SYMMETRIC AND ASYMMETRIC GARCH MODELS FOR FORECASTING THE PRICES OF GOLD

PUNG YEAN PING

UNIVERSITI TEKNOLOGI MALAYSIA

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To my beloved family, for your love and support.

To my friends, for your wits, intelligence and guidance in life.

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ABSTRACT

Gold prices forecasts are of interest to many people. Gold prices however, change rapidly from period to period. In short, they are not constant. The change is not only in the mean, but also in the variability of the gold prices series. Daily gold prices per ounce, from January 3, 2000 to December 31, 2010 is used in this study with the Schwarz Information Criterion (SIC), Mean Absolute Error (MAE), Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE) as the forecasting accuracy measures. For the purpose of this study, gold prices from ten major consumer countries are examined. The currencies are American dollar, Australian dollar, Canadian dollar, Swiss franc, Chinese renmimbi, Egyptian pound, Euro, Japanese yen, Turkish lira and South African rand. This study considers five models from the GARCH-family namely the Generalized Autoregressive Conditional Heteroscedasticity (GARCH (p, q)), GARCH-M, Power of GARCH (PGARCH), Threshold GARCH (TGARCH) and Exponential GARCH (EGARCH). These models are analyzed by using the E-Views 6.0 software. Several combinations of p and q values are considered to develop several GARCH (p, q) models. Using the maximum likelihood method to estimate the coefficients in the models, followed by model validation and model selection criteria, it is concluded that EGARCH (1, 1) and TGARCH (1, 1) are the best models for eight of the currencies understudied.

ABSTRAK

Ramalan harga emas menarik minat ramai orang. Walaubagaimanapun, harga emas berubah dengan pesat dari semasa ke semasa. Pendek kata, harga tersebut tidak tetap. Perubahan yang berlaku bukan sahaja dalam min, tetapi juga dalam serakan bagi siri harga emas. Harga emas harian bagi setiap auns, dari 3 Januari, 2000 hingga 31 Disember, 2010 digunakan dalam kajian ini manakala Kriteria Maklumat Schwarz (SIC), Purata Ralat Mutlak (MAE), Ralat Purata Kolerasi (RMSE) dan Peratus Purata Ralat Mutlak (MAPE) digunakan untuk mengukur kejituan ramalan. Dalam kajian ini, harga emas dari 10 negara pengguna utama akan diteliti. Mata wang tersebut adalah dolar Amerika, dolar Australia, dolar Kanada, franc Sweden, renmimbi China, paun Sterling, Euro, yen Jepun, lira Turki, dan rand Afrika Selatan. Kajian ini mempertimbangkan lima model dari keluarga GARCH iaitu Heteroskedastisiti Autoregresi Teritlak Bersyarat (GARCH (p, q)), GARCH-M, Kuasa GARCH (PGARCH), Ambang GARCH (TGARCH) dan GARCH eksponen (EGARCH). Model-model ini dianalisis dengan menggunakan perisian E-Views 6.0. Beberapa kombinasi nilai p dan nilai q, telah dipertimbangkan untuk membangunkan beberapa model GARCH (p, q). Dengan menggunakan kaedah kebolehjadian maksimum untuk menganggarkan pekali dalam model, diikuti dengan pengesahan model dan kriteria pemilihan model, dapat disimpulkan bahawa EGARCH (1, 1) dan TGARCH (1, 1) adalah model-model terbaik bagi lapan mata wang yang dikaji.