Available online at www.sciencedirect.com
SCIENCE DIRECT®
Journal of Financial Economics 76 (2005) 509–548
JOURNAL OF Financial ECONOMICS
www.elsevier.com/locate/econbase

There is a risk-return trade-off after all ☆

Eric Ghysels[a], Pedro Santa-Clara[b], Rossen Valkanov[b,*]

[a]*Kenan-Flagler Business School, McColl Building, Suite 4100, University of North Carolina, Chapel Hill NC 27599-3490, USA*
[b]*The John E. Anderson Graduate School of Management, University of California at Los Angeles, Los Angeles, CA 90095-1481, USA*

Received 2 May 2003; accepted 4 March 2004
Available online 8 February 2005

Abstract

This paper studies the intertemporal relation between the conditional mean and the conditional variance of the aggregate stock market return. We introduce a new estimator that forecasts monthly variance with past daily squared returns, the mixed data sampling (or MIDAS) approach. Using MIDAS, we find a significantly positive relation between risk and return in the stock market. This finding is robust in subsamples, to asymmetric specifications of the variance process and to controlling for variables associated with the business cycle. We compare the MIDAS results with tests of the intertemporal capital asset pricing model based on alternative conditional variance specifications and explain the conflicting results in the

☆We thank Michael Brandt, Tim Bollerslev, Mike Chernov, Rob Engle, Shingo Goto, Amit Goyal, Campbell Harvey, David Hendry, Francis Longstaff, Nour Meddahi, Eric Renault, Matt Richardson, Neil Shephard, and seminar participants at Barclays Global Investors, Centro de Estudios Monetarios y Financieros (Madrid), Emory University, the Global Association of Risk Professionals, Instituto Tecnologico Autonomo de Mexico (Mexico City), Instituto Superior de Ciencias do Trabalho e da Empresa (Lisbon), the Centre Interuniversitaire de Recherche en Analyse des Organisations Conference on Financial Econometrics (Montreal), Lehman Brothers, London School of Economics, Morgan Stanley, New York University, Oxford University, University of Cyprus, University of North Carolina, and University of Southern California for helpful comments. We especially thank an anonymous referee whose suggestions greatly improved the paper. Arthur Sinko provided able research assistance.

*Corresponding author. Tel.: +1 310 825 7246; fax: +1 310 206 5455.
E-mail address: rossen.valkanov@anderson.ucla.edu (R. Valkanov).

doi:10.1016/j.jfineco.2004.03.008

literature. Finally, we offer new insights about the dynamics of conditional variance.

JEL classification: G12; C22

Keywords: Risk-return trade-off; ICAPM; MIDAS; Conditional variance

1. Introduction

The Merton (1973) intertemporal capital asset pricing model (ICAPM) suggests that the conditional expected excess return on the stock market should vary positively with the market's conditional variance:

$$\mathrm{E}_t[R_{t+1}] = \mu + \gamma \,\mathrm{Var}_t[R_{t+1}], \tag{1}$$

where γ is the coefficient of relative risk aversion of the representative agent and, according to the model, μ should be equal to zero. The expectation and the variance of the market excess return are conditional on the information available at the beginning of the return period, time t. This risk-return trade-off is so fundamental in financial economics that it could be described as the "first fundamental law of finance."[1] Unfortunately, the trade-off has been hard to find in the data. Previous estimates of the relation between risk and return often have been insignificant and sometimes even negative.

Baillie and DeGennaro (1990), French et al. (1987), and Campbell and Hentschel (1992) do find a positive albeit mostly insignificant relation between the conditional variance and the conditional expected return. In contrast, Campbell (1987) and Nelson (1991) find a significantly negative relation. Glosten et al. (1993), Harvey (2001), and Turner et al. (1989) find both a positive and a negative relation depending on the method used.[2] The main difficulty in testing the ICAPM relation is that the conditional variance of the market is not observable and must be filtered from past returns.[3] The conflicting findings of the above studies are mostly the result of differences in the approach to modeling the conditional variance.

In this paper, we take a new look at the risk-return trade-off by introducing a new estimator of the conditional variance. Our mixed data sampling, or MIDAS, estimator forecasts the monthly variance with a weighted average of lagged daily squared returns. We use a flexible functional form to parameterize the weight given to each lagged daily squared return and show that a parsimonious weighting scheme

[1]However, Abel (1988), Backus and Gregory (1993), and Gennotte and Marsh (1993) offer models in which a negative relation between return and variance is consistent with equilibrium. Campbell (1993) discusses general conditions under which the risk-return relation holds as an approximation.

[2]See also Chan et al. (1992), Lettau and Ludvigson (2002), Merton (1980), and Pindyck (1984). Goyal and Santa-Clara (2003) find a positive trade-off between market return and average stock variance.

[3]We could think of using option implied volatilities as do Santa-Clara and Yan (2001) to make variance observable. Unfortunately, option prices are available only since the early 1980s, which is insufficient to reliably make inferences about the conditional mean of the stock market.