MOFC

Learn. Forecast. Compete. Disseminate. Excel.

THE MAKRIDAKIS OPEN FORECASTING CENTER

M6 Competition: February 2022 – February 2023

M Applied Forecasting Course: 18 April, 2022

Organizer: UNIVERSITY *of* NICOSIA

INSEAD The Business School for the World®

FORECASTING & STRATEGY UNIT

THE MAKRIDAKIS OPEN FORECASTING CENTRE

Forecasts are essential for practically all business decisions: from setting up appropriate inventory or service levels and credible budgets to evaluating long-term, strategic investments. The first objective of the expanding field of forecasting is to offer accurate predictions contributing to the success of such decisions. Its second, equally important goal is to provide precise estimates of the uncertainty inherent in all predictions and how to be able to deal with the resulting risks.

The vision of the M Open Forecasting Center (MOFC) is to improve, as much as possible, the accuracy of forecasting as well as the correct estimation of uncertainty and to offer specific suggestions on how such improvements can be made and how to rationally deal with the ensuing risks. Its mission is to expand the utilization of forecasting in business firms by identifying their needs, suggesting the most appropriate way of fulfilling them, demonstrating its benefits in reducing costs and/or improving profits while also avoiding untested practices.also guaranteeing expert knowledge.

M4 COMPETITION & CONFERENCE

The fourth competition, M4, was announced in November 2017. The competition started in Jan 1 2018 and ended in May 31 2018. Initial results were published in the *International Journal of Forecasting* on June 21, 2018. The paper can be downloaded at the www.sciencedirect.com.

The M4 extended and replicated the results of the previous three competitions, using an extended and diverse set of time series to identify the most accurate forecasting method(s) for different types of predictions. It aimed to get answers on how to improve forecasting accuracy and identify the most appropriate methods for each case. To get precise and compelling answers, the M4

Competition utilized 100,000 real-life series, and incorporates all major forecasting methods, including those based on Artificial Intelligence (Machine Learning, ML), as well as traditional statistical ones.

In his blog, Rob J. Hyndman said about M4: "The "M" competitions organized by Spyros Makridakis have had an enormous influence on the field of forecasting. They focused attention on what models produced good fore- casts, rather than on the mathematical properties of those models. For that, Spyros deserves congratulations for changing the landscape of forecasting research through this series of competitions."

The winners	Affiliation
1st Prize Slawek Smyl	Uber Technologies
2nd Prize Pablo Montero-Manso and Team	University of Coruna and Monash
3rd Prize Maciej Pawlikowski	ProLogistica
4th Prize Slawek Smyl	Uber Technologies
5th Prize Pablo Montero-Manso	University of Coruna
6th Prize Slawek Smyl	Uber Technologies

M4 Conference Sponsors:

amazon	Uber	Google
Premium Sponsor	Premium Sponsor	Silver Sponsor

M5 COMPETITION

The M5 Competition is the latest of the M Competitions (March 2 to 30 June 2020). The competition used actual/authentic data generously made available by Walmart and implemented using Kaggle's Platform. The competition was a huge success with over 100,000 entries from forecasters from over 100 counties competing for the $100,000 prizes. At the moment the Accuracy Challenge is currently Kaggle's 6th most popular competition of all time based on the number of teams.

M5 CONFERENCE

Following the M5 Competition, the M5 Conference presented and discussed the findings of the most accurate winning forecasting methods as well as suggested how what has been learned from the competition can be implemented into future forecasting methods.

M5 PUBLICATION

Similar to the M4 Publication that includes 35 papers covering all aspects of the M4 Competition and Conference, there will be a special issue devoted to the M5 Competition & Conference, focusing on how what has been learned can be integrated and applied in practice, will be published in the *International Journal of Forecasting*. Practitioners will be invited to submit their articles, comments and suggestions on how future competitions can be improved.

M5 PRIZES

The $100,000 in prize money for the most accurate forecasting methods was allocated as follows:

Most accurate point forecast	$25,000
Second most accurate point forecast	$10,000
Third most accurate point forecast	$5,000
Most precise estimation of the uncertainty distribution	$25,000
Second most precise estimation of the uncertainty distribution	$10,000
Third most precise estimation of the uncertainty distribution	$5,000
Most accurate student point forecast	$5,000
Most precise student estimation of the uncertainty distribution	$5,000
20 x $500 prizes to personnel of companies participating and winning some part of the most accurate forecast or the most precise estimation of the uncertainty distribution	$10,000

UNIC CEO, Antonis Polemitis, awards the winner of the M4 Competition, Slawek Smyl

MAKRIDAKIS OPEN FORECASTING CENTER (MOFC)
2022 MEMBERSHIP OPPORTUNITIES

	MOFC PARTNER $60,000 (5 MAXIMUM)	MOFC SPONSOR $25,000	MOFC SUPPORTER $10,000
Seat on MOFC Governing Board	5 seats available for MOFC partners		
Corporate advisory services	3 Days (Director level)	3 Days (non-Director level)	
Complimentary Enrolments to Applied Forecasting Course	10	6	2
Complimentary M conference Tickets	10	6	2
Advert in M conference brochure	Full Spread	Full page	Half page
Logo on MOFC/conference website and all conference marketing materials	✓	✓	✓
Sponsors desk at the back of the room at the M Conference (plus 2 complimentary tickets for staff)	✓	✓	✓

* All MOFC membership contributions or donations will be used to support the Centre's operation (research, education, M competition & conference) to improve our understanding and use of forecasting in organizations

M APPLIED FORECASTING COURSE

The M Applied Forecasting Course is a six week online course, (next intake April 18th, 2022) covering all types of forecasting in both time series and regression, offering concrete insight to businesses on how to improve their accuracy realistically estimating the uncertainty in their forecasts and its implications to risk. In addition to the traditional forecasting methods, newer ones will be presented like Machine, Deep and Cross Learning. The most important advantage of the course is its emphasis on hands-on learning by encouraging participants to use actual data to both predict and estimate the uncertainty of their forecasts and its implication to risk. This course will offer students the opportunity to harness 40 years of Professor Makridakis knowledge and experience and master forecasting, in six weeks. In addition, Dr. Evangelos Spiliotis will present the R popular forecasting software and how they can be used in business applications, while Dr. Cirillo will lecture on fat-tails and their implications to forecasting, uncertainty and risk.

Duration	Workload:	Mode of Study:	Tuition:
6 weeks	10h/week	online training with weekly LIVE interactive sessions with the instructors	€ 2,000

Week 0: Introduction to R and to the course
Recorded Tutorial: Getting started with R

Week 1: Introduction to Forecasting
Session 1: Time Series Decomposition
Session 2: Forecasting and Uncertainty

Week 2: Statistical Forecasting
Session 3: The M Competitions
Session 4: Naïve methods, exponential smoothing models, and the Theta method

Week 3: Explanatory and Machine Learning (ML) Methods
Session 5: Linear Regression: Using explanatory variables to predict the future
Session 6: Machine Learning, Deep Learning, Cross Learning, and Hybrid Models

Week 4: Advanced Machine Learning Methods with Applications
Session 7: Advanced Machine Learning Methods (Neural Networks, Regression Trees)
Session 8: Application of Machine Learning methods in energy prices forecasting

Week 5: Tail Risk and uncertainty
Session 9: Extremes and Fat tails
Session 10: Tail risk and modeling

Week 6: Forecasting at work
Session 11: Some successful forecasting applications
Session 12: The limits of forecasting

ANNOUNCING THE **M6** COMPETITION

THE M6 US STOCKS AND INTERNATIONAL ASSETS FINANCIAL FORECASTING COMPETITION

A March 11, 2021, article in the WSJ entitled "Stock Pickers Trailed Market Again in Roller Coaster 2020:

Some 60% of U.S. large-cap stock-picking funds lagged behind S&P 500 in 2020, marking 11th straight year of underperformance" exemplified the well-known finding that active, professional investment managers do not beat, on average, random stock selections. On the other hand, legendary investors like Warren Buffett, Peter Lynch and George Soros as well as celebrated firms as Bridgewater Associates, Renaissance Technologies, DE Shaw and several others have achieved phenomenal results, amassing returns impossible to justify by mere chance. It is the express purpose of the M6 competition to investigate this paradox by shedding as much light as possible to the following seven assertions:

1. The relationship between forecasting accuracy and investment returns.

2. The relationship between the perceived uncertainty around such accuracy and returns.

3. The contribution of judgment versus that of objective information in selecting stocks and assets.

4. How forecasting accuracy and uncertainty are assessed in making investment decisions.

5. The influence of judgmental biases in the way investment decisions are made.

6. The importance of a consistent investment strategy.

7. The role of luck in achieving consistent, above average returns.

The M6 competition is a duathlon consisting of two related challenges, involving two types of investments, both stocks and asset classes. The first category comprises 50 large capitalization US stocks and the second encompasses 50 broadly traded international ETFs (assets) covering international stocks, bonds, commodities, and currency markets. Competition participants would need to complete three tasks. First, rank the attractiveness of all 50 stocks and 50 ETFs on a scale from 1 to 5 and specify their level of certainty about such rank, second,

ANNOUNCING THE M6 COMPETITION

choose the stocks/assets and the percentage they would like to invest in each and third provide information on how their selection was made. Consequently, they will be evaluated for (a) their forecasting performance, (b) their return on investment and (c) their combined achievement in (a) and (b), with prizes awarded to each of the three categories.

The M6 Financial Forecasting Competition will be organized and run in a similar way to the previous five competitions, attracting data scientists, statisticians, financial experts/analysts, economists, and related specialties from around the world, contending to win the substantial prizes being offered. M6 will be live, lasting a whole year, and open with all information about the competition and its results made available to anyone with an interest in the results. Moreover, once the competition is finished its findings, together with background material and commentaries will be published in a special issue of the International Journal of Forecasting (IJF) with the goal of learning as much as possible about financial forecasting and the related factors driving investment returns and how investors can improve the accuracy of their forecasts and mitigate the uncertainty associated with them in order to build robust portfolios and achieving consistent, above average returns.

The M6 competition will be live, lasting for twelve months, starting in February 2022, and ending a year later in 2023. It will consist of a single month trial run and 24 rolling origins for participants to provide their submissions and be evaluated when the actual data becomes available. The 24 rolling origins (4 weeks, repeated for six months) will be in alternate months, leaving the intervening periods to participants to evaluate the submitted results, assess their performance and if necessary, modify their strategy for the remaining period of the competition. The schedule of the competition as well as detailed guidelines for participation is available in an accompanying document that will be uploaded to the M6 website.

ANNOUNCING THE M6 COMPETITION

The M6 competition introduces the following innovations over the previous five ones:

- Being live instead of concealing part of the data to evaluate performance, will allow participants to:
  - Search for and use any available information that could improve forecasting performance and returns on investments.
  - Incorporate, in addition to numerical inputs, judgmental ones about the economy, the industry, and the firms that participants would invest to improve forecasting performance and returns on investments.
- In addition to measuring forecast performance, we capture decisions made based on these forecasts
  - We can therefore measure the extent to which portfolio construction decisions detract investment value, given the value of forecast performance
- Having 24 rolling origins to evaluate performance (instead of a single one) allows participants to learn from experience, improve their methodology and potentially achieve higher returns.
- Running a duathlon and asking for investment choices in stocks and financial assets, substantially enlarges the scope of the competition and what can be investigated and learned,

including among others:
- The relative forecasting performance between stocks universe versus the asset class universe
- Differences in the Investment opportunity set (risk/return tradeoff) between of different classes of financial assets
- The connection between forecasting accuracy and investment returns, split by asset class
- The connection between the correct appreciation of uncertainty and investment returns
- The role of judgment in forecasting performance by type of prediction
- The role of judgment in investment returns by type of investment
- The role of luck in achieving above average returns
- The influence of fat tails in the evaluation of forecasting performance and investment returns

M6 COMPETITION SPONSORSHIP OPPORTUNITIES

| PACKAGE	PRICE	NUMBER OF PACKAGES AVAILABLE
Platinum	$100K	1
Gold	$50K	2
Diamond	$30K	3
Silver	$20K	5
Bronze	$10K	

ABOUT PROFESSOR MAKRIDAKIS

Dr. Spyros Makridakis is a Professor at the University of Nicosia, where is also a director of its Institute For the Future (IFF) and the founder of the Makridakis Open Forecasting Center (MOFC). He is also an Emeritus Professor at INSEAD and the University of Piraeus. He has authored, or co-authored, twenty-four books and more than 270 articles. His book Forecasting Methods for Management, 5th ed. (Wiley) has been translated in twelve languages and sold more than 120,000 copies while his book Forecasting: Methods and Applications, 3rd ed. (Wiley) has been a widely used textbook in the forecasting field with more than 5,300 citations.

Professor Makridakis was the founding editor-in-chief of the Journal of Forecasting and the International Journal of Forecasting and is the organizer of the **M (Makridakis) Competitions**. His article **"Statistical and Machine Learning Forecasting Methods: Concerns and ways forwards"** has been viewed/downloaded more than 123,000 times in PLOS ONE where it was published in March 2018 while his paper **"The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms"** (Futures, March 2017) is the most downloaded one of the journal.
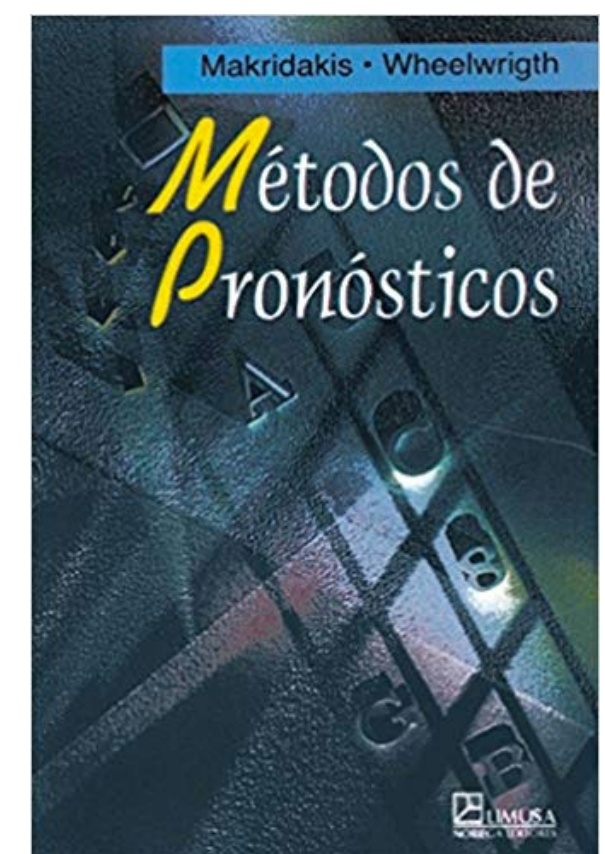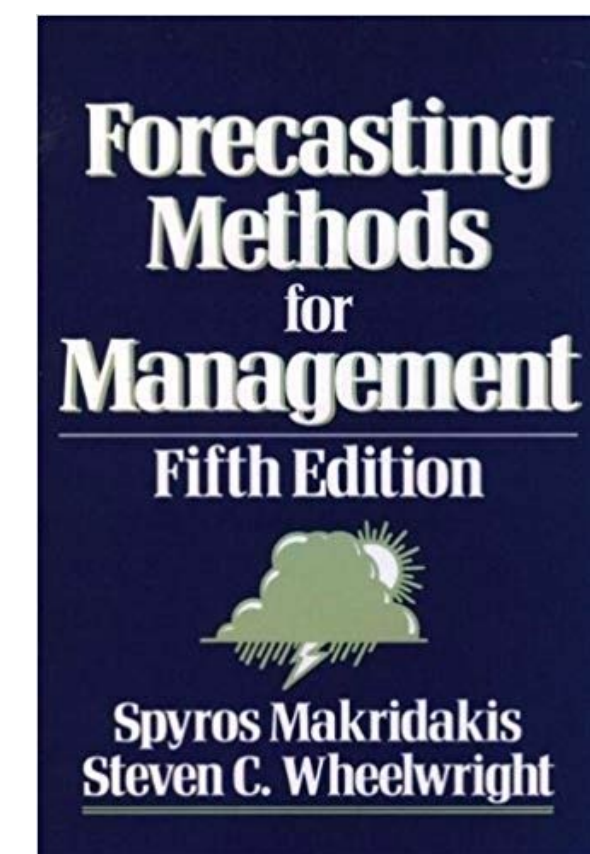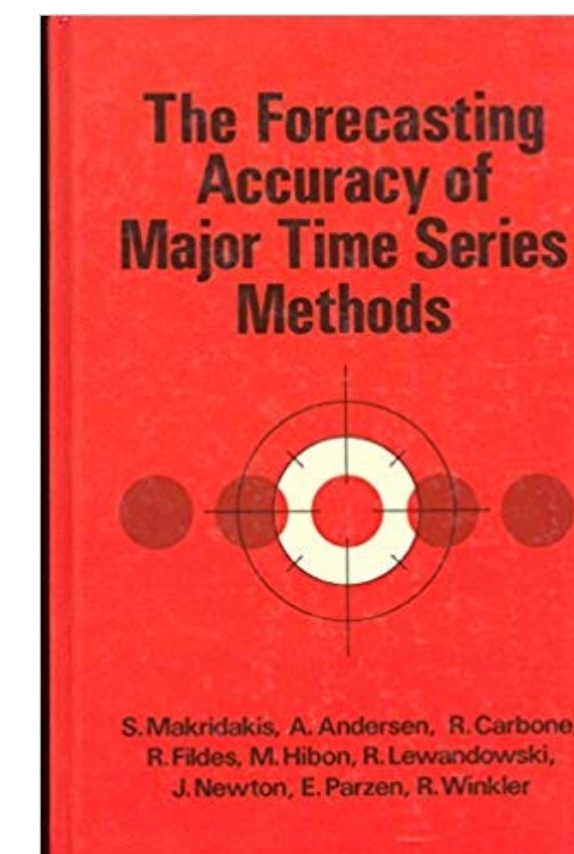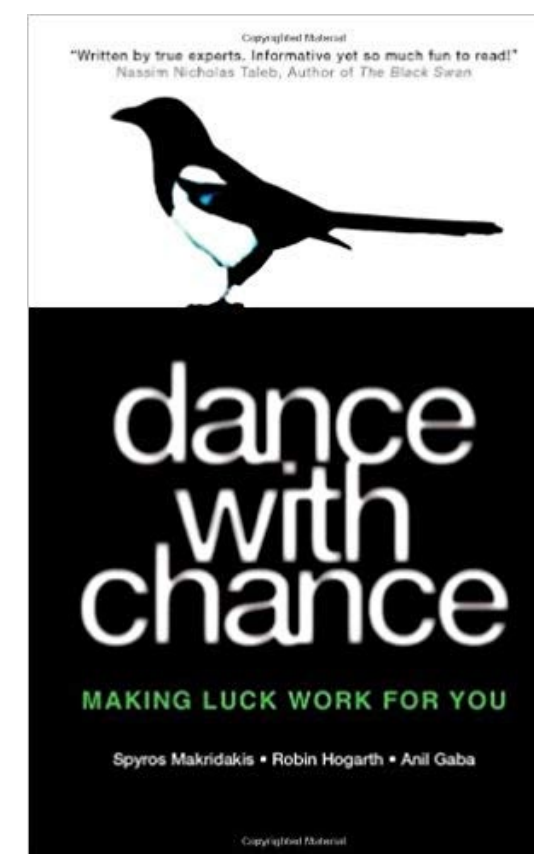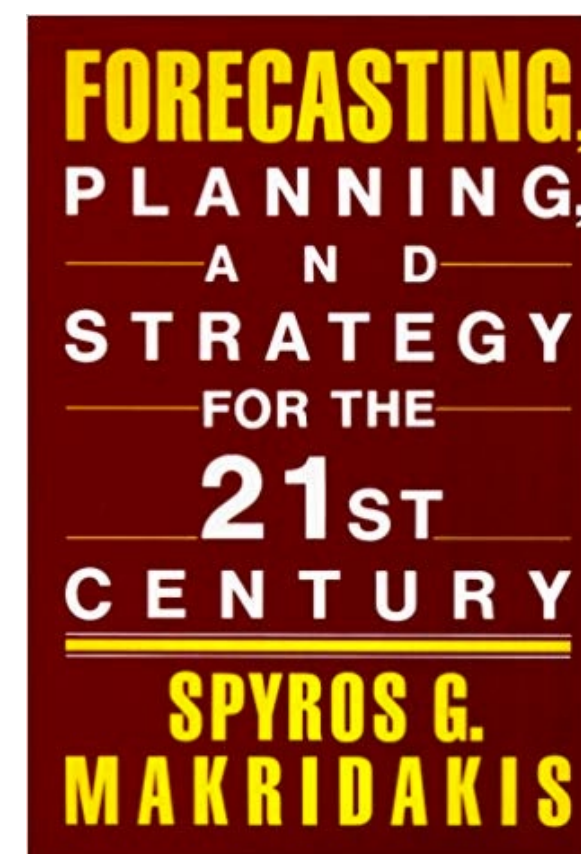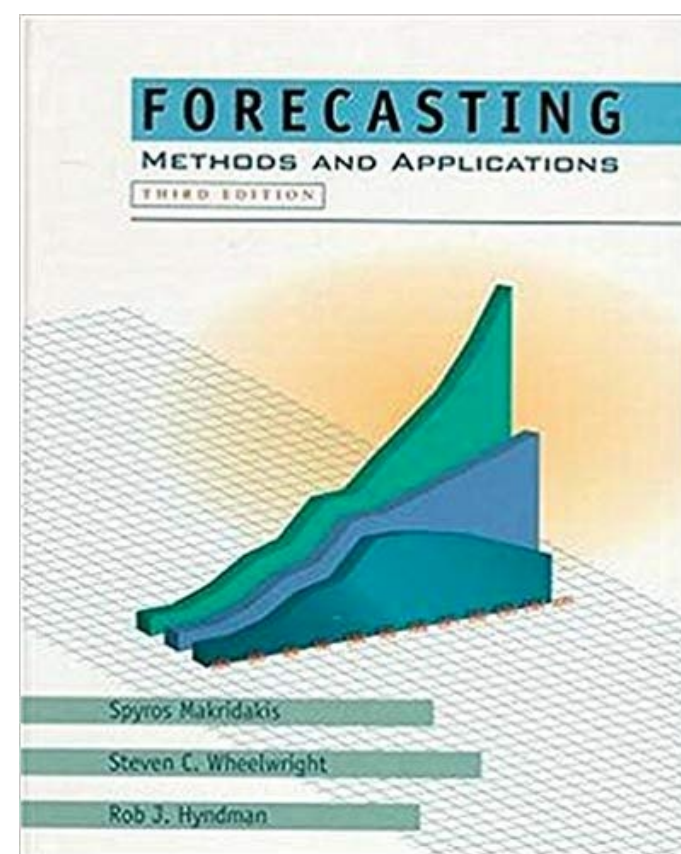
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