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Time-Series Analysis and Forecasting: an Update and Evaluation

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> I find the great thing in this world is not so much where we stand, as in what direction we are moving.
>
> Oliver Wendell Holmes

Introduction

Forecasting has clearly become a field in its own right; its growth and change continue at a rather fast pace, as the number of published books and papers on the topic increases and as more experience about forecasting applications accumulates. As with any new field there is considerable disagreement as to what is important, useful, and applicable; different schools of thought advocate their own approach and attempt to pull the field towards their own way of thinking. It may take many years before things can settle down. At present, there is very little firm evidence to support objective statements about even the most fundamental aspects of forecasting. What remains is opinion and faith, which very often is heavily coloured with personal biases, leanings towards a certain school of thought, and previously expressed opinions. Perhaps the only certainty is that there is no unamimity of opinion on what approach is best, what aspects are most important, and what method is the most appropriate, most accurate, least costly, and least complex for specific forecasting applications. Even though no consensus can ever be expected, some amount of agreement must be reached among the experts before forecasting can achieve its full potential for effective application. This paper expresses the author's view about what aspects are important in forecasting, what difficulties and problems face the field, and what type of debate is needed to make forecasting more useful and relevant for the ultimate user who must predict the future. In this the author would like to thank Professors Claude Faucheux, David Weinstein and Steve Wheelwright for their extremely useful comments.

These topics have been in the mind of the author for some time but the motivation to write about these views came from a paper published in this *Review* by Anderson (1977), entitled 'A Commentary on "A Survey of Time Series", by Spyros Makridakis'. The present paper responds to this commentary and expresses the author's views about current trends in time series analysis and forecasting. The paper will be divided into three parts: the first brings the author's original article (Makridakis, 1976) up to date through December 1977 (the time of writing) and lists omissions and errors in the original paper. The second part replies to Anderson's commentary, and the third examines time-series analysis and forecasting and the challenges, problems, and difficulties they face.

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1a A survey of time series: 1974–1978

'A Survey of Time Series' was written between March and May 1974. It appeared as an INSEAD Research Paper (No. 131) in September 1974 at which time it was also submitted to the *International Statistical Review* where it was published in April 1976 – a normal lead time between submitting a manuscript and its publication. Since 1974, there have been many