Strategic Forecasting and Diversification of A Regional Agricultural Economy

Prof. Dr. Bei Zeng

Hawaii Pacific University, USA

Abstract

This study applies a portfolio-theoretic framework to examine the long-term growth, stability, and diversification potential of Hawaii's agricultural sectors between 1968 and 2016. Integrating geographic comparisons by county with sectoral evaluations across 18 agricultural sub-industries, the analysis emphasizes forecasting future industry trajectories to guide strategic planning.

Findings reveal a structural shift in Hawaii's agricultural economy toward slower but more stable growth, with crop production becoming the primary anchor of the sector. Aquaculture, despite rapid initial expansion, remains highly volatile and does not project a consistent growth trend. Livestock, although steadily declining, demonstrates relatively predictable growth patterns. Consistent with Markowitz's portfolio theory, most industries exhibit an inverse relationship between growth and stability, though exceptions such as vegetables, non-pineapple fruits, and cattle suggest areas requiring targeted intervention.

Using Sharpe's model, industries are classified based on idiosyncratic growth and stabilizing capacity. "Star" sectors, including vegetables, honey, and milk, offer both high growth potential and strong stability, presenting opportunities for strategic investment. Conversely, "cash cow" sectors like eggs and hogs contribute portfolio stability with limited growth, while "question mark" sectors (e.g., algae) and "dog" sectors (e.g., sugarcane) reflect higher strategic risks and lower economic contributions.

Cointegration analysis further identifies dynamic relationships among major agricultural industries, forecasting a convergence of growth rates between crops and livestock and suggesting the emergence of a relatively stable production system. In contrast, aquaculture is unlikely to sustain its previous growth trajectory.

Overall, the study highlights the critical role of strategic diversification in reinforcing the resilience of Hawaii's agricultural economy. Targeted investment in industries with both stabilizing power and sustainable growth potential is essential to ensure long-term sectoral stability. These findings provide actionable insights for policymakers and stakeholders aiming to strengthen Hawaii's agricultural future through informed investment and diversification strategies.

Keywords: agricultural forecasting, strategic diversification, portfolio analysis, investment planning, growth convergence, sectoral stability