

School of Information Technology

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Trading in the Australian Stockmarket using Artificial Neural Networks

by

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Abstract

This thesis focuses on training and testing neural networks for use within stockmarket trading systems. It creates and follows a well defined methodology for developing and benchmarking trading systems which contain neural networks.

Four neural networks and consequently four trading systems are presented within this thesis. The neural networks are trained using all fundamental or all technical variables, and are trained on different segments of the Australian stockmarket, namely all ordinary shares, and the S&P/ASX200 constituents.

Three of the four trading systems containing neural networks significantly outperform the respective buy-and-hold returns for their segments of the market, demonstrating that neural networks are suitable for inclusion in stockmarket trading systems.

The fourth trading system performs poorly, and a number of reasons are proposed to explain the poor performance. It is significant, however, that the trading system development methodology defined in this thesis clearly exposes the potential failure when testing in-sample, long before the neural network would be used in real trading.

Overall, this thesis concludes that neural networks are suitable for use within trading systems, and that trading systems developed using neural networks can be used to provide economically significant profits.

Statement of original authorship

This thesis represents my own work and contains no material which has been previously submitted for a degree or diploma at this University or any other institution, except where due acknowledgement is made.

Signature

Witness

Date

Additional Publications

The following is a list of publications by the candidate on matters relating to this thesis.

Conference

Vanstone, B. and C. N. W. Tan (2003). A Survey of the Application of Soft Computing to Investment and Financial Trading. Proceedings of the 8th Australian & New Zealand Intelligent Information Systems Conference (ANZIIS 2003), Sydney.

Vanstone, B., G. Finnie, et al. (2004). Applying Fundamental Analysis and Neural Networks in the Australian Stockmarket. Proceedings of the International Conference on Artificial Intelligence in Science and Technology (AISAT 2004), Hobart, Tasmania.

Vanstone, B., G. Finnie, et al. (2004). Enhancing Security Selection in the Australian Stockmarket using Fundamental Analysis and Neural Networks. Proceedings of the 8th IASTED International Conference on Artificial Intelligence and Soft Computing (ASC 2004), Marbella, Spain.

Vanstone, B., G. Finnie, et al. (2005). Evaluating the Application of Neural Networks and Fundamental Analysis in the Australian Stockmarket. Proceedings of the IASTED International Conference on Computational Intelligence (CI 2005), Calgary, AB, Canada, ACTA Press.

Book Chapter

Vanstone, B. and C. N. W. Tan (2005). Artificial Neural Networks in Financial Trading. Encyclopedia of Information Science and Technology. M. Khosrow-Pour, Idea Group. 5: 163-167.

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Dedication

This thesis is dedicated to my family.

To my wife, Sue, and my children Daisy and Serena, for their continued support and understanding over the years that this journey has taken.

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Table of Abbreviations

A variety of specialized abbreviations are used within this thesis. The more obscure of these terms are listed below.

ADX:	Average Directional Index
AMEX:	American Stock and Options Exchange
AORD:	Australian All Ordinaries Index
ASX:	Australian Stock Exchange
ATR:	Average True Range
DAX:	German Stock Exchange Index
DJIA:	Dow Jones Industrial Average
FTSE:	London Stock Exchange Index
IBEX:	Spanish Stock Exchange Index
KOSPI:	Korean Stock Exchange Index
MACD:	Moving Average Convergence/Divergence
MOM:	Momentum Indicator
NIKKEI:	Tokyo Stock Exchange Index
NYSE:	New York Stock Exchange
RSI:	Relative Strength Index
SESALL:	Singapore All Equities Index
STOCHK:	Stochastic (Momentum) Indicator
TOPIX:	Tokyo Stock Exchange Price Index
TUNINDEX:	Tunisian Stock Exchange Index

Table of contents

Chapter 1	Introduction.....	21
1.1	Background to the research.....	21
1.2	Research problem and hypotheses	24
1.3	Justification for the research	25
1.4	Outline of the report.....	27
1.5	Definitions.....	28
1.6	Delimitations of scope	28
Chapter 2	Literature Review.....	29
2.1	Introduction.....	29
2.2	Value Investment	30
2.2.1	Introduction.....	30
2.2.2	Historical Evolution and Credibility	30
2.2.3	Applicability	42
2.3	Technical Analysis.....	43
2.3.1	Introduction.....	43
2.3.2	Historical Evolution and Credibility	43
2.3.3	Applicability	59
2.4	Soft Computing.....	59
2.4.1	Introduction.....	59
2.4.2	Historical Evolution and Credibility	60
2.4.2.1	Soft Computing Classifications	60
2.4.2.2	Research into Time Series Prediction	61
2.4.2.3	Research into Pattern Recognition and Classification	65
2.4.2.4	Research into Optimization.....	70
2.4.2.5	Research into Ensemble Approaches.....	71
2.4.3	Applicability	75
2.5	Research Contributions	76
2.6	Conclusion	76

Chapter 3	Methodology	79
3.1	Introduction	79
3.2	Data	82
3.2.1	Universe of stocks	82
3.2.2	Sources of Data	83
3.2.3	Creating the trading datasets	84
3.2.3.1	Data contents of the datasets	85
3.2.3.1.1	Aspect Fundamental Data	85
3.2.3.1.2	Norgate Technical Data	87
3.2.3.1.3	Trading Analysis Datasets	88
3.2.3.1.4	Determining the Index attribute	90
3.2.3.2	Merging process used to create the datasets	91
3.2.3.3	Partitioning of the Data	94
3.3	Strategies	97
3.3.1	Fundamental Screening Strategies	97
3.3.1.1	Graham's Undervalued Stocks	97
3.3.1.2	Aby & Briscoe Undervalued Stocks	99
3.3.2	Technical Strategies	99
3.4	Trading Considerations	100
3.4.1	Constraints	101
3.4.2	Determining Buy/Sell rules	102
3.4.2.1	Identifying Signal Thresholds	103
3.4.3	Risk Control	104
3.4.3.1	Investment risk	104
3.4.3.2	Trade risk	105
3.4.4	Money Management	108
3.4.5	Other Trading Parameters	109
3.5	Evaluation Metrics	110
3.5.1	Introduction	110
3.5.2	Trading System Metrics	111

3.5.3	Statistical Measures	117
3.5.4	Comparing Trading Strategies	119
3.6	Software & Hardware used in this study	119
3.7	Neural Network Considerations.....	120
3.7.1	Inputs.....	120
3.7.1.1	Fundamental timeframe	121
3.7.1.2	Selection of Fundamental Variables	121
3.7.1.3	Technical Timeframe	122
3.7.1.4	Selection of Technical Variables	124
3.7.2	Processing	136
3.7.2.1	Hidden Nodes and Layers	136
3.7.2.2	In-Sample testing metrics	138
3.7.2.2.1	Fundamental in-sample metrics	138
3.7.2.2.2	Technical in-sample metrics	139
3.7.2.3	Parameters.....	140
3.7.2.3.1	Momentum.....	140
3.7.2.3.2	Training Rate	140
3.7.3	Outputs.....	141
3.8	Limitations of the study	143
3.8.1	Ratio Analysis.....	143
3.8.2	Neural networks.....	144
3.9	Summary of models	145
3.10	Testable Hypotheses	149
Chapter 4	Results and Analysis	151
4.1	Introduction.....	151
4.2	Trading in the ASX Allshare using neural networks and fundamental data... 153	
4.2.1	Training data	153
4.2.2	Architecture selected.....	155
4.2.3	Derivation of Trading System parameters	155
4.2.3.1	Signal Strength Threshold.....	155

4.2.3.2	Stop-Loss threshold	156
4.2.4	Out-of-Sample Results.....	157
4.2.5	Detailed discussion of Traders Metrics.....	163
4.2.5.1	Net Profit (Loss) / Net Profit (Loss) %.....	163
4.2.5.2	Annualized Gain %.....	163
4.2.5.3	Exposure %	164
4.2.5.4	All Trades: Number of Trades	164
4.2.5.5	All Trades: Average Profit (Loss), Average Profit (Loss) %	165
4.2.5.6	All Trades: Average Bars Held.....	165
4.2.5.7	Winning Trades: Number of Trades, Winning %.....	166
4.2.5.8	Winning Trades: Average Profit, Average Profit %.....	167
4.2.5.9	Winning Trades: Average Bars Held.....	167
4.2.5.10	Winning Trades: Max consecutive wins.....	167
4.2.5.11	Losing Trades: Number of Trades, Losing %.....	168
4.2.5.12	Losing Trades: Average Loss, Average Loss %.....	168
4.2.5.13	Losing Trades: Average Bars Held.....	169
4.2.5.14	Losing Trades: Max Consecutive losses.....	169
4.2.5.15	Max Drawdown, Max Drawdown %, Max Drawdown Date	170
4.2.5.16	Profit Factor	171
4.2.5.17	Recovery Factor	171
4.2.5.18	Payoff Ratio	171
4.2.5.19	Sharpe Ratio.....	172
4.2.5.20	Ulcer Index.....	172
4.2.5.21	Luck Coefficient	173
4.2.5.22	Pessimistic Rate of Return	173
4.3	Trading in the ASX200 using neural networks and fundamental data	173
4.3.1	Training data	174
4.3.2	Architecture selected.....	175
4.3.3	Derivation of Trading System parameters	176
4.3.3.1	Signal Strength Threshold.....	176

4.3.3.2	Stop-Loss threshold	177
4.3.4	Out-of-Sample Results.....	178
4.3.5	Summary	183
4.4	Trading in the ASX Allshare using neural networks and technical data	183
4.4.1	Training data	184
4.4.2	Architecture selected.....	187
4.4.3	Derivation of Trading System parameters	187
4.4.3.1	Signal Strength Threshold.....	187
4.4.3.2	Stop-Loss threshold	188
4.4.4	Out-of-Sample Results.....	189
4.4.5	Summary	195
4.5	Trading in the S&P ASX200 using neural networks and technical data	195
4.5.1	Training data	195
4.5.2	Architecture selected.....	198
4.5.3	Derivation of Trading System parameters	198
4.5.3.1	Signal Strength Threshold.....	198
4.5.3.2	Stop-Loss threshold	200
4.5.4	Out-of-Sample Results.....	200
4.5.5	Summary	203
4.5.5.1	Non-Causal inputs.....	203
4.5.5.2	Lack of movement in the market	203
4.5.5.3	Market Efficiency	205
4.5.5.4	Change in Market Dynamics	206
4.5.5.5	Conclusion	206
Chapter 5	Conclusions and implications	208
5.1	Introduction.....	208
5.2	Discussion of Results.....	208
5.3	Conclusions regarding Research Question and Hypotheses.....	212
5.3.1	Conclusions about Hypothesis 1	213
5.3.2	Conclusions about Hypothesis 2.....	213

5.3.3	Conclusions about the research problem	214
5.4	Implications for theory.....	215
5.5	Future Research	216
Appendix A	Function Profiles.....	220
A.1	Function Profile: Moving Average of Price Ratio	222
A.2	Function Profile: ATR(3).....	225
A.3	Function Profile: ATR(15).....	227
A.4	Function Profile: The ratio ATR(3) / ATR(15)	230
A.5	Function Profile: Moving Average of Volume Ratio	234
A.6	Function Profile: ADX(3).....	238
A.7	Function Profile: ADX(15).....	242
A.8	Function Profile: ratio ADX(3) / ADX(15)	246
A.9	Function Profile: STOCHK(3).....	249
A.10	Function Profile: STOCHK(15).....	253
A.11	Function Profile: STOCHK(3) / STOCHK(15)	255
A.12	Function Profile: MOM(3).....	258
A.13	Function Profile: MOM(15).....	261
A.14	Function Profile: MOM(3) / MOM(15)	264
A.15	Function Profile: RSI(3)	267
A.16	Function Profile: RSI(15)	271
A.17	Function Profile: RSI(3) / RSI(15)	275
A.18	Function Profile: MACD(close)	278
A.19	Function Profile: Lowest Price Ratio.....	281
A.20	Function Profile: Highest Price Ratio	285
Chapter 6	Bibliography	289

List of tables

Table 2-1 Classification of Technical Variables used by practitioners	58
Table 3-1 Outline of Thesis Study	80
Table 3-2 Data sourced from the Aspect database.....	87
Table 3-3 Data sourced from the Norgate files.....	88
Table 3-4 Data contents of the target Trading datasets.....	90
Table 3-5 Trading System Metrics	117
Table 3-6 Selection of Technical Variable timeframes	124
Table 3-7 Technical variables chosen for profiling	127
Table 3-8 Description of Technical Variables profiled	135
Table 4-1 FNN(Allshare): Characteristics of available data.....	153
Table 4-2 FNN(Allshare): Characteristics of input data.....	154
Table 4-3 FNN(Allshare): Characteristics of training target	155
Table 4-4 FNN(Allshare): In-sample metric values	155
Table 4-5 TS-FNN(AllShare): Out-of-sample trading metrics.....	160
Table 4-6 TS-FNN(Allshare): Statistical analysis of mean profit/loss.....	161
Table 4-7 TS-FNN(Allshare): Runs test results.....	161
Table 4-8 TS-FNN(Allshare): Trades compared to Buy-and-Hold trades	162
Table 4-9 FNN(ASX200): Characteristics of available data	174
Table 4-10 FNN(ASX200): Characteristics of input data	175
Table 4-11 FNN(ASX200): Characteristics of training target.....	175
Table 4-12 FNN(ASX200): In-sample metric values	176
Table 4-13 TS-FNN(ASX200): Out-of-sample trading metrics	180
Table 4-14 TS-FNN(ASX200): Statistical analysis of mean profit/loss	181
Table 4-15 TS-FNN(ASX200): Runs test results	182
Table 4-16 TS-FNN(ASX200): Trades compared to Buy-and-Hold trades	182
Table 4-17 TNN(Allshare): Identification of outliers for technical variables	185
Table 4-18 TNN(Allshare): Characteristics of input data.....	186
Table 4-19 TNN(Allshare): Characteristics of training target.....	186

Table 4-20 TNN(Allshare): In-sample metric values	187
Table 4-21 TS-TNN(AllShare): Out-of-sample trading metrics	191
Table 4-22 TS-TNN(Allshare): Statistical analysis of mean profit/loss.....	192
Table 4-23 TS-TNN(Allshare): Runs test results	193
Table 4-24 TS-TNN(Allshare): Trades compared to Buy-and-Hold trades	193
Table 4-25 TNN(ASX200): Identification of outliers for technical variables.....	196
Table 4-26 TNN(ASX200): Characteristics of input data	197
Table 4-27 TNN(ASX200): Characteristics of training target	197
Table 4-28 TNN(ASX200): In-sample metric values.....	198
Table 4-29 TS-TNN(ASX200): Out-of-sample trading metrics.....	202
Table 5-1 TS-TNN(ASX200) with Filter Rule applied	211
Table A-1 3 day returns to the Moving Average of Price Ratio	223
Table A-2 6 day returns to the Moving Average of Price Ratio	223
Table A-3 9 day returns to the Moving Average of Price Ratio	223
Table A-4 12 day returns to the Moving Average of Price Ratio	224
Table A-5 15 day returns to the Moving Average of Price Ratio	224
Table A-6 3 day returns to ATR(3).....	226
Table A-7 6 day returns to ATR(3).....	226
Table A-8 9 day returns to ATR(3).....	226
Table A-9 12 day returns to ATR(3).....	227
Table A-10 15 day returns to ATR(3).....	227
Table A-11 3 day returns to ATR(15).....	229
Table A-12 6 day returns to ATR(15).....	229
Table A-13 9 day returns to ATR(15).....	229
Table A-14 12 day returns to ATR(15).....	229
Table A-15 15 day returns to ATR(15).....	230
Table A-16 3 day returns to the ratio $ATR(3) / ATR(15)$	232
Table A-17 6 day returns to the ratio $ATR(3) / ATR(15)$	232
Table A-18 9 day returns to the ratio $ATR(3) / ATR(15)$	233

Table A-19 12 day returns to the ratio $ATR(3) / ATR(15)$	233
Table A-20 15 day returns to the ratio $ATR(3) / ATR(15)$	234
Table A-21 3 day returns to the Moving Average of Volume Ratio	236
Table A-22 6 day returns to the Moving Average of Volume Ratio	236
Table A-23 9 day returns to the Moving Average of Volume Ratio	237
Table A-24 12 day returns to the Moving Average of Volume Ratio	237
Table A-25 15 day returns to the Moving Average of Volume Ratio	238
Table A-26 3 day returns to $ADX(3)$	240
Table A-27 6 day returns to $ADX(3)$	240
Table A-28 9 day returns to $ADX(3)$	241
Table A-29 12 day returns to $ADX(3)$	241
Table A-30 15 day returns to $ADX(3)$	242
Table A-31 3 day returns to $ADX(15)$	244
Table A-32 6 day returns to $ADX(15)$	244
Table A-33 9 day returns to $ADX(15)$	245
Table A-34 12 day returns to $ADX(15)$	245
Table A-35 15 day returns to $ADX(15)$	246
Table A-36 3 day returns to ratio $ADX(3) / ADX(15)$	247
Table A-37 6 day returns to ratio $ADX(3) / ADX(15)$	248
Table A-38 9 day returns to ratio $ADX(3) / ADX(15)$	248
Table A-39 12 day returns to ratio $ADX(3) / ADX(15)$	248
Table A-40 15 day returns to ratio $ADX(3) / ADX(15)$	249
Table A-41 3 day returns to $StochK(3)$	251
Table A-42 6 day returns to $StochK(3)$	251
Table A-43 9 day returns to $StochK(3)$	251
Table A-44 12 day returns to $StochK(3)$	252
Table A-45 15 day returns to $StochK(3)$	252
Table A-46 3 day returns to $StochK(15)$	254
Table A-47 6 day returns to $StochK(15)$	254
Table A-48 9 day returns to $StochK(15)$	254

Table A-49 12 day returns to StochK(15).....	255
Table A-50 15 day returns to StochK(15).....	255
Table A-51 3 day returns to StochK(3) / StochK(15).....	256
Table A-52 6 day returns to StochK(3) / StochK(15).....	257
Table A-53 9 day returns to StochK(3) / StochK(15).....	257
Table A-54 12 day returns to StochK(3) / StochK(15).....	257
Table A-55 15 day returns to StochK(3) / StochK(15).....	258
Table A-56 3 day returns to MOM(3).....	259
Table A-57 6 day returns to MOM(3).....	260
Table A-58 9 day returns to MOM(3).....	260
Table A-59 12 day returns to MOM(3).....	260
Table A-60 15 day returns to MOM(3).....	261
Table A-61 3 day returns to MOM(15).....	263
Table A-62 6 day returns to MOM(15).....	263
Table A-63 9 day returns to MOM(15).....	263
Table A-64 12 day returns to MOM(15).....	264
Table A-65 15 day returns to MOM(15).....	264
Table A-66 3 day returns to ratio MOM(3) / MOM(15)	266
Table A-67 6 day returns to ratio MOM(3) / MOM(15)	266
Table A-68 9 day returns to ratio MOM(3) / MOM(15)	266
Table A-69 12 day returns to ratio MOM(3) / MOM(15)	266
Table A-70 15 day returns to ratio MOM(3) / MOM(15)	267
Table A-71 3 day returns to RSI(3)	269
Table A-72 6 day returns to RSI(3)	269
Table A-73 9 day returns to RSI(3)	269
Table A-74 12 day returns to RSI(3)	270
Table A-75 15 day returns to RSI(3)	270
Table A-76 3 day returns to RSI(15)	272
Table A-77 6 day returns to RSI(15)	273
Table A-78 9 day returns to RSI(15)	273

Table A-79 12 day returns to RSI(15)	274
Table A-80 15 day returns to RSI(15)	274
Table A-81 3 day returns to ratio RSI(3) / RSI(15)	276
Table A-82 6 day returns to ratio RSI(3) / RSI(15)	276
Table A-83 9 day returns to ratio RSI(3) / RSI(15)	276
Table A-84 12 day returns to ratio RSI(3) / RSI(15)	277
Table A-85 15 day returns to ratio RSI(3) / RSI(15)	277
Table A-86 3 day returns to MACD	279
Table A-87 6 day returns to MACD	279
Table A-88 9 day returns to MACD	279
Table A-89 12 day returns to MACD	280
Table A-90 15 day returns to MACD	280
Table A-91 3 day returns to the Lowest Price Ratio	283
Table A-92 6 day returns to the Lowest Price Ratio	283
Table A-93 9 day returns to the Lowest Price Ratio	283
Table A-94 12 day returns to the Lowest Price Ratio	284
Table A-95 15 day returns to the Lowest Price Ratio	284
Table A-96 3 day returns to the Highest Price Ratio	286
Table A-97 6 day returns to the Highest Price Ratio	286
Table A-98 9 day returns to the Highest Price Ratio	287
Table A-99 12 day returns to the Highest Price Ratio	287
Table A-100 15 day returns to the Highest Price Ratio	288

List of figures

Figure 2-1 Data Theory and Focal Theory of this thesis	30
Figure 3-1 Summary of the dataset creation process used for each security	85
Figure 3-2 Start of data alignment for a security reporting at end of year.....	93
Figure 3-3 End of data alignment for a security reporting at end of year.....	93
Figure 3-4 Architecture of Trading System TS-FNN Allshare	147
Figure 3-5 Architecture of Trading System TS-FNN ASX200	147
Figure 3-6 Architecture of Trading System TS-TNN Allshare	148
Figure 3-7 Architecture of Trading System TS-FNN ASX200	149
Figure 4-1 FNN(Allshare): In-sample output signal strength graph.....	156
Figure 4-2 TS-FNN(Allshare): In-sample MAE.....	157
Figure 4-3 TS-FNN(Allshare): Distribution of monthly returns	162
Figure 4-4 FNN(ASX200): In-sample output signal strength graph	177
Figure 4-5 TS-FNN(ASX200): In-sample MAE	178
Figure 4-6 TS-FNN(ASX200): Distribution of monthly Returns.....	183
Figure 4-7 TNN(Allshare): In-sample output signal strength graph	188
Figure 4-8 TS-TNN(Allshare): In-sample MAE	189
Figure 4-9 TS-TNN(Allshare): Distribution of monthly returns	194
Figure 4-10 TNN(ASX200): In-sample output signal strength graph	199
Figure 4-11 TS-TNN(ASX200): In-sample MAE.....	200
Figure 4-12 TS-TNN(ASX200) Equity Curve	204
Figure 4-13 TS-TNN(ASX200) Monthly Returns.....	205
Figure A-1 Function Profile of SMA(close,3) / SMA(close,15)	222
Figure A-2 Function Profile of ATR(3).....	225
Figure A-3 Function Profile of ATR(15).....	228
Figure A-4 Function Profile of the ratio ATR(3) / ATR(15).....	231
Figure A-5 Function Profile of SMA(volume,3) / SMA(volume,15).....	235
Figure A-6 Function Profile of ADX(3)	239

Figure A-7 Function Profile of ADX(15)	243
Figure A-8 Function Profile of ratio ADX(3) / ADX(15)	247
Figure A-9 Function Profile of StochK(3).....	250
Figure A-10 Function Profile of StochK(15).....	253
Figure A-11 Function Profile of StochK(3) / StochK(15)	256
Figure A-12 Function Profile of MOM(3).....	259
Figure A-13 Function Profile of MOM(15).....	262
Figure A-14 Function Profile of ratio MOM(3) / MOM(15).....	265
Figure A-15 Function Profile of RSI(3).....	268
Figure A-16 Function Profile of RSI(15).....	271
Figure A-17 Function Profile of ratio RSI(3) / RSI(15)	275
Figure A-18 Function Profile of MACD	278
Figure A-19 Function Profile of the Lowest Price Ratio	282
Figure A-20 Function Profile of the Highest Price Ratio	285

List of Equations

Equation 3-1 Computing the Z-Score for a Runs test.....	118
Equation 3-2 Determining Filter Selectivity.....	139
Equation 3-3 Calculating In-sample Expectancy.....	140
Equation 4-1 FNN(Allshare): Computing the target variable.....	154
Equation 4-2 FNN(ASX200): Computing the target variable	175
Equation 4-3 TNN(Allshare): Computing the target variable	186
Equation 4-4 TNN(ASX200): Computing the target variable.....	197
 Equation A-1 Formula for Pct of Overall Return	 221