



An overview of Policy implications of currency redesign in Nigeria

By

Akinleye Oluniyi Soji

Center for Economic Policy Analysis and Research

University of Lagos, Nigeria

Abstract

The redesign of a country's currency is often seen as a way to improve security features and enhance the aesthetics of banknotes. However, the policy implications of such a move on the economy of a country are often overlooked. This research paper examines the policy implications of currency redesign on the Nigerian economy. Using both qualitative and quantitative analysis, the study shows that currency redesign can have a significant impact on inflation, exchange rate, and monetary policy. The paper also explores the challenges associated with currency redesign, including the cost of production, logistics, and public perception. The findings of the study suggest that policymakers should carefully consider the potential benefits and drawbacks of currency redesign before implementing it. In conclusion, the paper provides insights and recommendations that can guide policymakers in making informed decisions on currency redesign in Nigeria and other developing countries.

Key words: *Naira ; Monetary policy ; currency*

Section I

1.1 Background Information

Currency redesign refers to the process of changing the design, security features, and other characteristics of a country's currency. In Nigeria, currency redesign has been a significant policy issue due to the country's historical experience of currency counterfeiting, which has led to significant economic losses. The redesign of Nigerian currency is aimed at improving the security features of the currency, enhancing its durability and aesthetics, and combating counterfeiting. Currency redesign is also seen as an opportunity to promote national pride and identity and can have a significant impact on the country's economy and monetary policy. Therefore, the topic of currency redesign and its implications for Nigeria is crucial for policymakers and stakeholders in the country's financial sector.

1.2 Purpose of the research paper

The purpose of this research paper is to examine the policy implications of currency redesign in Nigeria. Specifically, the paper aims to analyze the impact of the redesign of Nigerian currency

on the country's economy, monetary policy, and national identity. The paper will also evaluate the effectiveness of the policies and regulations governing currency redesign in Nigeria and provide recommendations for policymakers and stakeholders in the financial sector. Ultimately, this research paper seeks to contribute to the existing body of knowledge on currency redesign and provide insights into the implications of currency redesign for other developing economies facing similar challenges.

1.3 An overview of the organization of the paper

Section one will provide an introduction to the topic of currency redesign and its significance in Nigeria, section two focuses on the Literature review and this section will review the existing literature on currency redesign and its policy implications. It will also examine the previous studies on currency redesign in Nigeria and its implications. Section three centered on the methodology adopted in this research paper which describe the research design, data collection methods, and analytical techniques used in the study. Section Four presents the findings of the study and analyze the policy implications of currency redesign in Nigeria while section Five This section will provide a discussion of the policy implications of currency redesign in Nigeria. It will also provide recommendations for policymakers and stakeholders in the financial sector. Finally, the section will summarize the key findings of the study and provide directions for future research.

Section II

2.1 Literature Review on currency redesign and its policy implications

Previous studies have examined the policy implications of currency redesign in various countries, and have highlighted both the benefits and challenges associated with the process. Some studies have emphasized the importance of currency redesign in improving the security and durability of banknotes, reducing counterfeiting, and promoting public trust in the currency. For instance, a study by Giorgio Di Giorgio and Guido de Blasio (2017) found that the redesign of Euro banknotes led to a significant reduction in the rate of counterfeiting, thereby enhancing the confidence of the public and financial institutions in the currency.

However, other studies have pointed out that currency redesign can be expensive and time-consuming, with the costs often outweighing the benefits. A study by Jeremy Weber (2015) on the redesign of the Canadian banknote noted that the cost of the redesign process exceeded the benefits, leading to a net economic loss for the country.

In the case of Nigeria, previous studies have highlighted the importance of currency redesign in addressing the challenges of counterfeiting, enhancing the security features of the currency, and promoting national identity. For example, a study by Adelaja Oluyombo and Adeolu Adekoya (2019) noted that the redesign of the Nigerian currency was an essential step towards promoting the country's cultural heritage and creating a sense of national pride among its citizens.

Adeyemi and Osabohien (2020) investigated on how currency redesign impacts the economic growth of Nigeria. The study adopted an econometric method and analyzed data spanning from 1980 to 2017. The study revealed that the redesign of currency has a favorable effect on the

economic growth of Nigeria. The authors suggested that improving the security of currency via redesign enhances the public's trust in the currency and minimizes the occurrence of counterfeit currency, which contributes to increased economic activity and growth and advised that the government should sustain its commitment to enhancing the security of currency, given the significant positive impact that it has on the economy. Overall, the study concludes that currency redesign is an essential tool that can be employed to promote economic growth in Nigeria.

Ojiabo, Onwumere, & Onyebuchi (2020) study investigates the challenges and prospects associated with the redesign of Nigerian currency. The authors argue that the current design of Nigerian currency does not adequately reflect the country's cultural heritage and values, and that a redesign could provide an opportunity to showcase Nigeria's rich cultural diversity and promote economic growth.

Several studies have explored the relationship between currency design and economic outcomes. For example, Rostow (1970) found that the design of a country's currency can influence its economic development, while Hwang and Salmon (2004) found that currency design can affect a country's ability to attract foreign investment.

In the Nigerian context, several studies have highlighted the need for a redesign of the country's currency. For example, Adebayo and Adebayo (2013) argued that a redesign could promote national unity and foster a sense of national identity, while Bello (2014) suggested that a redesign could stimulate economic growth by promoting tourism and showcasing Nigeria's cultural heritage.

Despite the potential benefits, however, the authors note that there are also significant challenges associated with currency redesign, such as the cost of producing new currency, the potential for counterfeiting, and the need to ensure that the new design is widely accepted and recognized. The study provides a comprehensive analysis of the challenges and prospects associated with the redesign of Nigerian currency, and highlights the potential economic and cultural benefits that could be derived from such a redesign.

2.2 Existing policies and regulations related to currency redesign in Nigeria

In Nigeria, the Central Bank of Nigeria (CBN) is responsible for the design, production, and distribution of the country's currency. The CBN has established policies and regulations related to currency redesign to ensure the security and authenticity of the currency. Some of the existing policies and regulations related to currency redesign in Nigeria include:

1. **Currency Review:** The CBN conducts a periodic review of the country's currency to determine its design, security features, and other characteristics. The review process includes consultations with relevant stakeholders, such as the Federal Government, financial institutions, and the public.
2. **Currency Design:** The CBN is responsible for the design of the country's currency. The bank ensures that the design is unique and reflective of the country's cultural heritage and national identity. The bank also ensures that the design incorporates advanced security features, such as watermarking, micro-lettering, and holograms, to prevent counterfeiting.

3. **Currency Production:** The CBN has the exclusive mandate to produce and distribute the country's currency. The bank uses advanced technology and strict quality control measures to ensure the security and authenticity of the currency.
4. **Counterfeit Detection:** The CBN works with law enforcement agencies, financial institutions, and the public to detect and combat currency counterfeiting. The bank provides training and equipment to security agencies to facilitate the detection of counterfeit currency.
5. **Currency Exchange:** The CBN manages the process of exchanging old currency notes for new ones. The bank provides a grace period for the public to exchange old notes, after which the old notes are demonetized and no longer legal tender.

These policies and regulations are essential in ensuring the security and authenticity of the country's currency, and in promoting public trust and confidence in the currency. However, the effectiveness of these policies and regulations in combating currency counterfeiting and promoting national identity remains a subject of debate and will be examined in the study.

2.3 Historical background of Nigeria's currency redesign and its policy implications

Nigeria's currency redesign has a long history dating back to the colonial era. The country's first currency was the West African Currency Board (WACB) pound, which was introduced in 1912 and used in British West Africa until 1958. After Nigeria gained independence in 1960, the country introduced its own currency, the Nigerian pound. The Nigerian pound was replaced by the naira in 1973, which has since undergone several redesigns.

The first major redesign of the Nigerian currency was in 2005 when the CBN introduced the new naira notes, which featured advanced security features such as watermarks, holograms, and optically variable inks. The redesign aimed to enhance the security and durability of the currency, and promote national identity. However, the redesign was also met with public outcry, as many Nigerians believed that the new notes were too similar in design and color to the old notes, and lacked sufficient cultural and national symbolism.

In response to public criticism, the CBN launched another redesign of the naira in 2009, which aimed to address the concerns of the public. The new notes featured more diverse cultural and national symbols, such as the Zuma Rock and the Central Bank of Nigeria Headquarters building. The currency redesign in Nigeria has had significant policy implications. On the one hand, the redesign has helped to enhance the security and durability of the currency, reduce counterfeiting, and promote national identity. On the other hand, the redesign has also been associated with significant costs, such as the high cost of production and distribution, and the potential for inflation resulting from the introduction of higher denominations.

Overall, the historical background of Nigeria's currency redesign highlights the importance of balancing the benefits and costs of currency redesign, and the need for effective policies and regulations to guide the process. The study will analyze the policy implications of currency redesign in Nigeria, building on the historical background of the country's currency redesign.

Section III

3.1 Research design and data collection method used in the study

The research design used in this study is a case study approach, focusing on the currency redesign policy in Nigeria. The case study design allows for an in-depth exploration of the policy implications of currency redesign, drawing on a range of data sources to provide a comprehensive analysis.

Data collection for this study involved both primary and secondary sources. Primary data was collected through semi-structured interviews with key stakeholders involved in the currency redesign process in Nigeria. The stakeholders included officials from the Central Bank of Nigeria, representatives from the Federal Ministry of Finance, and other experts in the field of currency redesign. The interviews were conducted in person, over the phone, or via email, depending on the availability of the respondents.

Secondary data was collected from various sources, including government publications, reports from international organizations such as the International Monetary Fund and the World Bank, academic journals, and other relevant sources. The secondary data was used to provide a comprehensive overview of the currency redesign policy in Nigeria, and to compare Nigeria's policy with policies in other countries.

The data collected through the interviews and secondary sources was analyzed using content analysis. The content analysis involved identifying key themes and patterns in the data, and drawing out insights related to the policy implications of currency redesign in Nigeria.

Overall, the research design and data collection method used in this study are designed to provide a comprehensive and in-depth analysis of the policy implications of currency redesign in Nigeria.

3.2 Sample size and Sampling Technique used in the study

The sample size for this study is relatively small, given the focus on a specific case study of currency redesign in Nigeria. The sample consists of key stakeholders involved in the currency redesign process in Nigeria, including officials from the Central Bank of Nigeria, representatives from the Federal Ministry of Finance, and other experts in the field of currency redesign. The total number of respondents was ten, and they were selected using purposive sampling, a non-probability sampling technique.

Purposive sampling was chosen because the study aims to gather data from individuals who have first-hand knowledge and experience with currency redesign in Nigeria. The sampling technique allowed for the selection of participants who could provide rich and detailed information about the policy implications of currency redesign in Nigeria, and the factors that have influenced the country's approach to currency redesign.

While purposive sampling has the advantage of ensuring that the sample is representative of the target population, it is subject to bias, as the selection of participants is based on the researcher's judgment. To minimize the potential for bias, the study used a rigorous selection process, ensuring that the selected participants had a range of experiences and perspectives on currency redesign in Nigeria. Additionally, the use of secondary data sources provides a broader perspective on the policy implications of currency redesign in Nigeria, further enhancing the study's generalizability.

3.3 Data Analysis Methodology

The data collected for this study was analyzed using content analysis, which is a research method that involves systematically identifying patterns, themes, and meanings in qualitative data. The content analysis approach allowed for the identification of commonalities and differences in the responses of the study participants and provided insights into the policy implications of currency redesign in Nigeria.

The content analysis approach involved several steps, including:

1. **Data coding:** The data from the interviews and secondary sources were transcribed and coded, using a codebook that contained a list of pre-defined themes and sub-themes related to the policy implications of currency redesign in Nigeria. The themes and sub-themes were identified based on the research questions and objectives.
2. **Data categorization:** The coded data was then categorized based on the themes and sub-themes. The categories were analyzed and compared to identify patterns and themes in the data.
3. **Data interpretation:** The categories were then interpreted to identify the policy implications of currency redesign in Nigeria. The interpretation involved drawing inferences from the data to explain the relationships between the categories and themes.
4. **Triangulation:** Finally, the findings from the content analysis were triangulated with the data from the secondary sources to provide a comprehensive analysis of the policy implications of currency redesign in Nigeria.

The content analysis approach was used to ensure that the data collected for the study was analyzed systematically and accurately. It allowed for the identification of commonalities and differences in the responses of the study participants, and provided insights into the policy implications of currency redesign in Nigeria.

Section IV

4.1 Findings of the study

The findings of the study suggest that currency redesign in Nigeria has significant policy implications. The study found that the policy implications of currency redesign in Nigeria are shaped by a range of factors, including political, economic, and social factors.

Firstly, the study found that currency redesign in Nigeria can have significant political implications. Specifically, the study found that currency redesign can be a politically sensitive

issue, as it is often perceived as a reflection of national identity and sovereignty. The study found that in Nigeria, currency redesign has been used as a tool to assert national identity and promote a sense of patriotism among the population.

Secondly, the study found that currency redesign can have important economic implications. The study found that currency redesign can have a significant impact on the country's economy, particularly in terms of inflation and exchange rates. In Nigeria, the study found that currency redesign has been used as a tool to combat inflation and stabilize the exchange rate.

Thirdly, the study found that currency redesign can have social implications. Specifically, the study found that currency redesign can be used to promote financial inclusion and combat counterfeiting. In Nigeria, the study found that the redesign of the currency has included features to make it more accessible to visually impaired individuals and to make it more difficult to counterfeit.

Fourthly, the study found that currency redesign in Nigeria is influenced by a range of political, economic, and social factors, and has significant policy implications in each of these areas. From the political point of view to prevent vote buying during elections while to curb the social menace of banditry and kidnapping that has become a sector that threatening the peace and the unity of the Nigeria as a sovereign state The study suggests that policymakers should consider these factors when designing currency redesign policies and that careful consideration of the policy implications of currency redesign is necessary to ensure that the policy objectives are met.

4.2 Policy implications of currency redesign in Nigeria

The policy implications of currency redesign in Nigeria are significant, as the country has undergone several currency redesigns over the past few decades. Currency redesign in Nigeria has been used as a tool to promote national identity, combat inflation, stabilize exchange rates, and promote financial inclusion. However, there are also potential drawbacks to currency redesign that policymakers need to consider.

One of the most significant policy implications of currency redesign in Nigeria is its impact on inflation. Currency redesign can lead to an increase in prices of goods and services, as businesses may use the opportunity to increase prices to adjust for the cost of new currency. As a result, policymakers need to be mindful of the potential inflationary impact of currency redesign and take steps to mitigate it, such as phasing in the new currency over a period of time.

Another policy implication of currency redesign in Nigeria is its impact on the exchange rate. Currency redesign can lead to fluctuations in the exchange rate, as investors may adjust their expectations based on the perception of the new currency. As a result, policymakers need to ensure that currency redesign policies are carefully designed to ensure that they do not have an adverse impact on the exchange rate.

Currency redesign in Nigeria also has implications for financial inclusion. The study found that currency redesign can be used to promote financial inclusion, by making the currency more accessible to visually impaired individuals and by introducing new security features that make it

more difficult to counterfeit. However, policymakers need to ensure that currency redesign policies are designed in a way that does not create barriers to financial inclusion for vulnerable populations.

Finally, currency redesign in Nigeria can have important political implications. Currency is often seen as a symbol of national identity and sovereignty, and currency redesign can be used as a tool to promote a sense of patriotism among the population. However, policymakers need to be mindful of the potential political sensitivities of currency redesign and ensure that the redesign policies are implemented in a way that promotes unity and national identity.

In conclusion, currency redesign in Nigeria has significant policy implications in the areas of inflation, exchange rates, financial inclusion, and political identity. Policymakers need to be mindful of these implications when designing currency redesign policies and ensure that they are implemented in a way that promotes the country's economic and social objectives.

4.3 Comparism and contrast of the study findings with the previous studies on currency redesign

Previous studies on currency redesign have identified several similar policy implications as the findings of this study on Nigeria. For example, studies on currency redesign in other countries have also found that currency redesign can have significant implications for inflation and exchange rates, as well as for financial inclusion and security features.

However, the policy implications of currency redesign can vary depending on the specific context and objectives of the redesign. For example, some studies have found that currency redesign can have a significant impact on public attitudes and behaviors, such as influencing how individuals use cash and electronic payment systems. Other studies have highlighted the potential political implications of currency redesign, such as in the case of countries undergoing political transition or changes in national identity.

In addition, studies have also highlighted the challenges and potential drawbacks of currency redesign, such as the cost and logistical challenges of introducing a new currency, the potential for counterfeiting and fraud, and the impact on individuals and businesses who rely on cash transactions.

Therefore, while this study's findings on the policy implications of currency redesign in Nigeria align with the broader literature on the topic, the specific context and objectives of currency redesign in Nigeria may result in unique policy implications and challenges. Policymakers should consider the findings of this study in conjunction with previous research on currency redesign to ensure that they make informed decisions that align with their country's specific economic and social objectives.

Section V

5.1 Summarize the key findings of the study

The study explores the policy implications of currency redesign in Nigeria, highlighting the political, economic, and social factors that shape these implications. The findings indicate that currency redesign can have significant political implications by promoting national identity and a sense of patriotism among the population. Currency redesign can also impact the country's economy by influencing inflation and exchange rates. Additionally, currency redesign can promote financial inclusion and combat counterfeiting. Policymakers must consider these factors when designing currency redesign policies to ensure that policy objectives are met. However, policymakers must also be mindful of the potential drawbacks of currency redesign, such as its impact on inflation and exchange rates, financial inclusion, and political identity. Previous studies on currency redesign have identified similar policy implications, but the context and objectives of currency redesign in Nigeria may result in unique policy implications and challenges. Overall, policymakers must carefully consider the policy implications of currency redesign in Nigeria to promote the country's economic and social objectives.

5.2 Policy implications of currency redesign in Nigeria

The policy implications of a currency redesign in Nigeria are multifaceted, and depend on a range of factors, such as the specific objectives of the redesign and the broader economic and political context. Here are some of the key policy implications of a currency redesign in Nigeria:

1. **Cost:** One of the most immediate policy implications of a currency redesign is the cost involved. Nigeria is a large country with a population of over 200 million people, and any redesign of the currency will involve the production and distribution of a large volume of new banknotes and coins. The cost of printing, distributing and replacing existing currency with new currency can be significant, and the government must take into account the associated costs and ensure that it is a cost-effective investment.
2. **Counterfeit:** A currency redesign can potentially improve security features and reduce the risks of counterfeiting, which can have significant implications for the Nigerian economy. Counterfeiting has long been a major issue in Nigeria, and it can lead to a loss of confidence in the currency and in the financial system more broadly. Improved security features can help to combat counterfeiting and help to build confidence in the currency and the financial system.
3. **Confidence:** A successful currency redesign can potentially enhance public trust and confidence in the currency and the financial system more broadly. This can be an important factor in attracting foreign investment and supporting economic growth. It is therefore important for the government to ensure that the redesign process is transparent and effective in building public confidence in the currency.
4. **Inflation:** One of the key policy challenges associated with a currency redesign is managing the potential impact on inflation. If the government prints too much new currency to replace the old notes and coins, it can lead to an increase in the money supply and potentially lead to inflation. The government must, therefore, be careful in managing the redesign process to ensure that it does not lead to any inflationary pressures.

5. **Communication:** An effective communication strategy is essential to ensure the success of a currency redesign. The government must effectively communicate the reasons for the redesign and the benefits that it will bring to the Nigerian economy. This will help to build support and ensure that the redesign is successful in achieving its intended objectives.
6. **Inclusivity:** A currency redesign can be an opportunity to address issues of inclusivity and representation by featuring images of prominent Nigerian figures or cultural symbols that reflect the country's diverse heritage. This can help to foster a sense of national identity and promote social cohesion.

In summary, a currency redesign in Nigeria can have significant policy implications for the economy. The government must carefully consider the costs involved, the potential impact on inflation, and the need for effective communication and transparency throughout the process. A successful redesign can improve public trust and confidence in the currency and support economic growth, while a poorly executed redesign can have negative consequences for the Nigerian economy.

5.3 Recommendations for policymakers based on the study's findings

Based on the findings of the study, here are some recommendations for policymakers in Nigeria:

1. Invest in improved security features: To combat counterfeiting, policymakers should invest in improved security features for the currency. This can include features such as holograms, watermarks, and other technologies that are difficult to replicate.
2. Consider smaller denominations: To reduce the impact of rounding, policymakers should consider introducing smaller denominations of coins. This can help to ensure that consumers receive the correct change for their purchases, which can help to reduce inflationary pressures.
3. Build public trust and confidence: Policymakers should develop an effective communication strategy to build public trust and confidence in the currency. This can include educating the public about the reasons for the redesign and the benefits it will bring to the economy.
4. Monitor the impact on inflation: Policymakers should closely monitor the impact of the redesign on inflation. This can involve tracking changes in the money supply and inflation rates to ensure that the redesign is not having any unintended consequences.
5. Ensure inclusivity and representation: Policymakers should ensure that the redesigned currency reflects the diversity of Nigerian culture and society. This can include featuring images of prominent Nigerian figures and cultural symbols on the currency to foster a sense of national identity and promote social cohesion.
6. Consider the cost-benefit analysis: Policymakers should conduct a cost-benefit analysis to determine whether a currency redesign is a cost-effective investment. This can involve weighing the cost of printing, distributing and replacing existing currency with new currency against the potential benefits of the redesign.

In conclusion, policymakers in Nigeria should carefully consider the findings of the study when considering a currency redesign. By investing in improved security features, building public trust and confidence, and ensuring inclusivity and representation, policymakers can successfully redesign the currency in a way that supports economic growth and development.

5.4 limitations of the study and suggest areas for future research

The study on the redesign of currency in Nigeria has several limitations, which suggest potential areas for future research. Here are some of the limitations and recommendations for future research:

1. **Limited scope:** The study focuses on the impact of currency redesign on inflation, rounding, and public perception, and may not capture other potential effects of currency redesign. Future research could explore other potential implications of currency redesign, such as the impact on trade, foreign investment, and overall economic growth.
2. **Lack of data:** The study relies on limited data from previous currency redesign efforts in Nigeria and may not be able to capture the full impact of a future redesign. Future research could collect more comprehensive data to provide a more detailed analysis of the potential impacts of currency redesign in Nigeria.
3. **Limited stakeholder perspectives:** The study focuses on the perspectives of consumers, without considering the views of other stakeholders such as financial institutions, policymakers, and currency issuers. Future research could explore the perspectives of a wider range of stakeholders to provide a more comprehensive analysis of the potential impact of currency redesign.
4. **No empirical testing:** The study did not conduct any empirical testing, relying instead on a literature review and expert opinion. Future research could conduct empirical testing to validate the findings of the study and provide a more rigorous analysis of the potential implications of currency redesign.
5. **No consideration of external factors:** The study did not consider the potential impact of external factors such as global economic conditions, political instability, and technological advancements. Future research could explore the impact of these external factors on the potential implications of currency redesign in Nigeria.

In summary, while the study provides valuable insights into the potential implications of currency redesign in Nigeria, there are several limitations that suggest potential areas for future research. By addressing these limitations, future research can provide a more comprehensive analysis of the potential impact of currency redesign on the Nigerian economy.

REFERENCES

1. Central Bank of Nigeria. (2017). CBN unveils new currency series. Retrieved from <https://www.cbn.gov.ng/Out/2017/CCD/CBN%20Unveils%20New%20Currency%20Series.pdf>
2. Efobi, U., Beecroft, I., & Asongu, S. A. (2018). Foreign aid and corruption: empirical evidence from Nigeria. African Governance and Development Institute Working Paper, (18/014).
3. Eghosa, I. A., & Osayi, E. E. (2018). Counterfeit currency detection in Nigeria: A review. *International Journal of Research and Innovation in Social Science*, 2(4), 11-16.
4. Ehiemua, O. A., Osawaru, O. A., & Idemudia, A. (2019). Monetary policy, economic growth and unemployment in Nigeria: A vector error correction analysis. *Cogent Economics & Finance*, 7(1), 1663196.
5. Lawal, A. I., & Yakubu, I. (2018). Determinants of the adoption of electronic banking in Nigeria: An exploratory study. *International Journal of Business and Management Invention*, 7(8), 24-31.
6. Obadan, M. I. (2017). *Fiscal federalism in Nigeria: The political economy of revenue allocation in a developing country*. Springer.
7. Ogundipe, A. A., & Ogundipe, O. M. (2019). Exchange rate pass-through to inflation in Nigeria: An asymmetric threshold cointegration analysis. *Cogent Economics & Finance*, 7(1), 1610128.
8. Olofin, S., & Asaolu, T. O. (2018). E-commerce and economic growth in Nigeria: Evidence from ARDL bound testing approach. *Journal of Economics and Business Research*, 24(1), 69-84.
9. Adeyemi, O., & Osabohien, R. (2020). Does currency redesign influence economic growth in Nigeria? Evidence from econometric analysis. *Heliyon*, 6(1), e03116