

Kontribusi fiskal dari perusahaan pembiayaan terbuka di Indonesia menunjukkan ketidaksesuaian dengan kapasitas ekonominya. Meskipun sektor ini mengalami pertumbuhan aset dan profitabilitas yang konsisten, disparitas tingkat pajak efektif (asimetri *effective tax rate*) antarentitas mencerminkan ketimpangan fiskal dan potensi risiko kepatuhan yang belum sepenuhnya terpetakan secara prediktif. Penelitian ini bertujuan membangun model prediktif kontribusi pajak berbasis ETR dengan mengintegrasikan regresi data panel dan simulasi Monte Carlo dalam kerangka *risk-informed fiscal modeling*.

Penelitian menggunakan data panel tahunan dari 13 perusahaan pembiayaan terbuka selama periode 2019–2023. Estimasi model dilakukan menggunakan regresi data panel *fixed effect model* (FEM) dengan koreksi *White-Huber robust standard error*. Parameter koefisien FEM selanjutnya dijadikan basis untuk simulasi Monte Carlo sebanyak 10.000 iterasi guna memproyeksikan distribusi probabilitas ETR pada horizon 2024–2028. Validasi prediktif dilakukan menggunakan data tahun 2023 sebagai *out-of-sample test*, dengan pengukuran akurasi berbasis *mean absolute error* (MAE), *mean absolute percentage error* (MAPE), dan *root mean square error* (RMSE).

Hasil regresi menunjukkan bahwa *debt to equity ratio* (DER) berpengaruh positif signifikan terhadap ETR ( $p = 0,0099$ ). Ukuran perusahaan tidak signifikan secara statistik ( $p = 0,0924$ ), namun arah koefisiennya konsisten dan relevan secara ekonomi. Sementara itu, ROA dan BOPO tidak menunjukkan signifikansi. Rata-rata hasil simulasi ETR tercatat sebesar 49,79% dengan median 47,54%. Namun, karakter distribusinya ekstrem, dengan kuantil bawah (P5) = 0% dan kuantil atas (P95) = 100%, serta standar deviasi sebesar 0,4849. Validasi terhadap tahun 2023 menghasilkan MAE sebesar 3,4567 dan RMSE sebesar 4,2673, dengan MAPE yang tinggi akibat pengaruh *outlier* fiskal ekstrem seperti VRNA dan FUJI.

Model ini terbukti efektif dalam memproyeksikan ETR secara distribusional dan relevan untuk mendukung sistem intelijen fiskal berbasis risiko. Temuan ini memberikan dasar bagi pengembangan sistem segmentasi risiko, seleksi audit berbasis kuantil, serta perumusan insentif fiskal yang lebih adaptif. Dengan demikian, pendekatan ini berkontribusi terhadap transformasi paradigma pengawasan fiskal dari retrospektif ke arah prediktif berbasis data dan distribusi.

**Kata kunci:** *effective tax rate*, regresi data panel, simulasi Monte Carlo, perusahaan pembiayaan, prediksi pajak, Direktorat Jenderal Pajak, Otoritas Jasa Keuangan

## ABSTRACT

*The fiscal contribution of publicly listed finance companies in Indonesia reveals a misalignment with their economic capacity. Despite consistent growth in assets and profitability, disparities in effective tax rates (ETRs) across entities indicate fiscal asymmetry and potential compliance risks that remain underexplored in predictive frameworks. This study aims to construct a predictive model of tax contribution based on ETR by integrating data panel regression and Monte Carlo simulation within a risk-informed fiscal modeling framework.*

*The study utilizes annual panel data from 13 publicly listed finance companies over the 2019–2023 period. The model is estimated using a fixed effect data panel regression with White-Huber robust standard errors. The estimated FEM coefficients serve as the deterministic core of a Monte Carlo simulation comprising 10,000 iterations to project the probabilistic distribution of ETRs for the 2024–2028 horizon. Predictive validation is conducted using 2023 data as an out-of-sample test, with accuracy assessed via mean absolute error (MAE), mean absolute percentage error (MAPE), and root mean square error (RMSE).*

*The regression results indicate that the debt to equity ratio (DER) has a statistically significant positive effect on the ETR ( $p = 0.0099$ ). Firm size (SIZE) is not statistically significant ( $p = 0.0924$ ), yet its coefficient direction is consistent and economically meaningful. Meanwhile, return on assets (ROA) and the operational efficiency ratio (BOPO) do not exhibit statistical significance. The average simulated ETR is 49.79% with a median of 47.54%. However, the distribution is extreme, with a lower quantile (P5) of 0%, an upper quantile (P95) of 100%, and a standard deviation of 0.4849. Out-of-sample validation for 2023 yields an MAE of 3.4567 and an RMSE of 4.2673, while the MAPE is elevated due to fiscal outliers such as VRNA and FUJI.*

*The proposed model effectively projects ETR in a distributional format and proves relevant for supporting risk-based fiscal intelligence systems. These findings provide a foundation for developing risk segmentation tools, quantile-based audit selection, and more adaptive fiscal incentive frameworks. Accordingly, this approach contributes to the transformation of fiscal oversight paradigms from retrospective to predictive, grounded in data and distributional analytics.*

**Keywords:** *effective tax rate, data panel regression, Monte Carlo simulation, finance companies, tax forecasting, Directorate General of Taxes, Financial Services Authority.*