Inflation Persistence in East Nusa Tenggara

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Abstract—The research entitled Persistence of Inflation in East Nusa Tenggara aims to explain the influence and relationship of commodities or groups of goods and services which consists of seven groups, namely the food ingredients group (BAMA), processed food, cigarettes and tobacco groups (MAJADI), housing groups, water, electricity, and fuel (PERUM), clothing group (SAND), groups health (KES), education, recreation and sports group (PENDIDI), and the transportation, communication and financial services (TRANS) group for inflation in NTT. This study uses a multiple linear regression analysis methods secondary data collection in the form of data from publications of the Central Statistics Agency (BPS) East Nusa Tenggara. The results of this study indicate that the commodity or group of goods/services has a positive and significant effect on inflation in NTT. That is if there is an increase in prices on commodities or groups of goods/services then inflation in NTT will also increase. This happens because when there is a shock like decrease in fuel prices. Decreasing fuel prices will have an impact on commodity prices others due to increased production costs and can cause a rise in levels of inflation. Based on the results of statistical calculations carried out by the researcher then the BAMA and TRANS groups have the largest coefficient values of 0.266828 and 0.185637, followed by SAND, KES, PENDIDI, MAJADI and PERUM groups with coefficients of 0.185568, 0.181975, 0.093424, 0.074034, and 0.041901. That is if the government can maintain commodity prices, especially the material group food by developing regional superior commodities with commodities which has high inflation, the government can control or anticipate high inflation.

Keywords: BAMA group, MAJADI group, PERUM group, SAND group, KES group, PENDIDI group, TRANS group, inflation

I. INTRODUCTION

National inflation basically is a combine from all region inflation, then for aim national inflation controlling needs to obtain full description about region inflation behavior. In order to, studying about inflation persistence on region range and find out the important motive to implementation in many regions with considering that each region has different characteristics with the result that needed different inflation controlling policy on each region [1]. Wimanda said that between region inflations with national inflation not indicated there is convergence so the movement pattern often different with the national inflation [2]. This is can effect monetary policy is not fully effective to push the inflation rate at region, so region inflation needs to especially investigate (see Table 1).

TABLE I. INFLATION OF EAST NUSA TENGGARA, MAUMERE AND KUPANG CITY 2012-2016 (%)[3]

| Year | East Nusa Tenggara | Maumere | Kupang |
|------|-------------------|---------|-------|
| 2012 | 5.33              | 6.49    | 5.10  |
| 2013 | 8.41              | 6.24    | 8.84  |
| 2014 | 7.76              | 4.00    | 8.32  |
| 2015 | 4.92              | 3.89    | 5.07  |
| 2016 | 2.48              | 3.62    | 2.31  |
| 2017 | 2.00              | 2.05    | 1.70  |

A. Research Purpose

The purpose of this research are:
• To explain the influence of the food ingredients group toward East Nusa Tenggara inflation.
• To explain the influence of food ingredients group, water, cigarette, and tobacco toward East Nusa Tenggara inflation.
• To explain the influence of the housing group, electricity, water, and fuel toward East Nusa Tenggara inflation.
• To explain the influence of the clothing group toward East Nusa Tenggara inflation.
• To explain the influence of health group toward East Nusa Tenggara inflation.
• To explain the influence education group, recreation, and sport toward East Nusa Tenggara inflation.
• To explain the influence of transportation group, communication, and financial service toward East Nusa Tenggara inflation.
• To explain the influence of goods/service group (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI, and TRANS) toward East Nusa Tenggara inflation.

II. THEORY RESEARCH

A. Inflation Definition

Inflation is one of the macroeconomic indicators which is mean as indication of goods price increasing that has general
characteristic and continuously, increase of one or two goods cannot have called as inflation except if the increase is expanding or cause price increase of another good. By theory, basically inflation related with phenomenon of interaction between demand and supply. However, in fact inflation cannot separate from other influence factor as commerce and traffic swift and services and government policy role.

B. Inflation Impact

According to Muana the happening inflation in economy can give the impact as follows [4]:

- Inflation can push the retribution income between community members, and this is the retribution impact of inflation (redistribution effect of inflation).
- Inflation can cause decrease in economic efficiency (economic efficiency).
- Also inflation can cause change in output and employment opportunity (employment), in a more direct way that is with motivate the company to production more or less from that has been done, and also motivate people to work more or less from what has been done so far.
- Inflation can create unstable environment for the economic decision.

C. Framework of Thinking

By knowing commodity contribution or goods/services group to inflation persistence can help the government in the decision-making process to keep the inflation stability. Based on the description then the framework of thinking researcher as follows Figure 1:

![Fig. 1. The framework of thinking researcher.]

D. Hypothesis

Based on the background and the description theory then the hypothesis from this research is:

- \( H_0: \alpha_1 = 0 \) there is influence between BAMA and inflation
- \( H_0: \alpha_1 \neq 0 \) there is no influence between BAMA group and inflation
- \( H_0: \alpha_2 = 0 \) there is influence between MAJADI and inflation
- \( H_0: \alpha_3 = 0 \) there is influence between PERUM and inflation
- \( H_0: \alpha_3 \neq 0 \) there is no influence between PERUM and inflation
- \( H_0: \alpha_4 = 0 \) there is influence between SAND and inflation
- \( H_0: \alpha_4 \neq 0 \) there is no influence between SAND group and inflation
- \( H_0: \alpha_5 = 0 \) there is influence KES and inflation
- \( H_0: \alpha_5 \neq 0 \) there is no influence between KES and inflation
- \( H_0: \alpha_6 = 0 \) there is influence between PENDIDI with inflation
- \( H_0: \alpha_6 \neq 0 \) there is no influence between PENDIDI with inflation
- \( H_0: \alpha_7 = 0 \) there is no influence between TRANS and inflation
- \( H_0: \alpha_7 \neq 0 \) there is no influence TRANS and inflation
- \( H_0: \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7 = 0 \) by together independent variable influence to dependent variable.
- \( H_1: \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7 \neq 0 \) by together independent variable to influence to dependent variable.

III. RESEARCH METHODS

A. Research Approach

This research uses quantitative analysis approach that is research whose quantitative analysis more focus to obtained data that’s is inflation data (Consume Price Index) and commodity data or goods/services groups (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI & TRANS) then analyzed and then interpreted.

B. Type and Source Data

1) Data type: The used data in this research is quantitative data which is time series. Time series data is in order data according to time, in this research based on availability data then used inflation data of East Nusa Tenggara Province is consumer price index data base year 2012=100 and seven goods/services commodity group time series monthly inflation forming period January 2012 until December 2016 (60 month) are food ingredient group (BAMA); food group, water, cigarrate and tobacco (MAJADI); housing group, water, electricity, and fuel (PERUM); clothing group (SAND); health group (KES); education group, recreation, and sport (PENDIDI); transportation group, communication, and financial service (TRANS).
2) Data source: In this study researchers used secondary data. Secondary Data is data obtained through intermediary media or indirectly in the form of financial reports, books, notes, evidence that already exists, or archives both published or not. The data source is from the official websites of Bank Indonesia (www.bi.go.id) and the official website of the Central Statistics Agency for East Nusa Tenggara (www.ntt.bps.go.id).

C. Data Collection Technique

Researchers using data collection techniques in this study is a literature study. For literature study techniques are done by collecting data based on sources obtained from the literature that discusses inflation persistence.

D. Data Analysis Technique

Data analysis techniques using multiple linear regression method, the data obtained and then analyzed on the basis of the existing theory so as to provide a fairly clear picture. Furthermore, it is investigated then a conclusion is drawn from the results of the analysis. As for analysis, researchers analyzed quarterly inflation based on 2012-2016 data. The stages of the analysis technique are as follows:

1) Multiple regression analysis: The analytical method that will be used in this research is multiple linear regression using software Eviews 7.0 thus providing an overall picture of the relationship between one variable and another. To find out whether there is a significant effect of the commodity/service effect on inflation, it is done by using multiple linear regression statistical analysis with quantitative descriptive approach. The data related to the research variables obtained were processed using Microsoft Office Excel 2007. Then The processed products are estimated using software Eviews 7.0. Estimation results can be seen in table 2 below:

### Table 2. Estimation Results

| Variable  | Coefficient | Std. Error | t-Statistic | Prob.  |
|-----------|-------------|------------|-------------|--------|
| C         | -2.889259   | 5.210800   | -0.554475   | 0.5816 |
| BAMA      | 0.266828    | 0.011699   | 15.97891    | 0.0000 |
| MAJADI    | 0.074034    | 0.028764   | 2.573873    | 0.0129 |
| SAND      | 0.185568    | 0.053388   | 3.475840    | 0.0010 |
| KES       | 0.181975    | 0.056630   | 3.213398    | 0.0023 |
| PERUM     | 0.041901    | 0.083911   | 0.499355    | 0.6196 |
| PENDIDI   | 0.093424    | 0.039405   | 2.370877    | 0.0215 |
| TRANS     | 0.185637    | 0.014646   | 12.67847    | 0.0000 |
| R-squared | 0.999188    |            |             |        |
| Adjusted R-squared | 0.999079 |            |             |        |

IV. RESULTS AND DISCUSSION

A. Research Results

1) Multiple regression analysis: In analyzing commodity/service effect on inflation, it is done by using multiple linear regression statistical analysis with quantitative descriptive approach. The data related to the research variables obtained were processed using Microsoft Office Excel 2007. Then The processed products are estimated using software Eviews 7.0. Estimation results can be seen in table 2 below:
The regression line equation model is:

\[
\text{Inflation}_t = -2.889259 + 0.266828 + 0.074034 + 0.185568 + 0.181975 + 0.041901 + 0.093424 + 0.185637 + \epsilon
\]

From the estimation results of the model to determine the source of inflation in East Nusa Tenggara Province in Table 2 can be explained as follows:

- Constant value \((\alpha)\) has meaning if the price of a commodity or group of goods/services (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI, TRANS) equal to zero, then inflation in East Nusa Tenggara is equal to -2.889259.

- Coefficient value of the foodstuff group (BAMA) amounted to 0.266828 which means that if food prices increase by 1% then inflation in East Nusa Tenggara by 0.266828, if the price of foodstuffs decreases by 1% then inflation in East Nusa Tenggara decrease by 0.266828.

- Coefficient value of the processed foods group, waters, cigarettes and tobacco (MAJADI) of 0.074034 which means that if the price of processed food, waters, cigarettes and tobacco increase by 1% then inflation in East Nusa Tenggara increase by 0.074034 and if the price of processed food, waters, cigarettes and tobacco decrease 1% then inflation in East Nusa Tenggara decreased by 0.074034.

- Coefficient values for housing, water, electricity and fuel groups (PERUM) amounted to 0.185568 which means that if the price of the PERUM group increase by 1% then inflation in East Nusa Tenggara increase by 0.185568 and if the price of the PERUM group fell by 1% then inflation in East Nusa Tenggara fell by 0.185568.

- The coefficient value of the clothing group (SAND) amounted to 0.181975 which means that if the price of the clothing group increased by 1% then inflation in East Nusa Tenggara increase by 0.181975 and if the price of the clothing group decreased by 1% then inflation in East Nusa Tenggara decreased by 0.181975.

- Health group coefficient values (KES) of 0.041901 which means that if the price of the health group increases 1%, inflation in East Nusa Tenggara increases by 0.041901 and if the price of the health group decrease 1% then inflation in East Nusa Tenggara decrease by 0.041901.

- Coefficient values for education, recreation and sports groups (PENDIDI) of 0.093424 which means that if the price of the PENDIDI group increase by 1% then inflation in East Nusa Tenggara increase by 0.093424 and if the price of the PENDIDI group decrease by 1% then inflation in East Nusa Tenggara decrease by 0.093424.

- The coefficient value of the transportation, communication and financial services group (TRANS) amounted to 0.185637 which means that if the price of the TRANS group increase 1% then inflation in East Nusa Tenggara increase by 0.185637 and if the price of the TRANS group increase by 1% then inflation in East Nusa Tenggara decreased by 0.185637.

2) \(T\)-test: The \(t\)-test value can be seen in each independent variable. With testing used is as follows:

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| BAMA     | 0.266828    | 0.016609   | 15.97891    | 0.0000 |
| MAJADI   | 0.074034    | 0.028764   | 2.573873    | 0.0129 |
| SAND     | 0.185568    | 0.053388   | 3.475840    | 0.0010 |
| KES      | 0.181975    | 0.056630   | 3.213398    | 0.0196 |
| PERUM    | 0.041901    | 0.083911   | 0.499355    | 0.0002 |
| PENDIDI  | 0.093424    | 0.039405   | 2.370877    | 0.0215 |
| TRANS    | 0.185637    | 0.014646   | 12.67487    | 0.0000 |

Based on table 3 above, it can be seen the probability value of the independent variables used in the research shows that six of the seven groups of goods and services have a positive and significant effect on inflation in East Nusa Tenggara, namely BAMA, MAJADI, SAND, PERUM, PENDIDI, and TRANS group. While the KES group had a positive but not significant effect on East Nusa Tenggara inflation.

3) \(F\)-test: Based on table 4 above the \(F_{\text{hitung}}\) value is 9144.982. \(F_{\text{hitung}}\) value in the 5% significance level it shows 2.19. To see \(F_{\text{hitung}}\) value in advance the value of the numerator is determined (n1) and denominator (n2). Value of n1 = k (number of used samples) – k, then the value of n2 = 52. With value n1 = 7 and n2 = 57 then it can be seen that value of \(F_{\text{hitung}} > F_{\text{ tabel}}\) Therefore \(H_0\) is rejected and \(H_a\) is accepted. This shows that the independent variables jointly significantly influence in East Nusa Tenggara Province inflation. So the commodity hypothesis or group of goods/services (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI, TRANS) influences on East Nusa Tenggara Inflation can be accepted (see Table 4).

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| BAMA     | 0.266828    | 0.016609   | 15.97891    | 0.0000 |
| MAJADI   | 0.074034    | 0.028764   | 2.573873    | 0.0129 |
| SAND     | 0.185568    | 0.053388   | 3.475840    | 0.0010 |
| KES      | 0.181975    | 0.056630   | 3.213398    | 0.0196 |
| PERUM    | 0.041901    | 0.083911   | 0.499355    | 0.0002 |
| PENDIDI  | 0.093424    | 0.039405   | 2.370877    | 0.0215 |
| TRANS    | 0.185637    | 0.014646   | 12.67487    | 0.0000 |

4) Determination coefficient test (\(R^2\)): Based on the regression calculations result in table 2 it can be seen that the adjusted R-squared coefficient value is 0.999079. This means that 99.90% inflation value change in East Nusa Tenggara Province together can be explained by the independent variables used in the model, namely commodities or groups of goods/services (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI and TRANS). While the remaining 0.10% can be explained by other variables not included in the model.
B. Discussion

Analysis of commodities effect or goods/services group (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI and TRANS) on East Nusa Tenggara inflation has been done by researchers. The results of the research have been described in the previous section which includes multiple linear regression analysis and statistical tests. Based on partial statistical test results it is known that the independent variable is groups of BAMA, MAJADI, PERUM, SAND, PENDIDI and TRANS positive and significant effect on inflation in the province of East Nusa Tenggara, while the KES group has a positive but not significant effect on inflation in NTT.

Besides that to statistical tests simultaneously groups of BAMA, MAJADI, PERUM, SAND, KES, PENDIDI, and TRANS jointly significant effect and the ability of the dependent variable can be explained by the independent variable. Based on the analysis results, the influence of commodity or goods/services groups variables will be explained (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI and TRANS) in the initial hypothesis.

1) Influence of foodstuff groups (BAMA) to inflation in East Nusa Tenggara Province: The results of the regression equation analysis showed the coefficient value of the foodstuff group (BAMA) amounted to 0.266828 which means that if food prices increase by 1% then inflation in East Nusa Tenggara increases by 0.266828 assuming that other variables remain. The results of the t-statistic calculation obtained a BAMA group probability value of 0.0000 < α 0.05. Then it can be concluded that the BAMA group has a positive and significant effect on inflation in East Nusa Tenggara. BAMA group has the biggest coefficient value of 0.266828 so the BAMA group is very vulnerable to shock such as natural disruptions (bad weather, crop failure) and government policies (import restrictions). In 2013 inflation in Kupang city reached 8.84% while inflation in the East Nusa Tenggara province was 8.41% due to inflation in the foodstuffs group. The main cause of high inflation was pushed by the foodstuffs group especially the fresh fish sub-group due to the high of sea waves. Whereas in 2016 NTT inflation decrease to 2.48%, the inflation decrease was caused by a decrease in food inflation along with an increase in the supply of fresh fish, vegetables and spices as a result of improved weather conditions.

2) Influence of processed food groups, waters, cigarettes and tobacco (MAJADI) against inflation in East Nusa Tenggara Province: Regression analysis results showed the coefficient value of processed food, water, cigarettes and tobacco (MAJADI) of 0.074034, which means that if the price of processed food, waters, cigarettes and tobacco increase by 1% then inflation in East Nusa Tenggara increase by 0.074034. The results of the t-statistic calculation obtained a probability value of 0.0129, which means the MAJADI group had a positive and significant effect on inflation in East Nusa Tenggara Province. The increase in tobacco excise duty also helped accelerate the inflation rate in East Nusa Tenggara Province (KEKR).

3) The influence of housing, water, electricity, gas and fuel (PERUM) groups on inflation in East Nusa Tenggara Province: Regression analysis results show the coefficient value of the housing, water, electricity and fuel (PERUM) group is 0.185568, which means that if the PERUM group price increases by 1%, inflation in East Nusa Tenggara will increase by 0.185568. From the results of t-statistic testing, the probability value is 0.0010, which means that the PERUM group has a positive and significant effect on inflation in East Nusa Tenggara Province. East Nusa Tenggara inflation in 2013 amounted to 8.41% due to the administered price group. The high inflation that occurred mainly due to rising fuel prices in the middle of the year and increasing TTL. Kupang city inflation was recorded at 8.84%, inflation pressure of the PERUM group was 3.29%.

4) The influence of the clothing group (SAND) on inflation in East Nusa Tenggara Province: Regression analysis shows the coefficient value of the clothing group (SAND) is 0.181975, which means that if the price of the clothing group increases 1%, inflation in East Nusa Tenggara increases by 0.181975. While statistical testing obtained a probability value of 0.0023. Thus it can be concluded that the SAND group has a positive and significant effect on East Nusa Tenggara inflation. The increase in NTT inflation in 2013 which reached 8.41% was inversely proportional to the inflation in the clothing group which decreased by 5.71% compared to the previous year which reached 9.27%. This was caused by the low inflation in all clothing sub-groups with the biggest decrease in the personal goods and other clothing sub-group.

5) Influence of health groups (KES) on inflation in East Nusa Tenggara Province: Regression calculations show the coefficient value of the health group (KES) of 0.041901 which is means that if the price of the health group increases 1% then inflation in East Nusa Tenggara increases by 0.041901 and the probability value of 0.6196 which means the health group (KES) has a positive effect but not significant to inflation in East Nusa Tenggara. The high NTT inflation in 2013 was also caused by an increase in health subgroup inflation by 4.33% higher than the previous year of 2.06%. This was caused by an increase in the physical care services sub-group by 19.86% compared to the previous year of 1.88%.

6) The influence of education, recreation and sports groups (PENDIDI) on inflation in East Nusa Tenggara Province: The results of the regression analysis showed the coefficient value of the education, recreation and sports group (PENDIDI) of 0.093424 which means that if the price of the PENDIDI group increase by 1% then inflation in East Nusa Tenggara increase by 0.093424 while the results of the PENDIDI group's t-statistic test amounted to 0.0215, then it can be concluded that the PENDIDI group has a positive and significant effect on inflation in East Nusa Tenggara. The high
inflation of the Kupang city in 2013 also came from the PENDIDI group of 1.42%.

7) The influence of the transportation, communication and financial services (TRANS) group on inflation in East Nusa Tenggara Province: The results of the regression analysis show the coefficient value of the transportation, communication and financial services (TRANS) group is 0.185637, which means that if the price of the TRANS group increases 1%, inflation in East Nusa Tenggara increases by 0.185637 and the t-statistic value is 0.0000, which means TRANS group has a positive and significant effect on East Nusa Tenggara inflation. In 2013 NTT inflation reached 8.41%, but decreasing inflationary pressure in TRANS group from 17.20% to 16.22% was able to inhibit NTT's inflation rate towards higher. The low inflation in this category was driven by the inflation rate in the transportation sub-group which recorded 22.52%, lower than the previous level of 23.76%.

The results of this regression are in accordance with structuralist theory that explains the causes of provenance inflation from the economic structure rigidity, especially the rigidity of the supply of foodstuffs and export goods. Because the "structural" causes of the increased production of these goods are too slow compared to their needs, thus raising the price of food ingredients and the scarcity of foreign exchange. The next effect is the increase in other prices, causing inflation. Inflation like this cannot be overcome simply by for example, reducing the amount of money in circulation, but must be overcome by developing the food and export sectors.

8) The effect of commodities or groups of goods / services on inflation in East Nusa Tenggara Province: \( F_{tstat} \) value is amounting to 9144.982. \( F_{tabel} \) value in the significance level of 5% it shows 2.19. Based on \( F_{tstat} \) value and \( F_{tabel} \) can be seen that the value of \( F_{tstat} > F_{tabel} \). Therefore \( H_0 \) is rejected and \( H_a \) is accepted. This shows that the independent variables jointly significantly influence inflation in East Nusa Tenggara Province. So that the commodity hypothesis or groups of goods/services (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI, TRANS) affect the inflation of East Nusa Tenggara can be accepted. Based on regression calculations, it is known that the adjusted R-squared coefficient value is 0.999079. This means that 99.90% changes in the inflation value of East Nusa Tenggara Province together can be explained by the independent variables used in the model, namely commodities or groups of goods/services (BAMA, MAJADI, PERUM, SAND, KES, PENDIDI and TRANS). While the remaining 0.10% can be explained by other variables not included in the model. Other variables in question such as government spending and other factors that have a relationship with inflation.

In general, NTT inflation which reached 8.41% in 2013 was caused by the transportation, communication and financial services group, the foodstuffs group, and the health group respectively 16.22%, 4.33% and 4.57%. The increase in fuel prices with a contribution of 2.73% was the main cause of high NTT inflation. In addition, an increase in the Electricity rate (TTL) every quarter, an increase in excise and tobacco and the adoption of horticultural import quotas also pushed inflation higher. Based on inflation-counting cities, inflation in Kupang City and Maumere City was recorded at 8.84% and 6.24%, respectively. The main cause of high inflation is driven by the foodstuffs group especially the fresh fish subgroup due to high sea waves (KEKR).

V. CONCLUSION

Based on the results of research conducted, inflation in East Nusa Tenggara is dominated by volatile food inflation (foodstuffs group) and administered prices (transportation, communication and financial services group). This is caused by shock such as natural disturbances (bad weather), government policies raising fuel prices, the cost of goods/services fees which are quite high due to inadequate infrastructure such as roads.

VI. SUGGESTION

The continued high rate of inflation in East Nusa Tenggara indicates that inflation control policies are not enough to originate from monetary policy alone. The needed for more intense attention to commodities that have high inflation rates include:

- Conduct a more in-depth study of market structure and trading mechanism.
- Cooperate with Bappeda (Badan Perencanaan Pembangunan Daerah) to align between the development of regional leading commodities with commodities that have high inflation persistence.

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