Sequential Multi-Period Group Decision Making
Using a New Framework With AHP: A Case in Stocks Selection Problem

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Abstract: With the growing importance of equities to investors, the selection of attractive stocks is of utmost importance to ensure the best return of investment (ROI). The stocks selection problem is generally a group decision making problem made through a series of multi-period decisions or decisions over time. Furthermore, these decisions incorporate a mix of quantitative and qualitative criteria as well as resource constraints.

Given the importance of selecting the best stock alternatives, there is a need to develop a framework that will handle the aforementioned intricacies of stocks selection problems. To the best of our knowledge, existing decision making methodologies addresses only certain parts of the problem but not all. Therefore, this study proposes a new framework for solving the stocks selection problem through multi-period sequential decisions using the Analytic Hierarchy Process (AHP) and multiple decision makers. Furthermore, to address resource constraints a Multiple Integer Linear Programming (MILP) model is also proposed to maximize the group preferences and consequently yield the maximum expected ROI.

The results show that the proposed framework provided a better ROI over a series of decisions over time, incorporating the varied decisions of multiple decision makers and resource constraints. The proposed framework could be utilized to aid investors in selecting the best stocks for optimal ROI.

Keywords: *AHP, Sequential Multi-Period Group Decision Making, Forecasting, MILP*