



# Stability Analysis and Convergence Proofs in Time-Series Econometrics for Financial Risk Estimation in Nigeria

Uche Anyaechi<sup>1,2</sup>, Obiora Nnamdi<sup>3</sup>, Victor Ezeanolue<sup>4,5</sup>, Chinedu Okoli<sup>1,5</sup>

<sup>1</sup> Nigerian Institute of Social and Economic Research (NISER)

<sup>2</sup> Nnamdi Azikiwe University, Awka

<sup>3</sup> Covenant University, Ota

<sup>4</sup> Ahmadu Bello University, Zaria

<sup>5</sup> Department of Research, Covenant University, Ota

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**Correspondence:** [uanyaechi@hotmail.com](mailto:uanyaechi@hotmail.com)

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## Author notes

*Uche Anyaechi is affiliated with Nigerian Institute of Social and Economic Research (NISER) and focuses on Mathematics research in Africa.*

*Obiora Nnamdi is affiliated with Covenant University, Ota and focuses on Mathematics research in Africa.*

*Victor Ezeanolue is affiliated with Ahmadu Bello University, Zaria and focuses on Mathematics research in Africa.*

*Chinedu Okoli is affiliated with Department of Research, Covenant University, Ota and focuses on Mathematics research in Africa.*

## Abstract

This study addresses a current research gap in Mathematics concerning Time-Series Econometrics for financial risk estimation in Nigeria: stability analysis and convergence proofs in Nigeria. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A theorem-driven mathematical framework was developed under explicit regularity assumptions, with stability and convergence analysis of the proposed estimator. The main results show stability of the proposed functional under bounded perturbations and convergence of the estimator to a well-defined limit, characterised by  $R(x) = \operatorname{argmin}_{\theta} L(\theta; x)$ . The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Time-Series Econometrics for financial risk estimation in Nigeria: stability analysis and convergence proofs, Nigeria, Africa, Mathematics, working paper This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims.

**Keywords:** *Nigerian, Stability Analysis, Convergence Proofs, Time-Series Models, Econometrics, Financial Risk, Nigeria*

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