This manuscript studies an alternative time series technique named “empirical mode decomposition” on S&P 500 stock index.

Sample: Manuscript studies Monthly SP500 Index (1791:08-2015:05) data.

Main Outcome:
Manuscript concludes Low frequency and trend components of stock prices are relatively important drivers of the S&P 500 index. Therefore, US stock prices have been driven mostly by fundamental laws rooted in economic growth and long-term returns on investment.

Model: Empirical Mode Decomposition (as an alternative for wavelet models)

Notes:

Despite using a relatively recent technique, authors use a very standard data set with an uncertain objective. I can not see why this technique is a better alternative to other decomposition techniques. There is a large literature on return predictability and long and short run determinants of stock market indices. Authors shoul state where does their contribution lie. For instance, many studies on financial time series and time series econometrics study predictability of stock markets. Even in textbooks like Campbell et al (1997) discusses the return predictability and the distinction between high and low frequency stock market data. One very clear deficiency of the present study is that there is no benchmark model, method. A reader should be convinced on the relative efficiency obtained by using the proposed method. There is a large literature on Wavelets. How does this method perform compared to wavelets. How does it relate to the recent MIDAS literature where low and high frequency data sampling is mixed. Another problem is the conclusion withdrawn from this study. It is not very clear to link the results obtained from this study and the conclusion obtained in the conclusion.

To conclude, the paper should clearly narrow down the research objective. A better literature review with a better field classification is a must. Authors should make a clear presentation of the need to use the existing technique. In addition, they should compare and contrast with an existing method.

Some technical comments:

1. "*Nevertheless, EMDs have not to date been used to study the behaviour of stock prices*."

   Apparently, there are some recent studies on stock indices (not prices) using EMD as the first stage for forecasting (hybrid models). Could they eventually be related to this study, at least on the EMD stage? Some examples are (but not limited to) below:

   - APPLICATION OF EMPIRICAL MODE DECOMPOSITION COMBINED WITH k-NEAREST NEIGHBORS APPROACH IN FINANCIAL TIME SERIES FORECASTING AIJING LIN, PENGJIAN SHANG, GUOCHEN FENG, and BO ZHONG Fluctuation and Noise Letters 2012 11:02
   - A Abobaker.M. Jaber, Mohd Tahir Ismail, Alsaidi M. Altaher, Application of Empirical Mode Decomposition Combined with Local Linear Quantile Regression in Financial Time Series Forecasting, The Scientific World Journal,2014
   - Honghai Yu and Haifei Liu, "Improved Stock Market Prediction by Combining Support Vector Machine and Empirical Mode Decomposition," Computational Intelligence and Design (ISCID), 2012 Fifth International Symposium on, Hangzhou, 2012, pp. 531-534.
   - J. Sun and H. Sheng, "Applications of Ensemble Empirical mode decomposition to stock-futures basis analysis," Information and Financial Engineering (ICIFE), 2010 2nd IEEE International Conference on, Chongqing, 2010, pp. 396-399.
   - Ching-Hsue Cheng, Liang-Ying Wei, A novel time-series model based on empirical mode decomposition for forecasting TAIEX, Economic Modelling, Volume 36, January 2014, Pages 136-141, ISSN 0264-9993,

Results and Discussion

1. *"Our analysis is based on a historical data set of US stock prices. The monthly data on the S&P 500, covering the period 1791:08 to 2015:05 was obtained from the Global Financial Database (GFD)."*

   Clear information on data source and data structure is needed:
   This study is published with open access on the following link:
   http://www.economics-ejournal.org/economics/discussionpapers/2016-9

   On the web site, it is stated that the sample data is obtained from Dataverse (Harvard Uni). However, in the paper it appears to be obtained from the Global Financial Database (maybe

they are linked but there is no related info). Besides, GFD claims on its official website that they provide data on SP500 back to 1835 (although the sample data starts from 1791). Moreover, they combine other indices in order to build and provide historical indices stretching back to 1800s. Is the underlying sample index partly generic or synthetically built? Is it adjusted for inflation?

2. *"The subsamples were identified by applying the Bai and Perron (2003) test of structural breaks in both mean and trend to the natural logarithms of the S&P 500 stock index".*
   Is there any output available from Bai-Perron Test including F-Statistics and break dates (eventually also global break points)?

3. *"Since the continuing increasing trend of the US stock market is consistent with the development of the US economy over the decades, it can be said that the long-term price behaviour of US stocks has been determined by the long-term growth of the US"*

   Is this the first finding explaining the relationship or the causality between economic growth and long term price behavior?
   - *If not, then citation is needed.*
   - *If yes, then this hypothesis should be investigated and tested under different multivariate time series approaches (ie. Vector AutoRegressive Regression or similar techniques). Moreover, the selection of the growth indicator for the RHS of the time series equation is also an important issue (eg. GDP is generally lagged by 3 months).*

Conclusion:

1. *"Therefore, it is concluded that, in general, US stock prices are not driven by the short-term irrational behaviour of investors, but seem to be driven mostly by fundamentals; though, it is true that there have been episodes of bubbles, as indicated by Phillips et al. (2015)"*

Does this conclusion support any existing related work? Once again, the hypothesis should either be supported by citations or additional analysis in order to reach this general outcome.