High-Low Price Prediction and Technical Analysis

A thesis presented in partial fulfilment of the requirements for the degree of

Master of Business Studies

in

Finance

at Massey University, Albany

Juan YANG

June 2014
Abstract

High and low prices convey additional information beyond closing prices, based on the fact that the improved high-low volatility estimator enjoys higher efficiency than the standard close-to-close variance. Empirical results show that a positive risk-return relationship is exhibited more frequently when predicted high-low prices are applied rather than historical data by taking advantage of the new volatility estimator in 48 countries. In this study, models using historical data contain (1) historical closing prices, (2) historical high-low prices, and (3) the Risk Aversion method, while the three high-low prices prediction approaches include (1) Engle and Granger two-step linear model, (2) Engle and Granger non-linear model, and (3) MIDAS technique. Corporate governance variables, associated with laws and enforcement, have weak explanatory power over investors’ perception of risk. This study also contributes to the validity of technical analysis by showing that high and low prices forecasts are able to generate valuable trading signals and positive returns based on range-based strategy and midpoint strategy. The superior investment performance benefits investors in trading both stock indices and options in U.S. financial markets.
Acknowledgements

The accomplishment of this thesis would have been impossible without empowering support from those people I encountered during the journey and I would like to thank them now. My deepest gratitude goes to my supervisor, Associate Professor Nuttawat Visaltanachoti for inspiring me with creative ideas and guiding me through the thesis with patience and continuous assistance. I am also indebted to my co-supervisor, Associate Professor Nick Nguyen, for the discussions and insights offered me about the research.

I am grateful to Massey University for the “Masterate Scholarship” I received from the Head of school. I wish to extend my regards to all the faculty members and administrative staff in the School of Economics and Finance for their generous help.

I dedicate this thesis to my beloved parents, who are always with me and provide me with unconditional love and warm encouragement. Thanks for their understanding of all those negative emotions in weak moments due to the pressure of the work. It was the faith they had in me that enabled me to walk through the struggle and keep going. Heartfelt thanks especially go to my friend Addison Pan. Your friendship, company and constructive criticism made the journey more colourful and memorable than you know.
**Table of Contents**

Abstract .............................................................................................................................. i

Acknowledgements ........................................................................................................... ii

Table of Contents ............................................................................................................. iii

Chapter 1 Introduction ...................................................................................................... 1
  1.1 Background .............................................................................................................. 1
  1.2 Contribution ............................................................................................................. 5
  1.3 Preliminary results ................................................................................................... 6
  1.4 Outlines of the thesis ............................................................................................... 6

Chapter 2 Literature Review ............................................................................................. 7
  2.1 Advantages of high-low prices ................................................................................ 7
  2.2 Variance construction based on high-low prices ..................................................... 7
  2.3 High-low prices' prediction models ......................................................................... 9
    2.3.1 Engle and Granger ordinary least squares model .............................................. 9
    2.3.2 Engle and Granger non-linear least squares model .......................................... 11
    2.3.3 MIDAS ............................................................................................................ 12
  2.4 Corporate governance ............................................................................................ 13
  2.5 Technical analysis .................................................................................................. 15
    2.5.1 Trading stock indices ....................................................................................... 15
    2.5.2 Trading options ............................................................................................... 19
  2.6 Hypotheses Development ...................................................................................... 20

Chapter 3 Data ................................................................................................................. 22

Chapter 4 Methodology ................................................................................................... 24
  4.1 Historical data ........................................................................................................ 24
List of Tables

Table 5.1 Summary Risk Aversion Coefficients Using Historical Data  .......................39
Table 5.2 Summary Risk Aversion Coefficients Using Historical Closing Prices ...... 41
Table 5.3 Summary Risk Aversion Coefficients Using Forecasted High-low Prices .. 43
Table 5.4 Summary Risk Aversion Coefficients For Countries With Strong Persistence ......................................................................................................................................... 46
Table 5.5 Results Summary for Four Legal Origins ..................................................... 48
Table 5.6 Results Summary for Investor Protection and Law Enforcement .......... 50
Table 5.7 Results Summary for Securities Law Factors .............................................. 51
Table 5.8 Summary Statistics for Monthly and Daily Returns ................................. 54
Table 5.9 Results for Co-integration Relationship Pre-test ....................................... 55
Table 5.10 Results for Simple Technical Trading Strategies from Two Estimation Periods ......................................................................................................................................... 58
Table 5.11 Summary Results for Range-based Strategy .......................................... 61
Table 5.12 Summary Results for Midpoint Strategy ............................................... 64
Table 5.13 Results Summary for Trading Options ....................................................... 69

Appendix

Appendix A ..................................................................................................................... 79
Appendix B ..................................................................................................................... 81