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Risk management and financial derivatives: An overview

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ABSTRACT

Risk management is crucial for optimal portfolio management. One of the fastest growing areas in empirical finance is the expansion of financial derivatives. The purpose of this special issue on “Risk Management and Financial Derivatives” is to highlight some areas in which novel econometric, financial econometric and empirical finance methods have contributed significantly to the analysis of risk management, with an emphasis on financial derivatives, specifically conditional correlations and volatility spillovers between crude oil and stock index returns, pricing exotic options using the Wang transform, the rise and fall of S&P500 variance futures, predicting volatility using Markov switching multifractal model: evidence from S&P100 index and equity options, the performance of commodity trading advisors: a mean-variance-ratio test approach, forecasting volatility via stock return, range, trading volume and spillover effects: the case of Brazil, estimating and simulating Weibull models of risk or price durations: an application to ACD models, valuation of double trigger catastrophe options with counterparty risk, day of the week effect on the VIX – a parsimonious representation, equity and CDS sector indices: dynamic models and risk hedging, the probability of default in collateralized credit operations, risk premia in multi-national enterprises, solving claims

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replication problems in a complete market by orthogonal series expansion, downside risk management and VaR-based optimal portfolios for precious metals, oil and stocks, and implied Sharpe ratios of portfolios with options: application to Nikkei futures and listed options.

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1. Introduction

Risk management is crucial for optimal portfolio management. One of the fastest growing areas in empirical finance is the expansion of financial derivatives. While some of the key issues underlying risk and portfolio management are reasonably well understood, many of the technical and empirical issues underlying the creation and movements in financial derivatives are less well understood.

The purpose of this special issue on "Risk Management and Financial Derivatives" is to highlight some areas in which novel econometric, financial econometric and empirical finance methods have contributed significantly to the analysis of risk management, with an emphasis on financial derivatives, specifically conditional correlations and volatility spillovers between crude oil and stock index returns (Chang, McAleer, & Tansuchat, in this issue-b), pricing exotic options using the Wang transform (Labuschagne & Offwood, in this issue), the rise and fall of S&P500 variance futures (Chang, Jimenez-Martin, McAleer, & Perez-Amaral, in this issue-a), predicting volatility using Markov switching multifractal model: evidence from S&P100 index and equity options (Chuang, Huang, & Lin, in this issue), the performance of commodity trading advisors: a mean-variance-ratio test approach (Bai, Phoon, Wang, & Wong, in this issue), forecasting volatility via stock return, range, trading volume and spillover effects: the case of Brazil (Asai & Brugal, in this issue), estimating and simulating Weibull models of risk or price durations: an application to ACD models (Allen, Ng, & Peiris, in this issue), valuation of double trigger catastrophe options with counterparty risk (Jiang, Yang, Liu, & Wang, in this issue), day of the week effect on the VIX – a parsimonious representation (Gonzalez-Perez & Guerrero, in this issue), equity and CDS sector indices: dynamic models and risk hedging (Caporin, in this issue), the probability of default in collateralized credit operations (Divino & Rocha, in this issue), risk premia in multi-national enterprises (Lutz, in this issue), solving claims replication problems in a complete market by orthogonal series expansion (Dong & Gao, in this issue), downside risk management and VaR-based optimal portfolios for precious metals, oil and stocks (Hammoudeh, Araujo-Santos, & Al-Hassan, in this issue), and implied Sharpe ratios of portfolios with options: application to Nikkei futures and listed options (Akuzawa & Nishiyama, in this issue).

It is our hope that the interesting, invaluable and innovative papers in this special issue will encourage others to undertake research in a variety of challenging areas associated with the exciting and rapidly expanding areas of risk management and financial derivatives.

2. Overview

In the first paper, "Conditional Correlations and Volatility Spillovers Between Crude Oil and Stock Index Returns", Chia-Lin Chang (National Chung Hsing University, Taiwan), Michael McAleer (Erasmus University Rotterdam, The Netherlands) and Roengchai Tansuchat (Maejo University, Thailand) investigate the conditional correlations and volatility spillovers between the crude oil and financial markets, based on crude oil returns and stock index returns. Daily returns from January 2, 1998 to November 4, 2009 of the crude oil spot, forward and futures prices from the WTI and Brent markets, and the FTSE100, NYSE, Dow Jones and S&P500 stock index returns, are analyzed using Bollerslev's CCC model, Ling and McAleer's VARMA-GARCH model, McAleer, Hoti and Chan's VARMA-AGARCH model, and Engle's DCC model. Based on the CCC model, the estimates of conditional correlations for returns across markets are very low, and some are not statistically significant, which means the conditional shocks are correlated only in the same market and not across markets. However, the DCC estimates of the conditional correlations are always significant. This result makes it clear that the assumption

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