ROBUST TRADING RULE SELECTION AND FORECASTING ACCURACY

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Abstract Trading rules performing well on a given data set seldom lead to promising out-of-sample results, a problem which is a consequence of the in-sample data snooping bias. Efforts to justify the selection of trading rules by assessing the out-of-sample performance will not really remedy this predicament either, because they are prone to be trapped in what is known as the out-of-sample data-snooping bias. Our approach to curb the data-snooping bias consists of constructing a framework for trading rule selection using a-priori robustness strategies, where robustness is gauged on the basis of time-series bootstrap and multi-objective criteria. This approach focuses thus on building robustness into the process of trading rule selection at an early stage, rather than on an ex-post assessment of trading rule fitness. Intra-day FX market data constitute the empirical basis of the proposed investigations. Trading rules are selected from a wide universe created by evolutionary computation tools. The authors show evidence of the benefit of this approach in terms of indirect forecasting accuracy when investing in FX markets.

Keywords A-priori robustness, data-snooping bias, efficient market hypothesis, evolutionary computation, intra-day FX markets, time-series bootstrap, trading rule selection.

1 Introduction

Technical trading rule performance in financial markets have been a widely discussed and investigated research field in literature. One of the main motivations for researchers to engage
in this field has been to determine whether technical trading rules can be employed to provide superior financial performance. This motivation is of course directly related to the “efficient market hypothesis” (EMH). Evidence that these trading rules provide significant profit opportunity when trading certain assets means that we succeed to reject the null hypothesis of efficiency of this particular market.

In one of the earlier studies — and perhaps the most extensive using 90 years of daily stock prices — Brock, Lakonishok, and LeBaron[1] found that a considerable number of technical trading rules applied to the Dow Jones Industrial Average (DJIA) provide significant financial performance. If these results were uncontested, this would have implied — against many researchers’ belief — that the EMH even in its weak form did not hold.

However, an important drawback and rarely directly addressed issue at that stage of the research was the problem of data-snooping. To quote White[2]:

“Data-snooping occurs when a given set of data is used more than once for purposes of inference or model selection. When such data reuse occurs, there is always the possibility that any satisfactory results obtained may simply be due to chance rather than to any merit inherent in the method yielding the results.”

For example, validation of in-sample results by means of out-of-sample test were also contested due to what is termed the “out-of-sample data-snooping”. In fact the problem of data-snooping was a ubiquitous problem called by many researchers to be remedied and controlled for (Merton[3]). As acknowledged by Brock, Lakonishok, and LeBaron[1], they were not able to account fully for the data-snooping issue.

The second line of research involved the extension of the earlier research on technical trading rules by applying new procedures and methods to take account of the effect of data-snooping more accurately, thereby also catering to the demands raised in literature.

Sullivan, Timmerman, and White[4] used “White’s Reality Check” bootstrap methodology to correct for the effects of data-snooping. In their view, this method would make it possible to evaluate whether the performance of technical trading rules is a result of superior economic content, or simply due to luck. They conclude that the superior performance of the best technical trading rule identified by Brock, Lakonishok, and LeBaron[1] is not repeated in the out-of-sample experiment covering the 10-year period 1987–1996. They go on to provide possible explanations of their findings. Qi and Wu[5], for instance, found evidence of profitability and significance even after applying White’s Reality Check bootstrap methodology.

However, besides the inferences on the influence and effects of the data-snooping bias, Sullivan, Timmermann, and White’s research represented a methodological novelty which is of particular value for investors who are searching for successful investment strategies. Consequently, robustness has emerged as an important criterion to gauge the validity of the results and to mitigate the data-snooping biases for both, researchers as well as investors.

In this paper, we construct a framework for technical trading rule selection using a-priori robustness strategies, where robustness is gauged on the basis of time-series bootstrap and multi-objective criteria. This approach focuses thus on building robustness into the process of