

Pricing Equity Swaps in an Economy with Jumps ^{*}

Mia Hinnerich[†]

Department of Finance,
Stockholm School of Economics,
Box 6501, SE-113 83 Stockholm, SWEDEN

October, 2006

First version: June 15, 2005

Abstract

Empirical evidence confirms that asset price processes exhibits jumps and that asset returns are not Gaussian. Hence pricing formulas for equity swaps that rely on the assumption of a Gaussian economy may potentially be wrong. We provide a pricing model for equity swaps, when all the asset price processes in the economy are allowed to jump. The market is driven by a general marked point process as well as by a standard multidimensional Wiener process. In order to obtain closed-form solutions of the swap values, we assume that all parameters in the asset price processes are deterministic, but possibly functions of time. We derive swap values using martingale methods and the technique of convexity corrections rather than using replicating portfolios. Our results are an extension of the results of Liao & Wang (2003). The martingale method is the key that enables the extension to jump-diffusions. We find that the pricing formula for quanto equity swaps does indeed change when we allow for jumps in the economy. We provide a simple numerical illustration of how to quantify the pricing errors that occurs if the true process is a jump-diffusion but the Gaussian model is used instead. We find that the pricing errors can be of economically significant size.

JEL classification: G12; G13

Key words: Derivatives pricing, equity swaps, convexity corrections, marked point processes, martingales

^{*}I gratefully acknowledge financial support from the Jan Wallander and Tom Hedelius foundation. I thank Tomas Björk and my colleagues at Stockholm School of Economics.

[†]Tel: +44 8 736 91 61, E-mail address: mia.hinnerich@hhs.se