Imperial College London

MEng Individual Project

Imperial College London

Department of Computing

Optimising Statistical Arbitrage Methods on Cryptocurrencies using Pure Arbitrage as a baseline

Author:
Devam Savjani yo

Supervisor:
Prof. Thomas Lancaster

Second Marker:
Unknown

December 18, 2022

Abstract

Your abstract goes here

Acknowledgements

Thanks mum!

Contents

List of Figures

List of Tables

Chapter 1

Introduction

Hello [**?**]

1.1 Objectives

1.2 Challenges

1.3 Contributions

Chapter 2

Background

1. [15] -
2. [11] -
3. [8] -
4. [1] -
5. [2] -
6. [14] -
7. [9] -
8. [10] -
9. [6] -
10. [4] -
11. [12] -
12. [3] -
13. [18] -
14. [17] -
15. [20] -
16. [] -
17. [16] -
18. [] -
19. [] -
20. [13] -
21. [7] -
22. [19] -
23. [5] -
24. [] -
25. [] -
26. [] -
27. [] -
28. [] -
29. [] -

Chapter 3

Project Plan

Chapter 4

Evaluation Plan

Chapter 5

Ethical Issues

Appendix A

First Appendix

Bibliography

[1] *Advanced Studies of Financial Technologies and Cryptocurrency Markets*. Springer Singapore, Singapore, 1st ed. 2020. edition, 2020.

[2] Stephen Byrne. An exploration of novel trading and arbitrage methods within decentralised finance.

[3] Tommy Crépellière, Matthias Pelster, and Stefan Zeisberger. Arbitrage in the Market for Cryptocurrencies, December 2022.

[4] Heather E. Dempsey. Market Inefficiency: Pairs Trading with the Kalman Filter. December 2017.

[5] Gianna Figá-Talamanca, Sergio Focardi, and Marco Patacca. Common dynamic factors for cryptocurrencies and multiple pair-trading statistical arbitrages. *Decisions in economics and finance*, 44(2):863–882, 2021.

[6] Thomas Fischer, Christopher Krauss, and Alexander Deinert. Statistical arbitrage in cryptocurrency markets. *Journal of Risk and Financial Management*, 12(1):31, Feb 2019.

[7] Ahmet Goncu and Erdinç Akyildirim. Statistical arbitrage with pairs trading. *International Review of Finance*, 16(2):307–319, 2016.

[8] Jianfeng Huang. Triangular arbitrage across forex and cryptocurrency markets during the covid-19 crisis: a mrs-ar approach. *Applied economics letters*, 29(15):1352–1357, 2022.

[9] Christopher Krauss. Statistical arbitrage pairs trading strategies: Review and outlook. *Journal of Economic Surveys*, 31(2):513–545, 2017.

[10] Christopher Krauss, Xuan Anh Do, and Nicolas Huck. Deep neural networks, gradient-boosted trees, random forests: Statistical arbitrage on the s p 500. *European Journal of Operational Research*, 259(2):689–702, 2017.

[11] Igor Makarov and Antoinette Schoar. Trading and arbitrage in cryptocurrency markets. *Journal of financial economics*, 135(2):293–319, 2020.

[12] Jingyua Mo. A Theoretical Model of Cross-market Arbitrage.

[13] Simão. Moraes Sarmento. *A Machine Learning based Pairs Trading Investment Strategy*. SpringerBriefs in Computational Intelligence. Springer International Publishing, Cham, 1st ed. 2021. edition, 2021.

[14] Jarley P. Nóbrega and Adriano L. I. Oliveira. A combination forecasting model using machine learning and kalman filter for statistical arbitrage. In *2014 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, pages 1294–1299, 2014.

[15] Cristian PAUNA. Arbitrage trading systems for cryptocurrencies. design principles and server architecture. *Informatica economica*, 22(2/2018):35–42, 2018.

[16] Andrew Pole. *Statistical arbitrage : algorithmic trading insights and techniques*. John Wiley Sons, Inc., Hoboken, New Jersey, 2015 - 2007.

[17] Nataliya Spiricheva, Vladislav Baklykov, Mihail Tuhbadshin, and Oleg Mukhnovskiy. Implementation of stock market arbitrage. In *2019 International Multi-Conference on Engineering, Computer and Information Sciences (SIBIRCON)*, pages 0055–0058, 2019.

[18] Ye Wang, Yan Chen, Haotian Wu, Liyi Zhou, Shuiguang Deng, and Roger Wattenhofer. Cyclic Arbitrage in Decentralized Exchanges, January 2022. arXiv:2105.02784 [cs, q-fin].

[19] Ziping Zhao, Rui Zhou, and Daniel P Palomar. Optimal mean-reverting portfolio with leverage constraint for statistical arbitrage in finance. *IEEE transactions on signal processing*, 67(7):1681–1695, 2019.

[20] Ziping Zhao, Rui Zhou, Zhongju Wang, and Daniel P. Palomar. Optimal portfolio design for statistical arbitrage in finance. In *2018 IEEE Statistical Signal Processing Workshop (SSP)*, pages 801–805, 2018.