台灣股票市場波動度預測：預測能力比較與最佳模型選取

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摘要

計量文獻中提出大量的GARCH模型，但實務上在使用時，到底何者較佳則沒有一致的結論，本文以Hansen(2005)所提出的卓越預測能力(Superior Predictive Ability; SPA)檢定法為出發點，利用Hsu, Hsu, and Kuan(2008)提出的「逐步卓越預測能力檢定法」(Stepwise-SPA)進行模型比較，試圖找出優秀的波動度模型。本研究使用台灣加權股價指數之日資料為標的，以實現波動度(realized volatility)為代理波動度，並利用QLIKE與MSE2為損失函數，用以解決代理波動度中，微結構噪音(Micro structure noises)之造成模型預測能力失真的問題，研究結果顯示大部份的GARCH家族模型在波動度預測上皆有相近的表現，本研究之結果可供市場投資人與學界研究者模型使用之依據。

關鍵詞：逐步卓越預測能力檢定法、GARCH、實現波動度、MSE2、QLIKE

參考文獻

一、 國內文獻

[1] 王豐文，2009，波動不對稱設定與條件分配對預測台股波動率之研究，淡江大學財務金融學系碩士論文。

[2] 李命志、洪瑞成、劉洪鈞，2007，厚尾 GARCH 模型之波動性預測能力比較，輔仁管理評論 14，47-71。

[3] 林德華和王珏，1995，台灣股市成交量對股價波動的影響 1986-1994GARCH 修正模型之應用，台北市銀行月刊，第 19 卷，第 7 期，頁 50-48。

[4] 邱建良、李命志和徐泰瑋，1999，台灣股市報酬率波動性行為之探討，台灣經濟金融月刊，第 35 卷，第 6 期，頁 43-53。

[5] 莊蕙菁、管仲閔，2010，無資料窺探偏誤的檢定評估共同基金績效，證券市場發展，181-206。

[6] 蔡麗如和葉銀華(2000)，「不對稱 GARCH 族模型預測能力之比較研究」，輔仁管理評論，第 7 卷，第 1 期，頁 183-196。

[7] 劉洪鈞、張高瑩，2010，以不同代理變數評估 GARCH 族模型之金融市場波動預測績效，績效與策略研究 7，1-16。

二、 國外文獻

[1] Baillie, R.T., T. Bollerslev and H.O. Mikkelsen, 1996. Fractionally Integrated Generalized Autoregressive Conditional Heteroskedasticity, *Journal of Econometrics* 74, 3-30.

[2] Braun, P. A, D.B. Nelson, and A. M. Sunier (1995), "Good News, Bad News, Volatility, and Betas", *Journal of Finance*, Vol.50, P1575-1603.

[3] Bollerslev, T., 1986. Generalized Autoregressive Conditional Heteroskedasticity, *Journal of Econometrics* 31, 307-327.

[4] Bollerslev, T. and H.O. Mikkelsen, 1996. Modeling and Pricing Long Memory in Stock Market Volatility, *Journal of Econometrics* 73, 151-184.

[5] Cheung, Y.W. and L.K. Ng (1992), "Stock price dynamics and firm size：An empirical investigation", *Journal of Finance*, Vol. 47, 1985-1997

[6] Ding, Z., C.W.J. Granger and R.F. Engle, 1993. A Long Memory Property of Stock Market Returns and a New Model, *Journal of Empirical Finance* 1, 83-106.

[7] Engle, R.F., 1982. Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation, *Econometrica* 50, 987-1007.

[8] Engle, R.F., 1990. Discussion of "Stock Volatility and the Crash of '87," by G. William Schwert, *Review of Financial Studies* 3, 103-106.

[9] Engle, R.F. and T. Bollerslev, 1986. Modelling the Persistence of Conditional Variances, *Econometric Reviews* 5, 1-50.

[10] Engle, R.F. and V.K. Ng, 1993. Measuring and Testing the Impact of News on Volatility, *The Journal of Finance* 48, 1749-1778.

[11] Fama, E.F., 1965, The Behavior Stock Market Prices, *The Journal of Business*, 38, 34-105.

[12] Franses, P.H. and D.van Dijk(1996), Forecasting Stock Market Volatility Using (Non-Linear)GARCH Model, *Journal of Forecasting*,15,229-235.

[13] Glosten, L.R., R. Jagannathan and D.E. Runkle, 1993. On the Relation between the Expected Value and the Volatility of the Nominal Excess Return on Stocks, *Journal of Finance* 48, 1779-1801.

[14] Gokcan, S.(2000), Forecasting Volatility of Emerging Stock Markets: Linear versus Non-Linear GARCH Models, *Journal of Forecasting*,19,499-504.

[15] Hansen, P.R., 2005. A Test for Superior Predictive Ability, *Journal of Business and Economic Statistics* 23, 365-380.

[16] Hansen, P.R., J. Large and A. Lunde, 2008. Moving Average-Based Estimators of Integrated Variance, *Econometric Reviews* 27, 79 - 111.

[17] Hansen, P.R. and A. Lunde, 2005. A Forecast Comparison of Volatility Models: Does Anything Beat a GARCH(1,1)?, *Journal of Applied Econometrics* 20, 873-889.

[18] Hansen, P.R. and A. Lunde, 2006a. Consistent Ranking of Volatility Models, *Journal of Econometrics* 131, 97-121.

[19] Hansen, P.R. and A. Lunde, 2006b. Realized Variance and Market Microstructure Noise, *Journal of Business and Economic Statistics* 24, 127-161.

[20] Hansen, P.R., A. Lunde and J.M. Nason, 2003. Choosing the Best Volatility Models: The Model Confidence Set Approach, *Oxford Bulletin of Economics and Statistics* 65, 839-861.

[21] Hansen, P.R., A. Lunde and J.M. Nason, 2011. The Model Confidence Set, *Econometrica* 79, 453-497.

[22] Higgins, M.L. and A.K. Bera, 1992. A Class of Nonlinear ARCH Models, *International Economic Review* 33, 137-158.

[23] Hsu, P.-H., Y.-C. Hsu and C.-M. Kuan, 2010. Testing the Predictive Ability of Technical Analysis Using a New Stepwise Test without Data Snooping Bias, *Journal of Empirical Finance* 17, 471-484.

[24] Koutmos, G. and Saidi, R. (1995), "The Leverage Effect in Individual Stocks and the Debt to Equity Ratio", *Journal of Business Finance and Accounting*, Vol. 22, P1063-1075.

[25] Lo, A.W. and A.C. MacKinlay, 1990. Data-Snooping Biases in Tests of Financial

Asset Pricing Models, *Review of Financial Studies* 3, 431-467.

[26] Mandelbrot, B., 1963, The Variation of Certain Speculative Prices, *The Journal of Business*, 36, 394-419.

[27] McAleer, M. and M.C. Medeiros, 2008. Realized Volatility: A Review, *Econometric Reviews* 27, 10-45.

[28] Mussa, M., 1979, Empirical Regularities in the Behavior of Foreign Exchange Market, *Carnegie-Rochester Conference Series on Public Policy*, 11, 9-57.

[29] Nelson, D.B., 1991. Conditional Heteroskedasticity in Asset Returns: A New Approach, *Econometrica* 59, 347-370.

[30] Patton, A.J., 2011. Volatility Forecast Comparison Using Imperfect Volatility Proxies, *Journal of Econometrics* 160, 246-256.

[31] Romano, J.P. and M. Wolf, 2005. Stepwise Multiple Testing as Formalized Data Snooping, *Econometrica* 73, 1237-1282.

[32] Schwert, G.W., 1990. Stock Volatility and the Crash of '87, *Review of Financial Studies* 3, 77-102.

[33] Taylor, S.J., 1986. Chichester, UK: John Wiley and Sons. *Modeling Financial Time Series*.

[34] White, H., 2000. A Reality Check for Data Snooping, *Econometrica* 68, 1097-1126.

[35] Zhang, L., P.A. Mykland and Y. Aït-Sahalia, 2005. A Tale of Two Time Scales, *Journal of the American Statistical Association* 100, 1394-1411.