Application and Implication of Cointegration in Asset Pricing[*]

Hoi Ying Wong[†]

Department of Statistics

The Chinese University of Hong Kong

November 3, 2011

Abstract

Cointegration is a useful econometric tool for identifying assets which share a common equilibrium. The importance of cointegration has become recognized and resulted in a Nobel Prize in Economics for Granger in 2003. In this talk, I will report several recent advances of asset pricing theories based on continuous-time cointegration dynamics. It covers cointegrated pairs-trading using classical mean-variance portfolio theory, cointegration option pricing with stochastic correlations using Fourier analysis, and (if time allows) the hedging with mortality risk in insurance products. Our theories predict that 1. if cointegrated assets are liquidly traded, then there exists a statistical arbitrage opportunity; 2. If the assets are not traded or not liquidly traded, their corresponding derivatives securities, in particular futures contracts, exhibit stochastic convenient yields which are partially driven by cointegrating factors; and 3. As human mortality is not traded by its nature and the national mortality rate is cointegrated with the mortality rate of an individual insurance company's client pool, cointegration techniques enhance the hedging of mortality risk with national mortality bonds. Empirical studies are performed to validate the use of the developed theories and numerical methods. (The talk is based several joint papers with M.C. Chiu, T.W. Wong and J. Zhao)

[†]E-mail: `hywong@cuhk.edu.hk`