Forecasting Firm Performance with Machine Learning: Evidence from Japanese Firm-level Data

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Abstract

The goal of this paper is to forecast future firm performance with machine learning techniques. Using data on over a million Japanese firms with supply-chain linkage information provided by a credit reporting agency, we show high performance in the prediction of exit, sales growth and profit growth. In particular, our constructed proxies far outperform the credit score assigned by the credit reporting agency based on a detailed survey and interviews of firms. Against such a baseline score, our models are able to ex-ante identify 16% of exiting firms (baseline: 11%), 25% of firms experiencing growth in sales (baseline: 8%), and 22% of firms exhibiting positive profit growth (baseline: 13%). The proof of concept of this paper provides a practical usage of machine learning methods in firm performance prediction.

Key words: Machine learning; big data; prediction; firm exit; firm growth

JEL classification: G31; L25

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