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Are abundant natural resources in the Democratic Republic of the Congo a blessing or curse?

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Abstract
This study examines the impact of natural resources and institutional quality (IQ) on the economic growth of the Democratic Republic of the Congo (DRC), one of the most resource-rich countries in the world. The study employs eleven variables from natural resource revenue, IQ, human capital, and other relevant economic drivers. All variables were analyzed using various econometric techniques. The Ramsey RESET test was used to validate and authenticate the robustness of the regression test. The findings revealed that human capital efforts, inflation, FDI, oil rents, forest rents, political instability, conflict, and corruption are crucial factors hindering the country's economy. This implies that the natural resources in the DRC are not a blessing but a curse to the country. Therefore, the study recommends strict monitoring and supervision in handling mineral rents, along with solid political stability, and combating both corruption and conflict to turn this curse into a blessing.

Keywords: Congo; economic growth; FDI; institutional quality, natural resources

Introduction

The Democratic Republic of the Congo (DRC) is an African nation endowed with an abundance of natural resources, positioning it among the most resource-rich countries globally. The DRC's mineral wealth includes gold, tantalum, cobalt, copper, and coltan, collectively accounting for approximately 24% of the world's mineral resources (Ndjungu, 2020). These minerals are concentrated in regions such as the Kilo-Moto Goldfield, the Manono-Kitenge Tin-Tantalum Belt, and the Katanga Copperbelt, with the latter being the largest and most valuable mining area in the DRC. The DRC holds the largest reserves of copper and cobalt worldwide, which significantly contributes to its wealth of natural resources (Waku et al., 2023).

The global economy heavily relies on the DRC's mineral resources. Key minerals essential for electronic devices, cell phones, and electric cars are found within the country. Copper is extensively used across various industries, including construction, manufacturing, and technology (Gulley, 2022). Tantalum and coltan are crucial for producing electrical components such as resistors and capacitors. Notably, the DRC has the third-largest tantalum reserves and the second-largest copper reserves (Danysz, 2021). These resources have the potential to significantly boost the nation's economy due to their global importance.

Despite its vast mineral wealth, the DRC remains one of the poorest nations globally. This paradox can be attributed to numerous issues plaguing the nation's resource sector, which hinder economic growth and the development of the mining industry (World Bank, 2017). The DRC's mining sector has experienced decades of stagnation and conflict (World Bank Group, 2018; Manojlovic & Kabanga, 2023). Corruption, bribery, lack of transparency, and allegations of political leaders profiting from mining operations contribute to the opacity of contracts and revenue (Titeca & Edmond, 2019; Wakenge, 2020). Furthermore,

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the industry suffers from a lack of skilled personnel and a robust regulatory framework, leading to unsafe and illegal mining activities (Otamonga & Poté, 2020).

The resource curse theory suggests that nations with abundant resources often experience slower economic growth (Auty, 1995). In the DRC, debates continue about the impact of mineral rents on economic expansion, with some studies indicating a positive effect (Ampofo et al., 2020; Murhula & Achiza, 2021) and others highlighting negative consequences (Nichols, 2018; Titeca & Edmond, 2019; Tshinu, 2022). According to De Rosa and Iootty (2012), resource-rich countries can benefit from their natural resources only when strong institutions are established and enforced. Their study identified challenges such as corruption, conflicts, and environmental pollution as significant barriers to economic progress in the DRC.

Institutional quality is critical in leveraging natural resources for economic growth. Poor institutional practices have a detrimental effect on the DRC's economy (Medase et al., 2023; Tshinu, 2022; Afolabi, 2023). Robust institutions can steer the country's resources in the right direction, enhancing economic activities and sustainability (Sala-i-Martin & Subramanian, 2013; Olaniyi & Oladeji, 2021; Ibrahim & Ajide, 2022; Mesagan et al., 2023). However, the inconsistency of resource rents due to weak institutional quality has destabilized the DRC's economy for many years (Asiamah et al., 2022; Ongo Nkoa & Song, 2022; Mlambo, 2022).

Mismanagement of resources, corruption, poor institutions, and conflict have been cited as reasons for the DRC's poor economic performance despite its resource wealth. Corruption significantly undermines economic growth, as evidenced by Zallé (2022) and Rahmé and Walsh (2022). Mulowayi and Pinshi (2023) highlight that GDP per capita fluctuations in many African countries are linked to high corruption and unequal distribution of natural resource rents, leading to poor savings and inadequate physical and human capital accumulation. Institutional issues such as corruption, lack of rule of law, and injustice exacerbate the resource curse in the DRC (Staines & Villafuerte, 2022).

To address the challenges associated with the resource curse, the DRC must invest in its workforce and establish robust institutions. Development in resource-rich countries hinges on the prudent utilization of mineral rents to fund infrastructure, human capital development, social amenities, and the health and education sectors (Raghupathi & Raghupathi, 2020). Such investments can reduce poverty, decrease inequality, and improve living standards.

Also, institutional quality plays a pivotal role in the effective management of natural resources and the overall economy. Establishing good institutions, including effective governance, corruption control, legal systems, political stability, and regulatory frameworks, creates a conducive environment for investment and economic growth (Aziz, 2018; Brander et al., 2017). Robust institutions are essential for achieving a high standard of living, low poverty rates, minimal unemployment, and economic sustainability (Ferrara & Nisticò, 2019).

Although extensive research has examined whether the DRC benefits from its resources (Tshinu, 2022; Rapanyane, 2022; Kalombo, 2022; Galli et al., 2022), the role of institutional quality in shaping natural resources and economic growth has been less explored. Further research is needed to fully understand the impact of institutional quality and identify specific challenges hindering economic activities despite abundant natural resources. This study aims to investigate the role of mineral resources and institutional quality in the economic growth of the DRC. It seeks to provide comprehensive insights and address gaps identified in previous research, offering practical, evidence-based recommendations to policymakers and stakeholders for promoting sustainable and equitable economic growth in the DRC. The study presents a detailed analysis of the DRC's economy through the lens of mineral resources and institutional quality.

The structure of this paper is as follows: the next section covers the literature review, followed by the research methodology. The subsequent section presents the results and discussion, with the final section dedicated to conclusions and recommendations.
Literature review

Literature review

Resource Curse Theory and Economic Growth

The resource curse theory posits that countries abundant in natural resources often experience slower economic growth. This theory suggests that weak institutional quality and overreliance on resource rents can stifle other sectors, encourage illegal activities, and ultimately harm the nation's economy (Ross, 1999; Sachs & Warner, 2001). Conversely, the theory also argues that strong institutions can enable a resource-rich country to harness its resources effectively, investing in various sectors to boost economic growth and attract foreign investors, thereby significantly benefiting the country's economy (Shinwari et al., 2023).

Mineral Resources and Economic Growth

Resource-rich countries frequently fall victim to the resource curse, spurring debate on how to mitigate this phenomenon. This theory posits that issues like corruption, conflicts of interest, and Dutch disease—where overdependence on mineral rents undermines other sectors—are prevalent in resource-rich countries (Marques & Pires, 2019). Dutch disease, in particular, results in the neglect of sectors such as manufacturing, health, and education, causing economic challenges (Badeeb et al., 2017). Corruption and unequal resource allocation further exacerbate these issues, leading to economic instability and discouraging foreign investment (De Rosa & Iootty, 2012; Dramani et al., 2022).

Political elites often exploit resource rents for personal gain, accelerating corruption and hampering economic progress (Knutsen et al., 2017; Zhan, 2017; Riyadi, 2020). Moreover, resource-rich countries are prone to various conflicts, which can disrupt economic activities (Conrad et al., 2019; Lessmann & Steinkraus, 2019). However, some nations have defied the resource curse by establishing strong institutions that enable them to leverage their resources for economic growth (Olander, 2019).
Countries like Norway, Finland, Kuwait, Oman, and Chile have successfully utilized their mineral resources to foster social and economic development, investing in education, health, and human capital (Australia, 2018; Creek, 2018; Ellefmo et al., 2019). These nations demonstrate that resource wealth can lead to economic prosperity with proper management and strong institutions (Lassila, 2018; Sun et al., 2018; Zeeshan et al., 2021).

Abundant resources can attract foreign direct investment, leading to economic growth (Lu et al., 2020; Eissa & Elgammal, 2020). Countries with robust institutions can counter the resource curse and achieve economic development (Akinlo et al., 2022).

Institutional Quality in Resource-Rich Countries

Institutional quality (IQ) plays a crucial role in mediating the relationship between natural resources and economic growth. While some argue that institutional quality is not the primary determinant of economic development, substantial evidence suggests that good institutions transform resource wealth into economic blessings (Abdulahi et al., 2019; Hassan et al., 2019; Qiang & Jian, 2020).
Indicators of IQ, such as the rule of law, transparency, accountability, and regulatory quality, are essential for investment and economic development (Olander, 2019; Jianguo et al., 2022). Countries with strong institutions can overcome the resource curse and achieve sustainable economic growth (Adams et al., 2019; Asif et al., 2020). In contrast, countries with weak institutions and vast resources, like the Democratic Republic of the Congo (DRC), tend to experience slower economic growth.

Mineral Resources and DRC Economic Growth

The impact of mineral resources on the DRC's economy is a contentious issue. Some researchers argue that the DRC has effectively utilized mineral revenue to finance economic activities, boosting the economy (Narice, 2023). Others, however, contend that these resources have not contributed significantly to economic progress and align with the resource curse theory. Corruption, conflicts, and environmental degradation have hindered the DRC's economic development (Sovacool, 2019; Muimba-Kankolongo et al., 2022). To bridge the gap between natural resources and economic growth, the DRC must enhance its institutional quality.

Role of Institutional Quality in Mediating the Relationship Between Natural Resources and Economic Growth

Institutional quality can significantly shape a nation's economy, regardless of its resource wealth. Good institutions—characterized by the rule of law, control of corruption, government effectiveness, and political stability—drive economic productivity (Shirley, 2005; Ren et al., 2022). Poor institutional quality, conversely, can lead to economic decline (Qiang & Jian, 2020).

Research supports the idea that IQ mediates the relationship between natural resources and economic growth. Strong institutions enable countries to utilize mineral revenues effectively, fostering sustainable economic growth (Asamoah et al., 2019; Ibrahim & Ajide, 2021). Quality institutions also attract foreign investment and diversify economic activities, enhancing economic stability and growth (Kayode-Ajala, 2023; Gustafsson & Scurrah, 2019).

In conclusion, the role of institutional quality is pivotal in determining whether resource-rich countries can overcome the resource curse and achieve sustainable economic growth. For the DRC, improving institutional quality is essential to harness its vast mineral wealth for economic development.

Research Method

This study aims to investigate the impact of mineral resources and institutional quality on economic growth in the Democratic Republic of the Congo (DRC). It examines institutional quality and resource curse theories, human capital, various economic drivers, and mineral rents as indicators of mineral resources. Given the long-term focus on a single country, the study utilizes time series data. Eleven variables are used to measure these indicators, with economic growth proxied by Real Gross Domestic Product (RGDP), denoted as "EC." The independent variables include government expenditure on education (GEE), government expenditure on health (GEH), inflation rate (INF), mineral rent (MRR), oil rent (OLR), political instability (PSA), forest rent (FOR), foreign direct investment (FDI), conflict (CON), and control of corruption (COC). Data for these variables were sourced from the World Bank Database, covering a period of thirty-eight years from 1985 to 2022.

To achieve its objectives, the study employs several econometric tests. Pre-estimation tests, including summary descriptive, matrix correlation, unit root, and cointegration tests, are used to assess the status of the series employed in the study. The main objective is then addressed through regression analysis. Post-estimation tests, such as heteroskedasticity, serial correlation, and Ramsey reset tests, are conducted to validate the regression results.

Regression analysis is particularly suitable for this study as it enables the simultaneous investigation of multiple variables, offering a comprehensive understanding of their impacts (Ciulla & D'Amico, 2019). Furthermore, Kumari and Yadav (2018) emphasize the relevance of regression methods in examining the reliability and influence of various independent variables on the dependent variable through their coefficients and the significance levels of each variable in the model.

The model specification for this study follows the standard econometric model, with the equation stated as follows:

$$EC = a_0 + a_1(GEE)_t + a_2(GEH)_t + a_3(INF)_t + a_4(MRR)_t + a_5(OLR)_t + a_6(PSA)_t + a_7(FOR)_t + a_8(FDI)_t + a_9(CON)_t + a_{10}(COC)_t + e_t \quad (1)$$

Where, a_0 is a constant, a_1 - a_{10} are the coefficients of independent variables, *t* is the year, and *e* is the error

Result and Discussion

Descriptive Statistics

Conducting descriptive statistics is essential to provide a roadmap and summarize the series employed in the study (Fried and Hisrich, 1994). This study considers the test necessary to confirm the series' status for further investigations. The descriptive results in Table 1 show that the mean value of GDP (EC) is 2.69, with other independent variables showing their respective average levels. The medians, which are close to the mean values, reveal that the series are equally distributed. Thirty-eight observations were considered and analyzed. The maximum, mean, and skewness values for all variables were within the expected range.

Correlation Matrix

The correlation matrix checks the relationship between the dependent and independent variables to avoid issues with any employed variables. All the variables were subjected to the correlation test to ascertain the degree of relationship between GDP and the other independent variables. The results revealed the expected relationships, implying that all the series were suitable for further investigation. Table 2 presents the correlation matrix of the variables.

Unit Root Test

The unit root test is crucial as it determines the status of the series, indicating whether they are stationary or not, which is necessary for appropriate testing (Roquez-Diaz and Escot, 2018). The study subjected all eleven variables to Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Six series (EC, GEE, INF, FDI, CON, and COC) were stationary at level, while the other five variables (GEH, MRR, OLR, PSA, and FOR) were stationary at first difference. This indicates that all the variables are suitable for further statistical calculation. Table 3 presents the unit root test results.

Cointegration Rank Test

Due to the non-stationarity of some variables in the previous test, it is essential to conduct the cointegration test to ascertain the long-run relationships between GDP and the independent variables to avoid spurious regression in subsequent tests. The result shows a long-term relationship with GDP, and the significance is indicated by the p-values of both the trace and eigenvalue tests for all variables. This suggests that the variables are suitable for subsequent analysis. Table 4 shows the results of the cointegration rank test.

Regression Analysis

Numerous scholars, such as Peduzzi et al. (1996) and Quah (1996), have emphasized the importance of regression analysis for understanding complex dynamics involving multiple variables. Regression analysis is crucial for analyzing complex variables and large series to understand the relationships between independent and control variables and the dependent variable (Inuwa et al., 2022; Liu et al., 2022; Ma et al., 2022; Khan et al., 2022; Liang et al., 2022; Li et al., 2023). Table 5 reveals that GEE (-1.068509) has a negative and significant impact on EC, GEH (0.347445) has a positive but statistically insignificant impact on the dependent variable, and INF (-1.63E-07) has a negative but

statistically insignificant effect on EC. MRR has a positive value of 0.103102 on EC and is statistically significant. OLR (-0.141436) indicated a negative and statistically significant effect on the dependent variable. The following variables: PSA, FOR, FDI, CON, and COC (-0.034541, -0.123049, -0.005476, -0.028328, and -0.107704), all negatively affect EC with insignificant values.

Heteroskedasticity Test

According to Kaufman (2013), post-estimation tests like heteroskedasticity should be performed to ascertain its presence or absence in the model. This study examines whether heteroskedasticity is present in the model residuals. The results show no evidence of heteroskedasticity, with an F-statistic of 0.786218 and a p-value of 0.6418. Thus, the study concludes there is no heteroskedasticity in the regression residuals.

Serial Correlation Test

The serial correlation test is prioritized to validate the regression outcome. Flatt and Jacobs (2019) suggest conducting this test to avoid model misspecification or misdirection. The test results confirm no serial correlation in the regression model, based on the Breusch-Godfrey Serial Correlation test result with an F-statistic of 0.407502 and a p-value of 0.6696. These results indicate no evidence of serial correlation in the model.

Ramsey RESET Test

To confirm the adequacy, omission, or misspecification of the regression model, a Ramsey RESET test is necessary, as stated by Pagan and Hall (1983). The test results reveal no omission or misspecification in the model, with an F-statistic of 0.9153 and a probability value of 0.3475. The model demonstrated adequacy and sufficiency, as observed from the high R-squared value of 0.9073. Table 6 shows these results.

Discussion

The findings from the study present a nuanced picture of the economic dynamics in the Democratic Republic of the Congo (DRC), particularly in relation to government expenditure, inflation, natural resource rents, and institutional quality. A critical analysis of these results sheds light on the complex interplay of these factors and their overall impact on economic growth.

Firstly, the study reveals that government expenditure on education (GEE) has a negative and insignificant impact (-1.0685) on the economy, suggesting that such spending does not contribute positively to economic growth. This finding is consistent with Kabundi (2019), who also found a negative effect of government education spending on the economy. This could be indicative of inefficiencies in the education sector, possibly due to misallocation of funds, poor quality of education, or systemic issues that prevent educational investments from translating into economic gains. This challenges the conventional wisdom that education spending is inherently beneficial for economic growth and suggests a need for reforms that ensure educational expenditures are more effectively utilized.

In contrast, government expenditure on health (GEH) shows a positive but insignificant effect (0.3474), implying that spending on health slightly enhances the DRC's economy. This finding aligns with Okombi (2018), who identified a positive relationship between government health expenditure and economic growth in the Congo. Although the impact is not statistically significant, the positive sign indicates potential benefits of health investments, suggesting that improvements in public health can contribute to economic productivity by enhancing the overall well-being and efficiency of the labor force. However, the lack of significance points to the possibility that current health spending levels or methods may not be sufficient to drive substantial economic growth.

Inflation (INF) has a negative impact (-1.63E-07) on GDP, indicating that inflation adversely affects the economy. Christian (2023) supports this by noting that national spending often suffers due to inflation's negative effects. High inflation erodes purchasing power, destabilizes the economy, and creates uncertainty, which can deter investment and hinder economic planning. This underscores the importance of implementing effective monetary policies to control inflation and stabilize the economy.

On the other hand, mineral rents (MRR) have a positive and significant impact (0.1031) on GDP, highlighting that revenue from minerals benefits the DRC's economy. This supports Ampofo et al. (2023), who found that natural resource rents positively influence GDP. The significant contribution of mineral rents suggests that the DRC's rich mineral resources can be a powerful driver of economic growth if managed properly. However, this also raises concerns about the sustainability and equitable distribution of resource-based revenues.

Conversely, oil rents (OLR) have a negative and significant effect (-0.1414) on economic activities, suggesting that oil revenue does not benefit the economy. Titeca and Edmond (2019) highlighted similar negative effects of oil rent, political instability, and corruption. This finding indicates a resource curse scenario, where oil wealth leads to economic distortions, governance issues, and dependency on volatile commodity prices. The significant negative impact of oil rents underscores the need for diversified economic strategies and better governance to mitigate the adverse effects of oil dependency.

Political instability (PSA) and control of corruption (COC) also negatively impact economic growth (-0.0345 and -0.1077, respectively). Keefer and Knack (1997) empirically documented that political instability and corruption contribute to persistent poverty, implying that without improved institutional quality, poor countries remain poor. These findings highlight the critical role of political stability and effective governance in fostering economic development. Addressing political instability and corruption is essential for creating an environment conducive to growth and investment.

Additionally, forest rents (FOR) negatively impact GDP (-0.1230), likely influenced by the high corruption rate. Forest resource mismanagement and illegal exploitation could be underlying factors contributing to this negative effect. Similarly, foreign direct investment (FDI) negatively affects the economy (-0.0055), consistent with Banzouzi et al. (2022), who found a negative effect of Chinese FDI on Congolese exports. This suggests that FDI, particularly if not aligned with national interests or adequately regulated, may not yield the anticipated economic benefits and could even exacerbate existing economic issues.

Finally, conflict (CON) has a negative impact (-0.0283) on the economy, aligning with Ogunnoiki (2019), who noted that conflicts have long hindered the DRC's economic progress. The persistent state of conflict in the DRC disrupts economic activities, deters investment, and diverts resources from productive uses to security and reconstruction efforts.

This study paints a complex picture of the DRC's economic landscape, where natural resource wealth, governance, and institutional quality play pivotal roles. While mineral rents show potential for economic benefit, the negative impacts of oil rents, political instability, corruption, and conflict highlight significant challenges. Addressing these issues through improved governance, effective resource management, and political stability is crucial for transforming the DRC's resource wealth from a curse into a blessing for sustainable economic development.

Conclusions, Suggestions, and Limitations

This study addresses whether the DRC's abundant mineral resources are a blessing or a curse by analyzing the roles of mineral resources, institutional quality, human capital, and economic growth. The findings reveal that government spending on education and health does not significantly benefit the economy, and inflation harms economic activities. Moreover, FDI, oil rents, forest rents, political

instability, conflict, and corruption negatively affect GDP. The study concludes that the DRC's natural resources are a curse rather than a blessing.

Based on these findings, it is recommended that the DRC strictly supervise and monitor government spending on education and health. Additionally, strategies should prioritize addressing mineral resource revenue management, strengthening political stability, and combating corruption to transform the resource curse into a blessing. Specifically, the DRC should rigorously implement Chapter II of the United Nations Convention against Corruption (UNCAC), enhancing political will, reducing political interference, and depoliticizing the judiciary to prevent corruption.

This study has limitations. Future research could conduct a comparative analysis of the mining and non-mining sectors in the DRC. Additionally, comparative studies with other resource-rich countries could help policymakers develop more effective policies to boost the DRC's economy.

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Table 1. Descriptive Statistics

	EC	GEE	GEH	INF	MRR	OLR	PSA	FOR	FDI	CON	COC
Mean	2.69	0.13	0.25	922.18	0.26	0.083	-2.22	1.17	2.52	0.58	-1.45
Median	2.67	0.12	0.20	19.31	0.54	0.15	-2.22	1.22	1.64	1.00	-1.46
Maximum	2.99	0.43	0.66	23773.13	1.46	0.45	-0.80	1.53	12.72	1.00	-0.78
Minimum	2.51	-0.14	0.02	0.74	-1.11	-0.51	-2.85	0.67	-1.30	0.00	-1.65
Std. Dev.	0.15	0.15	0.23	3888.90	0.72	0.27	0.37	0.22	3.34	0.50	0.15
Skewness	0.95	0.19	0.57	5.56	-0.43	-0.71	1.43	-0.29	1.49	-0.32	2.63
Kurtosis	2.84	2.07	1.79	33.11	1.78	2.58	7.16	2.37	4.71	1.10	13.13
Jarque-Bera	5.72	1.62	4.36	1631.04	3.60	3.50	40.33	1.15	18.68	6.35	206.33
Probability	0.05	0.44	0.11	0.00	0.17	0.17	0.00	0.56	0.00	0.04	0.00
Sum	102.10	4.76	9.56	35042.68	9.75	3.16	-84.20	44.62	95.92	22.00	-55.22
Sum Sq. Dev.	0.78	0.84	1.94	5.60	19.31	2.74	4.99	1.72	412.18	9.26	0.79
Observations	38	38	38	38	38	38	38	38	38	38	38

Table 2. Correlation matrix

Correlation Probability	**EC**	**GEE**	**GEH**	**INF**	**MRR**	**OLR**	**PSA**	**FOR**	**FDI**	**CON**	**COC**
EC	1.000000										

GEE	-0.500320	1.000000									
	0.0014	-----									
GEH	-0.265553	0.949081	1.000000								
	0.1071	0.0000	-----								
INF	0.033689	-0.202358	-0.217674	1.000000							
	0.8409	0.2231	0.1892	-----							
MRR	0.415535	0.389279	0.579171	-0.255419	1.000000						
	0.0095	0.0157	0.0001	0.1217	-----						
OLR	-0.222333	-0.383128	-0.498894	0.029525	-0.181874	1.000000					
	0.1797	0.0176	0.0014	0.8603	0.2745	-----					
PSA	0.007865	0.580039	0.677107	-0.222301	0.560893	-0.392445	1.000000				
	0.9626	0.0001	0.0000	0.1798	0.0002	0.0148	-----				
FOR	-0.576844	0.002805	-0.158873	0.112793	-0.433403	0.453480	-0.548863	1.000000			
	0.0002	0.9867	0.3407	0.5002	0.0066	0.0042	0.0004	-----			
FDI	-0.392516	0.508448	0.511628	-0.181536	0.334120	0.197786	0.303940	0.132452	1.000000		
	0.0148	0.0011	0.0010	0.2754	0.0403	0.2339	0.0636	0.4279	-----		
CON	-0.567771	0.566087	0.464870	-0.254153	-0.154005	-0.293057	0.226973	0.187538	0.144504	1.000000	
	0.0002	0.0002	0.0033	0.1236	0.3559	0.0742	0.1706	0.2595	0.3867	-----	
COC	-0.112505	0.401599	0.481563	-0.235028	0.340326	-0.281889	0.608373	-0.251375	0.349621	0.224420	1.000000
	0.5013	0.0124	0.0022	0.1555	0.0366	0.0864	0.0001	0.1279	0.0314	0.1756	-----

Table 3. Unit Root Test

Augmented Dickey-Fuller				Philip Perron			
Variables	**t-statistics**	**P-value**	**Order of integration**	**Variables**	**t-statistics**	**P-value**	**Order of integration**
EC	-4.564993	0.0057	1(0)	EC	-4.80337	0.0024	1(0)
GEE	-3.516070	0.0570	1(0)	GEE	-4.91092	0.0017	1(0)
GEH	-7.297432	0.0000	1(1)	GEH	-8.69179	0.0000	1(1)
INF	-755.0979	0.0000	1(0)	INF	-5.66846	0.0002	1(0)
MRR	-5.366110	0.0005	1(1)	MRR	-5.35489	0.0005	1(1)
OLR	-9.142634	0.0000	1(1)	OLR	-22.2365	0.0000	1(1)
PSA	-4.504070	0.0051	1(1)	PSA	-4.28988	0.0087	1(1)
FOR	-7.327124	0.0000	1(1)	FOR	-14.8183	0.0000	1(1)
FDI	-4.818104	0.0022	1(0)	FDI	-5.09841	0.0001	1(0)
CON			1(0)	CON	-	0.0336	1(0)
	-3.688258	0.0358			3.716567		
COC	-3.660692	0.0393	1(0)	COC	-3.87869	0.0238	1(0)

Table 4. Cointegration Rank Test

Variables	**Eigenvalue value**	**Trace Statistic**	**Prob.**
EC	0.993634	634.4138	0.0000
GDP	0.987243	452.3716	0.0000
GEE	0.872936	295.3517	0.0000
GEH	0.781982	221.0815	0.0000
INF	0.761293	166.2471	0.0000
MRR	0.682111	114.6765	0.0013
OLR	0.466912	73.41860	0.0251
PSA	0.453757	50.77216	0.0259
FOR	0.383753	29.00330	0.0615
FDI	0.260831	11.57543	0.1785
CON	0.019125	0.695187	0.4044

Table 5. Regression Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEE	-1.068509	0.297269	-3.594423	0.0013
GEH	0.347445	0.263829	1.316932	0.1989
INF	-1.63E-07	2.51E-06	-0.064864	0.9488
MRR	0.103102	0.026623	3.872725	0.0006
OLR	-0.141436	0.065895	-2.146386	0.0410
PSA	-0.034541	0.046382	-0.744708	0.4629
FOR	-0.123049	0.068479	-1.796887	0.0835
FDI	-0.005476	0.004116	-1.330519	0.1945
CON	-0.028328	0.026367	-1.074351	0.2922
COC	-0.107704	0.079301	-1.358172	0.1857
C	2.660316	0.121449	21.90480	0.0000
R-squared	0.904073	Mean dependent var		2.686912
Adjusted R-squared	0.868544	S.D. dependent var		0.144922
S.E. of regression	0.052544	Akaike info criterion		-2.817124
Sum squared resid	0.074544	Schwarz criterion		-2.343086
Log likelihood	64.52536	Hannan-Quinn criterion.		-2.648465
F-statistic	25.44634	Durbin-Watson stat		1.646496
Prob(F-statistic)	0.000000			

Table 6. Ramsey RESET Test

	Value	**df**	**Probability**
t-statistic	0.956690	26	0.3475
F-statistic	0.915255	(1, 26)	0.3475
Likelihood ratio	1.314675	1	0.2516

F-test summary:

	Sum of Sq.	**df**	**Mean Squares**
Test SSR	0.002535	1	0.002535
Restricted SSR	0.074544	27	0.002761
Unrestricted SSR	0.072009	26	0.002770

LR test summary:

	Value	**df**
Restricted LogL	64.52536	27
Unrestricted LogL	65.18270	26