



The European Journal of Finance >

Volume 15, 2009 - Issue 4

853 | 31 | 0
Views | CrossRef citations to date | Altmetric

Original Articles

Forecasting the weekly time-varying beta of UK firms: GARCH models **vs.** Kalman filter method

Taufiq Choudhry & Hao Wu

Pages 437-444 | Published online: 06 Jun 2009

Cite this article <https://doi.org/10.1080/13518470802604499>

Sample our
Economics, Finance,
Business & Industry Journals
>> **Sign in here** to start your access
to the latest two volumes for 14 days

Full Article

Figures & data

References

Citations

Metrics

Reprints & Permissions

Read this article

Share

Abstract

This paper investigates the forecasting ability of three different Generalised Autoregressive Conditional Heteroscedasticity (GARCH) models and the Kalman filter method. The three GARCH models applied are: bivariate GARCH, BEKK GARCH, and GARCH-GJR. Forecast errors based on 20 UK company's weekly stock return (based on time-varying beta) forecasts are employed to evaluate the out-of-sample forecasting ability of both the GARCH models and the Kalman method. Measures of forecast errors overwhelmingly support the Kalman filter approach. Among the GARCH models, GJR appears to provide somewhat more accurate forecasts than the two other GARCH models.

Keywords:

JEL Classification :

G1

G15

Acknowledgements

The authors thank two anonymous referees and the editor of this journal for several useful comments and suggestions. The authors also thank the participants of the 27th International Symposium on Forecasting 2007, New York City, USA, for valuable comments and suggestions on an earlier draft of the paper. Any remaining errors and omissions are the authors' responsibility alone.

Notes

Brooks, Faff, and McKenzie ([1998](#)) provide several citations of papers that apply these different methods to estimate the time-varying beta.

The leverage effect is due to the reduction in the equity value, which would raise the debt-to-equity ratio, hence raising the riskiness of the firm as a result of an increase in future volatility. Glosten, Jagannathan, and Runkle ([1993](#)) provide an alternative explanation for the negative effect; if most of the fluctuations in stock prices are caused by fluctuations in expected future cash flows, and the riskiness of future cash flows does not change proportionally when investors revise their expectations, the unanticipated changes in stock prices and returns will be negatively related to unanticipated changes in future volatility.

There is more than one GARCH model available that is able to capture the asymmetric effect in volatility, however, according to Engle and Ng ([1993](#)), the Glosten, Jagannathan, and Runkle ([1993](#)) model is the best at parsimoniously capturing this asymmetric effect.

Since only 20 firms are looked at, results presented cannot be generalised but only have implication for the firms studied.

The augmented Dickey-Fuller test is applied to check for the stochastic structure of the beta series. All GARCH estimated beta series are found to have zero unit roots. Some of the beta estimated by means of the Kalman filter approach may contain one unit root. As pointed out by one of the referees this result is not surprising since this is almost true by the style of construction of the Kalman filter and the GARCH. These results are also available on request.

Related Research Data

[Time-Varying Beta Risk of Australian Industry Portfolios: A Comparison of Modelling Techniques](#)

Source: Australian Journal of Management

[Testing the equality of prediction mean squared errors](#)

Source: International Journal of Forecasting

[Multivariate Simultaneous Generalized ARCH](#)

Source: Econometric Theory

[A Capital-Asset Pricing Model with Time-varying Covariances](#)

Source: Unknown Repository

[The predictive ability of several models of exchange rate volatility](#)

Source: Journal of Econometrics

[Volatility forecasting without data-snooping](#)

Source: Journal of Banking & Finance

[ARCH modeling in finance](#)

Source: Journal of Econometrics

Related research

People also read

Recommended articles

Cited by
31

Information for

Authors

R&D professionals

Editors

Librarians

Societies

Opportunities

Reprints and e-prints

Advertising solutions

Accelerated publication

Corporate access solutions

Open access

Overview

Open journals

Open Select

Dove Medical Press

F1000Research

Help and information

Help and contact

Newsroom

All journals

Books

Keep up to date

Register to receive personalised research and resources
by email

 Sign me up

  

  

Copyright © 2026 Informa UK Limited Privacy policy Cookies Terms & conditions

Accessibility



Registered in England & Wales No. 01072954
5 Howick Place | London | SW1P 1WG