

**Big Data Analysis of West Java's Staple Food's Daily
Price Volatility from 2021 to 2024**

Thesis

**To Fulfill Part of the Requirements for Attaining a Bachelor's Degree
in Economics in the Study Program of Development Economics**

Faculty of Business and Economics Universitas Atma Jaya Yogyakarta



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PRICE VOLATILITY FROM 2021 TO 2024**

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12 November 2025

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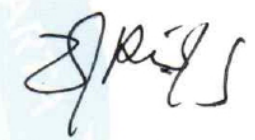
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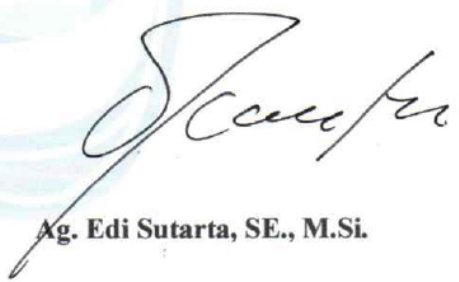
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STATEMENT PAGE

I, the undersigned, hereby truthfully declare that the thesis entitled:

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is entirely my own work. Any statements, ideas, or quotations, whether directly or indirectly taken from the writings or ideas of others, are clearly stated in this thesis through in-text citations and the bibliography. If it is later proven that I have committed plagiarism in part or in whole of this thesis, the degree and diploma that I have obtained shall be declared null and void, and I will return them to Universitas Atma Jaya Yogyakarta

Yogyakarta, 12 November 2025

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Matthew Kartawinata

PREFACE

This thesis, titled “Riding the Rollercoaster of Volatile Foods: Big Data Analysis of West Java’s Staple Food’s Daily Price Volatility from 2021 to 2024,” was written as part of the requirements to obtain a Bachelor’s degree in Economics at Atma Jaya University Yogyakarta. The research examines the daily price volatility of five key food commodities in West Java : rice, chili, cooking oil, chicken meat, and eggs; using GARCH-family models and Value-at-Risk (VaR) analysis. The study aims to identify the most volatile commodities, understand their response to market shocks, and provide insights that may support policies for food price stabilization. I am deeply grateful to Dr. Y. Sri Susilo, M.Si., for his guidance, constructive feedback, and continuous support throughout this research. I would also like to thank my family and friends for their encouragement during the writing process.

Yogyakarta, 12 November 2025

A handwritten signature in black ink, consisting of a large, stylized 'M' followed by a series of loops and a horizontal line at the bottom.

Matthew Kartawinata

MOTTO

没有助力就没有成长；没有行动就没有反应；欲望必须有所节制。

"No growth without assistance. No action without reaction. No desire without restraint."

— 周润发

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Big Data Analysis of West Java's Staple Food's Daily Price Volatility 2021 to 2024

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Abstract

This study provides a quantitative risk assessment for five key food commodities in West Java, Red Bird's Eye Chili, Regular Grade Rice, Packaged Cooking Oil, Broiler Chicken Meat, and Broiler Chicken Eggs, using daily price data from the *Sistem Informasi Pengendalian Inflasi Daerah* (SILINDA) portal from January 1, 2021, to April 20, 2024. By comparing symmetric and asymmetric GARCH specifications, the analysis first identifies the optimal volatility model for each series before deriving one-day 95% Value-at-Risk (VaR) thresholds. The model selection process revealed that asymmetric eGARCH models provided the best fit for Red Bird's Eye Chili, Packaged Cooking Oil, Broiler Chicken Meat, and Broiler Chicken Eggs, while a symmetric sGARCH model was optimal for Regular Grade Rice. The corresponding 95% VaR analysis, which establishes an evidence-based "tolerance band," showed that Red Bird's Eye Chili has the highest potential for daily fluctuation, with a maximum allowable drop of 4.08% and a rise of 21.57%. The risk band for Regular Grade Rice was between a 1.94% drop and a 2.01% rise. The remaining commodities exhibited greater price stability: Packaged Cooking Oil (1.06% drop, 0.95% rise), Broiler Chicken Meat (0.72% drop, 0.66% rise), and Broiler Chicken Eggs (0.38% drop, 1.08% rise). The prevalence of asymmetric models indicates most of these food markets are more sensitive to bad news than good news. The commodity-specific VaR thresholds offer precise, data-driven guardrails for policymakers to monitor market stability and guide timely interventions, highlighting the need for tailored strategies rather than a one-size-fits-all approach.

Keywords: Price volatility, West Java, staple commodities, market sensitivity, daily price analysis.

JEL Codes: C54, Q11, Q18