FORECASTING ANALYSIS OF ZIS COLLECTION IN BANJAR REGENCY USING DOUBLE EXPONENTIAL SMOOTHING METHOD

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Abstract

The purpose of this study is to observe forecasting zakat collection funds and other Islamic religious charity (ZIS) that the Banjar Regency Baznas collect from October 2021 to March 2022. The method used is the Double Exponential Smoothing method, and analyzed by using the parameters $\alpha = 0{,}4$ dan $\gamma = 0{,}1$. For this study, secondary data of Baznas Banjar Regency collection funds covering from January 2018 to September 2021 was obtained from its institution. The findings show that forecasting with this method resulted in ZIS collection will be increased monthly for the next six months. Therefore, the data will benefit Baznas Banjar Regency and other stakeholders in planning and evaluating the management of ZIS funds. Thus, policymakers can use it to improve public welfare and poverty alleviation in Banjar Regency.

Keywords: ZIS Funds, Baznas Banjar Regency, Double Exponential Smoothing

Abstrak

Tujuan dari penelitian ini adalah untuk mengetahui peramalan dana penghimpunan zakat dan dana amal syariah lainnya yang dikumpulkan oleh Baznas Kabupaten Banjar pada bulan Oktober 2021 sampai dengan Maret 2022. Metode yang digunakan adalah metode *Double Exponential Smoothing* yang kemudian dianalisa dengan menggunakan parameter α =0,4 dan γ=0,1. Dalam penelitian ini, data sekunder yang digunakan berasal lembaga Baznas Kabupaten Banjar periode Januari 2018 hingga September 2021. Hasil penelitian menunjukkan bahwa peramalan melalui metode ini akan meningkatkan penghimpunan dana ZIS setiap bulan selama enam bulan ke depan. Dengan demikian, data tersebut akan bermanfaat bagi Baznas Kabupaten Banjar dan pemangku kepentingan lainnya dalam merencanakan dan mengevaluasi pengelolaan dana ZIS. Oleh karena itu, pengambil kebijakan dapat memanfaatkannya untuk meningkatkan kesejahteraan masyarakat dan pengentasan kemiskinan di Kabupaten Banjar.

Kata Kunci: Dana ZIS, Baznas Kabupaten Banjar, Double Exponential Smoothing

THE INTRODUCTION

Improving public welfare is one of the goals of the Republic of Indonesia. This goal is contained in the preamble of the 1945 Constitution in the fifth principle of Pancasila, "social justice for all people of Indonesia". In line with this, at the global level, UN declared Sustainable Development Goals (SDGs) as a global development agenda which are planned to be achieved in 2030. SDGs have become a commitment of the global community and a successor of Millennium Development Goals (MDGs) which ended in 2015 (UN General Assembly, 2015).

The SDGs concept has purpose to accommodate development issues more extensive qualitatively and quantitatively compared to the MDGs concept. It is regarding to the issue that related to climate changing, environmental degradation, deflation of natural resources, social protection, food and energy securities, and a more pro-poor development (Diouf, 2019). Therefore, SDGs can be applied as development framework for the universal goals including for developing countries. In addition, the SDGs are also more participatory and exclusive because it is involving non-government stakeholders, such as the business and private sector, academic institutions/universities, non-governmental organizations and other interest groups. (Pratama, Purnomo, & Agustiyara, 2020)

In its development, the SDGs have three main pillars: Firstly, human development, which is oriented to the fields of education and health. Secondly, social economic development, which leads to the availability of facilities and infrastructure as well as economic growth. Thirdly, enviromental development, which aimed to realize the sustainability of natural resources and good environmental quality. This shows that the SDGs aimed to create the better human life in all aspects, both social and economic as well as to maintain balance of nature. UN has categorized 17 Sustainable Development Goals into the 5Ps:

1. *People*, the main concern of development. The SDGs seek to eradicate poverty and hunger in every aspects. It is hoped that every human being can fulfill their basic needs fairly and equitably, and live in a healthy environment.

2. *Planet*, it aims to protect the earth from all forms of harmful damage, with sustainable natural resource management, sustainable production and consumption, important actions and strategies related to climate change, to support current and future generations.

3. *Prosperity*, it aims so that all people get a decent and prosperous life, fulfilled all the needs of life in every aspects: economic, social, technological progress, health, and education aspects.

4. *Partnership*, by increasing global partnerships and cooperations to achieve global development goals, especially in efforts to eradicate poverty through the participation of all countries and stakeholders.

5. *Peace*, it aims to establishing peace and justice, free from violence and fear. This is because sustainable development will not be attained if it is not involving by peace, and there will be no peace without development that balances economic, social and environmental aspects (Badan Pusat Statistik, 2014).

Hence, achieving prosperous life, fulfilling basic needs, improving quality of life lead to enhancing welfare in the level of individual and social relationship. All the goals and targets of SDGs can stimulate the action that related to humanity and the planet. Because of the goals of SDGs are in line with the constitution of Indonesia, The Indonesian government has made various efforts to reduce the level of poverty and improve the quality of life in the country. This is also including by optimizing zakat funds and other Islamic religious charity (Zakat, Infaq, Sadaqah abbreviated as ZIS). Since 90's, there have been various kinds of zakat institutions that applied the principles of modern ZIS management. The National Board of Zakat (Badan Amil Zakat Nasional

abbreviated as Baznas) is the only official zakat institution that established and given the authority by the government through the Decree of the President of the Republic of Indonesia No. 8 year 2001. The role of Baznas as an authorized institution to manage ZIS at national scale was confirmed by the enactment of Law Number 23 of 2011.

Specifically, Baznas Banjar Regency in South Kalimantan has program to distribute ZIS in its working area in order to improve community welfare. A good governance is needed to maximize funds collection and to prepare a plan for the funds utilization and allocation with supports from other parties. (Al Parisi, 2017). Therefore, a statistical analysis is needed to predict the potential for collecting ZIS funds in order to anticipate unequal distribution and unplanned allocation. It also allows institution to put additional programs in.

As a part of government institution in collecting and distributing zakat and other Islamic charity, Baznas needs to determine the effectivity and efficiency of the distribution of zakat based on the amount of zakat collection fund every year. Zakat surplus contributes to decreasing people's trust to hand over their money to pay zakat in Baznas. However, this problem cannot be avoided but it can be minimized by using forecasting related to collecting of zakat. The accuracy of forecasting in the amount of zakat collection can increased the number of people or muzakki (people who pay zakat) come to institution (Fadlihisyam Bin et al., 2020). Therefore, there is a need to carried out this research as to find better prediction in zakat collection. Thus, this study aims to model zakat collection in using double exponential smoothing models. In addition, this study has potential to help the institution to improve the strategy in zakat collection and distribution and help the policy maker in managing zakat effectively and efficiently. This will bring to the institution can managing the fluctuation between zakat deficit and zakat surplus.

LITERATURE REVIEW

Zakat and other Islamic religious charity (Zakat, Infaq, Sadaqah/ZIS)

According to the study of Islamic economics, zakat is a fiscal instrument that acts as a driver of economic growth. Zakat aims to make assets always productive. The use of ZIS funds is expected to create an even distribution of people's income which has an impact on reducing poverty and increasing the welfare of the people (Ryandono, 2008). According to Qardawi in Beik & Arsiyanti (2016), zakat has great potential as social and economic instrument for the development of the nation because it can be used as resources of poverty alleviation and income inequality (Syauqi Beik & Arsyianti, 2016). However, Indonesia applies a voluntary zakat scheme which muzakki can pay their zakat whether via institution for example Baznas or directly pay to mustahik (zakat recipient). This kind of scheme can cause various amount zakat received because zakat payment is not centralized. In addition, according to Hasan (2021), Indonesia has great potential national zakat collection that reaches IDR 327,6 trillion in 2020. Meanwhile, in 2019 based on indicators of Mapping of zakat potential it is recorded at IDR 233,8 trillion or equivalent to 1,72% of 2018 GDP which is IDR 13,588.8 trillion (Hasan, 2021). It can be seen that zakat has great potential to grow year by year and this can be a great sign to overcome socio-economic problem that affected zakat recipient.

Monzer Kahf argues that zakat plays a role in controlling the Islamic macroeconomic system, including the allocation of productive assets, productive means, allocation of expenditures and savings, and allocation of savings benefits and luxury goods (Mas'ud & Muhammad, 2005). Therefore, zakat has giving purchasing power for mustahik because it increase their income then purchasing product to provide their basic needs. In addition, if zakat well managed and channeled to the right target it will contribute to increase income redistribution (Hasan, 2021). Thus, zakat must be allocated

properly in order to help people in needs empowered which hope they can change from mustahik into muzakki through professional zakat management.

Badan Amil Zakat Nasional (Baznas)

Badan Amil Zakat Nasional (Baznas) is the National Board of Zakat Republic of Indonesia that collecting and distributing zakat funds and other Islamic religious charity (ZIS) at the national level. In accordance with Law No. 23 of 2011 concerning Zakat Management, it further strengthens the role of Baznas as an institution authorized to manage zakat nationally. In the law, Baznas is declared as a non-structural government institution that is independent and responsible to the President through the Minister of Religion (Rusanti et al., 2022). Thus, Baznas together with the government are responsible for overseeing the implementation of zakat management based on Islamic Sharia, trust, benefit, justice, legal certainty, integration and accountability. As an institution that has the authority to collect and distribute ZIS, Baznas requires efforts for development in the collection and distribution system, because if zakat is distributed with good and responsible, it will be able to overcome or at least reduce the problem of poverty. (Santoso, 2016).

The vision and mission of Baznas is to become a trustworthy, transparency and professional zakat institution (Badan Amil Zakat Nasional, n.d.). Various efforts were developed by the government to increase the effectiveness of this zakat, including the establishment of various zakat institutions such as Baznas at the provincial and district or city levels and supported by community-formed zakat institutions such as the Zakat Collecting Unit (UPZ) and the Amil Zakat Institution (LAZ). One of the Pancasila mandates contained in the preamble of the 1945 Constitution is the realization of social justice for all Indonesian people. In economic development, this can be realized through a process of equalizing income distribution and alleviating poverty. Some of the arguments regarding zakat include the word of Allah SWT in Al

Qur'an chapter At-Taubah verse 103 concerning the obligation of zakat, and verse 60 concerning groups who are entitled to receive zakat (Fa'atin, 2016).

Like management in general, the management of ZIS funds in the Baznas of Banjar Regency also applies planning, organizing, implementing, and evaluating (controlling). Funds collected and managed by the Banjar Regency Baznas are always registered and reported on a regular or periodic basis by including supporting evidence, so that management is transparent and accountable. Reports are presented in monthly and annual data.

Some of the programs in the Banjar Regency Baznas are as follows:

1. Banjar Taqwa, is the distribution of assistance from ZIS funds for religious activities such as assistance for places of worship and including for converts.
2. Banjar Peduli about aid for the poor, disaster relief assistance for Ibn Sabil category.
3. Banjar Sejahtera, assistance for increasing productive businesses for Small Medium Enterprises (SMEs).
4. Banjar Cerdas, the distribution of assistance in the form of education fees and school equipment for children from poor families, including underprivileged students.
5. Banjar Sehat, which is the distribution of assistance to poor families who are sick to get medical expenses and hospital care.

The state involvement in Sharia is also formed as the embodiment of the Welfare State where the state encourages its people to give 2.5% of their wealth for the groups who need it. The donation aims to increasing the prosperity and welfare of all the poor and needy poor or other segments of society in need by divine law people (Al-Faizin, Insani, & Widiastuti, 2017). As a developing country, Indonesia has a large population so that the problem of poverty cannot be avoided (Aji, 2015).

Forecasting

Forecasting is a method for estimating or predicting information about the future trends using past data as consideration. Forecasting can be used as a basis for determining the direction of future organizational decisions. One of the forecasting methods commonly used in financial planning is the smoothing method which serves to minimize past data with irregular patterns. (Fahlevi, Bachtiar, & Setiawan, 2018). Forecasting can be used to in the process of decision making. Furthermore, forecasting is defined as a tool to predict specific value for the future time by observing past and present data that could be relevant as the information. False forecasting will lead to misinformation that needs to be applied in every decision taken. Therefore, these are three essential point that need to be considered in the forecasting process namely analyzing the prior data to see the pattern of the situation that might occurred in the past, determining data used which showed the result of forecasting is not too far from the actual data, and projecting the last data from the method while considering any factors that can be shifted (Sidqi & Sumitra, 2019).

Thus, forecasting has an important role in an organization as a reference for making policies that are in accordance with the goals of the organization itself. In addition, forecasting can also be a way out to develop strategic plans. One of the methods that can be used in this forecasting is Exponential Smoothing. This method is a time series analysis by assigning a weight value to the previous series of observations to predict the value in the future.

Double Exponential Smoothing

One of the common method that can be used as forecasting method is the exponential smoothing method (Rahamneh, 2017) . Exponential Smoothing is a time series analysis method that focuses on an exponential decrease in priority on the object of earlier data observation. Recent observations will receive higher priority in forecasting than older observations (Nawawi, 2017). Double Exponential Smoothing is one of the forecasting methods to use if there are several elements of a trend in it, namely an increase or decrease in the long

term (Rafikasi & Supriyadi, 2018). Exponential with trend is like simple smoothing with except both of the component which are data and trend have to be updated in every level the time of period and its trend (Sidqi & Sumitra, 2019). Level is an estimate that is smoothed from the data value at the end of each period (the value of the refinement of the forecasting data). A trend is a smoothed estimate of the average growth at the end of each period (Hansun & Subanar, 2016).

Forecasting method using Double Exponential Smoothing by Holt obtained through an analysis process using two weights in the form of parameter alpha (α) and parameter gamma γ with a value between 0 to 1 (Makridakis, Wheelwright, & McGee, 1983). This method is used if a time series data has an element of an up or down trend without any seasonal element (Akbarizan, et al., 2016). The following equations are used in the implementation of forecasting using Double Exponential Smoothing:

$$S_t = \alpha X_t + (1 - \alpha)(S_{t-1} + b_{t-1})$$
$$b_t = \gamma(S_t - S_{t-1}) + (1 - \gamma)b_{t-1}$$
$$F_{t+m} = S_t + b_t m$$

Where:

S_t	= Exponential Smoothing
b_t	= Trend
F_{t+m}	= Prediction Result
α	= Smoothing Constant
γ	= Constant for Trend

METHODOLOGY

This study is about forecasting models. In addition, this research with a quantitative approach is using secondary data from the report on ZIS funds collected and distributed by the Baznas Banjar Regency from January 2018 to

September 2021. The analytical method used in this study is *Double Exponential Smoothing.*
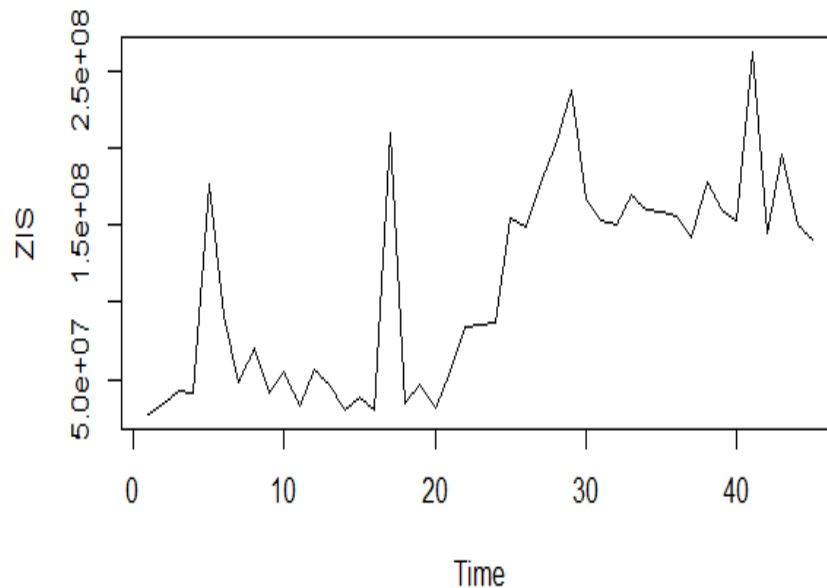
RESULT AND DISCUSSION

Figure 1. Plot Time Series Fund ZIS Baznas Kabupaten Banjar 2018-2021

In Figure 1. it can be seen that the ZIS collection funds at Baznas Banjar Regency fluctuate during 2018-2021. It described that there are several elements of trends in it. In addition, the x-axis showed the number of data which is 45 number of observation data from January 2018 to September 2021. However, there are no seasonal elements in the data or cyclical elements in the data. Based on this, *Double Exponential Smoothing* is one of the appropriate forecasting methods to use.

Parameter determination α and γ (weight) can be done through *trial and error* in forecasting using the method *Double Exponential Smoothing.* Determination of this parameter will involve a comparison of the values of *Sum of Squared Error* (SSE), where the selected parameter is the one that produces the smallest SSE value. The following are the results of measuring the accuracy of forecasting parameters by comparing the SSE values.

Table 1. Parameters and comparison SSE

Alpha (α)	Gamma (γ)	SSE
0,1	0,1	$1,154051 \times 10^{17}$
0,2	0,1	$1,104822 \times 10^{17}$
0,3	0,1	$1,060334 \times 10^{17}$
0,4	0,1	$1,05393 \times 10^{17}$
0,5	0,1	$1,07459 \times 10^{17}$
0,6	0,1	$1,117478 \times 10^{17}$
0,7	0,1	$1,181904 \times 10^{17}$
0,8	0,1	$1,269418 \times 10^{17}$
0,9	0,1	$1,383866 \times 10^{17}$

It can be seen that $\alpha = 0,4$ dan $\gamma = 0,1$ it is the right parameter to be used as a smoothing weight for this study with an SSE value of $1,05393 \times 10^{17}$ which is the smallest SSE value compared to the SSE value of the parameters α and γ others.
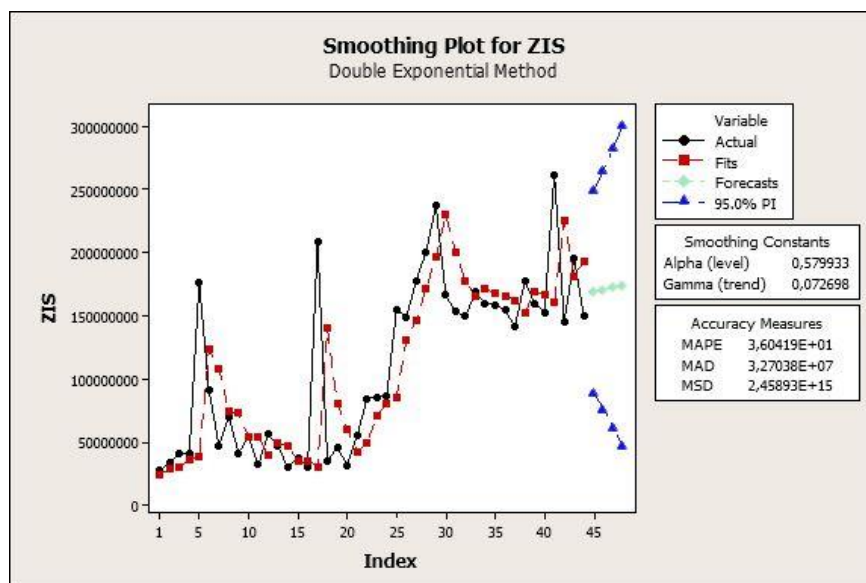

Figure 2. Test Result for Forecasting DES

This forecasting process used the data of zakat collection funds Baznas Banjar Regency from January 2018 to September 2021 with monthly period. The data have been examined come from October 2021 to March 2022 to forecast the upcoming data . The results of forecasting used to measure the accuracy from Double Exponential Smoothing that can be seen from figure 2. It also shows from the figure 2, the measurement of Mean Absolute Percentage Error (MAPE) which showed the accuracy of the forecast in the form of percentage.

The lower the percentage of MAPE indicate the forecasting model of the research has a good performance. Thus, in the figure MAPE showed the results 3,2% which means if the MAPE results is under 10% it indicates the data is excellent for forecasting. Therefore, the following is the results of forecasting the collection of ZIS BAZNAS funds in Banjar Regency for the next 6 periods.

Table 2. forecasting result using *Double Exponential Smoothing* with $\alpha = 0,4$ and $\gamma = 0,1$

Period	Month	Forecasting Result
46th	October 2021	Rp. 162.580.676
47th	November 2021	Rp. 162.681.502
48th	December 2021	Rp. 162.782.329
49th	January 2022	Rp. 162.883.155
50th	February 2022	Rp. 162.983.982
51th	March 2022	Rp. 163.084.808

As seen in table 2, the results of forecasting for the ZIS collected by Baznas Banjar Regency are obtained for the period October 2021-March 2022, where it is estimated increasing every month. This is presumably due to an increase in community participation in paying ZIS to formal ZIS institutions, especially Baznas. This is because Baznas Banjar Regency tries to increase various promotion in order to increase the number of muzakki who pay their zakat in this institution. Baznas is not only tried to promote in conventional way but also promote through social media. So, it helps muzakki to pay their zakat, infaq, sadaqah in conventional way. The various payment that Baznas can provide namely zakat counter, shari'ah banking, or even through various digital wallet that available in their smartphone.

CONCLUSION

Based on this analysis, the parameter used in this study is $\alpha = 0,4$ dan $\gamma = 0,1$ it has the smallest SSE value compared to the SSE value for other parameter values. The results show that forecasting for the following six

periods using *Double Exponential Smoothing* with these parameters has increased monthly. The results of this study are expected to be used as reference material for both Baznas Banjar Regency and other stakeholders in planning and managing ZIS funds for policy-making to improve community welfare and reduce poverty in Banjar Regency.

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