FORECASTING "NO GO ONLINE" PRODUCT QUANTITIES FOR HOME PRODUCT CENTER PUBLIC COMPANY LIMITED

Author : Charuan Limcharoen
Advisors : Dr. Parichart Pattarapanitchai and Asst. Prof. Dr. Kamonrat Suphawan
Department of Statistics, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand
Email : charuan_l@cmu.ac.th

ABSTRACT

This research aims to forecast the monthly product quantities of "No Go Online" sales to support "Go Online" sales of Home Product Center Public Company Limited. The data used for analysis covers the period from January 2013 to August 2024. The Exponential Smoothing method and the Box-Jenkins method are used in modeling and forecasting. The results indicated that the model from the Holt-Winters Exponential Smoothing method provided the lowest RMSE and MAPE values.

INTRODUCTION

Home Product Center Public Company Limited is a leading retail business in construction and home improvement in Thailand and Southeast Asia. The company focuses on product and service development, expanding branches, and enhancing e-commerce systems to comprehensively meet consumer needs. In a highly competitive market, introducing new products and expanding sales channels are crucial strategies to maintain leadership. "No Go Online" refers to a product that is sold exclusively in-store only. As consumers increasingly turn to online shopping, the company needs data on "No Go Online" (in-store) sales for analysis.

This research aims to forecast monthly "No Go Online" sales only using historical data to improve resource management and precisely meet consumer demands.

OBJECTIVES

1. To study and compare forecasting models for "No Go Online" product quantities of Home Products Center Public Company Limited.
2. To forecast "No Go Online" product quantities of Home Products Center Public Company Limited.

METHODOLOGY

Divide the data into two sets, with the first set used for training, using data from January 2013 to December 2022, and the second set used for testing, using data from January 2023 to August 2024.

TRAINING SET

1. Check whether the data is normally distributed. If not, transform the data and check again.
2. Check the stationarity of the data. If the data is not stationary, transform it or take the difference.
3. Test for trends and seasonal.
4. Analyze the time series using exponential smoothing and the Box-Jenkins method.
5. Consider the lowest RMSE and MAPE values.
6. Obtain the most suitable model.
7. Testing the suitability of the model.

TESTING SET

1. Analyze the time series using exponential smoothing and the Box-Jenkins method.
2. Consider the lowest RMSE and MAPE values.
3. Obtain the most suitable model.
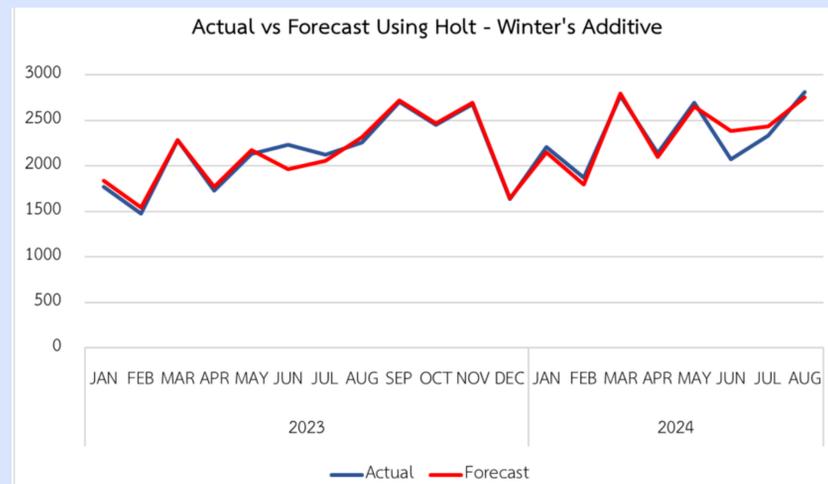4. Forecast the data.

BOX-JENKINS METHOD

$$\phi_p(B)\,\Phi_p(B^s)(1-B)^d(1-B^s)^D Y_t = \delta + \theta_q(B)\Theta_Q(B^s)\varepsilon_t$$

EXPONENTIAL SMOOTHING METHOD

Holt-Winter's Additive
$$y_{t+m} = L_t + hT_t + S_{t-1+m}$$

Holt-Winter's Multiplicative
$$y_{t+m} = (L_t + mT_t) \times S_{t-l+m}$$

RESULT & CONCLUSION

Actual vs Forecast Using Holt - Winter's Additive

Model	Training		Testing	
	RMSE	**MAPE**	**RMSE**	**MAPE**
Holt-Winter's Additive	0.0023	14.727	0.0003	1.638
Holt-Winter's Multiplicative	0.0020	15.171	0.0004	1.730
ARIMA(1,1,1)(1,0,1)[12]	0.0022	15.676	0.0006	4.704

The results indicated that the Holt-Winters model is the best for forecasting "No Go Online" product quantities, with an RMSE of 0.003 and a MAPE of 1.638.

REFERENCES

[1] Somkiat Ketueiam. (2003). Forecasting Techniques. Songkhla: Document and Textbook Mission, Educational Service Division, Thaksin University.
[2] Suaisuda Lohamud. (2022). Testing the Accuracy of Forecasting Values. Bangkok: Rajabhat Bansomdejchaopraya University.