

A Study of the Relationship Between Oil And Green Energy Crop - Application of GARCH - Dynamic Conditional Correlation -

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ABSTRACT

This study use bivariate GARCH-M model to investigate West Texas crude oil prices and Agriculture prices for corn, soybean, cane and rapeseed crop returns sensitivity analysis since January 1, 1990 to May 26, 2010. According to Granger and Arch testing of Structural changes found that the West Texas crude oil price is indeed a structural change, the structural change point is September 23, 2008, and this time just as the Asian financial crisis. By the mean equation and variance equation of the GARCH-DCC-M is pointed out that the corn crop futures prices return influenced by previous period West Texas crude oil price return for the negative impact to the statistics.

Keywords : GARCH-Dynamic Conditional Correlation-Mean Model, green-energy, bio energy

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REFERENCES

一、中文部分 國際生質柴油推展之初步探討(2007), 石油市場雙週報, 台灣綜合研究院。左峻德, 蘇美惠(2007), 國內外生質酒精發展策略與推廣現況, 台灣經濟研究院。白水和憲(2008), 從一滴原油解讀世界, 世茂出版集團。李堅明(2008), 國際生質能源發展問題與策略分析, 國際能源透視能源報導。吳瑛瑛, 邱佩冠(2004), 再生能源的發展 以美國再生能源發展為例, 全球變遷通訊雜誌, 13(44)

, 28-32。吳耿東, 李宏台(2004), 生質能源化腐朽為神奇, 科學發展, (383), 22-38。林俊義(2007), 國際推動生質能源作物之發展, 林業研究專訊, 68(14), 35-40。林文偉(2008), 制添加生質能源政策探討, 淡江大學產業經濟學系碩士班未出版之碩士論文。吳奇璋(2008), 我國推動生質燃料發展刻不容緩, 經濟部能源局。郭俊宏(2004), 多變量條件變異數模型之比較分析, 台灣大學經濟系碩士班未出版之碩士論文。陳芑(2009), 極端的變化 油源供需與價格分析, 經濟部能源局。陳志威, 吳文騰(2002), 生生不息的生質能源, 科學發展, 359, 8-11。黃秉鈞(2005), 人類未來的能源問題, 科學發展, 386(3), 21-33。黃宗煌, 陳佩芬, 黃瀕儀(2006), 推廣能源作物與生質柴油之政策效果與整合分析, 東莞理工學院學報, 13(4), 39-50。黃昱程(2008), 期貨與選擇權: 衍生性金融商品入門經典(二版), 華泰文化出版。黃釋緯(2008), 我國能源安全新思維, 台灣經濟研究院研究員。張維敕(2002), 金融危機與風險外溢-DCC 模型之應用, 國立中央大學財務金融系碩士班未出版之碩士論文。葉毓琪(2008), 原油及大宗穀物之波動關係與避險策略分析, 中原大學國際貿易系碩士班未出版之碩士論文。楊奕農, 劉炳麟, 巫春洲(2009), 農產品期貨動態避險策略的評價, 農業與經濟, 42, 39-62。新能源投資術-後石油時代致富商機(2007), 財訊出版社。謝文章(2008), 國內發展生質柴油潛力評估, 國立台北大學自然資源與環境管理研究所。

二、英文部分 Akgiray, V. (1989). Conditional heteroskedasticity in time series of stock return: evidence and forecasts. *Journal of Business*, 62(1), 55-80. Baillie, R., & Myers R. J. (1991). Bivariate GARCH Estimation of Optimal Commodity Futures Hedge. *Journal of Applied Econometrics*, 6(9), 109-124. Bachman, D., & Kopecky K. J. (1996). Common factors in international stock prices; evidence from a cointegration study. *International Review of Financial Analysis*, 5(1), 39-53. Berndt, H., & Hausman F. (1974). Estimation and inference in nonlinear structural models. *Annals of Economic and Social Measurement*, 4(3), 653-665. Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31(3), 307-327. Chu, S. H., & Feund H. (1996). Volatility estimation for stock index options: A GARCH approach. *Quarterly Review of Economics and Finance*, 36(4), 431-450. Engle, R. F., & Granger, C. W. (1987). Cointegration and error correction: representation, estimation, and testing. *Econometrica*, 55(2), 251-276. Engle, R. F. (2002). Dynamic conditional correlation: A simple class of multivariate generalized autoregressive conditional heteroskedasticity models. *Journal of Business and Economic Statistics*, 20(3), 339-350. Engle, R. F. (1982). Autoregressive conditional heteroskedasticity with estimates of the variance of UK inflation. *Econometrica*, 50(4), 987-1008. Engle, R., & Yoo, B. S. (1987). Forecasting and testing in cointegrated systems. *Journal of Econometrics* 35(1), 143-159. Eun, C., & Shim, S. (1989). International transmission of stock market movements. *Journal of Financial and Quantitative Analysis*, 24(2), 241-257. Forbes, K., & Rigobon, R. (2002). No contagion, only interdependence: measuring stock market comovements. *The Journal of Finance*, 57(5), 2223 – 2261. Food and Agriculture Organization of the United Nations & Organization for Economic Co-operation and Development. (2008). *Agricultural Outlook*, June. Viale delle Terme di Caracalla 00153 Rome, Italy. Food and Agriculture Organization of the United Nations. (2008). *Crop Prospects and Food Situation*, April (No. 37). Viale delle Terme di Caracalla 00153 Rome, Italy. Granger, C. W. (1969). Investigation causal relations by econometric models and cross-spectral methods. *Econometrica*, 37(3), 424-438. Granger, C. W., & Newbold, P. (1974). Spurious regression in econometric. *Journal of Econometrics*, 2, 1779-1801. International Energy Agency. (2007). *Medium-Term Oil & Gas Markets*, July (No. 322.1). Huston, American Territory: Author. International Energy Agency. (2008). *Medium-Term Oil & Gas Markets*, July (No. 342.3). Huston, American Territory: Author. International Monetary Fund. (2009). *World Economic Outlook*, June (No. 1997.1). Washington, D.C, American Territory: Author. International Monetary Fund. (2010). *World Economic Outlook*, February (No. 2043.1). Washington, D.C, American Territory: Author. Inclan, C., & Tiao, G. (1994). Use of cumulative sums of squares for retrospective detection of changes of variance. *Journal of the American Statistical Association*, 89(427), 913-923. Johansen, S. (1991). Estimation and hypotheses in testing of cointegrating vectors in gaussian vector autoregressive models. *Econometrica*, 59(6), 1551-1580. Kearney, C. (2000). The determination and international transmission of stock market volatility. *Global Finance Journal*, 11(1-2), 31-66. Knif, J., & Pynnonen S. (1999). Local and global price memory of International stock markets. *Journal of International Financial Markets, Institutions and Money*, 9(2), 129-147. Mandelbrot, B. (1963). The variation of certain speculative prices. *The Journal of Business*, 36(21), 394-419. Masih, R., & Masih, A. M. (2001). Long and short term dynamic causal transmission amongst international stock markets. *Journal of International Money and Finance*, 20, 563-587. Rodney, R. W., Labatt, S., & Whittaker, M (2007). The Financial Implications of climate change, 8(20) 233-249. Schwarz, G. (1978). Estimating the dimension of a model. *Annals of Statistics*, 6(2), 461-464. Theodossiou, P., & Lee U. (1993). Mean and volatility spillovers across major national stock market: Further empirical evidence. *Journal of Finance Research*, 16(4), 337-350. Tse, Y. K., & Tsui A. K. (2002). A Multivariate Generalized Autoregressive Conditional Heteroscedasticity Model with Time Varying Correlations. *Journal of Business and Economic Statistics*, 20(3), 351-362. United States Department of Agriculture. (2008). *Agriculture Research and Productivity: Sources of Public Sector Agricultural Research Expenditures*. February (3211). Washington, DC, American Territory: Author. Verleger, p (2007). *The International Economy Where Oil is Headed*, 42(3), 221-227.