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Crash forecasting in the Korean stock market based on the log-periodic structure and pattern recognition

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Abstract

The aim of this research is to propose an alarm index to forecast the crash of the Korean financial market in extension to the idea of Johansen-Ledoit-Sornette model, which uses the log-periodic functions and pattern recognition algorithm. We discovor that the crashes of the Korean financial market can be classified into domestic and global crises where each category requires different window length of fitted datasets. Therefore, we add the window length as a new parameter to enhance the performance of alarm index. Distinguishing the domestic and global crises seperately, our alarm index demonstrates more robust forecasting than previous model by showing the error diagram and the results of trading performance.

Keywords: Log-periodicity, Price forecasting, diffusion model, Pattern recognition, Non-linear time series, Financial market

1. INTRODUCTION

A financial bubble is an artificial growth of an asset price incurred by irrationally aggressive expectations among market participants, which can be seen as the state of over-valued financial market [1, 2, 3]. Moreover, it usually bursts at the zenith of the economic cycle. The outbreak of such event appears with the large drop of asset price, which is also known as the market crash [4, 5]. If a bubble is created from a non-popular asset, the severity of market crash is insignificant since only limited number of market participants will be harmed. In contrast, if

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