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Multifactor Risk Loadings and Abnormal Returns under Uncertainty and Learning

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Abstract

We explore the time variation of factor loadings and abnormal returns in the context of a four-factor model. Our methodology, based on an application of the Kalman filter and on endogenous uncertainty, overcomes several limitations of competing approaches used in the literature. Besides taking learning into account, it does not rely on any conditioning information, and it only imposes minimal assumptions on the time variation of the parameters. Our estimates capture both short- and long-term fluctuations of risk loadings and abnormal returns, also showing marked variation across US industry portfolios. The results from mean-variance spanning tests indicate that our baseline model yields accurate predictions and can therefore improve pricing and performance measurement.

Keywords: Multifactor models, Time-varying alphas, Time-varying betas.
JEL Codes: G12, G31, C51.

1 Introduction

Do systematic risks vary over time and across industries? Multifactor asset pricing models posit a linear relationship between asset returns and various risk factors that reflect the impact of market conditions on beliefs and/or preferences, and hence on risk premia. Motivated by empirical evidence on market anomalies, the model by Fama and French (1992) (see also Carhart, 1997) added two factors to the conventional form of the CAPM: market capitalization (size) and book-to-market (value/growth). More recent literature shows that expected returns and their key drivers, i.e., risk premia and risk loadings (betas), are likely to experience some variation over time (Fama and French, 1997, 2006; Lewellen and Nagel, 2006; Ang and Chen, 2007; Guidolin and Timmerman, 2008a; Cooper and Priestley, 2009). Most existing contributions account for that by allowing betas to change, while constant