific BRICS-funded projects. This approach would help in capturing the lived experiences and perspectives of local communities impacted by these investments. Exploring the role of technological innovations driven by BRICS investments in Africa can reveal how these innovations contribute to economic development and modernization. Future research should assess the transfer of technology and its integration into local economies.

As global power dynamics continue to evolve, future research should examine how geopolitical shifts influence BRICS investments and their impacts on Africa. Understanding the geopolitical context can provide insights into the strategic motivations and broader implications of these investments. Additionally, the current regression models used in this study may have limitations in accurately capturing the complex relationships between BRICS investments and socio-economic indicators. Future work should focus on refining these models by incorporating more sophisticated techniques, additional variables, and more robust data sources. This refinement would enhance the precision and reliability of the findings, providing a clearer picture of the causal impacts of BRICS investments on African economies.

By addressing these areas, future research can build on the current findings and contribute to a more comprehensive understanding of the multifaceted impacts of BRICS investments in Africa. This holistic approach would inform policymakers, investors, and stakeholders about the potential benefits and challenges associated with BRICS engagement on the continent.

References:

1. Adams, S., & Opoku, E. (2017). BRICS vs. OECD: Impact of Foreign Direct Investments on African Development. *International Journal of Comparative Economics*, 26(3), 210-229.
2. Boland, R. (2017). BRICS and the World-System: Emerging Global Centers. *Global Economic Review*, 46(3), 275-294.
3. Duggan, N., et al. (2022). The New Development Bank and BRICS: Changing Global Governance and Multilateral Development Finance. *Global Governance Journal*, 28(1), 45-63.
4. Elkemann, A., & Ruppel, O. (2014). China's FDI in Africa and Its Policy Implications for Other BRICS Nations. *Journal of International Economic Law*, 19(2), 238-256.
5. Gu, J., Renwick, N., & Xue, L. (Year not provided). BRICS Contribution to Green Growth and Sustainable Development in Africa: Focus on Renewable Energy. *Journal of Sustainable Development*, 21(2), 198-215.
6. Imoh-Ita, I., & Amadi, L. (2016). BRICS and Africa: Analyzing the Role through World-Systems Theory. *Journal of Contemporary African Studies*, 34(2), 189-206.
7. Lisimba, M. (2020). Dependency Theory and Sino-African Relations: A Literature Review. *African Journal of International Affairs*, 13(4), 255-273.
8. Martins, P. (2019). Dependency, Neoliberalism, and Globalization: The Latin American and African Experience. *Journal of Global Studies*, 27(3), 300-318.
9. Özekin, E. (2024). Re-evaluating Dependency Theory in the Globalized World: The Role of BRICS. *Global Development Journal*, 30(1), 40-58.
10. Shitu, A. (2022). Dependency Theory and Africa's Economic Situation: The Role of BRICS. Journal of Development Studies, 58(1), 112-128.

11. Thompson, L., & de Wet, P. (2017). BRICS and State-led Development in South Africa: A Collective Actor Approach. *Journal of Political Economy*, 45(4), 345-362.

12. Tsaurai, K. (2022). The Influence of BRICS Foreign Direct Investment on Domestic Investment in African Countries. *Journal of Economic Studies*, 49(1), 56-78.

13. Yarygina, T., & Krylova, O. (2023). Contemporary Investment Policies of BRICS: Economic Implications for South Africa. *African Economic Review*, 37(2), 112-131.