

「交易成本導向演算法」台灣期貨市場之實證研究

學生：林建億

指導教授：姜林杰祐 教授

國立高雄應用科技大學金融資訊研究所碩士班

摘要

近年來，國內外交易所透過演算法交易(Algorithmic Trading)的交易量逐年增加，並且與交易成本分析(TCA, Transaction Cost Analysis)結合，讓投資機構更了解交易成本組合，有助於策略參數調整，提升演算法策略之績效。

在演算法交易上常會面臨到交易者兩難問題(Traders Dilemma)，因此本研究運用交易成本導向演算法中的執行落差(IS, Implementation Shortfall)演算法與市場收盤價(MC, Market Close)演算法，結合成本模型於大台指數期貨上進行實證，並進行交易成本分析。

研究中以 Visual C# 撰寫並開發模擬下單系統，實證比較 IS 與 MC 演算法在大台指數期貨上的成交均價與標竿價(分別為開盤價、收盤價)的差異，並以平均絕對百分比誤差(MAPE)衡量差異，再以統計檢定比較成交均價與標竿價間的差異，最後進行交易成本分析，衡量衝擊成本、時間風險成本、買賣價差成本與價格趨勢成本，以解析不同市場狀況、策略下之成本解析。

研究實證結果顯示，使用 IS 與 MC 演算法可以在考慮衝擊成本與時間風險下有效的極小化執行落差。平均而言，買方適合運用 IS 策略、賣方適合運用 MC 策略。

關鍵詞：演算法交易、交易成本分析、交易者兩難問題、執行落差演算法、市場收盤價演算法、成本模型

「 Cost Driven Algorithmic 」 Taiwan Futures Market Empirical Studies

Student : Jian-yi Lin

Advisors : Dr. Chieh-Yow ChiangLin

Institute of Finance and Information
National Kaohsiung University of Applied Sciences

ABSTRACT

In recent years, the trading volume executed by algorithmic trading methods increased. Combined with transaction cost analysis, the transaction cost components can be analyzed by investment institutions to enhance the performance of the algorithmic strategies.

Traders dilemma can be solved by trading algorithms. This study applied IS(Implementation Shortfall) algorithms and MC(Market Close) algorithms in Taiwan Futures Market.

The empirical systems were developed on Visual C#. The performance of empirical results was measured by MAPE (Mean Absolute Percentage Error) and RPM(Relative Performance Measure). Statistic's hypothesis tests were made to compare the algorithms performance.

The results showed that using IS algorithmic and MC algorithmic could minimize the shortfall of impact cost and timing cost. Overall, the buyer was suggested to use IS algorithmic, and the seller was suggested to use MC algorithmic.

Keywords: Algorithmic Trading, TCA, Traders Dilemma, IS, MC, Cost Model

目錄

摘要.....	iii
ABSTRACT.....	iv
目錄.....	v
圖目錄.....	vii
表目錄.....	viii
附表圖目錄.....	x
第一章 緒論.....	1
第一節 研究背景.....	1
第二節 研究動機.....	1
第三節 研究對象、方法與假設.....	3
第四節 論文結構.....	4
第二章 文獻探討.....	5
第三章 演算法交易佈單系統設計.....	8
第一節 市場衝擊成本模型介紹.....	8
第二節 執行落差 IS (Implementation Shortfall)演算法.....	18
第三節 市場收盤價(MC ,Market Close)演算法.....	19
第四節 委託簿更新機制.....	21
第五節 交易機制.....	24

第六節 交易成本分析(Transaction Cost Analysis ,TCA).....	26
第七節 系統設計.....	30
第八節 評估指標.....	32
第四章 實證結果.....	35
第一節 IS 與 MC 演算法策略與標竿價格比較分析.....	35
第二節 IS 與 MC 演算法策略交易成本分析.....	44
第五章 結論與建議.....	64
參考文獻.....	68
附錄.....	69

參考文獻

Almgren R. and Chriss N., “Optimal execution of portfolio transactions” , Journal of Risk, vol.3, p5-39, 2000.

Kissell R., “The Expanded Implementation Shortfall : Understanding Transaction Components” , Journal of Trading , Summer 2006.

Kissell R. and Malamut R., “Algorithmic Decision-Making Framework”, Journal of Trading, Winter 2006.

Kissell R. and Malamut R., “Understanding the Profit and Loss Distribution of Trading Algorithms” ‘Guide to Algorithmic Trading ’ publisher Institutional Investor Inc, Spring 2005

Kissell R., Freyre-Sanders A., Carrie C., “The future of algorithmic trading” publisher The Trade,1st edition , 2005.

Kissell R., Glantz M., Malamut R., “A practical framework for estimating transaction costs and developing optimal trading to achieve best execution”, Finance Research Letter vol 1,p35-46, 2004.

Lee C., Ready M., “Inferring trade direction from intraday data.” Journal of Finance ,46,733-746,1991.

Treynor J.L., “What does it take to win the trading game”. Financial Analysts Journal 37,p 55–60, 1981.

Perold, A.F.,” The implementation shortfall: paper versus reality.” Journal of Portfolio Management , Spring 1988.

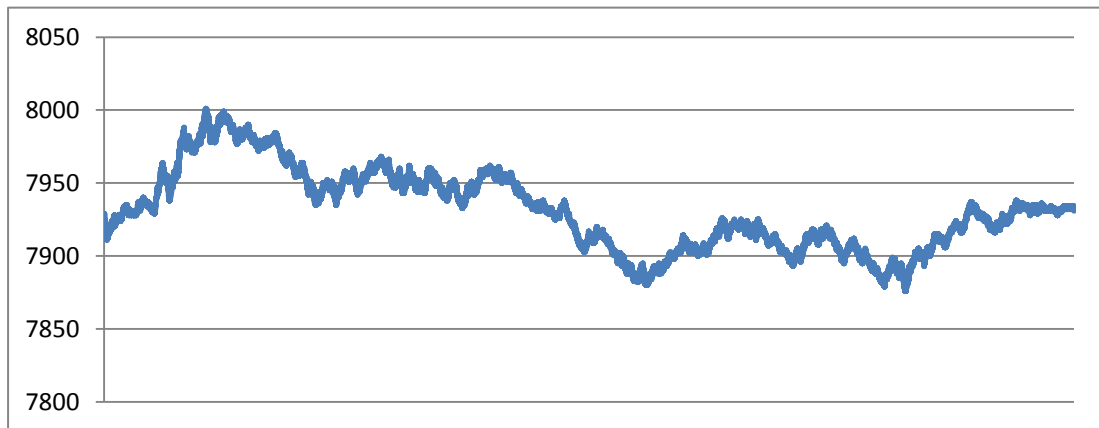
書籍

Kissell R. and Glantz M., “Optimal Trading Strategies: Quantitative approaches for

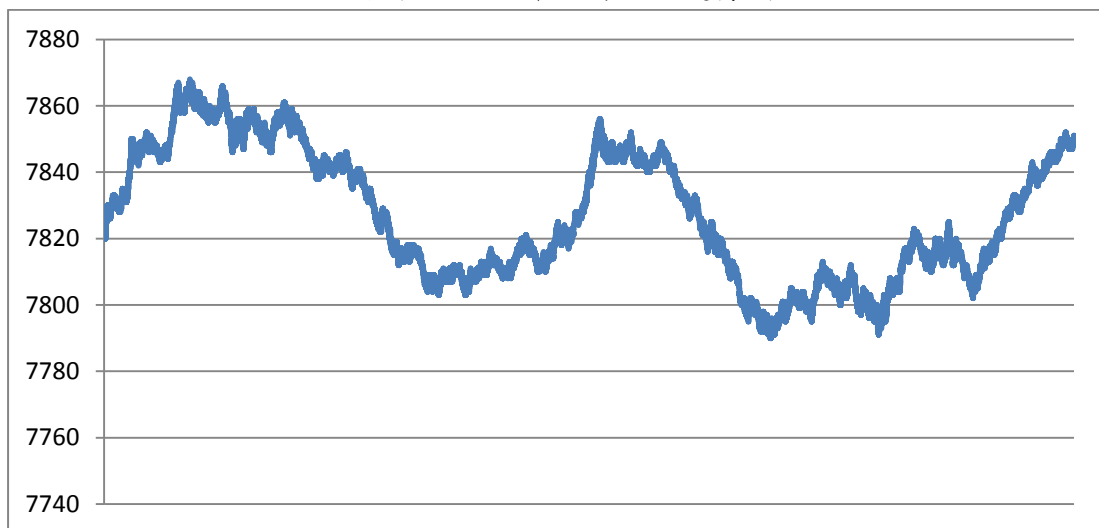
managing market impact and trading risk” , 2003. Publisher: AMACOM

Barry Johnson, “Algorithmic Trading and DMA: An introduction to direct access trading strategies” ,2010. Publisher: 4Myeloma Press

附錄



附圖 1 2010 年 5 月 3 日走勢圖



附圖 2 2010 年 9 月 8 日走勢圖