

Growth Story of NIKKEI 225 Extended with Forecasting: An Econometric Analysis

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ABSTRACT

In the current study, growth of Nikkei225 for more than 60 years has been estimated by adopting OLS regression method and by thus short run forecasting of Nikkei225 has been made using AR(p) technique to estimate the movement of Nikkei225 in near future. As per the outcome of the present study, it has been observed Nikkei225 has gone through a huge growth during the period of study and it is also expected that this positivity will remain unaltered in near future.

Keywords

Growth Analysis, Forecasting, OLS regression and AR(p)

INTRODUCTION

Stock price index can be termed as capital market barometer as it represents the overall condition of the capital market which is one of significant components of Economy of any country. The Nikkei225 is a stock price index of Tokyo Stock Exchange (TSE) of Japan. It is a price-weighted index. In the present paper, the growth of Nikkei225 has been computed for the period 1949 to 2017 in order to investigate the extent of its growth during the period of study. Future value of Nikkei225 has also been estimated for the period 2018-2020 in order to point out the path in which Nikkei225 will about to move in near future.

OBJECTIVE

The present study has been executed after keeping the following objectives in mind:

- i. To estimate the growth of Nikkei225 for the period of study;
- ii. To forecast the growth of Nikkei225 in near future.

In order to conduct the current study, various literatures written by eminent researchers, authors and writers have been reviewed. Few of them have been given as follows:

Huang, Nakamori and Wang executed a research study on forecasting the stock market movement in the year 2005. They have investigated thoroughly and found complexity in making any prediction about Nikkei225.

Ou and Wang, in the year 2009, have pursued a research work to predict the movement of stock market indices. As a outcome, they have estimated satisfactory future movement of Nikkei225 along with the other stock price indices.

DATABASE AND METHODOLOGY

In the present study, yearly closing data of Nikkei225 has been collected from the official website of Nikkei225¹ for the period 1949 to 2017. For estimating the growth of Nikkei225 for the aforesaid period, Ordinary Least Square (OLS) method has been incorporated where, the historical yearly data of Nikkei225 for the period, mentioned above, have been taken as dependent variable and time values have been considered as independent variables. OLS method has been developed as follows:

$$Nikkei225 = \alpha + \beta t$$

Here, 'Nikkei225' is dependent variable, ' α ' equals to constant and ' β ' represents coefficient of independent variable 'Time' (t).

Based on the outcome of OLS method, future value of Nikkei225 has been estimated for the near future holding the period 2018-2020 incorporating AR(p) model (autoregression). Autoregression model with lag 'p' [AR(p)] has been constructed as follows:

¹ <https://indexes.nikkei.co.jp/>

$$Nikkei225_t = \phi + Nikkei225_{t-1} + Nikkei225_{t-2} + \dots + Nikkei225_{t-p} + \varepsilon_t$$

In this model, ' ϕ ' equals to constant, ' $Nikkei225$ ' represents dependent variable and lag values of $Nikkei225$ reflects independent variables where $p = 68$. ' ε_t ' represents the error term in the model. Based on this model, future values of Nikkei225 for the period 2018-2020 i.e. $Nikkei225_{t+1}$ (for 2018), $Nikkei225_{t+2}$ (for 2019)

and $Nikkei225_{t+3}$ (for 2020) have been estimated. 'Gretl' software has been used for performing both the analysis.

FINDINGS OF THE STUDY

The outcome of Ordinary Least Square (OLS) regression has been given as follows:

OLS regression, using observations 1949-2017 (T = 69)

Dependent variable: Nikkei225

	Coefficient	Std. Error	t-ratio	p-value	
const	-1093.39	1451.92	-0.7531	0.4540	
Time	306.970	36.0547	8.514	<0.0001	***

Mean dependent var	9650.561	S.D. dependent var	8543.065
Sum squared resid	2.38e+09	S.E. of regression	5964.846
R-squared	0.519673	Adjusted R-squared	0.512504
F(1, 67)	72.48834	P-value(F)	2.85e-12
Log-likelihood	-696.7530	Akaike criterion	1397.506
Schwarz criterion	1401.974	Hannan-Quinn	1399.279
rho	0.855342	Durbin-Watson	0.291117

From the result shown as above, the coefficient of 'Time' (β) has been observed as 306.970. It reflects that Nikkei225 has gained an enormous growth (near about '307 times' or '30697%' growth) during the period 1949-2017. Value of Adjusted R^2 (0.512504) reflects an average

fit of data in the OLS regression model. Durbin-Watson statistic has reflected a sign of problem of autocorrelation in the OLS model.

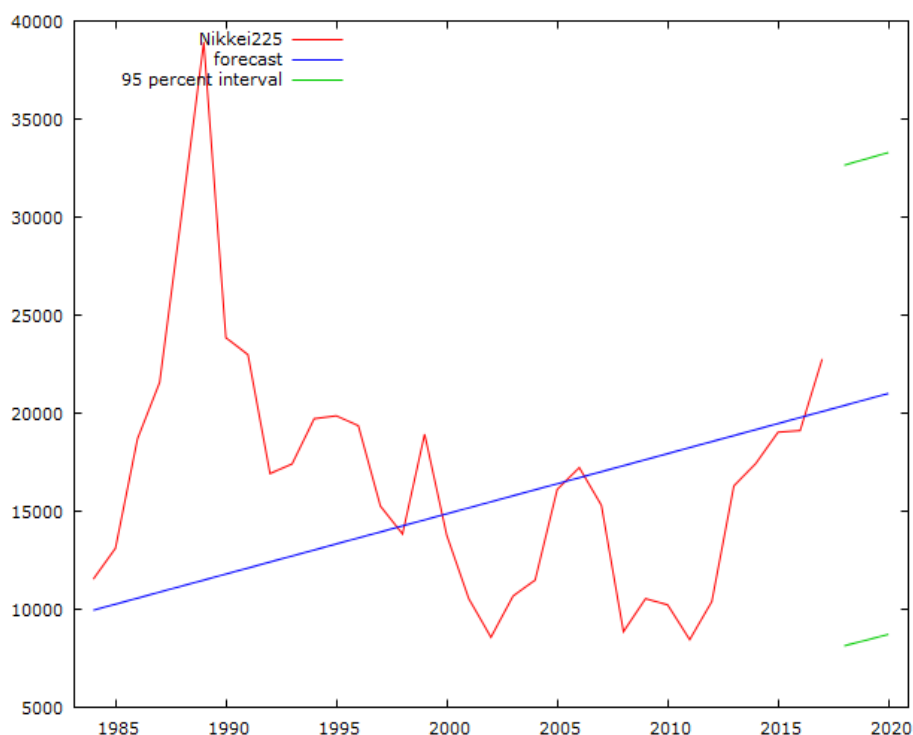
The outcome of forecasting by adopting AR(p) model has been shown as below:

Years	Nikkei225	Prediction	Std. Error	95% Interval
2018	Nikkei225	20394.5	6139.01	(8140.99, 32648.0)
2019	Nikkei225	20701.5	6146.52	(8432.97, 32970.0)
2020	Nikkei225	21008.5	6154.24	(8724.54, 33292.4)

[For 95% confidence intervals, $t(67, 0.025) = 1.996$]

From the above result, it has been observed that the expected future value of Nikkei225 are estimated to be 20394.5, 20701.5 and 21008.5 subject to 95% confidence interval of (8140.99, 32648.0), (8432.97, 32970.0) and

(8724.54, 33292.4) in the years 2018, 2019 and 2020 respectively. Thus, the result of short run forecasting reflects that Nikkie225 will be expected to grow in the near future holding the period 2018-2020.



CONCLUSION

After the empirical analysis, it is witnessed that Nikkei225 has gained a huge growth at a tremendous velocity during the period 1949-2017 and is also expected to grow even further in the recent future containing the period 2018-2020. As Nikkei225 is one the flagship indices of Japanese Stock market, so, the stock market of Japan will also be expected to be flourished steadily by the time.

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