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Hedonic Imputation with Tree-based Machine Learning Approaches

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New and disappearing products in a rapidly growing market result in items being unmatched across periods, posing difficulties for bilateral price index construction. I consider alternative estimations of hedonic prices by introducing tree-based machine learning models. The tree decision structure is found to be compatible with consumer preferences when product characteristics are complements. Model performance metrics based on scanner data confirm the reliability of tree-based machine learning in price predictions. Price indexes from random forests display correct predictions that are robust in single, double and full imputation. Hence tree-based machine learning approaches, especially random forests, can be employed effectively for unmatched products in hedonic imputation since consumer preferences are captured and prediction accuracy is improved in the tree structure.