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ROBUSTIFICATION OF SHEWHART CONTROL CHART BY MEDIAN BASED ESTIMATORS: A STUDY ON MALAYSIA STOCK DATA

(Peneguhan Carta Kawalan Shewhart Menggunakan Penganggar Berasaskan Median: Sebuah Kajian Berpandukan Pasaran Saham Malaysia)

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ABSTRACT

Statistical control chart is vastly used in financial field, especially in assessing changes in stock returns. Control charts are becoming an important consitituent of the decision-making process in stock trading. However, in the presence of non-normality, the classical control charts may produce too many false trade signals and therefore, may no longer be reliable in stock trading. This study aims to construct robust control chart using median based estimators and subsequently, used it on real financial data. Median and trimean estimators were applied in the construction of the limits for the Shewhart chart as well as in computing the charting statistics. The practical application of the proposed robust charts were demonstrated using a real data set about Top Glove stock's open price. In analyzing the capabilities of the robust Shehwhart charts for stock trading against the classical Shewhart chart, the findings show that the classical chart yields too many trade signals which most are considered as false alarms unlike the robust charts. This paper shows that the robustification of the Shewhart structure via the median based estimators help to alleviate the impact of non-normality on the chart's performance.

Keywords: investments; robust estimators; Shewhart control chart; statistical process control

ABSTRAK

Carta kawalan berstatistik selalu digunakan dalam bidang kewangan terutama dalam menilai perubahan pulangan saham. Instrument kualiti ini menjadi komponen penting dalam proses membuat keputusan perdagangan saham Oleh itu, instrument kualiti ini popular digunakan bagi membantu membuat keputusan perdagangan saham. Walau bagaimanapun, sekiranya data tidak normal, carta kawalan berstatistik yang klasik mungkin menghasilkan terlalu banyak isyarat perdagangan palsu dan oleh itu, tidak lagi boleh dipercayai dalam perdagangan saham. Kajian ini bertujuan untuk membina carta kawalan teguh menggunakan penganggar berasaskan median dan seterusnya, mengaplikasikan pada data kewangan sebenar. Dalam kajian ini, penganggar median dan trimean digunakan untuk membangun had kawalan carta Shewhart dan juga bagi mengira plot statistik. Aplikasi carta kawalan teguh yang dicadangkan dalam kajian ditunjuk menggunakan data sebenar mengenai harga terbuka saham Top Glove. Dalam menganalisis kemampuan carta teguh Shehwhart untuk perdagangan saham berbanding carta klasik Shewhart, penemuan menunjukkan bahawa carta klasik menghasilkan terlalu banyak isyarat perdagangan yang kebanyakannya dianggap sebagai palsu. Kajian ini ini menunjukkan bahawa peneguhan carta kawalan Shewhart melalui penganggar berdasarkan median membantu mengurang kesan ketidaknormalan terhadap prestasi carta.

Kata kunci: pelaburan; penganggar teguh; carta kawalan Shewhart; kawalan proses berstatistik

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