

How Does Human-Machine Collaboration Work? – Evidence from Auto Finance Leasing Transactions

Y.L. Sun

School of Management, Politecnico di Milano, Milan, Italy

Y. Lu

School of Economics and Management, Tsinghua University, Beijing, China

H.Q. Shi

School of Economics and Management, Tsinghua University, Beijing, China

ZH.S. Yang *

School of Economics and Management, Tsinghua University, Beijing, China

Abstract

This paper examines the role of human discretion in algorithm-assisted credit approval, drawing on detailed transaction-level data from a leading auto finance leasing firm in China that adopted a machine-learning-based credit scoring system. Exploiting a quasi-experimental setting created by the staggered rollout of this scoring system, we document three central findings. First, while machine scoring significantly reduces default rates, it increases reliance on coarse group-level predictors, indicating heightened statistical discrimination, particularly against long-tail borrowers with weaker observable traits. Second, human auditors provide an effective corrective mechanism: for applications the algorithm rejects but auditors approve, default rates remain stable while statistical discrimination declines, demonstrating that human overrides improve fairness without sacrificing performance. Third, machine adoption enhances operational efficiency, reallocating officer effort toward high-leverage cases—those where human judgment diverges from the algorithm. Heterogeneity and mechanism analyses show that override quality improves with auditor experience, localized knowledge, and incentive alignment, while pandemic-induced uncertainty exacerbates reliance on group-level features. These findings offer nuanced insight into how human-machine collaboration can be designed to combine algorithmic precision with contextual judgment, balancing accuracy, fairness, and efficiency in high-stakes financial decisions.

Keywords

FinTech, Human-Machine Collaboration, Credit Approval, Statistical Discrimination, In-House Finance.

