International Journal of Application on Sciences, Technology and Engineering
(IJASTE)
Volume 1, Issue 4, 2023. ISSN:2987-2499

TRIANGLE HEDGING AND AVERAGING TRADING ROBOT FOR METATRADER 4 PLATFORM

Joni Fat[1], Hadian Satria Utama[2],Henry Candra[3], Wati Asriningsih Pranoto[4], Axel Irving Yoshua[5], Tyven Christopher Gilbert[6]

[1]Faculty of Electrical Engineering, University Tarumanagara Jakarta
Email:jonif@ft.untar.ac.id
[2]Facultyof Electrical Engineering, University Tarumanagara Jakarta
Email: hadianu@ft.untar.ac.id
[3]Faculty of Electrical Engineering, University Trisakti Jakarta
Email: henry_candra@yahoo.com
[4]Faculty of Civil Engineering, University Tarumanagara Jakarta
Email: watip@ft.untar.ac.id
[5]Faculty of Electrical Engineering, University Tarumanagara Jakarta
Email: axel.525210004@stu.untar.ac.id
[6]Faculty of Electrical Engineering, University Tarumanagara Jakarta
Email: tyven.525220003@stu.untar.ac.id

Submitted: 26-09-2023, Revised: 26-10-2023, Accepted: 07-12-2023

ABSTRACT

This research designs and tests a trading robot designed for the MetaTrader 4 platform. The basic concept of this trading robot is triangular hedging, which involves trading three related currency pairs simultaneously. This robot is designed to automatically execute trades on three currency pairs that form a triangle, with the aim of exploiting price differences and correlations between these currency pairs. In addition, the robot also incorporates an averaging strategy, which makes it possible to correct losing trading positions by opening additional positions at better prices. This averaging strategy helps reduce potential losses and increase the chances of profits in the long term. This robot is also equipped with risk management, including stop loss and take profit settings, which helps protect traders' capital from large losses and keeps risks under control. Testing of the robot is carried out using the forward test method with a demo account. Testing was carried out between 9 June 2023 to 20 September 2023. The initial capital for the demo account was 100USD. The research results show that robots have the potential to generate stable profits (175.58%) and manage risks well (61.42% - although this risk level is still relatively very high). The designed robot can be a valuable alternative tool for Forex traders looking for a more diversified and effective approach to trading. With the use of these robots, traders can make trading decisions that are more informed and responsive to market changes, increasing the chances of success in Forex investments.

Keywords: *Averaging, Forex, Trading Robot, Triangle Hedging.*

1. REFACE

Introduction

The foreign exchange (forex) market is one of the largest and most liquid financial markets in the world, with trading activity reaching trillions of dollars per day. However, Forex is also known as a very complex and high-risk market. High volatility, rapid changes and global factors affecting exchange rates make trading in these markets a serious challenge. Technology has played an increasingly important role in solving these challenges and improving business outcomes [1]. One innovation is the development of a trading robot that combines a triangle hedging strategy with averaging on the MetaTrader 4 (MT4) platform. This trading robot aims to

improve the efficiency and performance of Forex trading by providing more responsive and versatile solutions to traders operating in a changing environment. Several previous studies have shown the effectiveness of using trading robots to improve trading in the Forex market. For example, the use of trading robots with different trading strategies could increase profits and reduce risks in Forex trading [2]. Another example is the use of trading robots that use market sentiment analysis, which can generate significant profits in forex trading [3].

This trading robot combines two proven trading strategies, namely triangle hedging and averaging [4][5]. Triangle hedging means trading three related currency pairs simultaneously to take advantage of price differences between them. This strategy allows robot to exploit price imbalances and correlations between currency pairs. On the other hand, the averaging strategy allows the robot to open additional positions at a better price to compensate for lost trading positions. This helps reduce potential losses and increases the chances of winning in the long run [6].

Problem Formulation

The purpose of this research is to answer several questions about the development and implementation of trading robots in complex currency markets. Some of the questions addressed in this study include:

1. Can combining triangle hedging and averaging strategies in a trading robot improve forex trading? In this case, it is evaluated whether using these two strategies together will give better trading results.
2. How do these trading robots perform in different market conditions? The robot is tested against real market data in various market conditions, including volatile and stable markets, to assess how well it adapts and makes consistent profits.
3. Can this trading robot manage risk well? Risk management is an important factor in currency trading. Robots must be able to effectively protect the investor's capital and reduce the possibility of large losses.

2. RESEARCH METHOD

The purpose of the research method used in this study is to develop, test and optimize a trading robot for the MetaTrader 4 (MT4) platform. The following steps and methods are used:

1. Development of trading robots, including algorithm development. The trading robot algorithm was developed by combining triangle hedging and averaging strategies. It includes programming and coding algorithms that allow the robot to make trading decisions based on pre-planned strategies.
2. Testing robot performance using real market data. Robot testing is done in real market situations on a demo account. This test tests the robot's ability to adapt to dynamic and unstable market conditions.
3. Risk assessment and capital management:
   a. Risk Analysis: Analysis can be used to understand the potential losses and risk level associated with the trading strategy of the robot [7].
   b. Capital Management: Applying appropriate capital management strategies to protect traders' capital.

4. Integration with the MT4 platform. The trading robot has been integrated into the MetaTrader 4 platform, and tests have been carried out in the MT4 environment to ensure the functionality of this robot on the platform commonly used by Forex traders.
5. Analysis of results:
   a. Robot Performance: Analyze trading robot test results, including performance, risk/reward and performance under various market conditions.
   b. Risk assessment: The risks associated with the trading strategy, including the possibility of large losses, are carefully assessed.

3. RESULT AND DISCUSSION

The results of this study show that the developed trading robot has significant potential to improve trading in the Forex market. The integration with the MetaTrader 4 (MT4) platform works well (Figure 1). This robot shows stability while working in an MT4 environment which is used by many Forex traders. Interacting with this robot through MT4 is relatively simple and intuitive through its user interface (UI), allowing traders to use the robot effectively (Figure 2).

Figure 1. Integration Robot to MetaTrader 4 (MT4) Platform

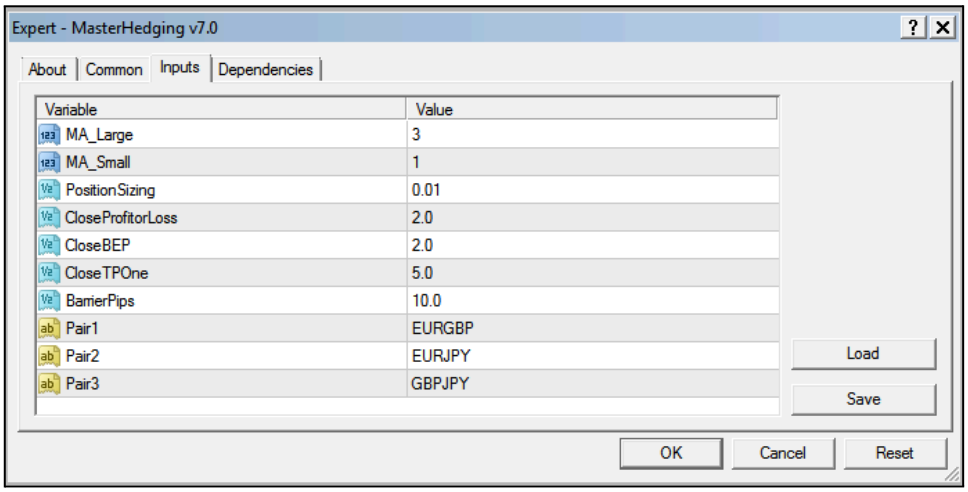

Figure 2. UI

This trading robot was able to generate consistent profits during the testing period. The trial period is June 9, 2023 - September 20, 2023 (Figure 3). During the trial period, the profit of the

demo account was 175.58%. As a result, the basic capital increased from USD 100 to USD 275.58. But the loss value is still floating, namely -$87.05. Robots also have sensitive abilities to adapt to changing market conditions. When the market experiences high volatility, the robot is able to reduce the risk, although the withdrawal value is still relatively high, i.e. 61.42%. From the trade made by the robot, it can be seen that the robot is able to take profits and cut losses (Figure 4). Figure 5 shows the demo account balance, profit/loss, and equity.

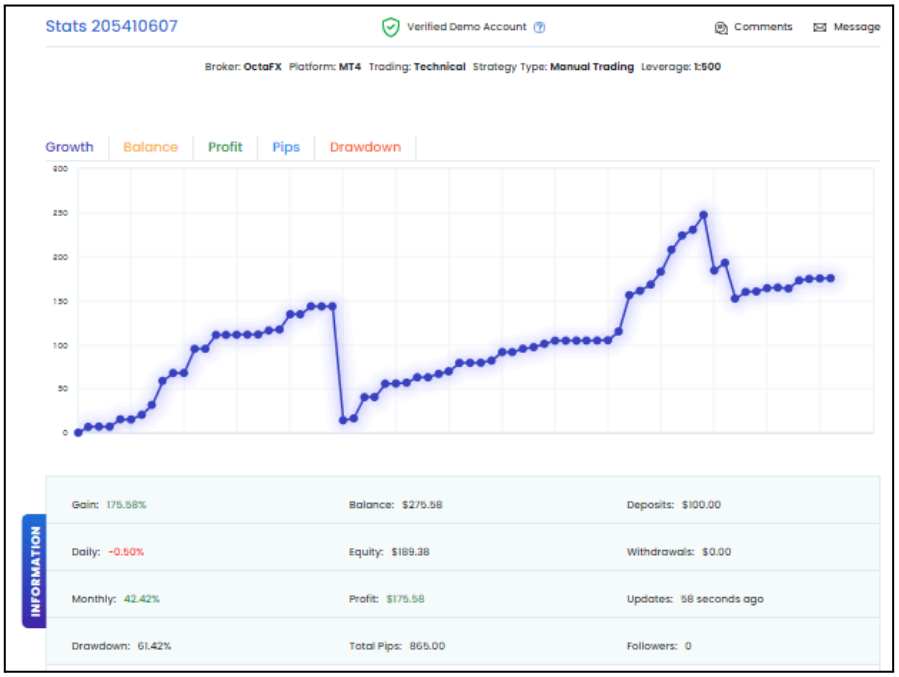

Figure 3. Trial Result for The Period of June 9, 2023 - September 20, 2023

Closed Transactions:

Ticket	Open Time	Type	Size	Item	Price	S / L	T / P	Close Time	Price	Commission	Taxes	Swap	Profit
192287253	2023.06.09 04:33:36	balance	D/Demo										100.00
192309509	2023.06.09 08:58:00	sell	0.03	gbpaud	1.87116	0.00000	0.00000	2023.06.09 13:21:00	1.86966	0.00	0.00	0.00	3.02
192356686	2023.06.09 14:08:00	sell	0.03	gbpaud	1.86852	0.00000	0.00000	2023.06.09 20:05:00	1.86674	0.00	0.00	0.00	3.60
192435736	2023.06.09 20:08:00	sell	0.03	gbpaud	1.86623	0.00000	0.00000	2023.06.12 01:14:32	1.86623	0.00	0.00	0.00	0.00
192500107	2023.06.12 01:26:00	sell	0.03	gbpaud	1.86550	0.00000	0.00000	2023.06.12 05:15:34	1.86550	0.00	0.00	0.00	0.00
192521956	2023.06.12 05:43:00	buy	0.03	euraud	1.59422	0.00000	0.00000	2023.06.13 03:50:01	1.59422	0.00	0.00	0.00	0.00
192525523	2023.06.12 06:23:00	sell	0.03	gbpaud	1.86506	0.00000	0.00000	2023.06.12 07:22:01	1.86493	0.00	0.00	0.00	0.27
192531899	2023.06.12 07:22:01	sell	0.03	eurgbp	0.85423	0.00000	0.00000	2023.06.16 21:42:02	0.85284	0.00	0.00	0.00	5.35
192697012	2023.06.13 00:14:06	sell	0.03	gbpaud	1.85186	0.00000	0.00000	2023.06.13 09:21:38	1.85185	0.00	0.00	0.00	0.02
192740134	2023.06.13 08:15:00	buy	0.03	euraud	1.59562	0.00000	0.00000	2023.06.13 08:15:18	1.59562	0.00	0.00	0.00	0.00
192783584	2023.06.13 12:18:00	buy	0.03	euraud	1.59452	0.00000	0.00000	2023.06.13 12:49:04	1.59452	0.00	0.00	0.00	0.00
192980521	2023.06.14 10:19:02	sell	0.03	gbpaud	1.86114	0.00000	0.00000	2023.06.14 10:54:01	1.86024	0.00	0.00	0.00	1.83
193112592	2023.06.14 19:55:00	buy	0.03	euraud	1.59032	0.00000	0.00000	2023.06.14 21:41:01	1.59350	0.00	0.00	0.00	6.48
193168326	2023.06.15 00:13:00	sell	0.03	gbpaud	1.86080	0.00000	0.00000	2023.06.15 05:06:34	1.86080	0.00	0.00	0.00	0.00
193169315	2023.06.15 00:53:00	buy	0.03	euraud	1.59394	0.00000	0.00000	2023.06.15 01:00:09	1.59382	0.00	0.00	0.00	-0.25

Figure 4. Take Profit and Cut Loss

Open Trades:

Ticket	Open Time	Type	Size	Item	Price	S / L	T / P		Price	Commission	Taxes	Swap	Profit
206361877	2023.09.19 05:04:11	buy	0.03	eurgbp	0.86335	0.00000	0.00000		0.86233	0.00	0.00	0.00	-3.79
206067932	2023.09.15 13:59:00	sell	0.03	eurusd	1.06549	0.00000	0.00000		1.06846	0.00	0.00	0.00	-8.91
205194789	2023.09.08 06:05:00	buy	0.03	gbpaud	1.95725	0.00000	0.00000		1.91959	0.00	0.00	0.00	-72.90
206505078	2023.09.20 03:38:00	sell	0.03	usdchf	0.89749	0.00000	0.00000		0.89804	0.00	0.00	0.00	-1.84
										0.00	0.00	0.00	-87.44
										Floating P/L:			**-87.44**

Working Orders:

Ticket	Open Time	Type	Size	Item	Price	S / L	T / P	Market Price
No transactions								

Summary:

Deposit/Withdrawal:	**100.00**	**Credit Facility:**	**0.00**		
Closed Trade P/L:	**175.58**	**Floating P/L:**	**-87.44**	**Margin:**	**26.30**
Balance:	**275.58**	**Equity:**	**188.14**	**Free Margin:**	**161.84**

Figure 5. Open Trades, Balance and Equity

4. CONCLUSIONS AND RECOMMENDATIONS

The results of these tests show significant achievements in the business of this robot. The conclusions of this study are as follows:

1. Significant demo profit: During the trial period, this trading robot was able to achieve 175.58% return from the demo account. The initial capital of USD 100 was successfully raised to USD 275.58. These results demonstrate the robot's ability to produce significant gains under simulated conditions.
2. Capital Growth: The robot was able to use triangle hedging and averaging strategies to optimize trading results, resulting in significant capital growth during the trial period.
3. Floating Loss: Although there are significant gains, it should be noted that the floating loss is still -87.05 USD. This shows that this robot is not completely without risk and possible losses must be further managed.

Acknowlegdement

The author would like to thank LPPM Tarumanagara University and the Directorate General of Vocational Education, Ministry of Education, Culture, Research and Technology (Kemdikbudristek) of the Republic of Indonesia for providing research grant funding in 2023 with the Applied Research Scheme-Downstream Pathway based on Decree Number 0536/E5/PG.02.00/2023 dated 30 May 2023. Also, thank you to the chair and staff of LPPM and the Electrical Engineering Study Program of Tarumanagara University who have facilitated this research activity.

REFERENCE

[1] Smith, A., & Jouganatos, A. (2018). The Impact of Automated Trading Systems on Markets. Journal of Finance and Economics, 6(4), 151-165.

[2] Arantes, R. L., Gomide, F. S., & Vellasco, M. M. B. R. (2019). *Design and Implementation of a Forex Trading Robot*. In International Conference on Computer Science, Engineering and Education Applications, pp. 679-686.

[3] Kwon, D. H., & Kim, Y. J. (2019). *A Forex Trading Robot Using Sentiment Analysis*. In Proceedings of the International Conference on Electronics, Information and Communication Engineering, pp. 1-5.

[4] Johnson, R., & Smith, A. (2019). *Triangular Arbitrage in the Forex Market*. Journal of Financial Economics, 123(3), 623-645. DOI: 10.1016/j.jfineco.2019.03.002.

[5] Wang, L., & Li, Y. (2021). *Designing Effective Forex Trading Robots Using Triangular Arbitrage Strategies*. Expert Systems with Applications, 176, 114285. DOI: 10.1016/j.eswa.2021.114285.

[6] Stamoulis, G. D., & Sogiakas, V. (2017). Averaging and hedging strategies in forex markets. International Journal of Economics, Commerce and Management, 5(2), 110-119.

[7] Wu, C., & Shieh, J. (2019). Analysis of Currency Hedging Strategy in Forex Market. Journal of Accounting and Finance, 19(6), 27-38.