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APPLICATION OF DECOMPOSITION METHODS FOR FORECASTING THE PERCENTAGE OF STUDENTS WHO DROP OUT OF SCHOOL TO PREDICT THE AMOUNT OF SCHOLARSHIP NEEDED IN CENTRAL JAVA INDONESIA

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ABSTRACT

Students dropping out of school is an individual who no longer proceed or desist from his studies before the appointed time for various reasons. In Indonesia, education that is compulsory for all citizens of basic education is 9 years old. Although already issued rules for compulsory nine-year schooling on the fact there are still many individual dropouts mainly due to economic factors. The purpose of this study is to find out the forecast with some proper decomposition model for use in forecasting the percentage of students dropping out of school of Central Java the year 2018 and results forecasting the percentage of students dropping out of school level Primary School, Junior High School, Senior High School and College the year 2018 in Central Java province based on the data of students dropping out of school 2009-2017 years. The methods used in data collection method interviews, literature studies and documentation. The data used as analysis material retrieved from the office of the Central Bureau of Statistics the Central Java. In doing the forecasting the percentage of students dropping out of school in the Central Java year 2018 model Decomposition forecasting method used Additives and Multiplicative. Based on the analysis already done retrieved model Decomposition can best describe the data the percentage of students dropping out of school in Central Java that is the model of the additive value of the MAD 1,752 and MSD 4,955, so that models these can be used in predicting student dropout data Central Java the year 2018. The results of the forecast percentage of students dropping out of school in Central Java is the first forecast the percentage of students dropping out of Primary School level of 0%, second forecasting the percentage of students dropping out of school Junior High School level rate of 1.47% , third forecasting percentage students dropout of Senior High School level 32.31% and lastly forecasting the percentage of students dropping out of school of Colleges level 74.87%. The results of forecasting the number of dropout students can be used by users, planners and policy makers in education in Central Java, especially in predicting the number of educational scholarships needed in Central Java, Indonesia

Keywords: *Student Dropouts, Scholarship, Education, Decomposition*.

1. INTRODUCTION

Education has an important role in the life of nation and State in creating qualified human resources. Through educational efforts improved the welfare of the people can be realized. Education is so important in the development and survival of the nation, as described in the Constitution of the Republic of Indonesia Number 20 years 2003 article 3 that *"the function of national education develops the ability to form the character of a dignified nation civilization as well as in the framework of the intellectual life of the nation, aimed at the development of potential learners in order to become a man of faith and piety to God Almighty, precious, healthy, have learned, accomplished, creative, independent, and become citizens of a democratic and responsible".*[i] Education also contributed significantly to the economic development in Indonesia.

In addition to contribute significantly to economic development, education also incubate the qualified human resources, knowledge and skills as well as master the technology, as well as be able to foster a healthy business climate and conducive to economic growth.[ii]

In Indonesia, education that is compulsory for all citizens was 9 years of basic education or named reasonable dikdas 9 years old. The chance of obtaining a decent basic education is a right for citizens, without exception. Equal rights in obtaining education means the absence of

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background social, economic, cultural difference in obtaining education for each student. Education is the pillar for a country in the Act for the construction of a nation. It is in accordance with the Constitution the number 20 years 2003 article 6 paragraph (1) and paragraph (2) which reads:

1. Every citizen over the age of seven to fifteen years following the compulsory primary education.
2. Every citizen is responsible for the sustainability of the Organization of education.[iii]

Reduce the number of students dropping out of school, the Government is already doing pretty well already strategies include: granting of assistance funds Awarding educational scholarships for the poor, the BSM (Help poor students), KIP (Indonesia Smart Cards) and BIDIKMISI (Scholarship poor students). But in fact there are still citizens of school age who could not continue their education. It is in accordance with the Basic Law number 20 year 2003 section 11 paragraph (2) which *reads "the Government and the local government is obliged to guarantee the availability of funds to this education for every citizen aged seven to five twelve years "*.[iv] But in fact there are still citizens of school age who do not attend school anymore for some reason. In 2014 the percentage of Indonesia's youth (ages 16-24 years) who did not attend school anymore of 75.43 percent. The reason that no longer bersekola youth of 36.01% because there is no cost, amounting to 23.77% because of work, amounting to 14.25 because taking care of the household and of 25.97% due to other reasons.[v] From these data the biggest reason is because there is no cost, it is evident that though the Government has already issued a student dropout prevention efforts turned out to be not quite as effective. Based on the above uaraian, researchers try to meramalan the percentage of students dropping out of school in Central Java Province Year 2018 to predict the amount of Scholarship Using the decomposition Method.

2. THEORY

2.1 Education

According to the legislation of the Republic of Indonesia Number 20 Year 2003 about national education system article 1 paragraph 1, education is a planned and conscious effort to bring about an atmosphere of learning and the learning process so that learners actively develop the potential for him to have a religious spiritual strength, self-control, personality, intelligence, akhal noble, as well as the necessary skills themselves, the community, the nation and the State. The line up consisted of education formal education, non-formal and informal which can be complementary and enriching.[vi]

2.2 Student Dropouts

Understanding of students dropping out of school, according to the great dictionary of Indonesian Language[vii], is a student who has yet to finish his school had stopped. The opinion of Ali Imron, stated that the definition of student dropouts are students who are stated to have been out of school before the time specified or stated before graduation and got a diploma from the school.[viii] Bagong Suyanto holds, dropout is a child or an individual who is no longer continued his education or dropped out of school.[ix] Many things behind without an individual not continue her studies or dropping out of school, according to Suyanto stated "*the main factor is the economic difficulties of dropouts or parents are not able to provide for his children's school fees*".[x] While the numbers are dropping out of school is the proportion of the population in the age groups of certain secondary school dropout on the appropriate level of education by age group against inhabitants in the age group.[xi] From some of the opinions above regarding the understanding of students dropping out of school, it can be inferred that the student dropouts are students who do not complete or not being able to continue her studies in elementary school.

Actually a lot of factors which are the cause of children dropping out of school is increasing. Factors that affect children dropping out of school, as seen from internal factors, low interest and ability of the child to attend school, have low self-esteem, school is not considered interesting, and an inability to follow the lesson. External factors cause students dropout, economic families, the lack of attention to the elderly and the environment play.[9]

2.3 Scholarship

To deal with the main external factors cause students dropping out of school, namely economic families, the Government is attempting to give a scholarship on families cannot afford. According to Jumadi, scholarship is the grant in the form of financial assistance given to an individual who intends to use for the sake of the continuity of education traveled.[xii] Scholarships can be given by government agencies, companies or foundations. The awarding of the scholarship can be categorized on the giving away free or the giving of the bond

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work (commonly called bond) after completion of the education. According to the great Indonesian Language Dictionary, the scholarship is awarded to a student allowance or student help with the cost of learning.[xiii]

There are many educational scholarship assistance given the Government on poor families, here's an example[xiv]:

1. PIP (Program Indonesia Pintar)
2. Bidikmisi Scholarship
3. Affirmation of higher education Scholarships (ADik)
4. Community Achievers Scholarship
5. Scholarships From local government.

2.4 Forecasting

Forecasting is an art and science to predict future events involving the retrieval of historical data and projecting to the future.[xv] According to Riduwan, forecasting is a process of systematically predicting what might happen in the future based on past information and now owned so that the guilty can be minimized. Forecasting gives no definitive answer about what will happen, but rather trying to find approaches about what will happen so it can contribute to determine the best decision.[xvi] According to Sudjana permalan is the estimate of quantity or amount on the future based on past data were analyzed scientifically, especially using statistical methods.[xvii] According to Whitten Jeffrey Bentley, Lonnie D and Dittan Kevin C[xviii], forecasting method is divided into two, namely:

1. Qualitative Methods
   The qualitative method used in historical data that there's not enough representative for predicting the future. Forecasting in this method considers the opinions of the experts who are experts. Therefore, forecasting results are subjective so are said to be less scientific.
2. Metode Kuantitatif
   The use of quantitative methods are based on the existence of the availability of historical data and a set of mathematical rules to predict future results. According to Henny Julius[xix], a variety of forecasting model that belongs to the quantitative methods, namely:
   1. Regression Models
      An extension of the linear regression methods were used to predict one variable which has finite relationship with free variables (independent) are known.
   2. Econometric Model
      Econometric models using a series of regression equations where there are dependent variables that stimulate economic segments like the price.
3. The Model of Time Series Analysis
   Install a representative trend line with historical data based on trend data and projecting to the future. The pattern data can be differentiated into four types of pattern data[xx], namely:
   1. The pattern of horizontal (H)
      Occurs when a data which fluctuate around the constant average (these data are average values against the stationary). In general the data structure can be described as Figure 1.

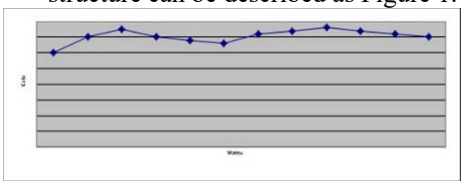

Figure 1 The Pattern of Horizontal

   2. The Seasonal Pattern (S)
      Occurs when a data value which is influenced by seasonal factors (e.g. a particular quarter, month or week days). In general the data structure can be described as Figure 2.

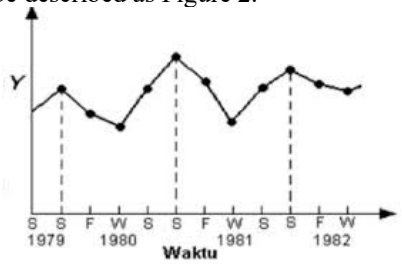

Figure 2 A Pattern of Seasonal Data

   3. Cyclical Pattern (C)
      Occurs when the data is affected by long-term economic fluctuations such as those associated with the business cycle. In general the data structure can be described as Figure 3.

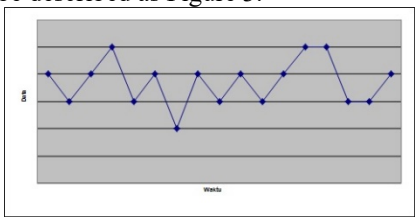

Figure 3 The Pattern of Cyclical Data

   4. Trend Pattern (T)

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Occurs when there is an increase or decrease in long-term secular in the data. In general the data structure can be described as Figure 4.

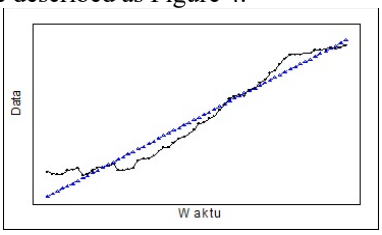

Figure 4 The Pattern of Trend Data

Time series methods are suitable for forecasting short term or medium. The method is often used in the technique of runtun time among other things[12]:

a. Smoothing Method
b. Decomposition Method

2.5 Seasonal Decomposition Method

Smoothing method works based on the idea that if there is a particular pattern underlying the data the pattern time series is distinguished from random error with how smooth the leveling or the value of the past. Meanwhile, the decomposition method based on the thought and effort to separate each component in the time series data. This method is based on the fact that normally what has happened it would be repeated again with the same pattern.[xxi]

Time series data often decomposition into multiple componen[13], namely:

a. Trend (Tt) that is characterized by the presence of forms the increase or decrease in data to changes in time.
b. Seasonal (seasonal (It)) if the plot data visible presence of recurrent fluctuations (irregular) past a certain time.
c. Cycle (cyclical (Ct)) have a longer period than seasonal.
d. Components of random (irregular (Et)), in the form of random pattern.

In practice, the decomposition is done only to components of trend, seasonal and random. If a component is omitted data trends, then the process is called detrended. If a data omitted his seasonal component, then this process is called seasonal decomposition (decomposition / seasonal adjustment). In the decomposition of seasonal seasonal index, calculated that illustrates the seasonal variations from data and using the seasonal indices to deseasonalize the seasonal components by removing from data.[13] Differences between seasonal and cyclical is that seasonal repeats itself at a fixed interval such as year, month or week, while cycle has a longer period of time and the time that is different from the one to silus another cycle.[xxii]

The decomposition has the assumption that data is composed as follows:

Data = f (trend, cycle, seasonal) + error (random)

So, in addition to the components of the pattern, there is an element of fault or to a wedding lull that was considered was the difference between the combined influence of these patterns with actual data.

The General mathematical approaches of decomposition approach is[20, 21, 22, xxiii, xxiv]:

$$X_t = f(I_t, T_t, C_t, E_t) \quad (1)$$

Where:

X_t : the actual data in the period t,
I_t : the seasonal component in the period t
T_t : components of the trend in the period t,
C_t : components of the cycle period t,
E_t : component error/random on perode t.

To model the data seasonal, can generally be used two types of models[13, xxv, xxvi], namely:

1. Additive Models

   According to s. Yuni, Mozart d. Talakua and a. Yopi Lesnussa[xxvii], average decomposition method of simple assume on the additive model mathematically can be written:

   $$X_t = T_t + C_t + I_t + E_t \quad (2)$$

2. Multiplicative Models

   According to s. Yuni, Mozart d. Talakua and a. Yopi Lesnussa[27], decomposition method on moving data (decomposition) assume that on the model multiplicative which mathematically can be written:

   $$X_t = T_t \times C_t \times I_t \times E_t \quad (3)$$

2.6 Software Minitab 18

In the development of science and technology, the role of the computer as a set of tools that were created to ease the work of human beings in a variety of things is very important. One of them is in the processing of statistical data, because it is so right if in analyzing data such as forecasting, data obtained processed quickly and precisely by utilizing computer software so as to get the right results It's easy, fast and practical.[xxviii] As for measures of use of software minitab 18 in doing forecasting as follows:

1. Input data on worksheet1 and name the Data of students dropping out of school.
2. Forecasting using the decomposition method
   a. The Additive Model

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1) Steps i.e. click menu Stat → click Time Series → click Dekomposition.
2) Enter the student Dropout Data into Variable, seasonal length in body 4 because there are four tiers of data i.e. elementary, junior high, high school and College, on the Model Type select Additive, on Model Components select plus seasonal Trend. Check list on the kind of forecast, then on a Number of forecast contents 4, because it would be foretold by 4 levels above, for Starting from the origin content with 36, because the data is numbered 36 and will start the data foreseen to 37.
3) click the Storage → then check list of Trend line, Seasonals, Fits, Residual and Forecast → click OK → Click OK

b. Multiplicative Model
1) Steps i.e. click menu Stat → click Time Series → click Dekomposition.
2) Enter the student Dropout Data into Variable, seasonal length in body 4 because there are four tiers of data i.e. elementary, junior high, high school and College, on the Model Type select Multiplicative, on Model Components select plus seasonal Trend. Check list on the kind of forecast, then on a Number of forecast contents 4, because it would be foretold by 4 levels above, for Starting from the origin content with 36, because the data is numbered 36 and will start the data foreseen to 37.
3) click the Storage → then check list of Trend line, Seasonals, Fits, Residual and Forecast → click OK → Click OK

3. METHOD

Data collection is a systematic and standardized procedures to obtain the necessary data.[xxix] Data collection was conducted in order to obtain the information needed in order to achieve the research objectives.[xxx] The data collection methods used in this research are:

1. The method of Documentation
   The data used in this study i.e. data percentage of students dropping out of school year 2010-2017 Central Java Office of the Central Bureau of statistics the provision of Central Java.
2. The method of Interview
   The method of interview is one of the techniques of data collection undertaken by way of asking directly at the source of the information. In this study, interviews were conducted with stakeholders from the Central Bureau of statistics section that handles the IPDS data field sisiwa dropped out of school in the Central Java province.
3. the method of the study of Literature
   Based on references which are relevant and are used to gather the necessary information in the preparation of the report in the form of books, journals, scientific papers and others who support the preparation of this report.

The data will be analyzed in this report, namely the data the percentage of students dropping out of school 2009-2017 year of Central Java province, which will then be used to predict the percentage of students dropping out of school in Central Java Province year 2018 using the method The decomposition. The analysis in this study uses the help of software Minitab 18. The analysis includes:

1. Identification of the Model
2. Trend Analysis
3. Analysis of Seasonal
4. The cycle
5. Irregular
6. The size of the accuracy of forecasting

As for the accuracy of the measurements is often used to find out the accuracy of a method of forecasting in model time series data is as follows[xxxi]:

a. MAPE (Mean Absolute Percentage Error) is a measure of the relative precision used to know presentese deviation results of forecasting.
b. MAD (Mean Absolute Devotion) States the deviation in forecast unit on the same data, with absolute value merata-ratakan error (deviation of the entire results).
c. MSD (Mean Square Devotion) is a measure of deviation of the forecast with quadratic merata-ratakan error (deviation of all predictions).

In phase of forecasting using their MSD and MAD as a measure of the accuracy of forecasting is most effective, because the MSD and MAD is the size of the absolute that is heavily dependent on the scale of time series data. Because of those reasons, then use the calculation of the MAD and MSD.

4. RESULTS AND DISCUSSION

4.1. The Result

The data will be analyzed in this study i.e. data percentage of students dropping out of school 2009-2017 year of Central Java province, which will then be used to predict the percentage of

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students dropping out of school in Central Java Province year 2018 using the the decomposition method. The analysis in this study using Minitab software 18..

Table 1 Data on Student Dropouts (percent) of Central Java province Year 2009-2017

Year/ Age	7-12	13-15	16-18	19-24
2009	1.07	14	46.24	88.95
2010	0.97	13.67	44.28	83.19
2011	0.78	10.61	43.91	83.19
2012	0.59	9.96	40.41	83.19
2013	0.38	8.81	39.66	81.94
2014	0.15	4.8	32.22	79.06
2015	0.09	4.22	32.05	78.9
2016	0.04	4.27	31.72	77.84
2017	0	4.1	31.04	77.51

Source : BPS Province Of Central Java

With the use of software Minitab 18 retrieved results output and its analysis as follows.

1. Model Identification

   Time series plot against the percentage of Students dropping out of school of Central Java province Year 2009-2017 can be seen in Figure 5 below. Number Index 1 represents ELEMENTARY SCHOOL, 2 represents the junior high school, three represent the same level/Equivalent and 4 representing the College.

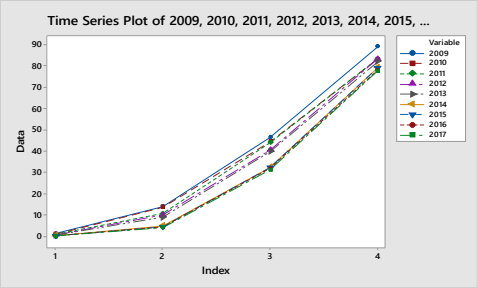

Figure 5 percentage of Students dropping out of school of Central Java province Year 2009-2017

Based on Figure 5 above, it can be seen that the recurrent time series pattern at any given time. The average percentage of students dropping out of school is increasing at every level of college education. The number of the highest percentage of dropouts occurred on Secondary College in the year 2009 and the lowest percentage of dropouts occurred on secondary Elementary school in 2017.

2. Analisis Trend

   a. Trend Analysis

   Based on the analysis of the data using software MINITAB 18 linear trend equation is obtained for the data the percentage of students dropping out of school, namely: : $Y_t = 38.050 - 0.3193 \times t$, and Trend analysis of Images obtained as follows:

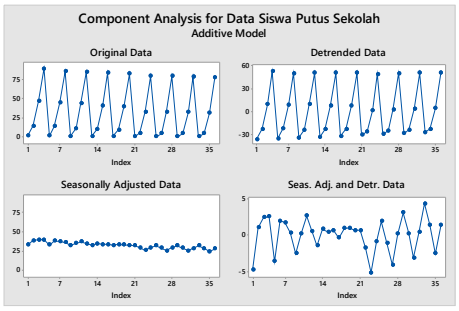

Figure 6 Trend Analysis Model of additive

Based on the above, Figure 6 shows the components for the actual data (the original data), data is not the trend (detrended data), the data seasonal adjustments (seasonally adjusted data) and a combination of seasonal adjustment and trend data are not seasonally adjusted (and detrended data).

b. Multiplicative Model

Based on the analysis of the data using software Minitab 18 linear trend equation is obtained for the data the percentage of students dropping out of school, namely: $Y_t = 71.14 - 1.741 \times t$, and Trend analysis of Images obtained as follows:

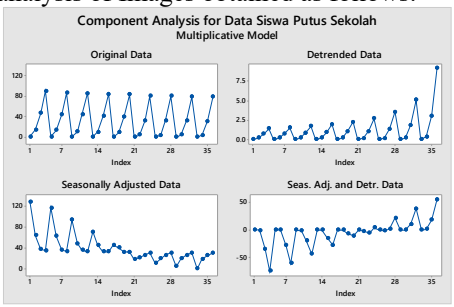

Figure 7 Trend Analysis Models Multiplicative

Based on the above, Figure 7 shows the components for the actual data (the original data), data is not the trend (detrended data), the data seasonal adjustments (seasonally adjusted data) and a combination of seasonal adjustment and trend data are not seasonally adjusted (and detrended data).

3. Analysis Of Seasonal

   a. Additive Models

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With the use of software Minitab analysis seasonal Images obtained 18 as follows:

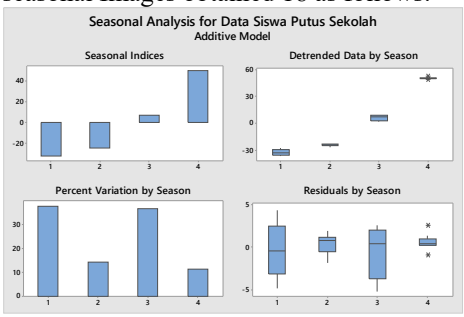

Figure 8 Analysis of Seasonal Additive Model

In Figure 8 can be seen a seasonal analysis, where the average index value of the season are:

Elementary school :-31.8687
Junor high school :-24.4450
Senior high school : 6,719
College : 49.5969

The seasonal analysis demonstrating that a seasonal indication of expectations has a value of 0% and the results we can is the percentage of students dropping out of school at a level Equal to elementary school is 3086.9% over the average value, junior high school is 2344.5% above the average value, high school is 571.9% below value expectations, level of the College is 4859.7% below the value of hope. So it can be seen that the level of elementary school has a seasonal pattern. While at the college level is the lowest index of seasonal index desired.

b. Multiplicative Model

With the use of software Minitab analysis seasonal Images obtained 18 as follows:

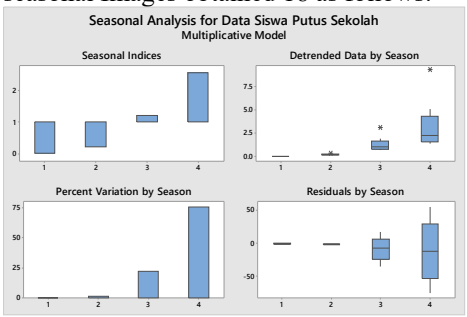

Figure 8 Analysis of Seasonal Multiplicative Model

In Figure 9 can be seen a seasonal analysis, where the average index value of the season are:

Elementary school : 0.00827
Junor high school : 0.21806
Senior high school : 1.22335
College : 2.55032

The seasonal analysis demonstrating that a seasonal indication of expectations has a value of 0% and the results we can is the percentage of students dropping out of school at a level Equal to elementary school is 0.00827% over the average value, junior high school is 0.21806% above the average value, high school is 1.22335% below value expectations, level of the College is 2.55032% below the value of hope. So it can be seen that the level of elementary school has a seasonal pattern. While at the college level is the lowest index of seasonal index desired.

4. The cycle

The effects of cyclical fluctuations is defined as surging around the trend. Cyclical pattern is difficult to model in a time series since the pattern is typically not stable/fixed. Fluctuations like waves heaving around trend rarely happen in a fixed time interval and the magnitude of the fluctuations tend to vary. The decomposition method can be extended to analyze cyclical data. However, due to the irregular nature of cyclical, cyclical components of penganalisaan often require the discovery of the incident that happened to be.

5. *Irregular*

a. Model Aditif

Irregular components showed a varying circumstances or are likely to be changed in the time series after other components removed. This component is called the residual or error. Prediction of the percentage of students dropping out of school in Central Java Province year 2018 every level is by multiplying the four components namely the trend, seasonal, cyclical and irregular each month to produce the following prediction values:

Elementary school 2018 : -5.6336 = 0%
Junior high school 2018 : 1.4709 %
Senior high school 2018 : 32.3134 %
College 2018 : 74.8741 %

For more details see our Figure data plot time series Decomposition model the following Additives:

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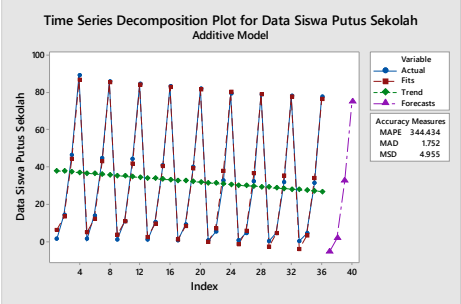

Figure 10 Plots of Data Time Series Decomposition Model of additive

Figure 10 shows the results of prediction percentage of students dropping out of school of Central Java the year 2018. In the graph shown that formed match between trend and seasonal component which means the actual data quite well. We can see that the average student dropouts decreased from every level of education. Forecasting results in the year 2018 continued to decline compared to the previous years.

b. Model Multiplicative

Irregular components showed a varying circumstances or are likely to be changed in the time series after other components removed. This component is called the residual or error. Prediction of the percentage of students dropping out of school in Central Java Province year 2018 every level is by multiplying the four components namely the trend, seasonal, cyclical and irregular each month to produce the following prediction values:

Elementary school 2018 : 0.05562%
Junior high school 2018 : 1.08630 %
Senior high school 2018 : 3.96455 %
College 2018 : 7.82465 %

For more details see our Figure data plot time series Decomposition model the following:

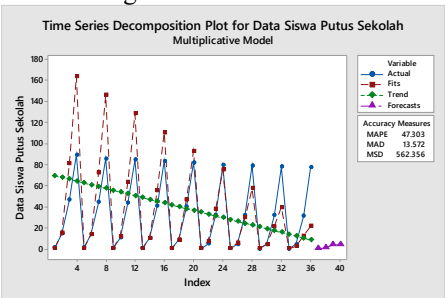

Figure 11 Plot Of Data Time Series Decomposition Model Multiplicative

Figure 11 shows the results predicted percentage of students dropping out of school of Central Java the year 2018. In the graph shown that formed the mismatch between trend and seasonal component which means the actual data is not good enough. We can see that the average student dropouts decreased from every level of education.

Forecasting results in the year 2018 continued to decline compared to the previous years.

6. The determination of the best Model

Determination of the best models we can compare the values of the MAD and MSD from experiments using Minitab 18, following the results of the model and model multiplicative additives:

Table 1 results of the MAD and Additive Model and MSD Multiplicative

	Additive Model	Model Multiplicative
MAD	1.752	13.572
MSD	4.955	562.356

From the table above it can be concluded that the forecasting model using the Decomposition method of additive, better good than on the model Multiplicative, evidenced by the results of the calculations of Minitab 18.

4.2. Discussion

Based on Figure 5 looks that the percentage of students dropping out of school shows conditions that are not constant and tend to progressively decline. This may be caused because the good education system in Indonesia. It can be seen also for the highest percentage of students dropping out of school is still at the college level, while the lowest percentage of students dropping out of school at the primary school level.

Data analysis conducted in the search for the best model that can describe the data the percentage of students dropping out of school of Central Java province, among others:

1. The Model Identification Stage

At this stage identification model to be chosen the right model that can represent data percentage of students dropping out of school in Central Java Province. Identification model of runtun time done by creating a data plot runtun time. Based on Figure 5 to see that data

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the percentage of students dropping out of school of Central Java province year 2009-2017 have a trend or seasonal.

2. Trend Analysis

Based on the results of the trend analysis model of the linear trend equation obtained Additive to data the percentage of students dropping out of school, namely: $Y_t = 38.050 - 0.3193 \times t$, and a linear trend equation is obtained for the data the percentage of students dropping out of school, namely: $Y_t = 71.14 - 1.741 \times t$ model Multiplicative. When viewed from the picture based on Figure 6 and 7, shows the components for the actual data (the original data) model of dam Multiplicative Additives tend to be the same, no data trend (detrended data) model of additives tend to be constant while the model Multiplicative cendenrung go up as time goes by, the seasonal adjustment of the data (seasonally adjusted data) of different Additive models, tend to be constant at around 25 while the Multiplicative model tends to fall over time, and the combination of adjustments data on seasonal and not trend (seasonally adjusted and detrended data) Additive models tend not to have the trend while the model Multiplicative tend to have a rising trend

3. Analysis Of Seasonal

At this stage can be seen to have additive model better than the seasonal Multiplicative. Judging from the results of the average index value, the model Multiplicative in whole to be under value expectations index. Analysis of the model Aditifi has the top rated at the level of elementary school with a value of 3086.9% above average. The lowest value of the acquisition and analysis of seasonal model Multiplicative is present on the College level with a value below the average 255,032.

4. Value Analysis Of Phase Cycle

The effects of cyclical fluctuations is defined as surging around the trend. Cyclical pattern is difficult to model on the right in a time series since the pattern is typically not stable/fixed. Fluctuations like waves heaving around trend rarely happen in a fixed time interval and the magnitude of the fluctuations tend to vary. The decomposition method can be extended to analyze cyclical data. However, due to the irregular nature of cyclical, cyclical components analysis of the circuit often require the discovery of the incident that happened to.

5. Irregular Stage

Irregular components showed a varying circumstances or are likely to be changed in the time series after other components removed. This component is called the residual or error. Prediction of the percentage of students dropping out of school in Central Java Province year 2018 every level is by multiplying the four components namely the trend, seasonal, cyclical and irregular. The result is much different between the additive and the model Multiplicative. Additive models have the value of the percentage of students dropping out of school the higher ranks of his education then the higher percentage. The result elementary school registration -5.6336% or equal to 0% because the value minus, junior high school outcome of 2018 1.4709%, high school/2018 32.3134% and Equal level Colleges 2018 of 74.8741%. Model multiplicative also had the same conclusion, namely the value of the percentage of students dropping out of school the higher ranks of his education then the higher percentage. But the forecasting value is very much different. Results forecasting model Multiplicative profit primary level of 0.05562%, junior high school/2018 1.08630%, high school level/Equivalent of 3.96455% in 2018. And persentase students dropped out of school at the highest level of College 7.82465% 2018.

The stage of determination of the best Model of the determination of the best models we can compare the values of the MAD and MSD from experiments using Minitab 18, viewed from the value of the MAD, the additive model is smaller than the model Multiplicative that is of 1,742 and model Multiplicative of 13,572. If viewed from the Additive model, MSD value was also better than the Multiplicative model, with the result of the additive model and model 4,955 Multiplicative sebesar 562,356. as indicated in table 5. Therefore, the results of the best forecasting method is to use the decomposition model of additives.

6. Determination of the best models

The stage of determination of the best Model of the determination of the best models we can compare the values of the MAD and MSD from experiments using Minitab 18, viewed from the value of the MAD, the additive model is smaller than the model Multiplicative that is of 1,742 and model Multiplicative of 13,572. If viewed from the

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This research needs to be done because in Indonesia, although nine years of compulsory school regulations have been issued in fact there are still many individuals dropping out of school mainly due to economic factors namely the cost of education. Research needs to be done to predict the number of students dropping out of school at the Primary School , Junior High School, Senior High School and Colleges levels due to educational cost difficulties. This research is unique because it has to study the pattern of data on the number of students dropping out of school from 2009-2017 and after knowing the pattern of data it is determined that the appropriate forecasting method is the Additive Decomposition method. The criteria for analyzing the decomposition method are the best forecasting results if MAD is minimal and MSD is minimal. From the summary of research results Table 1 page 8 obtained a minimum MAD value of 1.752 and a minimum MSD value of 4.955 The results was achieved by the Additive Decomposition Method. The main finding that contributes to the solution to the problem of this study is the method of forecasting the number of dropout students, namely Additive Decomposition. With this Additive Decomposition method, it is believed and significant that forecasting results for the number of students dropping out of school, first Primary School level by 0%, second forecasting percentage of students dropping out of Junior High School level by 1.47%, third forecasting percentage of students dropping out of Senior High School level by 32.31% and the latest forecast is the percentage of students dropping out of Colleges level by 74.87%. The best forecast for dropout students is a solution to the problem of minimizing the number of students dropping out of school in Central Java and can be used by users, planners and policy makers in education in Central Java, especially in predicting the number of educational scholarships needed so that there are no students dropped out of school in the Province of Central Java, Indonesia just because of the difficulty of paying for education.

5. CONCLUSIONS AND SUGGESTIONS

5.1. Conclusion

Based on the above analysis of the results obtained the following conclusions.

1. Model best describes the decomposition of the percentage of students dropping out of school in Central Java Province year 2018 is to use the Additive model is supported with the results of the calculation of the MAD amounted to 1,752 and MSD calculation results of 4,955 berbantu software Minitab 18.
2. The results of the forecast percentage of students dropping out of school in Central Java Province year 2018 is the first forecast the percentage of students dropping out of school primary level of 0%, forecasting the percentage of students dropping out of school the first middle school rate of 1.47% third, forecasting percentage students dropout of high school level 32.31% and lastly forecasting the percentage of students dropping out of school level colleges of 74.87%.
3. The results of forecasting the number of dropout students can be used by users, planners and policy makers in education in Central Java, especially in predicting the number of educational scholarships needed in Central Java, Indonesia

5.2. Suggestions

1. In order for the reader To find out in advance about the material, and thus more forecasting, understanding this report.
2. For related agencies so that this report be input to address the large number of students dropping out of school because of economic factors with the solution of providing educational scholarships.

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