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The Impact of Sovereign Credit Ratings on Foreign Direct Investment and Economic Growth in Egypt

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Abstract

The purpose of this study is to investigate the strength of the relationship between Sovereign Credit Ratings (SCR) and Foreign Direct Investment (FDI) and Economic Growth, by analyzing how changes in SCRs overtime have influenced investors' decisions to invest in Egypt. This study employs annual time-series data spanning from 1996 to 2023 to investigate the influence of Sovereign Credit Ratings (SCRs) on Foreign Direct Investment (FDI) and Economic Growth in Egypt. The Autoregressive Distributed Lag (ARDL) approach is utilized to ascertain both the short-run and long-run relationships among these variables. The empirical study reveals a robust correlation between Sovereign Credit Ratings (SCRs), Foreign Direct Investment (FDI), and Economic Growth in Egypt. Moreover, the analysis indicates that SCRs exert a more significant influence on Foreign Direct Investment compared to their impact on Economic Growth. This research underscores the critical role of Sovereign Credit Ratings (SCRs) in attracting foreign direct investment (FDI) and fostering economic growth in Egypt. Policymakers should prioritize initiatives to enhance the country's business climate, thereby improving its creditworthiness and attracting investors. By implementing these measures, Egypt can create a more favorable environment for economic development and prosperity.

Keywords: *Sovereign Credit Ratings, Economic Growth, Foreign Direct Investment.*

Introduction

For both the general public and policymakers, the pursuit of economic growth is a widely accepted policy objective. Economic growth serves as a powerful instrument for reducing poverty and improving living standards, particularly in developing countries. Moreover, sustained and rapid economic growth contributes to job creation, the provision of essential social services, and the maintenance of political stability. It reflects an expansion in an economy's productive capacity, resulting in the ability to produce greater quantities of goods and services over time.

Investment plays a pivotal role in transforming societies. Both foreign and domestic investment are crucial for socioeconomic development. Today's interconnected global economy, characterized by accelerated international trade, cross-border capital flows, and technological advancements, underscores the interdependence of financial markets and economies. International capital flows offer a valuable source of external financing, particularly for emerging countries, helping them bridge savings gaps and drive economic growth. This process is essential for maintaining exchange rate stability, managing interest rates, and mitigating political, economic, and financial risks.

Foreign Direct Investment (FDI) is a prominent type of international capital flow and a catalyst for transforming transition economies. Developing nations actively seek FDI to stimulate long-term economic growth and secure stable resources. FDI has emerged as a compelling alternative to borrowing from multilateral institutions like the World Bank and the International Monetary Fund (IMF).

Egypt's economic challenges are not unique among developing countries. Access to global capital markets depends largely on maintaining a strong credit rating, which is a crucial factor for emerging economies such as Egypt. A low credit rating increases borrowing costs and diminishes the likelihood of attracting foreign direct investment (FDI). Therefore, one of Egypt's key priorities is to improve its sovereign credit rating in

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order to stimulate investment inflows. This can be achieved through the government's commitment to fiscal and structural reforms and by enhancing private sector participation. Strengthening these areas will bolster investor confidence, improve economic performance indicators, and enhance Egypt's economic resilience and competitiveness, ultimately improving the quality of life and attracting greater levels of foreign investment

Research Questions and Objectives

The main research question is:

What is the impact of Sovereign Credit Ratings (SCR) on Foreign Direct Investment (FDI) inflows to Egypt and Economic Growth Rate during the period (1996-2023)?

From the main research question, there are 3 sub-questions, as follows:

- What is the impact of FDI inflows on the Egyptian Economy?
- What is the role of SCR on Investors' decisions and hence the level of FDI inflow to Egypt?
- To what extent does SCR upgrades or downgrades affect Egypt's Economic Growth Rate?

This study aims to investigate the strength of the relationship between Sovereign Credit Ratings (SCRs), Foreign Direct Investment (FDI) and Economic Growth in Egypt from 1996 to 2023, by analyzing how changes in SCRs have influenced investor decisions using the Autoregressive Distributed Lag (ARDL) approach to ascertain both the short-run and long-run relationships among these variables.

Study Contribution

The study offers several valuable contributions to the empirical literature; **First**, it extends previous research on the impact of SCRs on economic growth in Egypt to cover the most recent period, which includes significant global events. **Second,** highlights the crucial role of FDI as an alternative source of financing for developing economies like Egypt, and **Third**, addresses the criticism of credit rating agencies' failure to predict systemic risks during the global financial crisis.

By empirically estimating the impact of SCRs on FDI and economic growth, this study provides policymakers with valuable insights for improving Egypt's creditworthiness and achieving economic welfare through identifying constraints in the investment climate and making recommendations to the government.

Literature Review

Sovereign Credit Ratings (SCRs) have gained increasing importance as a key determinant in attracting international capital, particularly for emerging and developing economies. Issued by leading credit rating agencies such as Standard & Poor's (S&P), Moody's, and Fitch, these ratings assess a nation's ability and willingness to meet its debt obligations. They provide international investors with a concise signal of a country's creditworthiness, macroeconomic stability, and institutional reliability. In doing so, they serve as a critical tool for reducing uncertainty and guiding investment decisions across global financial markets.

For many developing countries, Sovereign Credit Ratings represent an essential channel through which they can access external financing. A favorable rating enhances investor confidence and improves the country's ability to attract Foreign Direct Investment (FDI), which has become an appealing alternative to borrowing from multilateral institutions such as the International Monetary Fund (IMF) and the World Bank. Conversely, a downgrade in a country's sovereign rating often triggers caution among investors and financial institutions, leading to restricted access to capital and higher borrowing costs.

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Changes in sovereign ratings can have a direct and measurable impact on economic growth. Positive rating upgrades tend to stimulate capital inflows and lower interest rates, thereby encouraging investment and supporting economic expansion. In contrast, negative revisions typically increase a country's debt burden and elevate the cost of borrowing. Such developments make it more difficult for both the government and domestic firms to raise funds in international markets. In extreme cases, capital flight following a downgrade can lead to higher financing costs, credit constraints, and reduced investment, all of which slow down real economic activity and may even push the economy toward stagnation or recession.

Ultimately, Sovereign Credit Ratings function not only as an assessment of fiscal credibility but also as a broader reflection of economic governance and policy effectiveness. Through their influence on investment flows, interest rates, and financial stability, they play a vital role in shaping a nation's economic trajectory and its integration into the global economy.

This literature review aims to provide a comprehensive overview of previous studies examining the impact of sovereign credit ratings (SCRs) on foreign direct investment (FDI) and economic growth. It highlights the main research gaps that the current study seeks to address through empirical investigation. Most of the existing literature on sovereign credit ratings has primarily focused on their influence on capital inflows to countries. However, limited attention has been given to their broader impact on overall economic growth, particularly in the context of Egypt. Therefore, this study explores the effect of sovereign credit ratings on both FDI and economic growth in Egypt, in an attempt to bridge this gap in the literature.

Empirical Evidence Linking Sovereign Credit Ratings and FDI

Ntswane (2014) investigated the relationship between long-term foreign currency sovereign credit ratings issued by Fitch, Moody's, and S&P and various types of capital flows across 28 African countries between 1994 and 2011. Using a panel regression framework, the study found a significant relationship between sovereign credit ratings and FDI, portfolio bonds, and private commercial borrowing. The results indicated that higher ratings encouraged capital inflows, while downgrades negatively affected investment decisions.

Violante (2016) examined the relationship between sovereign credit ratings and international capital flows to emerging market economies (EMEs) over the periods before and after the 2007–2008 financial crisis. Using a system GMM approach on data from 20 EMEs, the study revealed that sovereign credit ratings had a positive and significant impact on FDI inflows. A one-point rating upgrade was estimated to increase FDI by approximately USD 1.3 billion. Furthermore, the influence of credit ratings on FDI was found to be more pronounced in the post-crisis period than before the crisis, suggesting that investors increasingly relied on credit ratings to assess risk in the aftermath of global financial instability.

Abdel Ghani (2017) carried a study to analyze the Egyptian case in terms of the country's sovereign credit rating, focusing on the obstacles that have made Egypt's rating relatively lower compared to its emerging peers such as Brazil, China, and South Africa. The study also seeks to identify the key determinants responsible for improving Egypt's credit rating and to examine how such improvements are reflected in the country's overall economic growth, through the impact of the credit rating on attracting foreign direct investment (FDI). The study applies an econometric analysis using a first-order regression model with two lag periods, based on time series analysis of key economic variables, including Egypt's sovereign credit rating, in order to trace their effects on the inflow of foreign direct investment (FDI) in Egypt during the period 1996–2015.

The study concluded that there is a positive relationship between the credit rating and FDI inflows. An improvement in Egypt's credit rating leads to an increase in FDI inflows. According to the results of the FDI determinants model, there is a statistically significant and positive relationship between the credit rating and FDI, as an upgraded rating enhances investor confidence in investing in the country. A higher credit rating implicitly indicates lower risk and greater investor reassurance regarding the investment climate in general more FDI inflows. Conversely, a decline in the credit rating leads to reduced FDI inflows due to increased risk, particularly for risk-averse investors.

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Cai et al., (2018) explored the link between sovereign credit ratings and FDI flows from 31 OECD donor countries to 72 recipient (OECD and non-OECD) countries between 1985 and 2012. Using bilateral FDI data, their findings showed that higher sovereign credit ratings of recipient countries were positively associated with increased FDI inflows. Conversely, higher-rated donor countries tended to invest less abroad. Interestingly, while higher-rated OECD countries attracted more FDI, lower-rated non-OECD countries also received considerable FDI flows, indicating that other factors such as market size and potential returns may also play significant roles.

Emara and El Said (2019) analyzed how changes in sovereign ratings affect FDI inflows in 24 emerging markets between 1990 and 2014 using a dynamic panel system GMM. The study found that a one-notch upgrade in ratings led to a 0.11% increase in FDI as a share of GDP. Moreover, the presence of financial crises magnified the effects of rating changes: a downgrade during crisis periods led to a sharper decline in FDI compared to tranquil times. The study also revealed evidence of contagion effects—rating changes in BRICS countries significantly influenced FDI flows in other regions such as Europe, the Middle East and Africa (EMEA), and Latin America.

De and Ratha (2020) investigated the relationship between sovereign credit ratings, relative risk ratings, and private capital flows in 26 emerging and frontier economies from 1998 to 2017 using a dynamic panel regression model. Their findings indicated that absolute ratings were key determinants of capital inflows before the 2008 financial crisis, while relative risk ratings (which compare a country's rating to its peers) became more influential after the crisis. This suggests that investors increasingly assess countries not only on their individual performance but also in comparison to other emerging markets.

Wahhab and Gatea (2020) examined the impact of sovereign credit ratings on FDI and government debt in Iraq between 2010 and 2018. Their results demonstrated that sovereign credit ratings had a positive effect on FDI inflows, confirming that foreign investors rely on credit scores as a proxy for country risk. The study also found that FDI inflows were influenced by national income levels and that higher perceived risks were associated with higher expected investment returns.

Takawira and Motseta (2021) analyzed the relationship between sovereign credit ratings, FDI, and foreign portfolio investment (FPI) in South Africa using quarterly data from 1994 to 2017 and employing ARDL and ECM models. The results showed that higher ratings were associated with increased capital inflows, while macroeconomic stability, growth prospects, and financial sector development were significant determinants of investment. The findings highlighted that sovereign credit ratings influence both long-term FDI and short-term portfolio investments.

Arogundade and Eita (2022) assessed the impact of sovereign credit ratings on FDI inflows in 20 Sub-Saharan African countries between 2007 and 2019. Using panel data analysis, the study found a significant positive impact of SCRs on FDI inflows, confirming that investors increasingly relied on credit ratings for investment decisions, especially after the 2008 global financial crisis. Furthermore, a unidirectional causality was observed from sovereign ratings to FDI, implying that changes in ratings drive changes in FDI, rather than the reverse.

Athari (2023) investigated the effects of sovereign credit ratings on capital inflows in emerging European economies, focusing on Bulgaria, Croatia, Greece, Romania, and Slovenia from 2006 to 2018. The findings indicated that higher credit ratings positively influenced both FDI and portfolio investments. The study also underscored the importance of domestic pull factors—such as market size, institutional quality, and macroeconomic stability—in attracting FDI. Global push factors, including global liquidity and risk sentiment, were also found to significantly affect investment inflows.

Finally, Muzaffarli and Mahmudlu (2024) explored the influence of sovereign credit ratings on FDI and FPI across 22 emerging economies between 1999 and 2019 using fixed and random effects models. The study concluded that credit ratings were a strong determinant of FDI inflows: a 1% increase in credit ratings corresponded to an increase of approximately 1.1×10^9 USD in FDI. Their findings further highlighted

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the dominant role of credit ratings in shaping investor confidence and directing investment toward emerging economies.

Empirical Evidence Linking Sovereign Credit Ratings and Economic Growth

Hassan and Wu (2015) investigated the relationship between sovereign credit ratings, economic growth, and output volatility using monthly data covering the period from January 1996 to May 2010 for a panel of 76 developed and emerging economies. Employing an instrumental variable (IV) estimation technique, the study corrected for both heterogeneity and endogeneity using the generalized two-stage least squares (G2SLS) and efficient two-stage least squares (EC2SLS) procedures. Their findings provided empirical evidence that improvements in sovereign credit ratings contribute to reducing growth volatility. Moreover, the study highlighted the role of the Global Financial Crisis (GFC) in increasing macroeconomic volatility by weakening the stabilizing effect of sovereign credit ratings. Using a three-stage least squares (3SLS) approach, Hassan and Wu confirmed that the volatility-reducing impact of sovereign ratings is robust, and further demonstrated that monetary policy stance, inflation, and inflation volatility are key determinants of sovereign ratings. Consequently, effective monetary policy can play an instrumental role in enhancing a country's sovereign rating and reducing output volatility.

Similarly, Chen et al., (2016) examined the relationship between sovereign credit rating revisions and economic growth by analyzing changes in Standard & Poor's long-term foreign currency sovereign ratings for 103 countries during the period 1982–2012. Using a three-stage least squares (3SLS) procedure, they explored the transmission mechanisms through which rating changes influence growth. The study found that changes in a country's sovereign credit rating affect output growth primarily through two channels — interest rates and capital flows. Furthermore, the results indicated that the effects of rating revisions on economic growth are more pronounced when an upgraded country exhibits a high degree of economic openness, when a downgraded country has substantial external debt or deficit, or when the re-rated country's rating is near the investment-grade threshold.

In a related context, Mutize and Mugobo (2020) analyzed the causal relationship between sovereign credit ratings and economic growth in 19 Sub-Saharan African countries over the period 2003–2018. Using the Granger causality test, their results revealed a unidirectional causal relationship running from sovereign credit ratings to economic growth, but not vice versa. This finding implies that economic growth does not significantly determine sovereign credit ratings, suggesting that credit rating agencies act proactively in adjusting their ratings in anticipation of future economic performance.

Expanding on this relationship, Meyer and Mothibi (2021) investigated the effect of risk rating agency decisions on economic growth and investment in South Africa. The study adopted a quantitative approach, using quarterly data from 1994Q1 to 2020Q2, and estimated two models through the autoregressive distributed lag (ARDL) technique. Their findings revealed long-run relationships among economic growth (GDP), the risk rating index, foreign direct investment (FDI), exchange rates, gross fixed capital formation, and lending rates. Additionally, the results showed bidirectional causality between economic growth and the rating index, as well as between FDI and the rating index, indicating a mutually reinforcing relationship between sovereign ratings, growth, and investment activity.

Data and Methodology

The research methodology used in this study will, therefore, be empirically designed to examine the dynamic relationship between sovereign credit ratings, foreign direct investment, and economic growth of Egypt. Based on annual time-series data between 1996 and 2023, the study uses econometric approaches that ensure both statistical robustness and economic relevance. The methodology incorporates several stages, starting with descriptive and correlation analysis to summarize the dataset, followed by unit root and co-integration tests to check stationarity and the presence of long-run relationships among the variables. Following that, the Autoregressive Distributed Lag (ARDL) modeling framework is employed to estimate both the short-run and long-run dynamics due to its appropriateness in cases of a small sample size with mixed orders of integration. Diagnostic and stability tests, such as the LM serial correlation test, Breusch-

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Pagan-Godfrey test, and Jarque-Bera test, are conducted to ensure the validity and reliability of the estimated models. Principal Component Analysis (PCA) is also applied in the construction of the ESG index to address the problem of potential multicollinearity issues and enhance model robustness. The systematic approach of this methodology provides comprehensive and credible support for analyzing the macroeconomic effects of sovereign credit ratings in the Egyptian context.

Research Methodolgy

The empirical analysis in this study applies annual time-series data to capitalize on its numerous advantages. By visually representing the data, time-series analysis provides valuable insights into trends, patterns, and long-term developments. This approach enables the identification of trends, detection of changes, and forecasting of future values, making it particularly useful in economic analysis. Additionally, time-series analysis facilitates the identification and modeling of seasonal and cyclical patterns, as well as the detection and analysis of anomalies or outliers within the data, allowing for the identification of unexpected deviations and irregularities.

To initiate the analysis, descriptive statistics and a correlation matrix were employed to gain a preliminary understanding of the data series. Subsequently, unit root tests were conducted to assess the stationarity of the variables under investigation. The Augmented Dickey-Fuller (ADF) test, a widely recognized method, was utilized. The null hypothesis of the ADF test posits that the variable contains a unit root, while the alternative hypothesis suggests that it has no unit root.

Prior to model estimation, an ARDL bound cointegration test developed by Pesaran et al. (2001) was employed to ascertain the existence of a long-term relationship between the variables. The Wald F-test was utilized to evaluate the null hypothesis of no cointegration against the alternative hypothesis of cointegration, revealing the potential for an equilibrium relationship.

Subsequently, the short-run and long-run ARDL model was estimated. The ARDL model is a preferred econometric method due to its efficiency, particularly with smaller sample sizes. It accommodates both I(0) and I(1) integrated variables, making it versatile. Additionally, the ARDL model incorporates sufficient lags to capture the data generation process and addresses issues of endogeneity and serial correlation.

In the ARDL framework, long-run and short-run coefficients can be calculated simultaneously. The short-run coefficients measure the extent to which the dependent variables deviate from their long-run equilibrium paths.

To assess the model's validity, various diagnostic tests were conducted. These included the serial correlation LM test to check for the absence of serial correlation, the Breusch-Pagan Godfrey (1979) test to examine heteroscedasticity, and the Jarque-Bera (1980) test to assess the normality of the error term. For stability analysis, the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) plots were employed, as recommended by Brown et al. (1975). If these plots remain within the critical bounds at a 5% level of significance, the null hypothesis of coefficient stability in the regression model cannot be rejected.

Estimation Technique

For empirical investigation, the study uses two different models: (1) LFDI, (2) LGDP to achieve the objectives of this research. Those two models represent the econometrics model specifications as follows:

$$LFDI_t = \delta_0 + \delta_1 SCR_t + \delta_2 LINF_t + \delta_3 LTR_t + \delta_4 LRI_t + \delta_5 LESG_t + \varepsilon_{1t} \quad (1)$$

$$LGDP_t = \alpha_0 + \alpha_1 SCR_t + \alpha_2 LINF_t + \alpha_3 LTR_t + \alpha_4 LRI_t + \alpha_5 LESG_t + \varepsilon_{2t} \quad (2)$$

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Here in those equations, using the foreign direct investment (LFDI) and the annual growth of the gross domestic product (LGDP) as the dependent variables, the subscript t = 1, …, T identify the time range, SCR means sovereign credit rating, LINF is inflation rate, LTR represents the total reserve, LRI presents the real interest rate and ESG denotes Environment, Social and Governance Factors which is derived using PCA from 6 indicators based on the study of Pineau et al. (2022).For the first model, δ_0 is intercept and ε_{1t} indicates the error term of the first model, then $\delta_1, \delta_2, \delta_3, \delta_4, \delta_5$ represent the coefficients of LFDI with respect to relevant independent variables. Next, for the second econometric model, α_0 is the intercept and ε_{2t} indicates the error term of the second model. The $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ are the coefficients of LGDP with respect to relevant regressors. We apply the log transformation for the data.

In addition, it's important to mention that based on the literature there are many determinants for the FDI and GDP like the exchange rate, trade openness, population growth and many other variables which were excluded due to many problems such as: multi-collinearity, stationarity and other specification problems. Therefore, based on the selected variables, our ARDL models can be expressed as follows:

$$\Delta FDI_t = \delta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta SCR_{t-i} + \sum_{i=0}^{q} \beta_{3i} \Delta INF_{t-i} + \sum_{i=0}^{r} \beta_{4i} \Delta TR_{t-i} + \sum_{i=0}^{s} \beta_{5i} \Delta RI_{t-i} + \sum_{i=0}^{t} \beta_{6i} \Delta ESG_{t-i} + \delta_1 FDI_{t-1} + \delta_2 SCR_{t-2} + \delta_3 INF_{t-1} + \delta_4 TR_{t-1} + \delta_5 RI_{t-1} + \delta_6 ESG_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta GDP_t = \delta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta GDP_{t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta SCR_{t-i} + \sum_{i=0}^{q} \beta_{3i} \Delta INF_{t-i} + \sum_{i=0}^{r} \beta_{4i} \Delta TR_{t-i} + \sum_{i=0}^{s} \beta_{5i} \Delta RI_{t-i} + \sum_{i=0}^{t} \beta_{6i} \Delta ESG_{t-i} + \alpha_1 GDP_{t-1} + \alpha_2 SCR_{t-2} + \alpha_3 INF_{t-1} + \alpha_4 TR_{t-1} + \alpha_5 RI_{t-1} + \alpha_6 ESG_{t-1} + \varepsilon_t \quad (4)$$

where ΔFDI and ΔGDP are the dependent variables, $\beta_{1i}, \ldots, \beta_{6i}$ are the long terms and p, n, q, r, s and t are the optimal lag lengths of the ARDL model based on the AIC and SBC. Δ is the operator of the first difference and ε_t are the error terms assumed to be independently and identically distributed.

Data Source and Description

This paper examines the dynamic effects of the strength of Sovereign Credit Ratings (SCR) effect on Foreign Direct Investment and Economic Growth in Egypt by analyzing the effect of getting different Sovereign Credit Ratings (SCR), in different periods of time, on investors' decisions to invest in Egypt during the period (1996-2023) consisting of yearly observations for each variable. Throughout this analysis the study use S&P long-term ratings for Egypt, extracted from Bloomberg and The global economy. Sovereign credit ratings of all countries have been converted into a numerical scale from 21 (AAA) to 0 (Default) as can be seen in Table 4. Other authors propose a different credit rating conversion: Afonso et al., 2012 use a linear scale from 1 (from D to CCC+) to 17 (AAA), and Kim and Wu (2008) use a similar conversion of 0 (D or SD) to 20 (AAA) see table 1. ESG denotes Environment, Social and Governance Factors which is derived using PCA from 6 indicators. Principal Component Analysis (PCA) is an unsupervised technique that converts a dataset that contains correlated variables into a smaller number of uncorrelated variables known as principal components. PCA is used for dimensionality reduction and to deal with multicollinearity, as the first component explains the most variance, while every component after that is orthogonal to the previous component, and explains additional variance. Basically, PCA is an orthogonal linear combination of the original variables. PCA is sensitive to the scaling of variables, so it is usually applied on standardizing data so that there is no bias in the outcome.

In this approach, Principal Component Analysis (PCA) is used to generate the Environment, Social, and Governance (ESG) factor as one of the independent variables. Given the high correlation among original variables, multiple regression analysis would result in biased estimations, making PCA the ideal method for addressing multicollinearity. The analysis commences by assessing associations between variables at the 0.01 significance threshold and then converting the correlated variable constructs into a small number of

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uncorrelated variables or principal components (PCs), which retain most of the variance in the original dataset. PCA uses eigenvectors to establish maximum variance directions and eigenvalues to evaluate importance, so the PCs are those with eigenvalues exceeding one. This process reduces the dimensions of the dataset while retaining key structures. Within the analyses of the ESG, PCA was able to reduce 6 variables into fewer components, which is more efficient and robust. The number of PCs is determined through three common methods: more or less pre-determined variance explained, scree plot with an elbow outline, or eigenvalues rule. Ultimately, the analysis identifies the first PC as the most important, as it accounts for more variance than any one of the original variables.

Table 1: Eigen values for the 6 PCs of the ESG

Number of PC	Eigenvalue	Percentage of variance	cumulative percentage of variance
PC1	**5.394781**	**0.8991**	**0.8991**
PC2	**0.351824**	**0.0586**	**0.9578**
PC3	**0.193641**	**0.0323**	**0.9900**
PC4	**0.037736**	**0.0063**	**0.9963**
PC5	**0.019474**	**0.0032**	**0.9996**
PC6	**0.002544**	**0.0004**	**1.0000**

Source: Constructed by author using the EViews statistical program

The first eigenvector for the first eigenvalue is shown in Table 1. Each variable's weight or loading in the related PC is represented by the element. These loadings show how significant each variable is to the corresponding PC. The weights here should be $\frac{1}{\sqrt{6}} = 0.4082$ if for the **Environment, Social and Governance** all factors are equally contributing to the PC. Table 2 reveal that each variable makes a varied contribution, nevertheless. The higher weighted variables are highlighted in red.

Table 2 Eigenvector corresponding to the first PC of the Environment, Social and Governance

Number of PC	Eigenvalue
Agricultural land% of land area	0.419677
Food production index	0.405388
Life expectancy at birth total years	0.419569
Mortality rate under 5 per 1000 live births	0.391827
Patent applications residents	0.413858
Proportion of seats held by women in national parliaments	0.398355

Source: Constructed by author using the EViews statistical program

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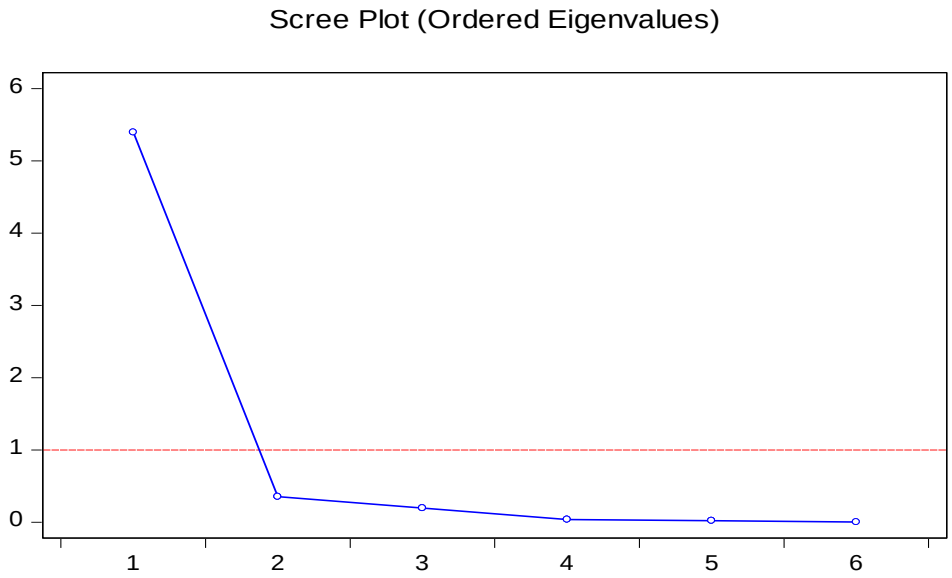

Fig. 1: Screen Plot Depicting Percentage of Variances Explained by Each Principal Component for the Environment, Social and Governance

Source: Constructed by author using the EViews statistical program

Table 3: KMO test

Number of variables	Eigenvalue
Agricultural land% of land area	0.7996
Food production index	0.7592
Life expectancy at birth total years	0.7384
Mortality rate under 5 per 1000 live births	0.7331
Patent applications residents	0.7636
Proportion of seats held by women in national parliaments	0.7885
Overall	0.7922

Source: Constructed by author using the EViews statistical program

The data of the other variables were collected from the World Development Indicators (WDI), World Governance Indicators (WGI) and the Trading Economics (TE). For more details on the measurement, data source, and abbreviation, see Table (5).

Table (4): Standard & Poor's Credit Ratings Converted Into A Numerical Scale.

D	0	BBB-	12
SD	1	BBB	13
CC	2	BBB+	14
CCC-	3	A-	15
CCC	4	A	16
CCC+	5	A+	17
B-	6	AA-	18
B	7	AA	19
B+	8	AA+	20
BB-	9	AAA	21

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BB	10		
BB+	11		

Source: Constructed by author

Table (5): Descriptions of the Variables

Variables	Symbols	Measurements	Data Source
Dependent variables			
Foreign Direct Investment **Economic Growth**	FDI EG	Capital inflow % of GDP GDP growth annual %	WB WB
Independent variables			
Sovereign Credit Ratings	SCR	Range between (AAA) which indicates Prime or high grade to (D) which indicates in default.	WB
Total reserve	*TR*	% of GDP	WB
Interest rate	*RI*	Real interest rate % of GDP	WB
Inflation rate	*INF*	Consumer price index % of GDP	WB
Environment, Social and Governance Factors	*ESG*	Principle Component Analysis (PCA)	WB

Source: Constructed by author

The detailed descriptive statistics of LFDI, LGDP, SCR LESG, LINF, LRI and LTR and the correlation matrix between the variables under study are summarized in Tables (6) and (7). Descriptive statistics reflect that the dataset contains 25 observations for each variable, with the mean value for LFDI at about 0.63 and for LGDP at about 0.93-positive values of both variables reflect overall economic expansion and a moderate average level of FDI across the sample. The SCR averages at about 8.88 points, on a scale likely ranging between 5 and 12, reflecting generally high institutional performance. Inflation remains quite low, with an average of 1.21. Very notable variation in the real interest rate is reflected in LRI with a mean of 0.48, a minimum of −1.24, and a maximum of 1.37, thus reflecting heterogeneous governance quality. Total reserve appears stable, with very low dispersion, at a mean of 10.67 and SD of 0.18. Large variation in environmental, social, and governance performance is attributed to LESG, with an SD of 0.64, while oscillating from −0.85 to 0.89 reflects improvement in some periods and deterioration during others. Skewness reflects mild asymmetry, while kurtosis values below 3 for most of the variables reflect relatively flat distributions. According to the probabilities of the Jarque-Bera test, all series are approximately normally distributed, and thus, parametric econometrics approaches can be appropriately applied to this data in further analysis. Table (7) represents the correlation coefficients between the variables under study. First, for model (1) the matrix shows that all the variables have a positive correlation with foreign direct investment except the real interest rate. Second, for model (2) the correlation matrix indicates that all the variables have a positive correlation with the economic growth. Also, table (7) shows the VIF results which assured the absence of the multicollinearity problem between the regressors.

Table (6): Descriptive Statistics of the Variable

	LFDI	LGDP	SCR	LINF	LRI	LTR	LESG
Mean	0.631369	0.926616	8.880000	1.209849	0.478452	10.66990	-0.005628
Median	0.646487	0.944820	10.00000	1.278573	0.528680	10.67473	-0.031120
Maximum	1.273012	1.157822	12.00000	1.771074	1.378642	10.95006	0.891613
Minimum	-0.088224	0.578960	5.000000	0.676697	-1.244853	10.43451	-0.854919
Std. Dev.	0.330093	0.164552	2.488641	0.277118	0.741839	0.184640	0.643037

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Skewness	0.068894	-0.392381	-0.108836	-0.336868	-0.800828	0.087530	0.044126
Kurtosis	2.856163	2.286392	1.259647	2.491564	2.884493	1.381145	1.419805
Jarque-Bera	0.041328	1.171966	3.204385	0.742113	2.686088	2.761810	2.609171
Probability	0.979548	0.556558	0.201454	0.690005	0.261050	0.251351	0.271285
Sum	15.78423	23.16540	222.0000	30.24621	11.96130	266.7474	-0.140693
Sum Sq. Dev.	2.615080	0.649860	148.6400	1.843070	13.20779	0.818210	9.923932
Observations	25	25	25	25	25	25	25

Source: Constructed by author using the EViews statistical program

Table (7) Correlation Matrix

	LFDI	**LGDP**	**LSCR**	**LESG**	**LINF**	**LRI**	**LTR**	**VIF**
LFDI	1							
LGDP	0.7267	1						
LSCR	0.4237	0.3016	1					3.80
LESG	0.2570	0.1222	-0.9056	1				4.78
LINF	0.4355	0.1651	-0.5105	0.5638	1			2.8
LRI	-0.1553	0.7391	0.3830	-0.4218	-0.7177	1		2.2
LTR	0.5595	0.4369	-0.2505	0.5557	0.5339	-0.3487	1	2.2

Source: Constructed by author using the EViews statistical program

Estimation Results

Before conducting the estimation of the Autoregressive Distributed Lag (ARDL) models, it is essential to determine the appropriate lag length, assess the stationarity of the variables, and verify the presence of a long-run equilibrium relationship among them. These preliminary diagnostic tests ensure that the time-series properties of the data are properly addressed and that the model specification is valid. Accordingly, tables (8) and (9) showed the results of Vector Auto-Regressive lag order selection information criteria; the analysis determined that lag three was the optimal lag length based on reference to all the information criteria for both models.

Table (8): Vector Auto-Regressive Lag Order Selection Information Criteria For The First Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	2670.406	NA	7.6e-100	-211.2325	-209.7698	-210.8268
1	2542.274	-143.5078	5.48e-94	-198.1019	-194.8841	-197.2094
2	2501.868	-25.85976*	1.01e-90*	-191.9894*	-187.0164*	-190.6101*
3	2447.287	-8.733008	7.23e-85	-184.7429	-178.0147	-182.8768

Source: Constructed by author using the EViews statistical program

Table (9): Vector Auto-Regressive Lag Order Selection Information Criteria For The Second Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-13.92816	NA	0.023504	1.914253	2.401803	2.049478
1	0.599830	20.92030	0.010327	1.072014	1.754584	1.261330
2	4.100387	4.480713*	0.011151*	1.111969*	1.989560*	1.355375*
3	6.958697	3.201307	0.012991	1.203304	2.275915	1.500801

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Source: Constructed by author using the EViews statistical program

Table (10) Unit Root Test

Variables	Level (0)		First Difference (1)	
	Constant	Constant &trend	Constant	Constant &trend
LGDP	-2.726081*	-2.717215	-5.402452***	-5.281282***
LFDI	-2.316204	-2.279358	-4.869444***	-4.770933***
LSCR	-1.065382	-2.836127	-3.276019**	-3.202792
LESG	-1.666348	-3.810080**	-3.412909**	-0.547138
LINF	-1.901176	-2.795997	-5.264112***	-5.143120***
LRI	-3.292261**	-3.865269**	-4.980740***	-5.299467***
LTR	-2.391034	-4.344251**	-5.262636***	-5.002321***

Note: ***, ** and * denotes 1%, 5% and 10% significant level.

Source: Constructed by author using the EViews statistical program

Next, Table (10) represents the results of the unit root tests for all the variables under study, which illustrates that all the variables are integrated at the level and at order one, which suggests the possibility of using the ARDL estimation technique.

Table (11) Results of Bounds Test for Co-Integration

	Model (1)		Model (2)	
F-Statistics	6.813558***		6.677908***	
Maximum Lag	2		2	
Lag Order	(1.1.2.2.2.2)		(1.0.1.2.1.2)	
K	5		5	
Critical value	I(0)	I(1)	I(0)	I(1)
10%	2.75	3.79	2.49	3.38
5%	3.12	4.25	2.81	3.76
2.5%	3.49	4.67	3.11	4.13
1%	3.93	5.23	3.5	4.63

1-The critical values are based on Narayan (2004), case III: unrestricted intercept and no trend. 2-k is a number of variables. 3-***, ** and * denotes 1%, 5% and 10% significant level. 4- k =5 for the model.

Source: Constructed by author using the EViews statistical program

Table (11) represents the result of the ARDL bounds test for checking the presence of co-integration between the variables under study. The maximum lag of (2) was used in each model as represented by the Akaike Information Criterion (AIC) and the Schwartz's Bayesian Criterion (SBC). The critical values are given under the number of variables, k = 5. The F-statistic of the two models (6.813558) and (6.677908) are greater than the corresponding lower I (0) and upper I (1) critical values, which makes the model significant at 1 percent level, thus, confirms the presence of the long run association among the variables.

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Table (12) Short Run Estimation Restricted Error Correction Model

Variables	Model (1) Coeff.	Variables		Model (2) Coeff.
FDI(-1)	0.303901	**GDP(-1)**		0.222681
SCR	0.188912**	**SCR**		2.34464***
SCR(-1)	0.225180**	**INF**		-0.009278
INF	-0.035642**	**INF(-1)**		-0.019232
INF(-1)	-0.023418**	**TR**		0.371311***
INF(-2)	-0.032177**	**TR(-1)**		0.511423**
RI	-0.040512**	**TR(-2)**		0.581521**
RI(-1)	-0.044881***	**RI**		-0.018846*
RI(-2)	-0.043635**	**RI(-1)**		-0.020393**
TR	0.0420511***	**ESG**		-0.050482
TR(-1)	0.0467611***	**ESG(-1)**		0.025833
TR(-2)	0.0456623**	**ESG(-2)**		0.107330***
ESG	-0.003163			
ESG(-1)	-0.011473			
ESG(-2)	0.190924***			
C	-2.482222**	**C**		-0.329738*
R-Sq	0.92	**R-Sq**		0.85
Adj.R-Sq	0.88	**Adj.R-Sq**		0.82

Note: ***, ** and * denotes 1%, 5% and 10% significant level.

Source: Constructed by author using the EViews statistical program

Table (12) represents the results of the short-run estimation for the two models. First, for model (1) it is clear that all the variables have a significant positive impact on the FDI at different lags, except the INF and RI which have a significant negative impact. Moreover, the R-squared values show that almost 92 % of the independent variables are able to explain the variation of dependent variables (FDI). Second, for model (2) we can notice that all the variables have a significant positive impact on the GDP at different lags, except the INF and RI which have a significant negative impact. Furthermore, the R-squared values show that almost 85 % of the independent variables are able to explain the variation of dependent variables (GDP).

Table (13) long-Run Estimation

Variables	Model (1) Coeff.	Model (2) Coeff.
SCR	0.594875***	0.192577**
ESG	0.253250**	0.106366**
INF	-0.131070**	-0.036678*
RI	-0.185359***	-0.050479*
TR	0.737411**	0.221511*
C	-2.482222**	0.048151**
ECT	-0.696099**	-0.777319***

Note: ***, ** and * denotes 1%, 5% and 10% significant level.

Source: Constructed by author using the EViews statistical program

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The above table (13) reports the results of the long-run estimation. The findings of both models show that all the variables have a significant positive impact at different level of significance, except the INF and RI which have a significant negative impact on both FDI and GDP. The negative and significant value of the error correction term confirmed the estimations of long run elasticity (ECT). This suggests that in the current year, approximately 69 and 77 percent of the disequilibria from the previous year's shock of those two models have an oscillatory convergence back to the long term equilibrium, respectively.

Table (14) Diagnostic Check:

Tests	Model (1)	Model (2)
LM Serial Corrlation test	2.627666 (0.1449)	1.142790 (0.3833)
Jarque-Bera test	1.944744 (0.378185)	1.366091 (0.505077)
Breusch pagan Godfrey test	0.431250 (0.9318)	0.606821 (0.8081)

Source: Constructed by author using the EViews statistical program

The findings from Table (14) show that those models don't suffer from any problems, which indicates that the long-term estimation of those models is reliable. Also, the two models represent no heteroscedasticity effects and no evidence of serial correlation in the residual terms. In addition, the Jarque-Bera normality test suggests that the residual terms are normally distributed so the two models are correctly specified. Furthermore, the results of the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of square of recursive residuals (CUSUMSQ) based on Figure (2 & 3) showing that the CUSUM line and the CUSUMSQ line are located between the two dashed lines or confidence limits, which confirms that the model is characterized by stability over time at a level of 5% significance, which confirms that the estimated parameters are stable throughout the study period.

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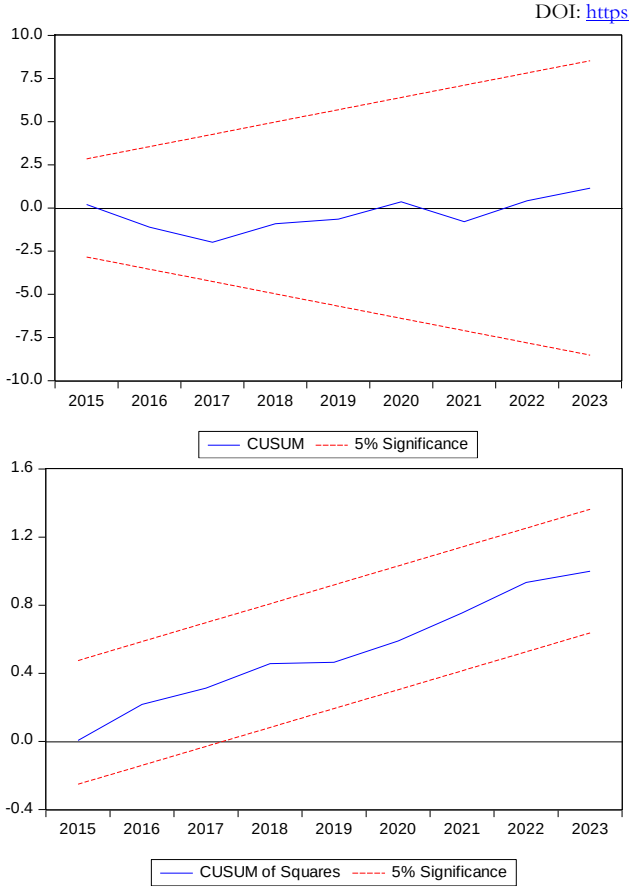

Figure (2) CUSUM and CUSUM of squares test for Model (1)

Source: Constructed by author using the EViews statistical program

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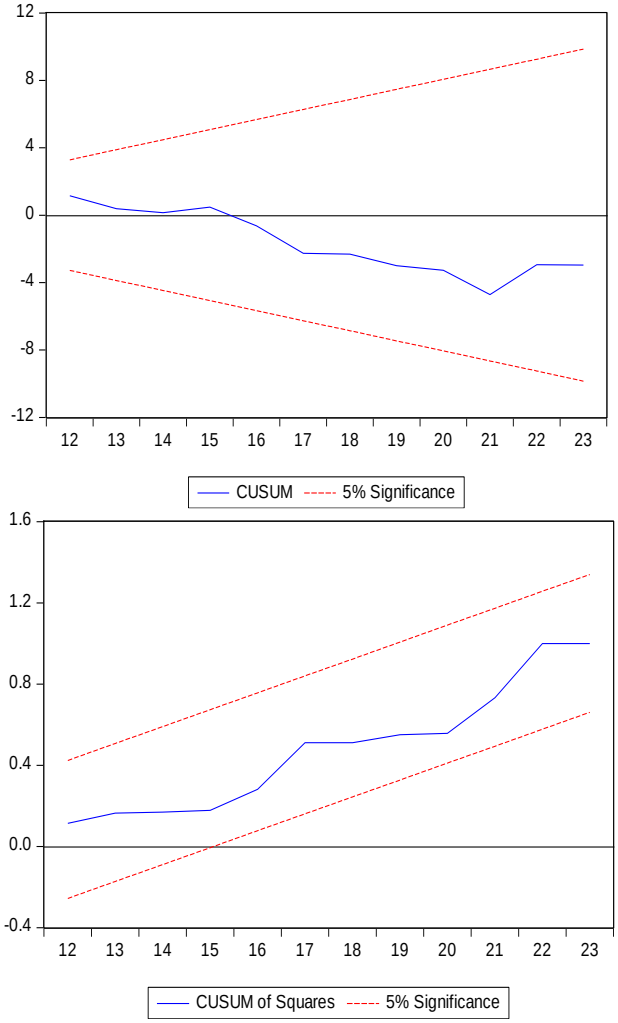

Figure (3) CUSUM and CUSUM of squares test for Model (2)

Source: Constructed by author using the EViews statistical program

Empirical Results Discussion

This study utilizes the Autoregressive Distributed Lag (ARDL) model to analyze the influence of Sovereign Credit Ratings (SCR) on Foreign Direct Investment (FDI) and Economic Growth in Egypt from 1996 to 2023. The year 1996 marks the beginning of credit ratings in Egypt, while 2023 represents the most recent data available. Two distinct models were employed: one assessing the impact of SCR on FDI, and the other examining the effect of SCR on Economic Growth. FDI and GDP served as dependent variables, while SCR was the independent variable. Additional control variables, including inflation, total reserves, real interest rates, and economic, social, and governmental factors, were considered to account for their potential influence on both FDI and GDP.

The empirical analysis revealed that in Model 1, all variables demonstrated a significant positive influence on FDI at different lags in the short run, except inflation and real interest rate, which exhibited a significant negative impact. Whereas, in Model 2, all variables have a significant positive impact on GDP at different lags, except inflation which has a negative insignificant impact and real interest rate negative significant impact on GDP.

In the long run, all variables exhibited a significant positive impact at varying levels of significance, except inflation and real interest rate, which negatively affected both FDI and GDP. These findings align with

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previous empirical studies, such as Mutize and Mugobo's (2016) analysis of the impact of sovereign credit downgrades on FDI in South Africa. Their study confirmed a strong relationship between FDI and SCR, with investors demonstrating heightened sensitivity to changes from Moody's and even reacting to the anticipation of a downgrade. Similarly, Takawira and Motseta (2021) found a positive association between higher sovereign credit ratings and increased financial flows in South Africa. Chen et al., (2016) examined the relationship between SCR revisions and economic growth, concluding that the impact of these revisions is more pronounced in countries with higher levels of economic openness. Meyer and Mothibi (2021) also analyzed the influence of risk rating agencies on economic growth and investment in South Africa, identifying a long-term relationship among these variables. Opeyemi (2020) and Kiplagat (2016) analyzed the relationship between inflation and GDP and reached the same conclusion—that inflation has a negative impact on GDP. Similarly, Hussain and Kimuli (2012) and Aguolze and Ibhagui (2021) found that inflation negatively affects FDI.

Regarding the impact of the real interest rate on GDP and FDI, Musyoka and Ocharo (2018) as well as Bano (2018) reported consistent findings, indicating that the real interest rate exerts a negative effect on FDI. Likewise, Hansen and Seshadri (2013) and Al-Ajlouni and Sanajleh (2023) reached similar conclusions, demonstrating that real interest rates negatively influence economic growth.

Khachoo and Khan (2012) and Onyeiwu and Shrestha (2004) found that total reserves have a positive effect on FDI, while Sula and Oguzoglu (2021) and Benli et al., (2022) revealed that total reserves positively affect GDP.

The final factor examined in this research is the ESG (Environmental, Social, and Governance) component, which has recently become one of the most influential determinants of sovereign credit ratings, FDI, and GDP. Yang (2024) and Chipalkatti et al. (2021) reported that ESG factors positively affect FDI, while Hassani and Bahini (2022) and Mohd Daud et al. (2024) found a positive relationship between ESG factors and economic growth.

Notably, the coefficient of SCR in Model 1 (0.594875) is higher than in Model 2 (0.192577), suggesting that SCR's impact on foreign direct investment.is more pronounced than its influence on Economic Growth.

Egypt's economic situation has undergone significant transformations over the past three decades, marked by periods of growth, challenges, and resilience, from the liberalization of its economy in the late 1990s to the challenges posed by recent global events.

Egypt's economic trajectory from 1995 to 2023 was significantly influenced by its reform measures and external factors. The initial implementation of economic liberalization policies in 1996 spurred an increase in foreign direct investment (FDI), sovereign credit ratings, and economic growth. However, this positive momentum was disrupted by the Asian financial crisis and domestic challenges between 1999 and 2005, leading to a decline in FDI and economic growth. A subsequent recovery was interrupted by the Egyptian Revolution of 2011, which negatively impacted both sovereign credit ratings and FDI inflows. To strengthen its economy, Egypt launched a new economic reform program in 2016, encompassing currency devaluation, subsidy reduction, privatization, and large-scale infrastructure projects. While this program contributed to economic recovery, the COVID-19 pandemic, Russia-Ukraine conflict, and Israel-Gaza wars posed additional challenges, resulting in lower levels of FDI and sovereign credit ratings

Conclusion and Policy Implications

The empirical study demonstrates a strong correlation between sovereign credit ratings, foreign direct investment, and economic growth. Investors carefully evaluate economic, political, and governmental factors before making investment decisions. The three major credit rating agencies, Moody's, Standard & Poor's, and Fitch, have significant influence over global debt issuers, where credit ratings assess the likelihood of borrowers defaulting on their debt.

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While credit ratings are opinions, they have a substantial impact on sovereign borrowers. Access to international capital markets often requires a credit rating, and the rating's quality directly affects the interest rates governments pay on their debt. Emerging economies often struggle with low per capita income, leading to limited domestic savings. Moreover, their financial institutions may not be fully equipped to channel these savings into productive investments. Therefore, access to international capital markets becomes crucial for securing the necessary capital to fuel economic growth.

International investors contribute more than just capital to emerging economies. They also bring essential managerial expertise and technical know-how, which can significantly boost local capacity and productivity. However, investing in low-income countries carries inherent risks, such as political instability and information asymmetry. A strong sovereign credit rating can help mitigate these risks by signaling a stable political environment and providing greater transparency. Therefore, Egypt's economic growth hinges on improving its creditworthiness to attract foreign direct investment and benefit from the associated capital, expertise, and technological advancements.

Despite a downgrade in its credit rating since 2022, Egypt has continued to attract foreign direct investment (FDI) in certain sectors, such as manufacturing, renewable energy, and real estate. The government has implemented policies to encourage FDI, including economic reforms and infrastructure development. However, to further enhance its attractiveness to investors, Egypt should improve coordination among its fiscal, monetary, and economic policies. Additionally, the business environment needs to be streamlined, reducing regulations and bureaucratic hurdles that can hinder investment. Although Egypt boasts a large domestic market, challenges such as high taxes, skills mismatches, and trade barriers persist. Addressing corruption and promoting digitalization can also create a more competitive investment climate.

Appendix

List of Abbreviations

Abbreviation	Full Form
SCR	Sovereign Credit Ratings
FDI	Foreign Direct Investment
ARDL	Autoregressive distributed Lag
IMF	International Monetary Fund
GDP	Growth Domestic Product
S&P	Standard and Poor's
CRAs	Credit Rating Agencies
ECM	Error Correction Model
ADF	Augmented Dickey-Fuller
INF	Inflation Rate
TR	Total Reserves
RI	Real Interest Rate
ESG	Environmental, Social and Governmental

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