

COUB01
F014621

Predicting Inflation With Machine Learning

by

Ben M. Taylor

A Project Report

Submitted in partial fulfilment
of the requirements for the award of

B.Sc.
in
Computer Science
of
Loughborough University

2nd December 2024

Copyright 2024 Ben M. Taylor

Abstract

In October 2022, the UK hit an inflation rate of 11.1%, the country's highest in over 40 years. Now more than ever, the ability to accurately predict inflation and other financial indicators is a crucial skill required by the government and the individual to prepare themselves for the future financially. In a time where Artificial Intelligence and Machine Learning are ever flourishing, it is only natural to attempt to use these tools at our disposal to predict and combat the issues we face.

In this paper I will attempt to predict inflation through the use of machine learning eventually presenting my findings and evaluations.

Keywords: Inflation, Artificial Intelligence, Machine Learning

Acknowledgements

Acknowledgement chapter

Contents

Abstract	ii
Acknowledgements	iii
1 Introduction	2
1.1 Motivation	2
1.2 Aims and Objectives	2
1.3 Potential Risks and Constraints	2
1.4 Methodology	2
2 Literature Review	3
2.1 Motivation	3
2.2 Available Literature	3
2.2.1 Financial Indicator Prediction Papers	3
2.2.2 Machine Learning Papers	4
2.3 Problem Domain	4
2.4 Problem Solution	4
2.5 Conclusion	4
3 Main chapters	5
4 Conclusion	6
5 References	7

List of Figures

List of Tables

References

- [1] Steven B Achelis. Technical analysis from a to z, 2001.
- [2] Ruey S Tsay. *Analysis of financial time series*. John wiley & sons, 2005.
- [3] G. Udny Yule. Why do we sometimes get nonsense-correlations between time-series?—a study in sampling and the nature of time-series. *Journal of the Royal Statistical Society*, 89(1):1–63, 1926.

Chapter 1

Introduction

Main goals and define all the terms in the thesis title

1.1 Motivation

1.2 Aims and Objectives

1.3 Potential Risks and Constraints

1.4 Methodology

Chapter 2

Literature Review

2.1 Motivation

Embarking on a literature review before developing our project offers numerous benefits. Understanding existing knowledge in Machine Learning, specifically when used to predict financial indicators, helps to contextualise our research, positioning it within the existing field. Reviewing previous literature also provides the benefits of identifying gaps in current research and finding supporting arguments that can guide our work and help us to avoid, as much as possible, redundancy in our and others' works. Having completed the literature review, we should have a strong foundation to start and guide our project.

2.2 Available Literature

This report's topic focuses on the prediction of inflation through the use of machine learning. To accomplish this we can view papers predominantly addressing two types of topics. The first type is papers that focus on the topic of predicting inflation or other economic indicators and time series. The second type of papers we can research are ones that deal with different machine learning techniques.

2.2.1 Financial Indicator Prediction Papers

The application of using past values to predict future values has been widely implemented for years, one of the earliest uses of autoregressive models used for time series being in the 1920s from U.G.Yule[3]. There is a strong monetary incentive to produce research on how best to predict financial indicators as the correct predictions can lead to profit and the avoidance of loss both for corporations and for individuals. This results in a large assortment of papers written experimenting

with a variety of techniques to predict future values, most of which we can learn from to help structure our models.

2.2.2 Machine Learning Papers

Machine Learning is a 'hot topic' that is to say there is an abundance of fresh papers constantly being put out within the field. This bodes well for our project as it means that we should have plenty of guidance on the options available to conduct and develop our predictive models.

2.3 Problem Domain

According to "Analysis of Financial Time Series" by Ruey S. Tsay "Financial time series analysis concerned with the theory and practice fo asset valuation over time." [2] There are many financial time series (FTS for short) prediction methods both theoretical and practical that have attracted attention. Among these is the trading discipline of technical analysis[1]. Technical analysis uses a variety of technical indicators and patterns in market data to evaluate and make predictions on investments and FTS. There are three main categories of technical analysis which are statistical models, Machine Learning (ML) models, and hybrid models. Statistical models Machine learning models Hybrid models

2.4 Problem Solution

2.5 Conclusion

Chapter 3

Main chapters

Chapter 4

Conclusion

Chapter 5

References