Journal of Accounting, Finance and Auditing Studies
https://www.acadlore.com/journals/JAFAS

The Impact of Economic Policy Uncertainty on the Performance of African Banks

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Received: 04-22-2024 **Revised:** 06-08-2024 **Accepted:** 06-19-2024

Citation: Oyetade, D. & Muzindutsi, P. F. (2024). The impact of economic policy uncertainty on the performance of African banks. *J. Account. Fin. Audit. Stud.*, *10*(2), 105-118. https://doi.org/10.56578/jafas100205.

Abstract: This study investigates the impact of economic policy uncertainty (EPU) on the performance of African banks, utilising a panel of 35 publicly listed commercial banks from seven African countries over the period from 2000 to 2022. A fixed-effect estimation model was employed to analyse the data, revealing that EPU has a detrimental effect on bank performance in Africa. Additionally, a significant increase in non-performing loans was observed during periods of heightened EPU. The findings also indicate that bank size negatively impacts performance, whereas adequate capital buffers enhance bank performance during stress periods. These results underscore the importance of management efficiency, risk assessment, and capital adequacy in ensuring the robust performance of African banks. It is recommended that policymakers and regulators bolster the capital levels of African banks to fortify the sector. Moreover, the formulation of stable and non-disruptive economic policies is crucial to mitigate the adverse effects of EPU on the African banking sector.

Keywords: Financial institutions; Economic policy uncertainty (EPU); Capital adequacy; Risk management; Bank performance

JEL Classification: G21; G28; G32; F61; F62

1. Introduction

The government introduces fiscal, monetary, and regulatory policies to manage the economy, which can present various risks, including EPU (Gozgor et al., 2019). EPU originates from frequent changes in government policies, political instability, political interference in economic decisions, unethical policy practices, macroeconomic volatility, and external shocks (Ozili, 2022; Parsons & Krugell, 2022). EPU can be defined as not knowing what the government will do next (Burger, 2023). It is defined as the inability of economic agents to anticipate changes to current economic policies and their failure to anticipate the government's future economic policies (Ozili, 2022). This creates an unstable economic environment, which imposes difficulties on business ability to make financial decisions. This leads firms to withhold investments until uncertainty is resolved, and banks, being risk-averse, adjust their lending and risk-taking behaviors accordingly (García-Gómez et al., 2021).

Banks act as a financial intermediary between depositors and borrowers, and the performance of banks is essential for economic growth (Desalegn & Zhu, 2021). However, during the last decades, the banking sector has faced significant changes and external shocks in its operating environment since the 2008 global financial crisis. These shocks include the European Sovereign Debt Crisis, Brexit, the COVID-19 pandemic, and ongoing geopolitical conflicts: the US-China trade war, the Russian-Ukrainian war, and the Israel-Palestine war (Baker et al., 2016; Gozgor et al., 2019). These events disrupt international trade, economies, and financial markets (Ekeocha et al., 2023). In response to these events, the government makes economic decisions and introduces new policies that can present different risks (Abaidoo & Agyapong, 2023). Some of these policies can be error-prone, thus increasing EPU and impacting banks' profitability (Baker et al., 2016; Demir & Danisman, 2021). These errors cause policy uncertainty from economic policy, politicians, and regulatory authorities (García-Gómez et al., 2021). According to Desalegn & Zhu (2021), uncertainty in economic policy implies that the policy will change and impact macro- and micro-level activities.

Empirical studies have shown that bank-specific, industry-specific, or macro-economic factors influence bank performance (Athari, 2021). Some highlighted the significant effect of bank-specific variables, including bank size (Obamuyi, 2013), liquidity (Bushashe, 2023), and capital adequacy (Desalegn & Zhu, 2021), on bank performance. External factors such as market structure (Sayah, 2017), inflation, and GDP growth (Athari, 2021) affect bank performance. However, the literature on the effect of EPU on bank performance is scarce, especially for African nations where a high level of EPU and a somewhat fragile banking sector are prevalent.

EPU may lead to reduced lending, increased non-performing loans, and difficulties in attracting foreign investment, negatively affecting bank performance (Desalegn & Zhu, 2021). This may be severe in countries where there is prolonged EPU and low confidence about the effectiveness of policy changes (Demir & Danisman, 2021). Understanding EPU's impact is crucial for developing strategies to mitigate these effects and enhance bank performance.

EPU is higher in developing countries, especially in Africa, due to variables such as political unpredictability, macroeconomic volatility, and weak governance (Abaidoo & Agyapong, 2023; Wu et al., 2020). Many developing countries exhibit elongated periods of EPU due to the lack of effectiveness of policies introduced by the government to tackle problems (Parsons & Krugell, 2022). African countries like Nigeria and Zimbabwe are experiencing significant policy uncertainty, further amplified by external shocks like the COVID-19 pandemic, economic crises, and geopolitical wars (Burger, 2023). Nigeria has faced economic and financial crises since the change in government in 2015. These issues were exacerbated after the 2023 election, when the government removed fuel subsidies and collapsed the exchange rate market to stabilize the currency. These actions have led to hyperinflation, exchange rate volatility, and others. These EPUs may negatively affect African banks, similar to how political uncertainty negatively affected the Ukrainian banking sector, according to Athari (2021).

African banks are essential for economic growth. However, they are characterized by fragility, high lending costs, and poor capitalization, which may increase their vulnerability to EPU. This may increase lending losses, which can adversely affect the performance of African banks. Also, banks are generally risk-averse. Therefore, rising EPU may influence bank behavior. In reaction to a rise in EPU, African banks may reduce the amount of loans they offer. Alternatively, the African banks can increase their lending to compensate for the EPU's exposure. EPU can further increase the risk of bank bankruptcies and the loss of depositors' funds, which may negatively impact bank performance and potentially harm the economy (Athari, 2021). Therefore, in order to create measures to mitigate these effects and improve the performance of the African banking industry, it is imperative to understand how EPU affects bank performance in Africa.

Many African banks have historically shown strong performance (Chironga et al., 2018), but recent events, especially after the Covid-19 pandemic, have led to declining profitability (Dayi et al., 2022). Therefore, it is unclear how EPU would affect banks in Africa. The influence of EPU on bank performance in Africa is not well supported by the empirical literature. The existing studies, such as Ekeocha et al. (2023), focused on the effect of EPU on economic performance in African countries, without zooming into the banking sector.

The study aims to fill a gap in the literature by exploring the impact of EPU on bank performance in Africa and determining whether adherence to higher Basel capital requirements moderates this relationship. The findings will provide insights for policymakers and regulators to better understand the effects of their policy decisions and strive towards developing policies that promote both banking stability and a stable economic climate. This is relevant to fostering a resilient and performing banking sector that supports African economic growth. Secondly, bank management needs to improve risk management and sustain bank performance amid unpredictable economic policy. Having a thorough understanding of how policy uncertainty affects bank performance can assist bank management in creating plans to reduce the risks connected with EPU. Lastly, the findings provide insights for investors on how policy uncertainty impacts the African banking sector and how to make informed investment decisions and portfolio management strategies. Thus, the World Uncertainty Index (WUI) is used in this study to assess EPU, and the fixed effect estimation technique is employed for data analysis to investigate the impact of EPU on African banks. Also, macroeconomic and bank-specific variables such as GDP growth, inflation, interest rates, and bank size were included to ascertain the importance of these factors in the context of EPU and their implications for the African banking sector.

In summary, higher EPU reduces African banks' performance. Non-performing loans are one of the channels via which the negative impact of EPU on performance is transmitted. However, capital adequacy, GDP growth, and inflation moderate the negative impact of EPU on African banks' performance. It is recommended that bank authorities gradually increase Basel capital, to improve the stability and profitability of African banks. It is also recommended that policymakers introduce undisruptive and quality policies to reduce EPU.

2. Literature Review

2.1 Rational Choice Theory and Resource Allocation

Rational choice theory is one of the primary theories in economics that explains the decision-making behaviours

of economic agents. According to this theory, the decisions made by economic agents, including investors, policymakers, consumers, and other participants in the business environment, are based on all pertinent and readily available information at their disposal (Abaidoo & Agyapong, 2023). This theory assumes that economic agents make rational decisions. In this context, the decisions of bank managers regarding whether to lend or not may reflect the prevailing economic conditions. However, the level of uncertainty prevailing in an economy may lead to bank managers' suboptimal allocation of bank resources (Caglayan & Xu, 2019). Also, banks are risk-averse (Desalegn & Zhu, 2021). This implies that, given the current level of EPU, bank loans will not be allocated as efficiently as possible (Caglayan & Xu, 2019). Since most African countries are characterised by several and prolonged policy uncertainties (Parsons & Krugell, 2022), African banks may suffer from efficient loan allocation, which may affect the bank's asset quality, such as an increase in non-performing loans, negatively affecting bank performance.

2.2 Portfolio Theory-Loan Allocation

In periods of uncertainty, banks may shift their portfolios towards holding low-risk assets such as Treasury bills. This behaviour also enables the banks to reduce their capital holdings against credit risk in periods of uncertainty (Desalegn & Zhu, 2021). In this stance, EPU may influence portfolio shift behaviour, to lower the investment categories of certain loans, such as commercial loans, consequently impacting the performance of banks. Furthermore, when banks shift their portfolios, it can result in loan concentration in specific loan categories relative to total assets, thereby increasing the banks' exposure to higher credit risk in comparison to their total portfolio risk (Oyetade et al., 2021). Profitability is crucial for banks; however, EPU can amplify their vulnerabilities, affecting bank behaviours. Thus, these dynamics provide a theoretical foundation to explore the relationship between EPU and African bank performance.

2.3 EPU and Bank Performance

For banks, profitability is a strategic goal to expand lending, maximize shareholders' wealth, and promote economic growth (Ishioro, 2022). On the other hand, poor performance can increase the probability of bank failures, affecting the economy (Bushashe, 2023). In recent years, the EPU has increased; for instance, the world economy has faced many uncertain events since the 2008 Global Financial Crisis (Ekeocha et al., 2023). Policy uncertainty increases as uncertainty rises (Desalegn & Zhu, 2021; Ozili, 2022). Risk-averse banks might reduce lending and investments during high EPU periods, which may affect bank performance (Desalegn & Zhu, 2021).

There is growing interest in the economics and finance literature to investigate the reasons for rising EPU in recent years. There are different uncertainties; one aspect is policy uncertainty. According to Ozili (2022), the effect of EPU on banks is important to investors who want to place their portfolio of investments in banks. They consider whether their investments can withstand uncertain times without depreciating in value. EPU impacts macro- and micro-level activities. From a micro perspective, EPU can influence banks to reduce lending hoard liquidity and investments, reducing bank profitability because of uncertainty about potential future economic policies (Ozili, 2022). Also, it can affect bank stock performance (Athari, 2021). Yet, there is limited empirical evidence of EPU's impact on bank performance, particularly in Africa, where banks face higher political and policy uncertainty than other emerging markets.

Few studies, such as Athari (2021); Desalegn & Zhu (2021); and Mendy et al. (2023), focus on the relationship between EPU and the performance of banks. Other studies (Caglayan & Xu, 2019; Ozili, 2022; Phan et al., 2021) focus on bank stability, credit risk, and non-performing loans. Nevertheless, it is difficult to measure the prevailing EPU in a country. Some existing studies have used various proxies for EPU, including stock volatility, inflation, interest rates, and political risks, but these may not fully capture EPU's effects (Nasim & Downing, 2023; Sumendap et al., 2023). This debate calls for further studies with different measures of EPU to test the validity of the proxies used in the existing studies. Consequently, new measures like the Economic Policy Index (EPU) proposed by Baker et al. (2016) and the WUI constructed by Ahir et al. (2023) offer more comprehensive assessments. The EPU index is computed using searches of keywords in the newspapers that mention words relating to EPU (Ghirelli et al., 2021). The keywords are refined, adjustments made, and indexed.

Similarly, WUI tracks the word "uncertainty" using text mining, reflecting the degree of uncertainty present in the actual economy. We use the new WUI as a measure of EPU to adequately capture the level of EPU prevalent in individual African countries. The application of the recent EPU measure is crucial in determining the importance of the EPU-performance relationship for banks in Africa. The WUI index has been increasingly used in recent financial economics and finance literature as a measure of EPU. Some of the studies include: Ekeocha et al. (2023) and Ghirelli et al. (2021) on economic performances; García-Gómez et al. (2021) on tourism. The WUI index has also been employed in studies such as Caglayan & Xu (2019), Demir & Danisman (2021), and Phan et al. (2021) for bank credit and stability. Additionally, several empirical studies (Demir & Danisman, 2021; Gozgor et al., 2019; Mendy et al., 2023) have investigated the impact of EPU on various aspects of banking. For instance, Gozgor

et al. (2019) use WUI as a proxy for EPU to examine its effect on domestic credit in the private sector. They found that EPU negatively impacts domestic credit to the private sector in both OECD and non-OECD countries, with a stronger adverse effect in non-OECD countries, which are typically developing and poorer. The study suggests that the prevalence of informal economies in non-OECD countries amplifies the negative impact of EPU on domestic credits (Gozgor et al., 2019). On a micro-level, Demir & Danisman (2021) analysed the impact of EPU on bank credit in 19 countries using WUI as a measure of EPU. They also reported a negative impact of EPU on bank credit. Additionally, Caglayan & Xu (2019) examined the effects of EPU on the bank credit, non-performing loans, and loan-loss provisions for banks across 18 countries employing the EPU index. Their findings indicate that higher EPU lowers the availability of bank credit while increasing non-performing loans and loan-loss provisions. These studies' findings may suggest that EPU can significantly affect bank performance.

For bank stability, the EPU index was found to be statistically and economically important. Phan et al. (2021) reported that a unit increase in EPU decreases bank stability by an average of 3.98 percent, but their research found that the impact on bank stability varied according to the degree of financial development. A higher level of EPU is commonly associated with recessions and weak recoveries, which distorts and weakens the banking system (Caglayan & Xu, 2019; Gozgor et al., 2019). Consequently, banks may adjust their lending behaviour, leading to losses, that may affect performance.

In developed countries, Mendy et al. (2023) found that EPU had a detrimental effect on US banks' performance between 2001 and 2016. They discovered that EPU increased non-performing loans and significantly decreased loan growth. Athari (2021) found a negative and significant impact of EPU on the performance of banks in Ukraine between 2005 and 2015 using OLS and the fixed effect model. Studies from emerging countries, by Desalegn & Zhu (2021), using two-step GMM for a sample period between 2011 and 2018, find a negative and significant influence of EPU on bank earning opacity in the Chinese banking sector.

There are studies on the effect of EPU on economic performance, such as those by Ekeocha et al. (2023) in Africa; Ghirelli et al. (2021) in Spain. For instance, Ghirelli et al. (2021) found that increased EPU negatively impacted GDP, private consumption, investments, and hours worked. However, GDP and private consumption were the most affected. In contrast, Ekeocha et al. (2023), focused on the global EPU effect on economic performances in Africa and found that GDP positively impacts EPU. Their study highlighted African economies' resilience to uncertainty from European countries, the UK, and Russia, but significant vulnerability to EPU from China and the USA. Regional differences were noted, with East and West Africa being more vulnerable, while Central, North, and Southern Africa showed greater resilience to imported EPUs (Ekeocha et al., 2023).

Other variables also influence how well banks perform. Other variables also influence how well banks perform. Macroeconomic variables like GDP growth, unemployment rate, inflation rate, and money supply were also considered in previous research on the effect of EPU on banks (Demir & Danisman, 2021; Gozgor et al., 2019; Phan et al., 2021). Following these studies, we include three macroeconomic variables as control variables in our analysis: GDP growth, inflation, and interest rates, based on the following arguments:

GDP growth is the most commonly employed macroeconomic indicator in finance literature (Ishioro, 2022). During good times, GDP growth positively impacts banks' performance (Lee & Lee, 2019). The argument is that banks lend more as economic conditions improve, which reduces credit risk and non-performing loans (Ishioro, 2022). The multiplier positively impacts the asset quality of banks. In contrast, Ghirelli et al. (2021) find that GDP has the most negative response to a rise in EPU.

For inflation, rising inflation decreases savings and investments, increasing interest rates, and the cost of capital as investors seek higher returns to compensate for the rising inflation. As a result, inflation is inversely related to bank performance (Singh & Milan, 2020). The opposing argument is that inflation boosts bank performance as long as banks are able to predict inflation in the future and modify interest rates to raise income relative to expenses, which boosts performance and profit (Nasim & Downing, 2023).

In summary, there is very little evidence of the effect of EPU on African banks' performance, underscoring the need for more empirical research on African banks' vulnerability to EPU. To close this gap in the literature, this study intends to determine whether the performance of banks in Africa is subject to EPU. A recent measure of EPU is used, along with bank-specific variables like bank size, non-performing loans, and liquidity; macroeconomic variables like GDP growth, inflation, and interest rates are included as control variables.

2.4 EPU and Capital Adequacy

Capital adequacy is an important factor for bank investments and lending decisions, as it helps protect banks against unexpected risk (Desalegn & Zhu, 2021; Phan et al., 2021). But, as uncertainty increases, capital levels increase. However, higher capital levels can raise interest rates on bank loans, affecting the profitability of banks. (Desalegn & Zhu, 2021; Yahaya et al., 2016). Compliance with the recent higher Basel III capital requirement increases capital levels and stability and improves banks' risk profiles (Anani & Owusu, 2023; Phan et al., 2021). Less adequately capitalised banks are more vulnerable to EPU, which may negatively affect performance.

Basel III capital requirements, implemented globally in 2013, introduce new capital requirements, higher quality

and quantity of capital to strengthen bank stability (BCBS, 2017; Desalegn & Zhu, 2021). Studies (Anani & Owusu, 2023; Mendy et al., 2023; Phan et al., 2021) show that Basel III capital enhances bank stability and has a moderate EPU impact on performance. According to Phan et al. (2021), capital has a major and favourable impact on bank stability. Similar findings were made by Anani & Owusu (2023), who discovered that the Basel III capital requirement improved US bank stability during the COVID-19 pandemic problems. Furthermore, Mendy et al. (2023) discovered that sufficient capital mitigated the effect of EPU on US banks' performance.

However, many African banks lag in Basel III compliance, exposing them to EPU (Molefe & Muzindutsi, 2016; Oyetade et al., 2023). Basel III has only been fully implemented in Egypt and South Africa (Makrelov et al., 2023). Some African banks still adhere to Basel I standards introduced in 1988, which does not reflect the current risk in their operating environment, despite the introduction of the Basel III accord. Furthermore, the majority of African banks do not have the minimum capital required by Basel II and Basel III. Bank regulatory authorities in Africa not enforcing higher Basel capital for African banks is a form of regulatory uncertainty. As a result, inadequate capital increases their vulnerability to EPU, which may affect bank operational efficiency, funding costs, and increased operating costs, consequently, affecting performance. Therefore, this study also examines whether the level of capital adequacy of African banks protects their profitability against EPU.

2.5 EPU and Bank Size

This study also considers the impact of bank size on performance. Theoretically, large banks have resources to compete and diversify risk, and portfolios might better withstand EPU (Phan et al., 2021; Sumendap et al., 2023). Also, large banks are more stable in generating profits and diversifying risk than small-sized banks (Sumendap et al., 2023). However, their complex structures can be a disadvantage during stressful periods, potentially harming performance. This can negatively affect bank performance. Empirical evidence is mixed. For instance, Demir & Danisman (2021) find no evidence of a significant relationship between asset returns and bank size. In contrast, Obamuyi (2013) found a significant and adverse relationship between asset returns and bank size for Nigerian banks. Thus, this study investigates if bank size mitigates the detrimental effect of EPU on bank performance.

2.6 Research Hypothesis

There is a gap in the literature on the connection between EPU and bank performance, particularly for African countries. The conventional hypothesis suggests that banks are risk-averse, leading to reduced investment and lending with higher EPU, negatively impacting performance. Similarly, the rise of EPU can influence bank re-allocation of resources and portfolio shift, which can reduce bank lending, leading to a decline in bank profitability (Athari, 2021). African banks operate in environments with political instability and policy uncertainty compared to other emerging countries, along with varying regulatory and institutional development and political opacity. Despite these challenges, African banks perform well but face issues such as liquidity sourcing, high central bank interest rates, high non-performing loans, and fragile macroeconomic conditions. This raises concerns about how EPU affects African banks, potentially differing from other emerging markets. Therefore, the following hypothesis has been developed to investigate this impact:

H_0: There is no relationship between EPU and bank performance.

H_1: There is an inverse relationship between EPU and bank performance.

Theoretically, sufficient capital is needed to lessen the detrimental impact of EPU on bank performance. This ought to make African banks more resilient, even in times of crisis. Objective 2 serves as the foundation for testing Hypothesis 2 since it looks at how capital adequacy affects bank performance:

H_2: Adherence to increased Basel capital requirements considerably reduces the impact of EPU on African banks' performance.

3. Methodology

3.1 Data Source and Sample Selection

Using secondary panel annual data of all commercial banks listed on African stock exchanges between 2000 and 2022, this study takes a qualitative approach to investigate the impact of EPU on the performance of banks in Africa. The study's dataset came from a number of internet databases. The annual financial data of commercial banks is obtained from the Bloomberg online database and the financial statements of banks. The EPU index data for African countries are constructed by Ahir et al. (2023) and obtained from the WUI website, which provides global and country-level data for 143 countries (World Uncertainty Index, 2023). The macroeconomic data is sourced from the World Bank and the McGregor database.

This study analyzed all publicly listed commercial banks on African stock exchanges with available financial statements from 2000 to 2022. The sample period covers major event periods: the Basel II Accord introduced in

2004, the 2008 global financial crisis, the Basel III Accord implemented in 2013, the COVID-19 pandemic, and the Ukrainian-Russia war in 2022. Initially, 137 commercial banks were identified from the Bloomberg database. After excluding 80 non-Basel-compliant banks, due to a lack of additional information disclosure of regulatory capital; and 22 banks with insufficient data, the final sample included 35 Basel-compliant commercial banks from 10 African countries: namely, Botswana, Egypt, Ghana, Kenya, Namibia, Nigeria, South Africa, Swaziland, and Tanzania. Based on the availability of data on the dependent and explanatory variables, a sample period of 22 years, from 2000 to 2022, was selected. This produced an unbalanced panel of data from 770 observations. This sample size is representative of the overall African banking sector across the Sub-Saharan African region.

3.2 Bank Performance and EPU Measures

The dependent variable to proxy for performance is the return on asset (ROA). A rise in EPU can theoretically lower banks' profit margins (Singh & Milan, 2020). Many performance measures include return on equity, net interest margin, and ROA. Amongst these measures, ROA reflects the ability of the bank to transform its existing operating assets into profit regardless of the economic conditions (Bushashe, 2023). According to Bushashe (2023), ROA is the most important performance ratio that measures a bank's efficacy and operating performance. Banks' asset quality can be eroded during stress periods, which affects interest income (Singh & Milan, 2020). Thus, ROA is a strong determinant of bank profitability and performance.

This study proxies EPU using the WUI constructed by Ahir et al. (2023), following the Economic Policy Index (EPU) introduced by Baker et al. (2016). WUI is measured using text mining to track the frequency of the word "uncertainty" in the quarterly Economic Intelligence Unit country reports (Ahir et al., 2023; Demir & Danisman, 2021). Using the WUI index captures uncertainty related to economic policies and political unrest in individual countries, encompassing both short- and long-term concerns (Ahir et al., 2023), which is relevant in the African context. The EPU index is widely used in recent literature because it uses text mining to track a broad keyword mentioned in news articles, reflecting uncertainty across different policy areas in a country. For instance, in the US, the index increased significantly with the September 11, 2001, attacks and the Donald Trump election in 2016 (García-Gómez et al., 2021). Thus, the index should reflect the COVID-19 pandemic, the Russian-Ukraine war, and political instability in Africa to achieve the study objectives. Since the study adopts panel data analysis, the EPU index provides a standardized measure of policy uncertainty for comparison across different countries over time (Ahir et al., 2023; Demir & Danisman, 2021).

The limitations of the EPU Index in the African context include its reliance on news media articles, which may not consistently represent the economic conditions in all African countries. Media coverage can be uneven, with some countries receiving more attention than others, potentially biasing the index. In addition, the EPU index may fail to capture African-specific uncertainty factors. Also, the African economy is largely informal and may not be well captured by media reports (Gozgor et al., 2019) to reflect in the EPU index. Nevertheless, the EPU index is appropriate for this study for several reasons: the index provides a proper measure of EPU, that can be consistently applied across different countries and periods. It also allows for comparative analysis with other observed African countries, thus helping to position the findings within the broader literature on EPU. Also, the study included macroeconomic factors to enhance the capture of some African-specific factors.

3.3 Estimated Model

Following similar studies such as Caglayan & Xu (2019), we examine the impact of EPU on bank performance using Eq. (1):

$$ROA_{it} = \alpha + \beta_1 EPU_{it} + \gamma Control_{it} + \varepsilon_{it} \quad (1)$$

where, *i* is the individual bank in year *t*. ROA is the proxy for performance measure. EPU proxy for EPU. Control represents two control variables: macroeconomic variables (GDP growth, inflation, and interest rate proxy by Repo rate) and bank-specific variables (loan to deposit for liquidity, non-performing loans, and cost to income ratio). According to Bushashe (2023), macroeconomic variables do not influence bank performance, while bank-specific variables influence bank performance. Contrarily, Phan et al. (2021) argue that some conventional variables influence bank performance. We expect the control variables to affect the EPU-bank performance relationship in Africa. The variables used in the study are considered in more detail in Table 1.

Eq. (1) controls for year effects in line with studies such as Phan et al. (2021). Year effects are included to control for time-fixed effects, unobserved heterogeneity, and business cycles across the country over time (Bond & Eberhardt, 2013). Since the study uses panel data, we carried out a panel unit root test using an augmented Dickey-Fuller unit root test following existing studies such as Athari (2021). This is to test whether each variable is stationary. Eq. (1) is estimated using the fixed effects model (FEM) since it is panel data with cross-sectional characteristics, and the time-fixed effects are not random. Thus, fixed effects become appropriate for this study.

Table 1. Definition of the variables

Variable	Definition	Formula	Expected Sign
ROA	Bank performance	Profit before tax/average total asset	Dependent variable
EPU	Economic policy uncertainty	Index	Negative
Cap	Basel II and Basel III capital ratios	Tangible common equity/RWA	Positive
Size	Bank size	Quintiles of total assets	Positive
Bankspe Loan dep ratio	Loan-Deposit	Loan/Deposit	Positive
Npl_ta	Non-performing loan	Non-performing loans/average total asset	Negative
Cost_inc	Cost to income ratio		Negative
macroec Repo_rate	Govt interest rate to banks		Negative
Inflation	Inflation rate		Negative
Gdpgrowth	Real GDP growth	GDP growth rate	Negative

3.3.1 Capital regulations and EPU effect on bank performance

Regulatory capital is expected to affect the EPU-performance relationship. A bank with low capital is likely to have negative effects from EPU on profits. CAP represents the Basel II capital ratio (BII_cap) and the Basel III capital ratio (BIII_cap). To test this hypothesis, we introduce capital ratios for regulatory capital to test the effect of capital adequacy on the relationship between EPU and bank performance using Eq. (2):

$$ROA_{it} = \alpha + \beta_1 EPU_{it} + \beta_2 CAP_{it}\, \gamma Control_{it} + \varepsilon_{it} \quad (2)$$

3.3.2 Size and EPU effect on bank performance

Size is represented using dummy variables for total assets. The dummy variables are divided into five quintiles. where, 1 represents small banks, and 5 represents large banks.

We test this hypothesis using Eq. (3):

$$ROA_{it} = \alpha + \beta_1 EPU_{it} + \beta_2 SIZE_{it} + \gamma Control_{it} + \varepsilon_{it} \quad (3)$$

4. Results

4.1 Descriptive Statistics

Table 2 shows that African banks have an average ROA of 2.3 percent, indicating the strong efficiency of African banks in generating returns for shareholders and supporting bank expansion. This ROA is higher than the global banking sector average. For instance, Demir & Danisman (2021) reported an ROA of 1.2 percent for 19 emerging countries, while Desalegn & Zhu (2021) and Tan & Floros (2013) found an ROA of less than 1 percent for Chinese banks.

However, the standard deviation of ROA is 1.8, suggesting that African banks face higher risk levels compared to banks in other emerging markets, as noted by Tan & Floros (2013) and Demir & Danisman (2021). According to Tan & Floros (2013), a higher standard deviation of ROA represents higher risk positions for banks.

The Spearman rank correlation matrix for the key variables is also reported in Table 3. The correlation between the ROA and EPU is -0.057, which is negative, but indicates a weak relationship. Inflation also has a weak but positive relationship with ROA.

Table 2. Descriptive statistics of key variables

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	783	2.302	1.832	-8.992	13.795
EPU	740	0.2831	0 .239	0	1.343
GDP_growth	796	4.144	3.178	-14.144	15.329
Inflation	790	9.247	5.688	-.692	41.51
Repo_rate	719	4.778	4.952	-9.05	18.18
BII_cap	554	16.352	8.804	4	147
BIII_cap	523	17.947	7.0261	2.901	73.807
Loan_dep	697	10.158	187.26	.16	4859.73
Npl_ta	770	3.565	6.081	0	63.398
Cost_inc	631	57.569	32.023	-345.557	242.034

Table 3. Spearman rank correlation

	ROA	EPU	GDP_growth	Inflation	Repo_rate	BII_cap	BIII_cap	Loan_dep	Npl_ta	Cost_inc
ROA	1.000									
EPU	-0.057	1.000								
GDP_growth	0.175	-0.297	1.000							
Inflation	0.074	-0.213	0.031	1.000						
Repo_rate	0.133	0.065	0.083	-0.166	1.000					
BII_cap	0.505	0.206	0.09	0.111	0.129	1.0000				
BIII_cap	0.567	0.151	0.060	0.185	0.098	0.7484	1.000			
Loan_dep	-0.162	0.137	-0.248	-0.315	-0.236	-0.3128	-0.362	1.000		
Npl_ta	-0.163	0.061	-0.042	0.178	-0.1398	0.1823	0.113	0.014	1.000	
Cost_inc	-0.521	0.210	0.022	-0.172	0.1862	-0.055	-0.174	-0.040	0.145	1.000

4.2 Empirical Results

Table 4 reports the fixed effect model estimation results based on Eq. (1). It presents the results of how EPU affects bank performance in various models. Eq. (1) was estimated five times using different control variables. In Model 1, only EPU effects on ROA were estimated, including year effects. Models 2-4 added macroeconomic and bank-specific variables, while Model 5 excluded the year effect.

EPU consistently shows a negative and significant influence on bank performance in Models 1-4 but not in Model 5, thus highlighting the importance of controlling for time effects. In Models 2 and 4, the significance of EPU decreased to a 5% level when macroeconomic variables were included, indicating that some macroeconomic factors mitigate EPU's negative impact on bank performance.

Table 4. EPU and control effects on bank performance

	1	**2**	**3**	**4**	**5**
	ROA	ROA	ROA	ROA	ROA
EPU	-0.995***	-0.753**	-1.029***	-0.658**	-0.352
	(0.298)	(0.299)	(0.296)	(0.281)	(0.228)
GDP_growth		0.045**		0.031	0.035**
		(0.019)		(0.019)	(0.016)
Inflation		0.039***		0.062***	0.050***
		(0.015)		(0.014)	(0.012)
Repo_rate		0.000		0.019	0.017
		(0.013)		(0.013)	(0.012)
Loan_dep			0.000	0.000	-0.000
			(0.000)	(0.000)	(0.000)
Npl_ta			-0.028***	-0.023**	-0.028***
			(0.010)	(0.009)	(0.009)
Cost_inc			-0.003	0.002	0.001
			(0.002)	(0.002)	(0.002)
_cons	2.370***	1.594***	2.003***	1.002**	1.628***
	(0.239)	(0.296)	(0.412)	(0.422)	(0.234)
Observations	734	664	583	533	533
Year effect	Yes	Yes	Yes	Yes	No
Adjusted R2	0.458	0.693	0.914	0.380	0.069

Note: Standard errors are in parentheses * p<0.1, ** p<0.05, *** p<0.001
Source: Author's calculation based on data obtained from Bloomberg, WUI and World Bank databases

Our study findings identify inflation as a possible dominance that has cushioning effects. In Models 2 and 4, inflation has a positive and significant impact on bank performance at the 1% level. This suggests that during the EPU period, banks anticipate inflation and can adjust interest rates to reflect this. This results in higher revenue, lower costs, and improved performance. Our result is in line with the findings of Tan & Floros (2012) for Chinese banks on performance and Phan et al. (2021) for US banks on stability. However, high inflation is bad. Boyd et al. (2001) argued that there is a threshold of about 15 percent for economies with high inflation; within this range, inflation continues to rise, and banks will continue to make profits. Above that threshold, any further increased inflation threatens bank assets. Banks will withhold their lending above this threshold. According to Table 2, Africa has an average inflation rate of 9 percent, thus suggesting caution for African banks assets and performance.

Despite the cushioning effect of inflation, EPU still negatively impacts bank performance, demonstrating that banks remain vulnerable to economic policy uncertainties. The implication is that uncertainty about the policies, either regulatory, fiscal, or monetary, implemented by African governments adversely affects the performance of banks in Africa. This uncertainty may force banks to constrain lending, thereby leading to lower bank performance.

GDP growth positively affects bank performance in two of the three models, while the repo rate has no significant impact. The positive relationship suggests that increasing GDP improves banks' performance. A

booming economy increases the demand and supply of loans and deposits, ultimately increasing banks' performance. Our result is consistent with Obamuyi (2013) for Nigerian banks.

Among bank-specific variables, non-performing loans consistently negatively and significantly impact bank performance, weakening banks' asset quality. Loan-to-deposit ratio (loan_dep) and cost-to-income ratio (cost_income) are statistically insignificant. The insignificant effect of loan_dep confirms that the low volume of lending in African banks does not have any significant impact on bank performance.

Model 5 was not able to control the time effect. It's observed that the EPU is negative but insignificant. The findings show the importance of accounting for unobserved heterogeneity factors, which can significantly impact micro-estimation models and avoid misleading inferences. Overall, the results highlight how poorly African banks perform when exposed to EPU, how inflation acts as a buffer, and how much non-performing loans affect the situation.

Although the prior results above have established the detrimental impact of EPU on the performance of African banks, it is crucial to examine how regulatory capital and bank size affect this impact. Table 5 and Table 6 analyze the impact of EPU on bank performance in relation to regulatory capital and bank size.

Table 5 reports the estimation results based on Eq. (2). The findings regarding the impact of regulatory capital and EPU on bank performance are presented. For banks that comply with Basel II and Basel III, there is a consistent negative relationship between EPU and bank performance. Across all models, the negative impact of EPU is statistically significant at the 1 and 5 percent significance levels. However, Table 6 shows that the impact of EPU is greater in Basel-III-compliant banks. Nonetheless, Basel III capital positively and significantly impacts bank performance amid EPU. In contrast, Basel II capital has a negative but insignificant relationship with bank performance.

This indicates that adequate capital, as required by the Basel III Accord, mitigates the negative effects of uncertainty on banks, supporting the hypothesis in the literature that capital regulation can buffer the impact of EPU, given the positive impact of Basel III capital on bank performance regardless of the negative effect of EPU on Basel III-compliant banks. Our findings are consistent with studies such as Phan et al. (2021) that find that higher capital improves bank stability positively and significantly. Similarly, Anani & Owusu (2023) found that the Basel III capital requirement effectively increased the stability of US banks during the COVID-19 pandemic crises.

In summary, while EPU negatively affects bank performance, robust capital regulations (Basel III) can enhance bank performance and reduce the adverse effects of EPU for African banks.

Table 5. EPU and capital regulations effect on bank performance

	1	**2**	**3**	**4**	**5**
	ROA	ROA	ROA	ROA	ROA
EPU	-0.802***	-0.598**	-0.819***	-0.600**	-0.249
	(0.263)	(0.239)	(0.281)	(0.251)	(0.190)
BII_cap	-0.005	-0.006	-0.005	-0.006	-0.006
	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)
BIII_cap	0.087***	0.072***	0.094***	0.077***	0.078***
	(0.011)	(0.009)	(0.012)	(0.010)	(0.010)
GDP_growth		0.032*		0.029	0.026*
		(0.018)		(0.019)	(0.015)
Inflation		0.052***		0.050***	0.036***
		(0.014)		(0.014)	(0.012)
Repo_rate		0.019		0.019	0.022*
		(0.013)		(0.014)	(0.012)
Loan_dep			0.000	0.000	-0.000
			(0.000)	(0.000)	(0.000)
Npl_ta			0.005	0.012	0.008
			(0.021)	(0.019)	(0.018)
Cost_inc			0.004*	0.008***	0.008***
			(0.002)	(0.002)	(0.002)
_cons	0.181	-0.460	-0.070	-0.837	0.053
	(0.982)	(0.868)	(1.014)	(0.867)	(0.273)
Observations	438	408	402	375	375
Year effect	Yes	Yes	Yes	Yes	No
Adjusted R2	0.4254	0.3065	0.4248	0.3351	0.3509

Note: Standard errors are in parentheses * p<0.1, ** p<0.05, *** p<0.001
Source: Author's calculation based on data obtained from Bloomberg, WUI and World Bank databases

Table 6. EPU and capital regulations effect on bank performance

	1	2	3	4
	ROA	ROA	ROA	ROA
EPU	-0.711**	-0.758***	-0.338	-0.354
	(0.285)	(0.278)	(0.276)	(0.258)
BII_cap	-0.001		-0.003	
	(0.005)		(0.005)	
BIII_cap		0.092***		0.085***
		(0.011)		(0.010)
GDP_growth			0.012	0.021
			(0.020)	(0.019)
Inflation			0.072***	0.056***
			(0.015)	(0.015)
Repo_rate			0.032**	0.038***
			(0.014)	(0.013)
Loan_dep			0.000	0.000
			(0.000)	(0.000)
Npl_ta			-0.020*	-0.022**
			(0.010)	(0.009)
Cost_inc			0.008***	0.010***
			(0.002)	(0.002)
_cons	2.978***	4.028***	-0.020	-1.124
	(0.669)	(1.088)	(0.748)	(0.933)
Observations	527	488	436	407
Year effect	Yes	Yes	Yes	Yes
Adjusted R2	0.3161	0.4912	0.2000	0.3818

Note: Standard errors are in parentheses * p<0.1, ** p<0.05, *** p<0.001
Source: Author's calculation based on data obtained from Bloomberg, WUI and World Bank databases

Table 7. EPU and size effects on bank performance

	1	2	3	4	5
	ROA	ROA	ROA	ROA	ROA
EPU	-0.931***	-0.756**	-0.919***	-0.583**	-0.307
	(0.304)	(0.302)	(0.298)	(0.283)	(0.229)
_Isize_2	0.102	0.203	-0.178	-0.074	-0.031
	(0.201)	(0.213)	(0.213)	(0.220)	(0.223)
_Isize_3	-0.088	0.113	-0.318	-0.180	-0.129
	(0.221)	(0.221)	(0.236)	(0.228)	(0.229)
_Isize_4	-0.210	0.111	-0.680**	-0.515	-0.230
	(0.279)	(0.284)	(0.335)	(0.323)	(0.310)
_Isize_5	-0.992**	-0.655	-1.416***	-1.231***	-0.924**
	(0.409)	(0.406)	(0.454)	(0.436)	(0.422)
GDP_growth		0.044**		0.025	0.035**
		(0.020)		(0.019)	(0.016)
Inflation		0.036**		0.058***	0.047***
		(0.015)		(0.014)	(0.012)
Repo_rate		0.002		0.027**	0.021*
		(0.014)		(0.013)	(0.012)
Loan_dep			-0.000	-0.000	-0.000
			(0.000)	(0.000)	(0.000)
Npl_ta			-0.028***	-0.023**	-0.028***
			(0.010)	(0.009)	(0.009)
Cost_inc			-0.003	0.002	0.001
			(0.002)	(0.002)	(0.002)
_cons	2.541***	1.580***	2.396***	1.314***	1.927***
	(0.304)	(0.352)	(0.441)	(0.450)	(0.314)
Observations	720	652	583	533	533
Year effect	Yes	Yes	Yes	Yes	No
Adjusted R2	0.137	0.426	0.136	0.153	0.064

Note: Standard errors are in parentheses * p<0.1, ** p<0.05, *** p<0.001
Source: Author's calculation based on data obtained from Bloomberg, WUI and World Bank databases

Table 7 reports the estimation results based on Eq. (3). It presents the findings of the effect of EPU and bank size on bank performance. In Table 7, bank size negatively and significantly impacts bank performance. Isize5

means large bank, and Isize2 means small bank. The result implies that large banks earn less profits than small ones. For large banks, the negative effect on performance may possibly be due to increased complexity and bureaucracy as they grow. Our result is consistent with Obamuyi (2013) for Nigerian banks. However, our findings are inconsistent with findings from developed countries, such as Athari (2021), that large banks are more profitable due to economies of scale in loan diversification.

Many banks in Africa are small banks. According to Tan & Floros (2013), growing size enables banks to engage in risk and portfolio diversification, including competition and economies of scale. However, a growing bank may face diminishing marginal returns, which may cause a decline in performance with size (Obamuyi, 2013). For small and mid-sized banks, size has an insignificant impact on performance. The result may imply that small-sized African banks are yet to leverage their size for competitive advantage to enhance performance. In summary, large African banks face performance challenges due to growth-related complexities and cost inefficiencies, while small and mid-sized banks have not yet capitalized on their size to boost performance.

4.3 Diagnostic and Specification Tests

Specification tests were conducted to test the reliability of the estimated models and the accuracy of the findings. An augmented Dickey-Fuller unit root test was run, and the results are in Table 8. The test confirms that all variables are stationary except Basel_II capratio and Npa_tl, which contain unit root, therefore, the two variables were used in their first difference. This indicates that the results obtained were not spurious. To compare the null hypothesis (H_0) of no cross-dependence with the alternative hypothesis (H_1) of cross-dependence among the variables, the Pesaran and Frees tests for the FEM were performed. At the 5 percent significance level, the null hypothesis of no cross-dependence for the Eq. (1) findings in Table 3 was rejected.

A further Frees test showed that the calculated test is greater than critical values, which rejects the H_0 of no cross-dependence. Nevertheless, considering the Pesaran test's average absolute correlation of 0.33 (FE), the existence of cross-dependence is minimal. As a result, the Hausman test in Table 9 further supported the fixed effect model as a reliable and effective estimator for the research.

The diagnostic tests, namely the Modified Wald and Woolridge tests, were used to detect and correct heteroskedasticity and autocorrelation, respectively. The hypotheses for these tests were the H_0 of homoskedasticity and no autocorrelation. The results presented in Table 10, indicate the presence of both heteroskedasticity and autocorrelation, as the H_0 was rejected for both tests. This implies that the OLS assumptions are violated, leading to biased coefficient estimates. Also, t-statistics and confidence intervals would be invalid for the inference problem. Thus, to address these issues, robust standard errors were used in the regression.

Table 8. Panel unit root test

Variables	ADF	Stationary
ROA	0.0000	I(0)
EPU	0.0000	I(0)
BII_capratio	0.0000	I(1)
BIII_capratio	0.0000	I(0)
Loan_deposit	0.0000	I(0)
Npl_ta	0.0000	I(1)
Cost_inc	0.0000	I(0)
Repo_rate	0.0000	I(0)
Inflation	0.0000	I(0
Gdpgrowth	0.0000	I(0

Table 9. Hausman test

Hausman	ROA	Capital	Size
	P>10 percent	P<1 percent	P<1 percent
	Fail to reject H_0	Reject H_0	Reject H_0
Decision	Random effect is preferred	Fixed effect is preferred	Fixed effect is preferred

Note: Hausman hypothesis-H_0: Random effects is preferred. H_1: Fixed effects is preferred

Table 10. Modified Wald test

Modified Wald Test		Woolridge Test for Auto-Correlation	
Chibar2 (26)	73.71	F (1, 475)	5.45
Prob > Chi2	0.000	Prob > F	0.02

Note: Modified Wald test for heteroskedasticity in FEM and Woolridge test for autocorrelation in panel data
Source: Author's Compilation

5. Discussion

According to our research, bank performance in Africa is negatively impacted by EPU, suggesting that high EPU periods are associated with lower bank performance. This study's results are consistent with those of Demir & Danisman (2021) and Desalegn & Zhu (2021), showing that when EPU is high, banks respond to it by decreasing lending and expanding their portfolios of alternative investments. This aligns with rational choice and resource allocation theories, suggesting that prolonged EPU harms economic performance, business confidence, and investment climate (Parsons & Krugell, 2022).

Due to the high level of EPU, African banks struggle with the optimal allocation of bank resources for productive use to increase bank performance, in line with Caglayan & Xu (2019), leading to reduced lending and increased non-performing loans that negatively and significantly affect bank performance.

The positive effect of inflation on bank performance shows that banks can anticipate inflation and adjust accordingly, ensuring profitability. Our findings are consistent with those of Abaidoo & Agyapong (2023) for banks in African countries. This implies that many African banks put measures in place in advance to reduce exposure to rising inflation, hence the positive relationship. GDP growth has a positive and significant impact on bank performance, banks can adjust depending on the business cycle. Our findings are consistent with the research of Lee & Lee (2019) findings that GDP growth positively impacts bank performance in good times.

The negative and significant impact of bank size on performance suggests that larger banks face greater risks and may rely on government bailouts, leading to moral hazard issues, according to previous studies, such as Phan et al. (2021). If larger banks face greater risks to be more profitable, they may be more impacted by EPU. These larger African banks fall into the “too big to fail” category. So, they may take unnecessary risks, leading to moral hazard problems. They may rely on the expectation that the government will provide bail-out options in distress times to avoid systemic risk contagion and the negative effect of their failure on the economy.

Adequate capital reduces fragility and weakens the effect of EPU on banks, with Basel III-compliant banks being more profitable but also more adversely affected by EPU than Basel II-compliant banks. The findings highlight that adequately capitalised banks tend to lend more, improving performance, but may be incapable of assessing risk and the macroeconomic environment.

In this case, our finding is inconsistent with rational choice theory for Basel III-compliant banks in Africa, as they are more profitable despite the level of EPU. Basel III-compliant banks were less risk-averse as they were more profitable despite the level of EPU.

Our results show that poorly capitalised banks will be more affected by the frequent changes in government policies in Africa. The practical implication is that banks reduce lending, interest rates, and operational costs, while legal fees increase, operational efficiency declines, and stock performance deteriorates. Our findings are consistent with those of Desalegn & Zhu (2021), who found that weak Chinese banks are vulnerable to fluctuating economic policy. A country with a high capital ratio is less impacted by EPU because, according to Desalegn & Zhu (2021), higher capital requirements act as buffers against macroeconomic and financial shocks.

The findings highlight several important issues for policymakers in Africa. First, policymakers in Africa should consult industry experts to formulate quality and undisruptive policies. Bank regulatory authorities in Africa should encourage banks to adopt higher capital requirements to protect them against uncertainties. The benefit of adequate capital enables African banks to tap into revenue growth opportunities. Implementation of the Basel III Accord will empower regulatory authorities and ensure better supervision of larger banks to promote safe risk-taking and reduce moral hazard problems.

Recommendation for bank managers to improve management efficiency, risk management, and resource allocation to prevent excessive risk exposures. The banks need better resource allocation, the development of new and innovative products to generate more revenue, and product diversification channeled towards productive sectors in the economy to increase productivity and economic activities. This will help create a stable value chain between customers and the banks and increase financial deepening, which improves bank performance.

Policymakers should develop favorable and strong macroeconomic policies to stimulate economic growth, reduce EPU impact on bank performance, and help lower funding costs for banks to issue cheaper loans and stabilize the economic environment.

6. Conclusions

The study aimed to examine the impact of EPU on the performance of banks in Africa. We use the WUI as a measure of EPU for a sample of 35 banks from seven African countries for the period of 2000-2022. EPU negatively and significantly affects bank performance. However, African banks can anticipate other macroeconomic factors, such as inflation and GDP growth, and adjust, positively impacting performance. Therefore, EPU exerts a negative and significant influence on the asset quality of African banks. Additionally, larger banks are prone to EPU because they undertake higher risks, which can increase both operational risk and cost. The implication is that higher EPU, negatively affecting asset quality, may also affect the stock performance

of banks. Adequate capital is important for African banks to be profitable even in prolonged uncertainty periods. The study makes some recommendations; African banks should improve management efficiency, risk management, and capital levels. This enables banks to improve lending decisions, better planning for investment, and diversify risk profiles to enhance performance. Also, the global business landscape is changing due to wars, fin-techs, and fast innovations, which can threaten the African banking sector. Thus, African bank regulators should introduce the Basel III capital requirements over a medium-term period to improve the capital buffers of African banks without harming the banks in the transition period. Also, the African government should open and deepen the stock market in Africa, which increases the financial freedom of banks, to enable banks in African countries to boost profitability and compete favorably. Policymakers should develop favorable and strong macroeconomic policies to reduce the adverse effect of EPU on bank performance in Africa. Overall, the findings are important for policymakers, investors, and bank managers to understand the EPU effect and mitigate the adverse effects of EPU on banks. Future research should focus on the short-term and long-term impacts of EPU on bank performance.

Data Availability

The data used to support the research findings are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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