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Determining the timing of Investment in Mutual Fund Product using the Doble Exponential Smoothing Model

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ABSTRACT

Purpose: As we know, COVID-19 affects the economy of most of the world, one of the investment media that continues to grow is mutual fund investment. This study aims to find the right time to invest by studying data in the previous period.

Design/methodology/approach: In this study, we collect daily data on Net Asset Value (NAV) prices from January to September 2021, by analyzing calculations using the double exponential smoothing method to predict the time with the lowest price for investing.

Findings: The results showed that this study was able to predict the right time to invest in mutual funds using the Holt Double Exponential Smoothing method using the actual smoothing data parameter of 0.9 (alpha) and the trend data smoothing parameter of 0.1 (beta) with produces a Mean Absolute Percentage Error (MAPE) value of 0.85343. The right time to invest in this research is determined on November 2, 2021, with an estimated net asset value (NAV) of 2348.644032.

Paper type: Research paper

Keywords: Mutual Fund, Investment Time, Investment Tool, Double Exponential Smoothing.

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I. INTRODUCTION

The presence of the COVID-19 pandemic has influenced people's investment behavior. From 2018 to 2019 there was an increase in the number of Single Investor Identification (SID) an average of 5% per month (Adhianto, 2020). Although the crypto market is currently more popular among the public, the mutual fund investment market is still promising with stable results. One of the mutual fund investment markets that are relatively stable and increase periodically is the Cipta OVO Equitas mutual fund which is a product of PT. Ciptadana Asset Management. The profit from this mutual fund investment is determined by the price of the Net Asset Value (NAV), which is the fair market value of securities and other assets of the mutual fund minus all liabilities whose calculations are always updated and announced every exchanging day. To get a large return on investment, determining the right time for investment, namely when the NAV price touches the lowest price is a key factor. From previous research, information is obtained that the use of the Holt Double exponential smoothing method has the smallest error value compared to the Browns Double Exponential Smoothing method (Muchayan, 2019). This is the background for researchers to continue research using the Holt Double Exponential Smoothing method.

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II. LITERATURE REVIEW

Mutual funds are one of the instruments traded on the capital market by following per under, and law number 8 of 1995 article 1 paragraph 27 concerning the capital market. Mutual funds are also a space that is used as a place to collect funds from customers, in this case, the investor community, which will then be invested in a securities portfolio by the investment manager. (Zamzany & Setiawan, 2018). In a previous study conducted by (Suryani, 2021) which took respondents from several cities including Jakarta, Bogor, Tangerang, and Bekasi in three month periods from April to June 2020 the following results were obtained :

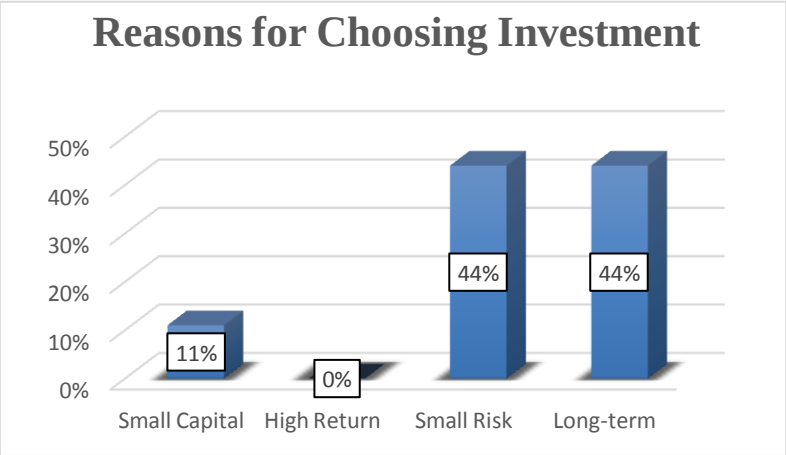

Figure 1. Reason for Choosing Investment

Source : (Suryani, 2021)

From the graph, we can see that most people in choosing investments tend to choose investments that have a small risk and a long investment period, this is very suitable for investment conditions through mutual funds.

One of the promising mutual fund products is Cipta OVO Equitas which is a mutual fund product from PT. Ciptadana Asset Management. Cipta OVO Equitas is a Mutual Fund in the form of a Collective Investment Contract as stated in the Deed of Collective Investment Contract Mutual Fund CIPTA GEMILANG EQUITY Number No. 52 dated December 18, 2015, deed of ADDENDUM OF MUTUAL FUND COPYRIGHT GEMILANG EQUITY No. 47 dated December 19, 2016, both were made before Leolin Jayayanti, SH., a notary in Jakarta, between PT Ciptadana Asset Management as Investment Manager and PT Bank CIMB Niaga Tbk. COPYRIGHT OVO EKUITAS has received an effective statement letter from OJK by following per under Letter No. S-10/D.04/2016 dated January 15, 2016. (Rianty Komarudin, 2021).

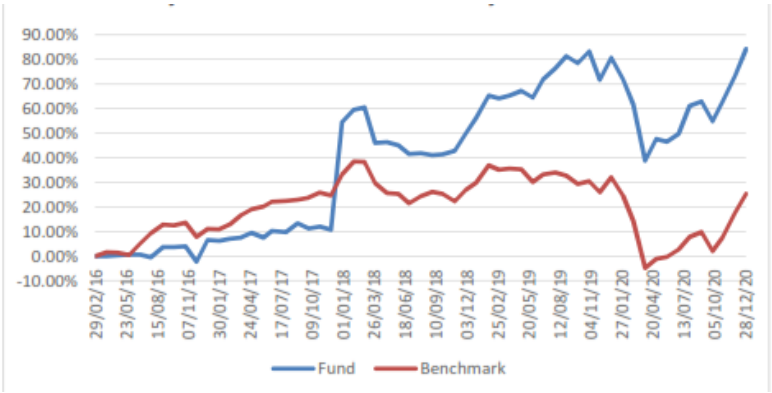

Figure 2. Portfolio Performance Since Launch (Https://pasardana.id, 2020)

From the Fund Fact Sheet document, it can be seen how the performance of the Cipta OVO Equitas mutual fund which since its launch in 2016 until now has experienced a very significant increase in Net Asset Value,

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this is very promising for potential investors who have the type of wanting investments that have small risks and choose to invest for a long time.

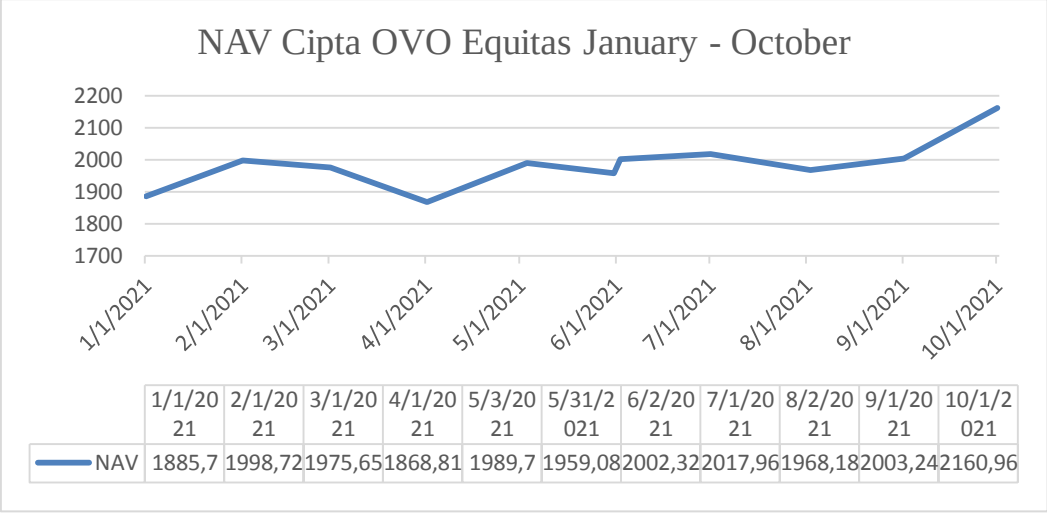
The key to successful investing through mutual funds is choosing the right time to buy Net Asset Value (NAV), making purchases when the NAV price is low will provide multiple benefits when one day we will resell. Profits are obtained from the difference between the purchase price and the selling price in different periods. To choose the right time, we can use many methods, this is closely related to price forecasting in a certain period based on a collection of price data in the previous period time. The methods that are often used in the case of forecasting without following the trend are Moving Average and Exponential Smoothing. In a previous study conducted by (Chaerunnisa & Momon, 2021) on product sales forecasting at PT. Tunas Baru Lampung states that the use of the exponential smoothing method is much better and more accurate than using the Moving Average method, this is evidenced by comparing the two methods based on the Mean Absolute Percentage Error (MAPE) value, which is a calculation using absolute error in each period then divided by actual observed values for the period. The smaller the MAPE value, the more accurate the results or forecasting techniques are and vice versa.

With so many studies trying to raise the case of forecasting, it is very rare to take the topic of predicting the right investment time to invest, especially in determining the timing of mutual fund investments. We can know the right investment time by looking at the price predictions in the future period time (t) and then we compare each period with the actual price in the current period. Thus, the exact direction of movement will be known when the price will touch the lowest point in the predicted time (t).

III. METHODOLOGY

To achieve the purpose of this study, which is to get the right time to invest in case study mutual funds in Cipta OVO Equitas mutual funds, researchers will use the double exponential Smoothing method with an alpha value () of 0.9 and a beta value () of 0.1 according to with recommendations from previous studies whereby using the alpha and beta values it has the smallest Mean Absolute Percentage Error (MAPE) value compared to the use of other variations of alpha and beta values. (Muchayan, 2019).

The data that will be used in this study is the net asset value (NAV) price data from the Cipta OVO Equitas mutual fund for 2021 starting from January 1, 2021, until October 2021 when researchers start researching with the assumption that stock exchange holidays will be excluded. A snippet of price data from the NAV of the Cipta OVO Ekuitas mutual fund can be seen in Figure 2 below:



	1/1/2021	2/1/2021	3/1/2021	4/1/2021	5/3/2021	5/31/2021	6/2/2021	7/1/2021	8/2/2021	9/1/2021	10/1/2021
NAV	1885,7	1998,72	1975,65	1868,81	1989,7	1959,08	2002,32	2017,96	1968,18	2003,24	2160,96

Figure 3 NAV Period January – October 2021

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From Figure 3 we can see that several reference points can be taken as the right time to invest in Cipta OVO Equitas mutual funds, namely in April, June, and August, where at these points, the NAV price decreased before experiencing a decline. significant improvement in the period after.

This study uses the Holt Double Exponential Smoothing method (Masud, 1986) where this method is Holt's answer for solving forecasting problems involving data that is influenced by trends while the formula used is as follows :

$$S_t = \alpha X_t + (1-\alpha)(S_{t-1} + T_{t-1}^{(1)})$$
$$T_t = \beta(S_t - S_{t-1}) + (1-\beta)T_{t-1} \quad (2)$$

Meanwhile, to get prediction results, you can use the following formula:

$$F_{t+m} = S_t + (T_t \times m) \quad (3)$$

Where the description of each variable is as follows:
Xt: Latest data in period t
St: Smoothing value period t
Tt: Value of smoothing trend period t
α:Smoothing parameters data ($0 \leq \alpha \leq 1$)
β: Smoothing parameters trend data ($0 \leq \beta \leq 1$)
Ft+m: Forecast data in Period
m: Number of periods to be predicted.

Assuming that the first smoothing value (St) is taken from the first NAV data value and while the first trend smoothing value is the same as the second NAV value minus the first NAV data plus the fourth NAV data minus the third NAV data, then the result is divided by two (Muchayan, 2019).

To ensure data accuracy, it is necessary to calculate the error from the forecasting results using the Mean Absolute Percentage Error (MAPE) formula as follows:

$$MAPE = \frac{1}{n}\sum_{t-1}^{M} |PE_t| \quad (4)$$
$$PE_t = \left(\frac{X_t - F_t}{Xt}\right) x100 \quad (5)$$

where is known :
Value n and M: Amount of data
PEt: The percentage difference between the forecast and the actual data for a certain period.

IV. ANALYSIS AND DISCUSSION OF RESULTS

From the results of calculations using the Holt Double Exponential Smoothing Method, data are obtained as shown in table 1 below:

Table 1. The last ten data calculation result

t	*Period*	*NAV Value*	*St*	*Tt*	*F*	*Error*
194	*15/10/2021*	*2409,76*	*2409,337*	*17,89545*	*2405,531*	*0,175512*
195	*18/10/2021*	*2431,12*	*2430,731*	*18,24532*	*2427,233*	*0,159906*
196	*19/10/2021*	*2431,67*	*2433,401*	*16,68773*	*2448,977*	*0,711715*

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197	*21/10/2021*	*2417,57*	*2420,822*	*13,76107*	*2450,088*	*1,345086*
198	*22/10/2021*	*2414,51*	*2416,517*	*11,95451*	*2434,583*	*0,831345*
199	*25/10/2021*	*2409,98*	*2411,829*	*10,29025*	*2428,472*	*0,767301*
200	*26/10/2021*	*2417,62*	*2418,07*	*9,885301*	*2422,119*	*0,18611*
201	*27/10/2021*	*2390,98*	*2394,678*	*6,557529*	*2427,955*	*1,546447*
202	*28/10/2021*	*2338,9*	*2345,134*	*0,947374*	*2401,235*	*2,665144*
203	*29/10/2021*	*2362,16*	*2360,552*	*2,394495*	*2346,081*	*0,680696*

Source: Authors own computation

From the table, it is known that the number of day periods on which the forecast is based in 203 trading days terms of forecasting errors, is very varied. in the table, the minimum error value is 0.1% which if you look at the actual data there is a smaller that is only 0.001% and the largest error value is 2.6%. By looking at the whole and doing calculations with the MAPE formula, an average error of 0.85% is obtained.

After knowing the MAPE value from the prediction results, the next step is to make predictions for the next trading day period, here the researcher will try to calculate to make predictions on the next ten trading days to be able to determine the right time to invest in Cipta Ovo Ekuitas mutual funds by modifying the third formula by referring to the last data from table 1, namely the smoothing value in the 203rd period, which is 2360,552 and the smoothing value for the 203rd-period trend is 2.394495. The NAV price forecasting data in the 203rd t period will become the NAV value in the 204th period and so on until the 213rd t period so that the formula for forecasting the next 10 trading days is as follows:

Ft+m = St + (Tt x m)
1st Exchange Day :
F204 = 2360,552 + (2,394495 x 1)
= 2362,946583

Continued until the 10th trading day

10th Exchange Day:
F213 = 2356 + (0,638623 x 1)
= 2356,639

For the results, we can see in Table 2 below:

Table 2. Forecasting NAV prices for the next 10 exchange periods

t	*Period*	*NAB value*	*St*	*Tt*	*F*
203	*29/10/2021*	*2362,16*	*2360,552*	*2,394495*	*2346,081*
204	*01/11/2021*	*2346,081*	*2347,767*	*0,876582*	*2362,947*

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205	*02/11/2021*	*2362,947*	*2361,516*	*2,163812*	*2348,644*
206	*03/11/2021*	*2348,644*	*2350,148*	*0,810562*	*2363,68*
207	*04/11/2021*	*2363,68*	*2362,408*	*1,955536*	*2350,958*
208	*05/11/2021*	*2350,958*	*2352,299*	*0,749061*	*2364,363*
209	*08/11/2021*	*2364,363*	*2363,232*	*1,767473*	*2353,048*
210	*09/11/2021*	*2353,048*	*2354,243*	*0,69183*	*2364,999*
211	*10/11/2021*	*2364,999*	*2363,993*	*1,597644*	*2354,935*
212	*11/11/2021*	*2354,935*	*2356*	*0,638623*	*2365,591*
213	*12/11/2021*				*2356,639*

Source: Authors own computation

From the prediction results in table 2, we can see that from the 204th to the 213th exchange day, according to the trend, it has indeed increased, but it is still not possible to determine the right time to invest, to make identification easier, it will be illustrated in Figure 4 below:

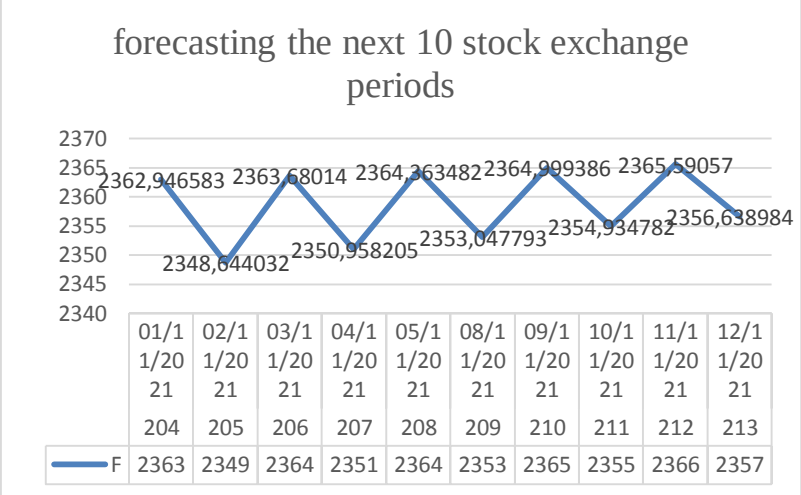

Figure 4. Forecasting for 10 stock exchange periods

From the picture above, we can see that the lowest point is in the second forecasting period, namely on November 2, 2021, with a NAV value of 2348.644032, which means that it is recommended that that date is the right time to invest in Cipta OVO Equitas mutual funds.

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V. CONCLUSIONS AND RECOMMENDATION

From the discussion on the implementation of the Holt Double Exponential Smoothing formula to determine the right time to invest in mutual funds, the results show that in the calculations, the forecasting error result is 0.853430175 using the Mean Absolute Percentage Error (MAPE) calculation formula, which means that the level of accuracy between the forecasting results and the actual data is not too much different. In addition, this research has succeeded in determining the right time to invest in Cipta OVO Equitas mutual funds, which is by following per under the lowest price forecast, which is on November 2, 2021, namely by forecasting the NAV price of 2348.644032.

Recommendations that can be given in further research are how to relate the Holt Double Exponential Smoothing method to using an integrated information system so that it can obtain real-time data both in terms of real prices and forecasting results.

VI. ACKNOWLEDGEMENT

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