

Issues in Evaluating Multifactor Options in a PDE Framework

Carl Chiarella^{*}, Jeff Dewynne[†], Nadima El-Hassan[§] and Manfred Gilli[‡]

^{*}School of Finance and Economics, University of Technology, Sydney,
E-mail: carl.chiarella@uts.edu.au

[†]Mathematical Institute, University of Oxford
E-mail: dewynne@maths.ox.ac.uk

[§]School of Finance and Economics, University of Technology, Sydney,
E-mail: nadima.el-hassan@uts.edu.au

[‡]Department of Econometrics, University of Geneva and FAME, Switzerland
E-mail: manfred.gilli@metri.unige.ch

January 30, 2003

Abstract

Pricing of multifactor derivatives has proven to be a challenging problem in computational finance. We explore the use of a partial differential equation framework for the valuation of an option depending on up to three factors. The financial application of this work is the pricing of European and American basket options and the calculation of the corresponding hedging parameters. The techniques employed are benchmarked against analytic solutions for certain examples. Some comparisons are made with the Monte Carlo approach.

Keywords: Multifactor option pricing, finite difference methods, θ -method, hedge-ratio.