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“Smart-SDFs”

Abstract

We introduce model-free Smart Stochastic Discount Factors (S–SDFs) minimizing various notions of SDF variability under general convex constraints on pricing errors, which can be motivated by particular market frictions, asymptotic APT-type no-arbitrage assumptions or a need for regularization in large arbitrage-free asset markets. S–SDFs give rise to new nonparametric SDF bounds for testing asset pricing models, under more general assumptions on a model’s ability to price cross-sections of assets. They arise from a simple transformation of the optimal payoff in a penalized dual portfolio selection problem with uniquely determined penalization function. We demonstrate the properties of S–SDFs induced by various economically motivated pricing error penalizations, which can load on a sparse set of endogenously selected securities and can produce a more robust pricing performance. We then show how pricing error and dual portfolio weight sparsity can be made compatible with tractability, i.e., smoothness, of the corresponding dual portfolio problem. For such settings, we develop the relevant econometric methodology for the empirical analysis of S–SDFs. Lastly, we demonstrate the properties of S–SDFs in various APT settings where SDF-regularization matters