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THE CENTRE FOR RESEARCH ON FINANCIAL MARKETS AND POLICY®

# The Influence of Climate Related Risk on Interest Rate spread in Kenya

## Executive Summary

*Climate-related risks pose significant threats to the global economy, with sectors like agriculture, energy, and transport often cited as primary sources of pollution. However, the financial sector's role in addressing these risks is often overlooked. This policy brief argues that the financial sector, guided by principles like "Common but Differentiated Responsibilities," plays a crucial role in pricing risks and allocating resources to mitigate climate-related disasters. It raises important questions about the financial sector's contribution to environmental sustainability, the division of responsibilities among financial and non-financial actors and the government, and the role of financial sector policies in promoting climate resilience. Given Kenya's vulnerability to climate-related disasters, the study emphasizes the need for a systematic transition to a greener economy, requiring the financial system to integrate climate-related risks in capital allocation and risk assessment. The study aims to assess the feedback effects of climate risk on banking sector performance and interest rate spreads in Kenya.*

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## 1. Background

**Climate related risks are existential threats with the potential of causing unprecedented problems to the global economy. Environmental debate has to a great extent held productive sectors such as agriculture, energy, mining and transport sectors as the primary sources of pollution while downplaying the role of financial sector on the same.** From the "Common but differentiated Responsibilities and Respective Capabilities Principle" the financial sector has a key role to play because of its fundamental responsibility of pricing risks and allocating resources. To this end, the conduct of the financial sector can exacerbate or mitigate climate related disasters.

This policy brief is based on the studies main argument that stipulates that "As climate change continues to impact the global economy, the financial sector's response to these challenges is a crucial aspect of climate resilience and sustainability. Critical policy issues that arise from this debate can be summarized by the following questions?

- Should financial institutions contribute to the environmental sustainability goal by ensuring that the market functions efficiently and effectively?
- What should be the division of responsibilities among the financial sector, non-financial actors and the government?
- What role should financial sector policies play in facilitating climate resilience and sustainability?

The Kenyan economy is highly vulnerable to climate-related disasters, such as droughts, famine and floods. To this end, a systematic transition to a greener economy would require the financial system to integrate climate-related risks in allocation of capital and risk assessment. In light of this argument, the study attempts to assess the feedback effect and transmission pathway of climate risk to banking sector performance and climate risk and interest rate spread in Kenya

## 2. Methodology and Approach

Conditional processes analysis is the analytical integration of mediation and moderation analysis. It is applied when evaluating how or by what process certain phenomena are transmitted and its effect on the dependent variable. A mediator is defined as a variable that is causally located between the independent and the dependent variable.

The dependent variable (Y) is the interest rate spread, independent variable (X) is the natural log of non-performing loans, mediating variable (M) is climatic disaster and moderating variable (W) is maximum temperature. The regression models were estimated using monthly data from February 2011 to December 2022. Ordinary least squares were used for estimation. Bootstrap method was deemed appropriate because it computes standard errors that are robust. Evaluation of the transmission process required the decomposition of the direct and indirect effect of the X, M and W on Y. This is important to isolate the effect of a specific variable and illustrate the pathways or transmission channels which Hayes refers to as the mediated moderated process. It's important to mention that due to unavailability of data, proxy variables were used to measure climate related disaster and changes in weather patterns.

## 3. Results and Discussion

The regression models designated interest rate spread as the dependent variable and evaluated the total effect (model I), direct effect (model II) and indirect effect (model III) of the independent variable natural log of non-performing loans (NPL) and mediator namely climate related risk having controlled for the moderating variable. **Table 1** shows the regression result

**Table 4.4: Analysis of the Moderating & Mediating effect of Climatic Variables on Spread**

| | Model I – Total Effect | | Model II – Direct Effect | | Model IIII – Indirect Effect | |
|---|---|---|---|---|---|---|
| | Coeff | p-value | Coeff | P-Value | Coeff | P-Value |
| Climate Disaster | | | -0.542** | (0.014) | | |
| Natural log of NPL | -3.137*** | (0.000) | -3.304** | (0.000) | 0.174*** | (0.000) |
| Max temperature | 0.0615 | (0.339) | 0.329 | (0.608) | 0.029 | (0.812) |
| Capital Adequacy | -11.157 | (0.207) | -17.868** | (0.05) | 4.979*** | (0.000) |
| Intercept term | 37.70*** | (0.000) | 45.08*** | (0.000) | -7.246*** | (0.000) |
| | | | | | | |
| Index of Moderated Mediated | | | 0.035* | (0.089) | | |
| Natural log of non-performing loans: Low | | | 0.118** | (0.05) | | |
| Natural log of non-performing loans: Medium | | | 0.169** | (0.016) | | |
| Natural log of non-performing loans: High | | | 0.219** | (0.0014) | | |
| Adjusted R Square | | 0.82 | | 0.83 | | |
| n | | 143 | | 143 | | |

p-values in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

**Table 1** presented three regression model estimates. The first model captures the total effect of bank specific independent variables on the dependent variable. Model II captured the direct effect by augmenting bank specific independent variables with the climate related disaster as the mediating variable conditional on presence of the controlling variable and the moderator. Model III was estimated as the difference between model I and II, the standard errors were estimated using bootstrap method for robustness

### Key Findings

- The index of moderated mediated term (0.035) was significant at 10 percent. In addition, the coefficient of climatic risk of -0.542 (see model II) is significant at 5 percent. This implies that changes in interest rate spread are mediated by climatic disaster having been moderated by variation in temperature
- Both coefficients of non-performing loans in Model 1 (-3.137) and Model II (-3.304) are is negative and significant at 5 percent. The coefficient is positive and significant in Model III (0.174). These finding suggests increase in NPL by a small margin has a larger impact on Interest rate spread during periods with climate related disaster compared to periods without climate related disaster.
- The coefficients of Capital adequacy (CA) are insignificant in model I but becomes negative and significant in Model II (-17.868) after providing for climate related risk. The coefficient is positive and significant in Model III (4.979). These findings imply that Increase in CA leads to decrease in interest rate spread. There is evidence to suggests that increase in Capital adequacy by a small margin has a larger impact on Interest rate spread during periods with climate related disaster compared to periods without climatic disaster

## 4. Conclusion

Despite the methodological limitations, the results therefore show that: First, there exists a relationship between climatic risk and bank performance to the extent that changes in interest rate spread are mediated and moderated by climate related factors. This implies that there exists a feedback effect between changes in climate and performance of commercial banks in Kenya. Secondly, there is evidence to suggests that increase in non-performing loans and capital adequacy ratio during periods of climatic disaster leads to higher spread compared to periods without climate related disaster. These results confirm that financial instability is exacerbated by extreme weather conditions and adverse climate related conditions. The study findings therefore show that financial institutions and regulators have a responsibility to their stakeholder to protect them from a disruptive carbon transition path. In this regard, the following policy recommendations were made:

## 5. Recommendations

1. Commercial Banks should introduce a risk model that scores customers on environmental issues thus generating adaptable green banking products and sustainability linked products to include investment accounts, loan accounts, climate bonds among others
2. Central Bank of Kenya should formulate a well-structured policy framework to guide financial sector in transitioning banks portfolios and facilitate climate resilience and sustainability.