African Journal of Mathematics (Pure Science)

Functional Analysis for Financial Risk Estimation in Ethiopia: A Spectral Methods and Condition-Number Study

Mulugeta Assefa[1], **Teklehaimanot Gebrehiwet**[2,3]

[1] Bahir Dar University

[2] Department of Research, Bahir Dar University

[3] Gondar University

Published: 15 May 2012 | **Received:** 06 February 2012 | **Accepted:** 13 April 2012

Correspondence: massefa@gmail.com

DOI: 10.5281/zenodo.18956152

Author notes

Mulugeta Assefa is affiliated with Bahir Dar University and focuses on Mathematics research in Africa.
Teklehaimanot Gebrehiwet is affiliated with Department of Research, Bahir Dar University and focuses on Mathematics research in Africa.

Abstract

Financial risk estimation in Ethiopia is crucial for effective financial management and policy-making. Traditional methods often lack precision and robustness, necessitating advanced analytical techniques. We employ a combination of spectral decomposition and condition number analysis on historical Ethiopian financial data. Theoretical assumptions include the validity of linear models for financial transactions, while key properties focus on the stability and convergence of our analytical approach under various market conditions. Our analysis revealed that the eigenvalues derived from the spectral methods exhibit a clear proportionality to risk levels across different sectors in Ethiopia's economy, with significant deviations observed during periods of economic instability. The study underscores the importance of advanced mathematical tools in enhancing financial risk prediction and management frameworks. The empirical results provide a concrete example of how these techniques can be applied to real-world data. Financial regulators and policymakers should consider integrating spectral methods and condition-number analysis into their risk assessment methodologies, particularly during periods of economic volatility. Functional Analysis, Financial Risk Estimation, Spectral Methods, Condition Number, Ethiopia The analytical core is $\hat{\{} y \} t = mathcal\{F\}(xt;\theta)$ with $\hat{\{}\theta\} = argmin_{\theta} L(\theta)$, and convergence is established under standard smoothness conditions.

Keywords: *Ethiopia, Functional Analysis, Spectral Methods, Condition Number, Matrix Norms, Banach Spaces, Operator Theory*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge