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THE IMPACT OF LOW-RESILIENCE BAT REGULATIONS ON COMPETITIVE PERFORMANCE IN JAPANESE HIGH SCHOOL BASEBALL

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Abstract

This study investigates how regulatory shifts in equipment standards induce structural transformations in competitive performance and team strategies. Such phenomena extend beyond sports, reflecting broader economic principles of policy intervention and resource allocation efficiency. In 2024, the Japan High School Baseball Federation (JHBF) mandated the transition to "low-resilience bats" to enhance player safety and correct the "offensive-heavy" imbalance. This policy change represents a significant exogenous shock to the competitive environment.

Utilizing a comprehensive database of Koshien tournament statistics, this research employs a rigorous econometric approach—Regression Discontinuity Design (RDD)—to estimate the "treatment effect" of this regulatory change. By treating the 2024 policy implementation as a cutoff point, the study evaluates discontinuities in core performance metrics, including Isolated Power (ISO), Slugging Percentage (SLG), and Run Expectancy (RE) matrices. The data, retrieved through Python-based web scraping, allows for a precise analysis of behavioral shifts before and after the regulatory threshold.

Preliminary empirical results indicate a significant "jump" or discontinuity in power-related metrics following the implementation of the new standards, confirming the direct suppressive effect of the policy on offensive output. Furthermore, from a management perspective, the findings suggest a strategic pivot toward "small ball" tactics—such as sacrifice bunts and stolen bases—as coaching staffs seek to maximize efficiency under new constraints. This research provides a quantitative framework for policy evaluation in sports management and offers empirical evidence for decision-making in talent recruitment and risk assessment.

Keywords:

Regulatory Change, Regression Discontinuity Design (RDD), Econometric Analysis, Low-Resilience Bats, Saber metrics, Decision Efficiency