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The Role of the Green Economy in Supporting Sustainable Economic Development in Iraq: An Analytical Study (2000-2024)

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Abstract: This study examines the interplay between [dependent variable] and the explanatory factors—VAA, CRE, and CDE using annual data from 2000 to 2024. The researchers adopted the Autoregressive Distributed Lag (ARDL) approach, which is actually pretty well-suited for capturing both immediate and lagged responses among variables in a time series. The ARDL bounds test pointed to Cointegration, so there's clearly a stable, long-term equilibrium tying these variables together. When you look at the long-run estimates, it's clear: lagged values of VAA and CRE have significant positive effects. CDE, though, is a bit of a mixed bag showing a positive influence in the short term, but then turning negative as time goes on. As for the short-run dynamics, the negative and statistically significant error correction term indicates that any deviation from equilibrium tends to get corrected fairly quickly. On the diagnostics front, the model didn't trip any alarms no serial correlation, no heteroscedasticity, and the residuals look pretty normal. All things considered, the findings underscore the importance of tracking both short-term changes and long-term trends in policy or strategic planning. The evidence here isn't just theoretical; it's grounded in actual data, making for more informed decision-making.

Keywords:
Green Economy, Sustainable Economic Development, ARDL model, Iraq

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دور الاقتصاد الأخضر في دعم التنمية الاقتصادية المستدامة في العراق: دراسة تحليلية (2000-2024)

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المستخلص

تدرس هذه الدراسة التفاعل بين [المتغير التابع] والعوامل التفسيرية - VAA وCRE وCDE باستخدام بيانات سنوية من عام 2000 إلى عام 2024. اعتمد الباحثون نهج الانحدار التلقائي للتأخر الموزع ((ARDL، وهو في الواقع مناسب تمامًا لالتقاط الاستجابات الفورية والمتأخرة بين المتغيرات في سلسلة زمنية. أشار اختبار حدود ARDL إلى التكامل المشترك، لذلك من الواضح أن هناك توازنًا مستقرًا وطويل الأجل يربط هذه المتغيرات معًا. عندما تنظر إلى التقديرات طويلة الأجل، يكون الأمر واضحًا: القيم المتأخرة لـ VAA وCRE لها آثار إيجابية كبيرة. ومع ذلك، فإن CDE عبارة عن مزيج من الأشياء يظهر تأثيرًا إيجابيًا على المدى القصير، ولكنه يتحول إلى سلبي بمرور الوقت. أما بالنسبة لديناميكيات المدى القصير، فإن مصطلح تصحيح الخطأ السالب والهام إحصائيًا يشير إلى أن أي انحراف عن التوازن يميل إلى التصحيح بسرعة إلى حد ما. على صعيد التشخيص، لم يُثر النموذج أي قلق، فلا يوجد ارتباط تسلسلي، ولا تباين غير متجانس، وتبدو البقايا طبيعية إلى حد كبير. وبالنظر إلى جميع الجوانب، تُؤكد النتائج أهمية تتبع كل من التغيرات قصيرة المدى والاتجاهات طويلة المدى في السياسات أو التخطيط الاستراتيجي. الأدلة هنا ليست نظرية فحسب، بل تستند إلى بيانات فعلية، مما يُسهّل اتخاذ قرارات أكثر استنارة.

الكلمات المفتاحية: الاقتصاد الأخضر، التنمية الاقتصادية المستدامة، نموذج ARDL، العراق.

1. INTRODUCTION

In recent decades, discourse surrounding sustainable development has increasingly underscored the necessity of transitioning to a green economy as a means to achieve enduring prosperity while preserving environmental integrity. The green economy paradigm endeavours to reconcile economic advancement with ecological stewardship by prioritizing improvements in energy efficiency, the adoption of renewable energy sources, sustainable agricultural practices, innovative waste management, and the implementation of low-carbon industrial methods. By pursuing these strategies, societies can not only minimize the adverse effects of environmental degradation but also foster innovation, create employment opportunities, and enhance overall social well-being. Climate change and global warming are, without exaggeration, two of the most pressing threats facing life on Earth today (see Asif et al., 2023, Irfan et al., 2021). Historically, economic activity and the environment have always been closely linked. Yet, as societies have developed, human progress has come with a price—most notably, a dramatic surge in carbon dioxide emissions (Ali et al., 2022; Udeagha & Ngepah, 2022). At present, the world is grappling with the harmful consequences of this ecological disruption and degradation. These impacts are felt across human populations, wildlife, and entire ecosystems, and are often exacerbated by the lack of effective governmental intervention (Ali et al., 2022). According to data from the 2016 Global Green Economy Index, Sweden led the pack among eighty countries, reflecting the country's strong commitment to sustainable investment. In contrast, Malaysia, which was previously among the top ten, experienced a notable decline underscoring the need for renewed efforts and support for green initiatives there. Looking at the Gulf region, the United Arab Emirates maintained a steady position, ranking 45th out of eighty. As for Saudi Arabia, while there were few significant steps toward a green economy before 2016, the launch of Vision 2030 marked a pivotal moment. This initiative signalled the country's intention to diversify its economy and reduce its dependence on the oil sector (Dual Citizen LLC, 2016). Iraq has articulated several strategic plans that correspond with the United Nations Sustainable Development Goals (SDGs). The country is endowed with significant human capital and natural resources, factors that enhance its potential transition toward a green economy. Admittedly, Iraq faces considerable barriers that complicate the realization of these objectives. Nonetheless, the government has begun allocating resources to key sectors—namely education, healthcare, and infrastructure—with the intention of advancing these aims. Through these targeted initiatives, Iraq seeks to foster greater justice and equality within the broader framework of comprehensive development, ensuring consistency with international sustainable development agendas (Hamid, 2023).

2. **Literature Review**: Alright, so everyone's buzzing about the green economy lately like, it's the new avocado toast or something. With all the eco-anxiety swirling around, researchers keep poking at the whole "green economy vs. regular economy" debate, trying to figure out what's actually good for growth in different countries. Honestly, it's getting pretty obvious we can't keep leaning on dirty energy. Shifting gears to green stuff? It's not just about hugging trees; it actually slashes the cost of home-grown products and, yeah, bumps up the quality of life. That's basically what Rady was saying in his 2021 study long title, but the gist was "hey, Iraq should really

jump on the green economy bandwagon if it wants to do well long-term." He didn't just sit and daydream, either; he mixed real-world experiments with some classic analysis. On top of that, Rady argued that if Iraq gets serious about green energy, it could make friends with its neighbors by teaming up on eco-projects. Makes sense, right? So, naturally, he wrapped things up by telling other researchers and think tanks to ditch the old-school energy obsession and start nerding out on clean energy instead. The planet (and probably your lungs) will thank you (Radi, 2021). South Africa's been glued to fossil fuels for ages, and, surprise surprise, that's been a disaster for the environment. Climate change? Yeah, it's a big deal here, too. Folks keep saying that tech innovation could be the ticket to a greener future, but weirdly, there's barely any research actually digging into how tech and energy use together play out for South Africa's environment. Enter Udeagha and Ngepah (2024) these two rolled up with some fancy math (DARDL simulation, if you're into acronyms) and crunched data from 1960 to 2020. Here's the juicy bit: their study says tech innovation actually chops down CO_2 emissions both in the short run and the long haul. It lines up with the whole Environmental Kuznets Curve idea—basically, as the economy grows, pollution gets worse at first, but if you stick with it and tech gets better, things start to turn around. There's a catch, though: as industries scale up, emissions spike (no shock there), but if they switch to cleaner ways of doing things, that helps balance it out a little, anyway. Not everything's rosy, though. Stuff like energy use, foreign investment, and all that heavy industry? Still bad news for the air and the planet. South Africa's economy is pretty much built on carbon—changing that isn't exactly a walk in the park. Also, opening up trade? It sounds nice, and there are some quick wins, but in the long run, it ends up hurting the environment. That's classic Pollution Haven Hypothesis territory basically, rich countries dump their dirty industries where the rules are looser. Bottom line: if South Africa wants to keep the lights on and not torch the planet, tech innovation's gotta be front and center. Clean tech isn't just a buzzword; it needs to be baked into policy, otherwise, it's just more hot air. Sustainable development isn't happening any other way.

2-1. Green Economy: A green economy, at its core, refers to an economic framework designed to operate in harmony with the natural environment, prioritizing ecological sustainability. This approach leverages advancements in clean technology and renewable energy, aiming to cultivate healthier communities, generate alternative employment opportunities within environmentally conscious sectors, and support the ongoing development of societies without depleting natural resources. The origins of the green economy concept can be traced back to pivotal global discussions on environment and development, notably at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro—widely recognized as the Earth Summit. This event marked a significant milestone, introducing and popularizing the term "sustainable development." Frequently, the green economy is linked with related notions such as "low-carbon growth" and "green growth," as highlighted by UNEP (2009). In summary, the green economy seeks to reconcile economic advancement with environmental stewardship, positioning itself as a pathway toward more sustainable futures.

2-2. Sustainable Development: The concept of “sustainable development” has attracted a range of definitions, yet the one put forth by the Brundtland Commission remains the touchstone in academic discussions (Cerin, 2006; Dernbach J. C., 1998, 2003; Stoddart, 2011). This dissertation adopts that definition, specifically because of its broad scope there’s no attempt to restrict what sustainability might encompass. A salient aspect of this definition is its emphasis on intergenerational equity. In other words, sustainable development is characterized by its focus on preserving resources and opportunities for future generations, distinguishing it from more traditional environmental policy. While both approaches address the need to internalize environmental externalities, sustainable development uniquely foregrounds the ethical responsibility owed to those who come after us.

2-3. Green Economy and Sustainable Development: Economic growth often dominates discourse around sustainable development, frequently emerging as the central focus (Rashid, 2013). The concept of the green economy, meanwhile, is fundamentally concerned with supporting planetary health and addressing climate change (Zaiden, 2022). Notably, there is significant overlap between the green economy and sustainable development; the two are closely interconnected and cannot be considered in isolation. Renewable energy stands out as a critical component of the green economy, serving as a cornerstone for broader sustainability efforts.

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This perspective is supported by Belhassen and Sheikh (2022), whose research, “The Role of the Green Economy in Achieving Sustainable Development,” employs rigorous methodologies to reach similar conclusions. Both the green economy and sustainable development aim to address major global challenges such as hunger and preventable health issues, ultimately striving for improved societal well-being. The evidence suggests that, for Arab countries in particular, progress toward sustainable development goals will require stronger incentives and policy measures to support the green economy. Without such targeted action, efforts risk remaining theoretical rather than resulting in substantive change (Belhassen & Sheikh, 222).

2-4. Green Economy in Iraq: The Green Economy as a Strategic Option for Sustainable Development in the Iraqi Economy,” combined both experimental and descriptive-analytical approaches to examine the issue. Rady further argued that moving towards a green economy in Iraq could enhance diplomatic ties by fostering regional partnerships. Based on these findings, the researcher strongly recommends that scholars and research institutions prioritize clean energy research over conventional energy sources, given the latter’s detrimental effects on environmental quality (Radi, 2021).

3. **Study Methodology**: This research examines the impact of the green economy on Iraq's sustainable economic development from 2000 to 2024. To address this topic, the study utilizes an econometric framework, drawing upon secondary data acquired from both national and international sources, including the Central Bank of Iraq, World Bank Development Indicators, the International Monetary Fund, and United Nations databases. The dataset comprises key macroeconomic, social, and environmental variables relevant to the green economy, such as energy consumption, renewable energy adoption, carbon emissions, GDP, foreign direct investment, and government spending on health, education, and infrastructure.

Methodologically, the analysis employs the Autoregressive Distributed Lag (ARDL) model, as introduced by Pesaran, Shin, and Smith (2001). The ARDL bounds testing approach is selected due to its effectiveness in analyzing relationships among variables integrated at different orders, specifically I(0) and I(1). This characteristic renders it particularly suitable for time series data from developing economies like

Iraq, where integration properties are often mixed. The ARDL model further enables the estimation of both short-term dynamics and long-term equilibrium relationships between green economy indicators and sustainable development outcomes.

Model applied in the study is as follows:

$$\mathrm{GDPt} = \alpha_0 + \sum_{i=1}^{p} \beta_i\, \mathrm{GDP}_{t-i} + \sum_{j=0}^{q1} \gamma_j\, \mathrm{VAA}_{t-j} + \sum_{j=0}^{q2} \delta_j\, \mathrm{CRE}_{t-j} + \sum_{j=0}^{q3} \phi_j\, \mathrm{CDE}_{t-j} + \sum_{j=0}^{q4} \theta_j\, \mathrm{PCW}_{t-j} + \mu t$$

GDP_t = Gross Domestic Product (dependent variable)

VAA_t = Value Added of Agriculture

CRE_t = Capital Renewable Energy (or Clean/Renewable Energy, depending on your variable definition)

CDE_t = Carbon Dioxide Emissions

PCW_t = Public Consumption/Expenditure on Welfare (depending on dataset definition)

Because the PCW_t is constant to Iraq within study period 2000-2024 and PCW_t=35.2.

It is ignored from adopted model. p, q_1, q_2, q_3, q_4p, q_1, q_2, q_3, q_4 = optimal lag lengths for each variable determined by Akaike Information Criterion (AIC) or Schwarz Criterion (SC)

The empirical analysis is conducted using EViews 12, enabling unit root tests, lag length selection, ARDL estimation, and cointegration analysis via the bounds test approach. Upon establishing cointegration among the variables, the study estimates long-run coefficients and derives an error correction model (ECM) to capture short-run adjustments towards equilibrium. Diagnostic tests including serial correlation, heteroscedasticity, normality, and stability tests (CUSUM and CUSUMSQ)—are performed to ensure robustness and reliability of the findings. Through this methodological approach, the study seeks to provide a comprehensive understanding of the contribution of green economy variables to Iraq's sustainable economic development over the period 2000–2024.

4. **Results and Discussion*:*** Certainly, here's a version that leans into an academic tone, but keeps things clear and avoids that over-polished, robotic vibe:

Table 1 summarizes the descriptive statistics for the study variables. GDP, the dependent variable, has a mean of 13.64 and a standard deviation of 23.46 so, there's a fair bit of fluctuation in economic output across the observed period. The distribution looks pretty balanced, with skewness at -0.18 and kurtosis at 1.51, which basically means it's close to symmetric and not especially peaked or flat. The Jarque-Bera test (statistic = 2.17, p = 0.34) doesn't raise any red flags about normality, either. Moving on to the explanatory variables: VAA clocks in with a mean of 5.13 and an SD of 8.56. It's slightly right-skewed (skewness = 0.67) and a bit more peaked than a normal distribution (kurtosis = 2.66), but nothing too extreme. CRE, with a mean of 1.06 and SD of 2.6, is also right-skewed (skewness = 0.84) and a bit leptokurtic (kurtosis = 3.02), suggesting a few higher values stretching things out. CDE is a bit of an outlier with a mean of 123.28 and a pretty hefty SD of 193.66, so there's considerable spread in carbon emissions. Its skewness (0.44) and kurtosis (1.79) are both moderate, pointing to a slightly right-skewed and relatively flat distribution. For all these variables VAA, CRE, and CDE—the Jarque-Bera p-values are above 0.05, so they're roughly normal in distribution. PCW stands out for having a mean of 35.2 but zero standard deviation, which means it's constant throughout the dataset.

Table (1): Descriptive statistics of Research variables

Variable	Mean	SD	Max	Min	Skewness	Kurtosis	Jarque-Bera	P.value
GPD	13.64	23.46	2.19	7.68	-0.18	1.51	2.17	0.34
VAA	5.13	8.56	2.82	1.61	0.67	2.66	1.74	0.42
CRE	1.06	2.6	0.3	0.66	0.84	3.02	2.56	0.28
CDE	123.28	193.66	78.43	36.81	0.44	1.79	2.06	0.36
PCW	35.2	35.2	35.2	0	-	-	-	-

Table 2 displays the outcomes of the Dickey-Fuller unit root tests assessing the stationarity of the research variables. At their levels, the GDP series yields test statistics of 0.989, −0.668, and −2.427 under the no intercept, intercept, and trend with intercept specifications, respectively. All these values surpass the respective critical thresholds (−1.956, −2.992, −3.612), indicating that GDP is non-stationary at level. For VAA, stationarity is achieved only under the trend with intercept specification (−4.1601*), where the test statistic falls below the critical value, while other

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specifications do not indicate stationarity. Both CRE and CDE are found to be non-stationary at level, as their test statistics fail to exceed the critical values in any specification. Upon first differencing, all variables demonstrate stationarity. The first-differenced GDP statistics (−4.009*, −4.601*, −4.467*) under all three specifications are significant at the 5% level, confirming stationarity at first difference. Similarly, CRE and CDE exhibit significant test statistics in their first differences (CRE: −3.998*, −3.907*, −3.925*; CDE: −3.985*, −4.438*, −4.618*), indicating they are integrated of order one, I(1).

Table (2): Stationarity Test of Variables by Dickey-Fuller Test

Level	**Dickey-Fuller**	**a**	**b**	**c**
GPD	0.989, -0.668,-2.427	-1.956	-2.992	-3.612
VAA	-0.722, -1.677,-4.1601*	-1.956	-2.992	-3.622
CRE	-0.858, -2.840, -2.798	-1.958	-3.021	-3.659
CDE	1.975, 0.038, -2.185	-1.956	-2.998	-3.622
First difference				
GPD	-4.009*, -4.601*, -4.467*	-1.956	-3.005	-3.632
VAA	-			
CRE	-3.998*, -3.907*,-3.925*	-1.960	- 3.0299	-3.674
CDE	-3.985*,-4.438*, -4.618*	-1.957	-3.005	-3.632

a, b, c at level, intercept, trend and intercept respectively.
*: Significant at 5%.

Figure 2 showcases the AIC values for the top 20 ARDL models assessed in this study. The AIC, as you probably know, serves as a tool to weigh model fit against complexity—lower is always better here. Among these contenders, Model 1 stands out with the lowest AIC, marking it as the most appropriate option. This suggests that Model 1 effectively captures the interplay between GDP and its repressors (VAA, CRE, CDE, PCW) without getting bogged down by overfitting. In short, it strikes a strong balance between accuracy and parsimony, which is exactly what you want in this kind of analysis.

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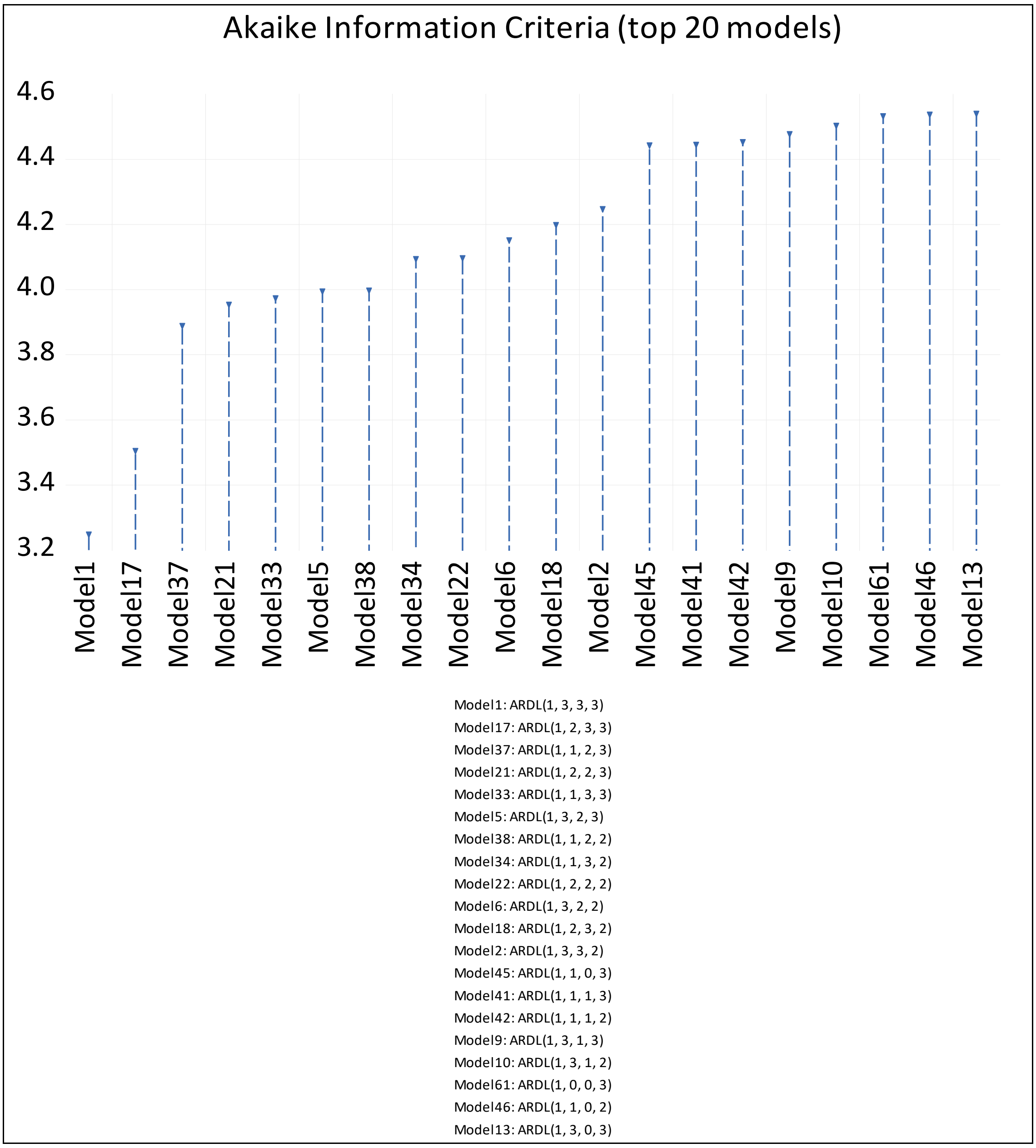

Figure (1): Optimal Lag to ARDL Model

The ARDL bounds test results provide clear evidence of a long-term equilibrium relationship among the variables examined. Specifically, the calculated F-value of 7.234 significantly exceeds the 5% critical threshold, and the corresponding t-value of 7.233 also surpasses the upper bound at this significance level. This allows for a rejection of the null hypothesis of no Cointegration, indicating that the variables move together over the long run. The significance at the 5% level further reinforces the conclusion of a stable, long-term association. Therefore, these findings justify the application of the ARDL framework to analyze both the short-run and long-run dynamics among the variables.

Table (3): ARDL bounds test analysis

Cointegration	**Significance**	**F-Value**	**F-Bounds Test**		**t-Value**	**T-Bounds Test**	
Yes	7.234*		I(0)	I(1)	7.233*	I(0)	I(1)
		10%	2.37	3.2		2.37	3.2
		5%	2.79	3.67		2.79	3.67
		1%	3.65	4.66		3.15	4.08

*: Significant at 5%.

The ARDL Cointegration analysis outlined in Table 4 offers a comprehensive look at both the long-term and short-term dynamics among the studied variables. In the long run, several lagged values of VAA and CRE emerge as statistically significant, suggesting that historical observations of these variables exert a positive and meaningful influence on the dependent variable. Specifically, both VAA (-1) and VAA (-2) display positive coefficients (2.835 and 3.471, respectively) with p-values below 0.05, indicating robust effects. Similarly, CRE and its lagged terms also contribute positively and significantly. CDE presents a more nuanced pattern: its contemporaneous value is positive and highly significant, while CDE (-3) exhibits a negative coefficient, hinting at a delayed adverse effect. The constant term is negative and significant, which likely reflects the baseline influence of omitted variables. Turning to the short-run results, the first differences of VAA, CRE, and CDE show significant adjustments, with both positive and negative coefficients that illustrate the dynamic nature of the relationships in response to short-term shocks. The error correction term, CointEq(-1), stands out as negative and highly significant (-0.938, p = 0.001). This finding confirms the model's strong tendency to revert to long-run equilibrium following short-term disturbances. The model demonstrates exceptional explanatory power, with an R-squared value of 0.993 and an adjusted R-squared of 0.974. The F-statistic (52.771, p = 0.0002) further underscores the statistical significance of the overall model. In summary, the results in Table 4 affirm that the ARDL framework effectively captures both long-run equilibrium relationships and short-run dynamics among the variables under investigation.

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Table (4): ARDL Cointegration Long and Short Run Coefficients

Long Run Analysis				
Variable	**Coefficient**	**SE**	**t-Statistic**	**P.value**
GPD(-1)	0.062	0.174	0.358	0.735
VAA	0.15	0.744	0.202	0.848
VAA(-1)	2.835	0.952	2.979	0.031
VAA(-2)	3.471	1.248	2.781	0.039
VAA(-3)	-0.838	0.568	-1.476	0.2
CRE	2.25	0.831	2.708	0.042
CRE(-1)	2.769	1.067	2.596	0.049
CRE(-2)	4.72	1.359	3.474	0.018
CRE(-3)	4.572	1.764	2.592	0.049
CDE	0.371	0.076	4.892	0.005
CDE(-1)	0.277	0.109	2.532	0.052
CDE(-2)	-0.077	0.085	-0.909	0.405
CDE(-3)	-0.237	0.075	-3.176	0.025
C	-75.866	20.24	-3.748	0.013
Short Run Analysis				
D(VAA)	0.15	0.442	0.339	0.748
D(VAA(-1))	-2.634	0.636	-4.139	0.009
D(VAA(-2))	0.838	0.277	3.029	0.029
D(CRE)	2.25	0.449	5.007	0.004
D(CRE(-1))	-9.292	1.407	-6.605	0.001
D(CRE(-2))	-4.572	1.087	-4.206	0.008
D(CDE)	0.371	0.045	8.269	0.000
D(CDE(-1))	0.314	0.042	7.553	0.001
D(CDE(-2))	0.237	0.054	4.422	0.007
CointEq(-1)*	-0.938	0.116	-8.069	0.001
Sensitivity analysis				
R-squared	0.993			
Adjusted R-squared	0.974			
F-statistic	52.771			
Prob(F-statistic)	0.0002			

Diagnostic Tests

The diagnostic assessments presented in Table 5 collectively reinforce the reliability and robustness of the estimated ARDL model. The Breusch–Godfrey serial correlation LM test (F = 4.333, p = 0.130) reveals no evidence of serial correlation, confirming the independence of the error terms. In a similar vein, the Breusch–Pagan–Godfrey heteroscedasticity test (F = 2.504, p = 0.118) indicates that the residuals exhibit constant variance, thereby ruling out heteroscedasticity concerns. The Jarque–Bera test (statistic = 0.006, p = 0.997) demonstrates that the residuals are normally distributed, which supports the validity of statistical inference. Furthermore, the Ramsey RESET test (statistic = 0.247, p = 0.646) finds no evidence of model misspecification, suggesting that the functional form is appropriate and no key variables are omitted. Taken together, these diagnostic results confirm that the ARDL model is well-specified and suitable for drawing credible inferences regarding both short-run and long-run relationships among the variables.

Table (5): ARDL Diagnostic Test Results

Test	F-stat	P.value	Results
Breusch–Godfrey serial correlation LM test	4.333	0.130	No of serial correlation issue
Breusch–Pagan–Godfrey heteroscedasticity test	2.504	0.118	No Heteroscedasticity issue
Jarque–Bera test	0.006	0.997	Estimated Residual is normal
Ramsey test	0.247	0.646	Model is fitted correctly

5. Conclusion: The empirical analysis utilizing the ARDL bounds test and Cointegration approach provides compelling evidence of a stable, long-term association among the variables examined. Both the F- and t-bounds tests (as detailed in Table 3) substantiate the presence of Cointegration, indicating that these variables exhibit synchronous movement over time. Examination of the long-run coefficients (Table 4) demonstrates that lagged values of VAA and CRE exert significant positive influences on the dependent variable, whereas CDE displays a more nuanced impact delivering an immediate positive effect followed by a delayed negative one. In the short run, the dynamics are equally noteworthy. The negative and highly significant error correction term signals a swift return to equilibrium following any disturbances, underscoring the model's capacity for rapid adjustment. The robustness of the ARDL model is further supported by high R-squared values and a significant F-statistic, highlighting its explanatory power. Collectively, these findings confirm the critical and multifaceted roles of VAA, CRE, and CDE in shaping the dependent variable, both in the short and long run. The results offer valuable implications for policymakers and strategists seeking to understand and influence the underlying dynamics at play.

6. Recommendations:

1. Policy strategies really shouldn't ignore the lagged effects of VAA and CRE. Even if you don't see the impact right away, the evidence (again, see Table 4) shows these variables matter over the long term. Policymakers need to design interventions that factor in these delayed responses—sustainable outcomes depend on it.
2. When it comes to short-run dynamics, the significant coefficients and the error correction term point to a system that doesn't waste time moving back toward equilibrium. That means stakeholders must be ready to act promptly, with targeted measures that can smooth out short-term volatility and support stability.
3. CDE isn't straightforward, either. It boosts things in the short run, but those gains can turn negative further down the line. Authorities have to keep tabs on both immediate and lagged effects, managing any potential risks before they become problems.
4. Finally, the strong long-run relationships across variables point to the necessity of long-term planning. Development policies shouldn't just chase quick wins; instead, they should emphasize strategies that deliver enduring benefits, reinforcing the importance of sustained interventions over fleeting results.

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