



RENEWABLE ENERGY CONSUMPTION, FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH A COMPARATIVE ANALYSIS OF BRICS AND MINT

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ABSTRACT

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This study examined the relationship between renewable energy, financial development and economic growth in BRICS and MINT nations. The data used for the study was obtained from the World Bank development indicators from 1990-2022. The data was analysed using panel regression analysis (Pooled OLS) and Fixed Effects as well as the Dumitrescu-Huulin (2012) test for causality the result of the analysis showed that broad money per GDP had a positive impact on economic growth in MINT countries while it had a negative impact on economic growth BRICS nations. Market capitalisation per GDP was found to have a positive and significant impact on economic growth in BRIC nations Renewable energy on the other hand had a negative impact on economic growth in MINT countries while it had a negative impact on economic growth in BRICS nations. Renewable energy also had a unidirectional causality relationship with economic growth.

KEYWORDS: *Renewable Energy, Financial Development, Economic Growth, Sustainable Development*

1. INTRODUCTION

The growth and development of any nation may be determined by the performance of different sectors of the economy (Iheonu *et al.*, 2020). However, among these sectors, the financial sector may be the most important as it can be described as the brain of an economy (Mishkin, 2008). According to Xu, (2021), the financial sector stimulates economic growth through its intermediation function by providing funds from the surplus side of the economy to the deficit side of the economy. Azmeh (2021) identified that the financial system of a country helps in the facilitation of seamless financial transactions, risk management, funds mobilisation, utilisation and distribution of funds and monitoring of funds. Over time, this may help stimulate investment leading to economic growth and development. Hence, financial development in any nation may be crucial to its economic growth.

The development of the financial system may be defined as the improvement in the size, stability and efficiency of the financial market of a particular economy which creates various opportunities in the economy (Guru *et al.*, 2019). Shaw (1973) on the other hand defined financial development as the rapid accumulation of financial assets more non-financial assets. Hence, a well-developed financial system may improve economic growth through technological innovation and the provision of financial resources for different firms. (Madichie, *et al.*, 2014)

Over the years financial development and its relationship with economic growth has attracted the attention of different researchers both from theoretical and empirical perspectives. According to Hoffman (2023), the theoretical view can be classified into four different the supply-leading hypothesis, the demand-pulling hypothesis and the endogenous growth theory. These theories suggest a positive relationship between

financial development and economic growth while empirical evidence has found mixed results (Deltuvaite, and Sinevičienė, 2014).

Aside from financial development, the use of renewable energy is also important to economic growth. The use of non-renewable energy may foster economic growth through increased productivity but comes at a cost to the environment (Bhuiyan, 2022). The environmental problems may be due to the emission of greenhouse gases (GHGs) which lead to global warming (Ojekemi et al., 2023). Hence, the advocacy for the use of renewable energy has increased over the years to achieve Sustainable Development Goals (SDGs). Hence it is also important to understand if the adoption of renewable energy has improved economic growth

This study is done to understand the relationship between renewable energy consumption, financial development and economic growth by taking a comparative analysis of the BRICS and MINT Nations. Much research (Wait et al., 2017; Erkişi 2018; Khatun and Bist 2019; Guru and Yadav 2019; Gövdeli et al., 2021) has been conducted on the impact of financial development and economic growth in BRICSs, however, only a handful of research has been conducted on BRICS and MINT with the inclusion of renewable energy consumption. This study will help fill the gap identified and also contribute to the literature.

In addition, this study focuses on BRICS and MINT because BRICS (Brazil, Russia, India, China and South Africa) is fast becoming one of the major economic Bloc that have a significant impact on the world economy as well as energy consumption while MINT (Mexico, Indonesia, Nigeria, and Turkey) countries are also emerging developing nations with immense development potentials. According to Ojekemi et al., (2023), the BRIC nations account for 40% of global energy consumption and also surpass the G7 nations in the form of average GDP. BRICS energy consumption results in about 43.19% of the world's total CO2 emissions and their GDP accounts for 22.45% of the world's total GDP (Li et al., 2021). This means changes in the economic conditions of these two groups may affect the world. Hence, the objectives of this study is as follows:

- i. Compare the impact of financial sector development and renewable energy consumption on economic growth between BRICS AND MINT countries.
- ii. Compare the direction of causality between financial sector development and economic growth between BRICS and MINT countries.
- iii. Compare the direction of causality between economic growth and energy consumption to

test the growth hypothesis, conservation hypothesis and feedback hypothesis between BRICS and MINT countries.

This paper is divided into five sections. Section one gives a brief introduction to the study and sets the aim of the study. Section two explains the literature review including theories and empirical evidence. Section three explains the methodology and the different estimation techniques to be used in the study. Section four explains the findings of the study. Finally, the section provides the conclusions and recommendations for the study.

2.LITERATURE REVIEW

This section of the study provides a critical review of the different theories associated with this study as well as the empirical evidence relating to BRICS and MINT nations.

2.1Theoretical literature

On the relationship between financial development and economic growth, the McKinnon and Shaw hypothesis identified that financial development can lead to economic growth (Ajala, et al., 2020) as a repressed financial market may discourage savings thus reducing investment which may ultimately lead to poor economic growth (Amaira, 2023). This also supports the Harrod-Domar Model which identifies that the level of economic growth is a function of savings and investment in the economy (Drăgoi, 2019). However, it is important to note the importance of the savings and investment gap in developing countries that may not be able to mobilize savings and investment among the BRICS nations. The two-gap model identifies the importance of financial aid in bridging the gap between savings and investment which may also contribute to economic growth (Awino, and Kioko, 2022; Onwumah, and Nayak 2023). These models have identified the relevance of finance in economic growth and development.

The environmental Kuznets on the other hand explain the relationship between economic growth and environmental degradation due to energy consumption. It identifies that environmental degradation will be eliminated in the long run by economic growth (Kaika and Zervas, 2013). Over the years different researchers have identified different relationships. This relationship can be classified into three namely growth hypothesis, conservation hypothesis and feedback hypothesis (Demissew Beyene and Kotosz 2020). The growth hypothesis suggests a unidirectional causality from energy use to economic development (Narayan and Smyth, 2008) while the conservation hypothesis identifies a unidirectional causality from economic development to energy use (Huang, et al., 2008). The feedback hypothesis on the other hand identifies a

bidirectional relationship between energy use and economic growth (Eggoh et al., 201).

2.2 Empirical Literature

2.2.1 Financial Development And Economic Growth BRICS

Different research has been carried out to understand the relationship between financial development and economic growth as well as renewable energy and economic growth. This section of the study takes a critical view of the Empirical research.

Wait et al., (2017) compared the impact of financial market development on economic growth in BRICS countries and non-Brick countries using the GMM estimation technique. From the result domestic capital, stocks, labour and bank asset was found to have a negative positive impact on economic growth. Debt to GDP, Trade openness, and government consumption were also found to have a negative relationship with economic growth. The study concluded that financial market development has a positive impact on economic growth compared to other non-BRICS countries.

Khatun and Bist, (2019) investigated how financial development and financial service trade openness influenced economic growth in BRICS nations from 1990-2012 using dynamic ordinary least squares and fully modified ordinary least squares. Specific variables were identified to proxy the banking sector, stock market, bond market and insurance sector development. It was discovered that financial development has a positive impact on economic growth. However, this study used old data ending 2012 which may not reflect the situation in the past decade.

Guru and Yadav (2019) used the generalized method of moment system estimation (SYS-GMM) to examine the relationship between financial development and economic growth in the BRICS from 1993 to 2014 with a specific focus on the banking sector and stock market indicators. The result indicated that both the banking sector and stock market developments help improve economic growth. However, this study also made use of old data sets.

In a similar study Gövdeli et al., (2021) used the cointegration and causality test to examine the relationship between financial development and economic growth in BRICS countries using data from 1991 and 2017. The result showed a cointegration among the variables used while the causality test indicated a two-way causality between financial development and economic growth. However, this study failed to establish the impact of financial development on economic growth using a more rigorous estimation technique which may be a drawback of the research.

Tekin Turham et al., (2023) examined how financial sector development and educational attainment may improve economic sustainability among the BRICS nations using panel causality and cointegration tests. A bidirectional causality was found between financial development and economic sustainability.

2.2.2 Energy Consumption And Economic Growth BRICS

Aydin (2019) examined how biomass energy consumption may influence economic growth in BRICS countries for the years 1992-2013. Using the panel causality and cointegration test, it was concluded that biomass energy consumption improves economic growth among the BRICS countries. Banday and Aneja (2020) on the other hand used the bootstrap Dumitrescu and Hurlin panel causality test and found a unidirectional causal relationship between GDP to CO₂ among the BRICS nations excluding Russia for the period of 1990-2017.

Yıldırım et al., (2019) also discovered a bi-directional causal relationship between energy consumption and economic growth among the BRICS nations. However, the study used an old data set from 1990-2014. In a similar study Fu et al., (2021) discovered a bi-directional causal relationship between renewable energy and economic growth among the BRICS nations which confirms the feedback hypothesis while the unidirectional causality relationship between renewable energy and CO₂ emissions confirms the conservation hypothesis. However, a drawback of this study was the use of the Cobb–Douglas test instead of CES which may be more appropriate.

Ummalla and Goyari (2021) also confirmed the the existence of EKC hypothesis among the BRICS nations which corroborates the findings of Fu et al., (2021). However, a unidirectional relationship was found between energy consumption and economic growth which contradicts the findings of Yıldırım et al., (2019). This study also made use of old data sets from 1992-2014. Iqbal et al (2023) discovered a positive relationship between energy consumption and economic growth while a unidirectional relationship was discovered between carbon emissions and economic growth in the BRICS nation.

2.2.3 Financial Development And Economic Growth MINT

Lenee and Oki (2017) investigated the relationship between capital market development and economic growth in the MINT countries from 2000-2012. However, a negative and significant relationship was discovered between capital market development and economic growth. An individual analysis of the

economies indicated that capital market development has a positive and significant impact on the Indonesian economy. This study also used old data which may not reflect the current economic conditions in the MINT economies Odugbesan et al., (2021) also investigated relationship between financial sector development and economic growth in the MINT economies. The study adopted the NARDL estimation technique to analyse the data obtained from 1980-2019. It was discovered that positive and negative shock in financial development has a positive and significant impact on economic growth in the economies.

Torusdag (2022), on the other hand, adopted a panel causality test in its study while analysing MINT economies independently. The study used credit to the private sector as the main proxy for financial development. A bi-directional causal relationship was found between the credit to private sector and economic growth in Mexico, Indonesia and Nigeria while Turkey had a unidirectional relationship from economic growth to financial sector development. However, one drawback of the study is the small sample size used from 2010-2020. The study also did not measure the impact but rather the direction of causality among the variables.

2.2.4 Energy Consumption And Economic Growth MINT

Lin and Benjamin (2018) examined the causal relationship between energy consumption, foreign direct investment and economic growth in the MINT

$$Gdp_{it} = \alpha_1 + \alpha_2 Bmpg_{it} + \alpha_3 Mcpg_{it} + \alpha_4 Rec_{it} + \alpha_5 Sav_{it} + \alpha_6 Tech_{it} + e_{it} \tag{1}$$

3.2 Measurement and Source of Variables

**TABLE 1
MEASUREMENT AND SOURCE OF VARIABLES**

Variables	Symbol	Measure	Source
Economic Growth	GDPg	GDP growth (annual %)	World Bank Development Indicators
Financial Development	Bmpg	Broad money (% of GDP)	
	Mcpg	Market capitalization of listed domestic companies (% of GDP)	
Renewable Energy Consumption	Rec	Renewable energy consumption (% of total final energy consumption)	
Savings	Sav	Gross savings (current US\$)	
Technological Advancement	Tech	Mobile cellular subscriptions (per 100 people)	

Source: Author’s Computation

3.3 Estimation Techniques

This study compared the relationship which exists among renewable energy, financial sector development and economic growth between the BRICS and MINT nations using the panel data regression analysis and Dumitrescu-Hullin (2012) test. The panel data regression analysis was conducted to measure the impact of renewable energy consumption and financial development on economic growth using the Pooled OLS

economies using data from 1990-2014. The result confirmed a bi-directional between economic growth and energy consumption in Nigeria, Turkey and Mexico while a Unidirectional relationship between energy consumption to economic growth in Indonesia. However, Odugbesan and Rjoub, (2020) discovered a different result using the Data from 192-2017. Their analysis showed a unidirectional relationship from energy to economic growth was discovered in Nigeria and Turkey while a Bidirectional relationship was discovered in Mexico and Turkey

Akram et al., (2022) also investigated the link between renewable energy, economic growth and CO2 emission in the MINT nations using the panel cointegration and nonlinear panel ARDL. Energy efficiency and renewable energy usage were discovered to reduce carbon emissions. However, the Granger causality showed a significant relationship among the variables used in the analysis.

3. METHODOLOGY

The section provides a summary of the model, variables used and estimation technique used in this study.

3.1 Model Specification

This model was adapted to the study of Wait et al., (2017) with few modifications.

$$GDPg = f(Bmpg, Mcpg, Rec, Sav, Tech,)$$

(POLS) and Fixed Effects (FE). The Dumitrescu-Hullin (2012) on the other hand was conducted to understand the direction of causality between financial development and economic growth to test the supply-leading and demand-following hypothesis. The direction of causality between energy consumption and economic growth was carried out to test the growth hypothesis, conservation hypothesis and feedback hypothesis. The data used for this study covered the period 1990-2022.

4. DATA ANALYSIS

4.1 Descriptive statistics

TABLE 2
DESCRIPTIVE STATISTICS OF VARIABLES IN THE BRICS & MINT COUNTRIES

Variable	BRICS			MINT		
	Mean	Std. Dev.	CV	Mean	Std. Dev.	CV.
GDP Growth	3.978	4.748	1.193	4.026	3.994	0.992
Broad Money per GDP	81.154	45.896	0.566	34.058	13.529	0.397
Market capitalization per GDP	97.633	72.348	0.741	26.200	12.352	0.471
Renewable Energy Consumption	25.038	17.395	0.695	38.262	29.863	0.780
Gross Savings	680.254	1402.244	2.061	137.896	103.494	0.751
Technological Advancement	59.362	57.912	0.976	49.610	45.632	0.920

Source: Author's computation

Table 1 presents a comprehensive snapshot of key economic variables in both the BRICS (Brazil, Russia, India, China, South Africa) and MINT (Mexico, Indonesia, Nigeria, Turkey) countries, offering valuable insights into their economic landscapes. Notably, the mean GDP growth rates for the two groups are close, with the BRICS displaying a mean of 3.978% and the MINT slightly higher at 4.026%. However, the higher standard deviation (4.748) and coefficient of variation (CV) of 1.193 in GDP growth for the BRICS indicate greater variability in economic performance within this group, reflecting diverse growth trajectories among its member nations.

Examining the financial indicators, the mean Broad Money per GDP is significantly higher for the BRICS (81.154) compared to the MINT (34.058). Moreover, the BRICS exhibit a higher standard deviation (45.896) and CV of 0.566, signalling a wider range of values and potentially more diverse financial structures among these nations. Similarly, in terms of Market Capitalization per GDP, the BRICS again present a higher mean (97.633) and greater variability with a standard deviation of 72.348, compared to the MINT (26.200). These differences suggest varied degrees of market development and capitalization efficiency between the two groups, with the BRICS displaying a more varied economic landscape.

Renewable Energy Consumption, a key indicator of environmental sustainability, showcases distinct patterns. The MINT countries, with a higher mean (38.262) and standard deviation (29.863), seem to place a relatively greater emphasis on renewable energy compared to the BRICS. This is reflected in a higher CV of 0.780 for the MINT, underlining not only a commitment to renewable energy but also a broader range of practices and policies within this group. Turning to economic savings, Gross Savings in the BRICS are notably higher, both in terms of mean (680.254) and variability, as reflected in the standard deviation (1402.244) and CV of 2.061. This substantial variability underscores the diverse approaches to savings and investment strategies within the BRICS, potentially influenced by different economic structures and policies.

Lastly, Technological Advancement reveals a higher mean for the BRICS (59.362) compared to the MINT (49.610). While both groups display substantial variability (BRICS: Std. Dev. 57.912, CV 0.976; MINT: Std. Dev. 45.632, CV 0.920), this mean difference suggests varying levels of technological sophistication and innovation, emphasizing the diverse technological landscapes within these emerging economies.

4.2 Pairwise Correlation Statistics

TABLE 3
PAIRWISE CORRELATION STATISTICS OF VARIABLES IN THE BRICS & MINT COUNTRIES

Variable	BRICS						MINT					
GDP growth	1.00						1.00					
Broad Money per GDP	0.38	1.00					-0.01	1.00				
Market capitalization per GDP	-0.23	-0.27	1.00				-0.02	0.39	1.00			
Renewable Energy Consumption	0.17	-0.15	-0.39	1.00			0.12	-0.51	-0.52	1.00		
Gross Savings	0.26	0.83	-0.27	-0.21	1.00		-0.03	0.37	0.59	-0.55	1.00	
Technological Advancement	-0.14	0.17	0.13	-0.38	0.23	1.00	-0.05	0.39	0.43	-0.31	0.86	1.00

Source: Author's computation

Table 2 furnishes insightful pairwise correlation statistics among key economic variables within the BRICS and MINT countries. Examining the relationship between GDP growth and Broad Money per GDP, the moderate positive correlation of 0.38 in the BRICS suggests that, on average, higher levels of broad money in circulation relative to GDP are associated with increased GDP growth. However, the absence of a significant correlation (-0.01) in the MINT implies a more muted relationship between these variables within this group.

Market Capitalization per GDP shows interesting dynamics, with negative correlations of -0.23 in the BRICS and -0.02 in the MINT with GDP growth. These correlations suggest that, on average, higher market capitalization relative to GDP is associated with lower GDP growth, although the strength of this relationship varies between the two groups. Renewable Energy Consumption reveals divergent patterns, with a weak positive correlation of 0.17 in the BRICS and a weaker positive correlation of 0.12 in the MINT with GDP growth. These correlations imply, on average, higher renewable energy consumption is associated with

slightly higher GDP growth in the BRICS than in the MINT.

Furthermore, Gross Savings displays correlations of 0.26 in the BRICS and -0.03 in the MINT with GDP growth. In the BRICS, this suggests a positive association, indicating that, on average, higher gross savings are somewhat linked to increased GDP growth, although the correlation is not very strong. However, in the MINT, the correlation of -0.03 implies a weak negative association, suggesting that, on average, higher gross savings are weakly associated with lower GDP growth in these countries.

Turning to Technological Advancement, the correlations with GDP growth are -0.14 in the BRICS and -0.05 in the MINT. These findings suggest a weakly negative association between technological advancement and GDP growth in both groups. In the BRICS, this implies that, on average, higher technological advancement is weakly associated with lower GDP growth. Similarly, in the MINT, the correlation of -0.05 suggests a weak negative link between technological advancement and GDP growth.

4.3 Regression Analysis

**TABLE 4
GDP GROWTH RATE REGRESSION MODEL ESTIMATES FOR THE BRICS & MINT COUNTRIES**

Variable	BRICS		MINT	
	POLS	FE	POLS	FE
Broad Money per GDP	-0.024** (0.012)	-0.156*** (0.030)	0.021 (0.038)	-0.127** (0.059)
Market capitalization per GDP	0.020*** (0.005)	0.012 (0.008)	0.006 (0.040)	0.009 (0.043)
Renewable Energy Consumption	-0.041** (0.020)	-0.038 (0.102)	0.046** (0.021)	0.001 (0.146)
Gross Savings	2.773*** (0.410)	3.500*** (0.838)	2.806*** (1.045)	5.478*** (1.053)
Technological Advancement	-0.055*** (0.006)	-0.026** (0.012)	-0.040** (0.018)	-0.081*** (0.025)
Constant	-63.59*** (9.987)	-73.02*** (21.87)	-67.93** (26.61)	-127.08*** (26.91)
R ²	0.587	0.677	0.071	0.299

*Note: *** p < 1%, ** p < 5%, * p < 10%*

Table 3 presents regression model estimates for GDP growth rates in the BRICS and MINT countries, employing both pooled ordinary least squares (POLS) and fixed effects (FE) methods to analyze the economic dynamics. Examining the relationship between Broad Money per GDP and GDP growth, the BRICS exhibit a negative POLS estimate (-0.024) that intensifies in the FE estimate (-0.156), suggesting a potential dampening effect on GDP growth associated with higher broad money relative to GDP. This negative result may be due to inflationary pressure in the countries due to excess

money supply which reduces purchasing power thus leading to poor economic growth. Conversely, the MINT shows a nuanced relationship, with a weak positive POLS estimate (0.021) and a stronger negative FE estimate (-0.127), indicating potential variability in the impact of broad money per GDP on GDP growth within this group. The difference in the POLS and FE results suggests that there are other country-specific factors influencing the relationship between Broad Money per GDP and GDP growth which may include central bank policies among others.

Analyzing Market Capitalization per GDP, both groups demonstrate a positive relationship with GDP growth. In the BRICS, a stronger positive relationship is evident in the POLS estimate (0.020), implying that higher market capitalization relative to GDP is associated with increased GDP growth. The MINT, while positive, display an insignificant relationship, with both POLS (0.006) and FE (0.009) estimates suggesting a potentially weaker influence of market capitalization on GDP growth in these economies. The difference in the result between the BRICS and MINT shows the level of development in the financial market of the two groups. Over the years the BRICS nations have developed a more mature financial and stock exchange market which may contribute significantly to the growth of their nation. The positive impact of Market Capitalization per GDP on GDP growth in the BRICS nations supports the findings of Khatun and Bist, (2019).

Renewable Energy Consumption presents divergent patterns. In the BRICS, the negative POLS estimate (-0.041) suggests that higher consumption is associated with lower GDP growth, while the FE estimate introduces uncertainty. Conversely, in the MINT, the positive POLS estimate (0.046) implies a potential positive association between increased renewable energy consumption and higher GDP growth, though the FE estimate weakens this relationship, highlighting potential complexities in the role of renewable energy in driving economic growth.

4.4 Panel Causality Test

TABLE 5
PANEL CAUSALITY TEST FOR THE BRICS & MINT COUNTRIES

Hypothesis	BRICS		MINT	
	W-Stat	Prob	W-Stat	Prob
Broad Money/GDP does not cause GDP growth	5.127	0.008	3.046	0.455
GDP growth does not cause Broad Money/GDP	4.953	0.013	3.203	0.379
Market capitalization/GDP does not cause GDP growth	6.004	0.061	7.165	0.000
GDP growth does not cause Market capitalization/GDP	0.825	0.359	2.883	0.593
Renewable Energy Consumption does not cause GDP growth	4.910	0.011	2.039	0.905
GDP growth does not cause Renewable Energy Consumption	2.325	0.893	0.781	0.241

Note: Statistics are based on the Dumitrescu-Hullin (2012) with lag 2.

Table 4 outlines the outcomes of a panel causality test for both BRICS and MINT countries, employing the Dumitrescu-Hurlin (2012) test with a lag of 2 for statistical analysis. Firstly, regarding the relationship between Broad Money/GDP and GDP growth, the null hypothesis that Broad Money/GDP does not cause GDP growth is rejected for BRICS, as indicated by a Wald statistic of 5.127 with a probability of 0.008. This

Gross Savings emerge as a robust driver of GDP growth in both groups, with significantly positive associations. In the BRICS, the POLS estimate is 2.773, and the FE estimate is 3.500, emphasizing the positive link between higher savings and increased GDP growth. Similarly, in the MINT, both POLS (2.806) and FE (5.478) estimates underscore the importance of savings in fostering economic expansion, suggesting a consistent positive impact of gross savings on GDP growth in these economies. This also supports the Harrod-Domar growth model which identified that growth is a function of savings and investment in an economy.

Regarding Technological Advancement, a negative relationship with GDP growth is observed in both groups. In the BRICS, the POLS estimate is -0.055, and the FE estimate is -0.026, suggesting that higher technological advancement is associated with decreased GDP growth. Similarly, in the MINT, both estimates suggest a negative relationship, with the FE estimate (-0.081) reinforcing a more pronounced negative association, signalling potential challenges in balancing technological advancement with sustainable economic growth in these regions. The negative result found in the relationship between technological advancement and economic growth may be associated with the choice of proxy used to measure technological advancement.

supports the hypothesis of the “Supply Leading” hypothesis in the BRICS nation where a well-functioning financial sector contributes to economic growth. Conversely, for MINT countries, the null hypothesis cannot be rejected, with a Wald statistic of 3.046 and a probability of 0.455. Moving on to the reciprocal causality, the null hypothesis that GDP growth does not cause Broad Money/GDP is rejected for BRICS

and not for the MINT, with respective Wald statistics of 4.953 (probability of 0.013) and 3.203 (probability of 0.379). This also supports the “Demand Following” hypothesis which indicates that economic growth leads to development in the financial sector.

Transitioning to the impact of Market Capitalization/GDP on GDP growth, the null hypothesis is marginally not rejected for BRICS, with a Wald statistic of 6.004 and a probability of 0.061. However, for MINT countries, the null hypothesis is firmly rejected, supported by a Wald statistic of 7.165 and a probability of 0.000. This supports the “Supply Leading” hypothesis in the MINT nations. Conversely, examining the reverse causality, the null hypothesis that GDP growth does not cause Market Capitalization/GDP is not rejected for both BRICS and MINT, with respective Wald statistics of 0.825 (probability of 0.359) and 2.883 (probability of 0.593).

Lastly, assessing the influence of Renewable Energy Consumption on GDP growth, the null hypothesis is rejected for BRICS, with a Wald statistic of 4.910 and a probability of 0.011. However, for MINT countries, the null hypothesis is not rejected, evidenced by a Wald statistic of 2.039 and a probability of 0.905. Considering the reciprocal causality, the null hypothesis that GDP growth does not cause Renewable Energy Consumption is not rejected for both BRICS and MINT, with respective Wald statistics of 2.325 (probability of 0.893) and 0.781 (probability of 0.241). This result supports the growth hypothesis or Energy-led-Growth which identifies that the consumption of energy in an economy increases economic growth. This also supports the findings of Ummalla and Goyari (2021) on a unidirectional relationship between energy consumption to economic growth in the BRIC nations.

5.LIMITATION AND CONCLUSION

5.1 Limitation of the Study

Although this study has contributed by addressing the gap that exists in the literature. It has some limitations. One of these is the indicators used to measure financial development. Future studies should consider the use of other variables like credit to the private sector among others. The period considered was between 1990-2022. Other studies may also consider information before 1990 to have a holistic view of the relationship while they can also compare the relationship before and after COVID-19. This study did not compare the individual countries to identify country-specific factors which may also influence the relationship between the selected variables and economic growth. Finally, future studies may consider the use of the technology advancement index (TAI) to proxy technological advancement.

5.2 Conclusion

This study takes a comparative view of the relationship between renewable energy consumption, financial development and economic growth between BRICS and MINT countries. From the analysis, it was concluded that renewable energy consumption has a significant impact on economic growth in the MINT countries while the benefit of renewable energy consumption on economic growth in the BRICS countries has not been actualized. Varying result was also discovered between also discovered concerning financial development which indicates that various aspects of the financial sector may influence the economic growth of a nation. The result indicated that the stock market has a positive impact on economic growth in the BRICS nations compared to the MINT Countries. Capital accumulation through gross savings was also discovered to have a positive impact on economic growth while technological advancement was found to have a negative impact on economic growth in BRICS and MINT nations. The result of this study indicates the need to improve the capital market in the contributestries to ensure it contribute to economic development. There is also a need to regulate the money supply in the economy to address the inflationary pressure which occurs due to excess money in circulation.

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