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## Effect of Unemployment Rate, Inequality and Investment Against Economic Growth on The Island of Sumatra

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### ABSTRACT

This study aims to analyze and empirically prove the effect of unemployment rate, inequality, and investment on economic growth on the island of Sumatra in a recently half of decade. Using panel dataset among N=154 districts/cities as entities on the island of Sumatra in the span period of six years (2015-2020), this study utilizes econometric panel model of multiple linear regression. This research suggests that the variables of unemployment rate and inequality density have a significantly negative correlation with economic growth on the island of Sumatra. Meanwhile, investment rate has positively significantly correlated with economic growth on the island of Sumatra. However, this study also has several limitation such follow: firstly, this study only uses three independent variables (unemployment, inequality, and investment) meanwhile not afford other factors or variables outside the model which may also affect the dependent variable (economic growth). Despite several limitations, this research contributes as equal as an input and evaluation for stakeholders in making policies (Government and Regional Government) so that they can produce more targeted policies in an effort to increase economic growth, especially for Regional Governments on the Island of Sumatra.

**Keywords:** Economic growth, unemployment rate, Sumatra Island

### 1. INTRODUCTION

The main goal of economic development is to create the highest growth. And, to eliminate and to reduce the level of poverty, income inequality and unemployment [1]. By understanding the main goal of economic development, we could also understand that economic development has not been running optimally by seeing economic growth low, high poverty and high unemployment rates, and poor income distribution as indicators. The economic situation can be measured, one of which is economic growth, which in 2020 Indonesia's economic growth experienced a significant decline to the level of -2.07 percent. The percentage indicates that the Indonesian economy in 2020 could not experience growth. Nevertheless, the performance of Indonesia's Gross Domestic Product (GDP) in 2020 has reached 10,722 trillion rupiah, while the value of GDP per capita is 39,557 million rupiah, as shown in Table 1.

Furthermore, the performance of Indonesia's economic growth in shows the deepest growth contractions occurred in the Transportation and Warehousing sector, which was -15.04 percent. And, the Accommodation and Food and Drink Provision sector grows -10.22 percent. On the other hand, all components of expenditures has been contracted except for the Government Consumption Expenditure component which is still experiencing positive growth. The Export of Goods and Services component became the component with the deepest contraction of -7.70 percent. Meanwhile, imports of goods and services, which are a reducing factor, contracted by -14.71 percent [2].

The emerging situation and the development of the Coronavirus Disease 2019 (COVID-19) pandemic in Indonesia has macro-triggered the Indonesia's economic recession in 2020. Amidst Pandemic Covid-19 in Indonesia, more than 1.3 million people were infected

since the first case was announced in March 2020. And, at least 35,000 people have died. However, efforts to inhibit the spread of the COVID-19 virus have hampered economic activities and the impact on the level of social welfare is increasingly felt by the community [3]. The government took concrete policy steps to deal with the COVID-19 pandemic, which in turn reduced the frequency of community mobility and activities did not run normally as before the COVID-19 pandemic. Thus, the COVID-19 pandemic not only have several impacts on public health, but also affect the economic conditions, education, and social life of the Indonesian people.

**Table 1: Macro Economic by Island in Indonesia in 2020**

Island	Economic growth (%)	Gross Regional Domestic Product (Trillion Rupiah)	GRDP per Capita (Thousand Rupiah)	Unemployment Rate (%)
Sumatera	-1.19	2,303	38,808	6.14
Jawa	-2.51	6,367	41,765	8.09
Bali dan Nusa Tenggara	-5.01	309	20,576	4.69
Kalimantan	-2.27	898	53,560	5.52
Sulawesi	0.23	704	35,338	5.45
Maluku dan Papua	1.44	257	34,260	5.50
INDONESIA	-2.07	10,722	39,557	7.07

Source: The Central Statistics Agency, 2021

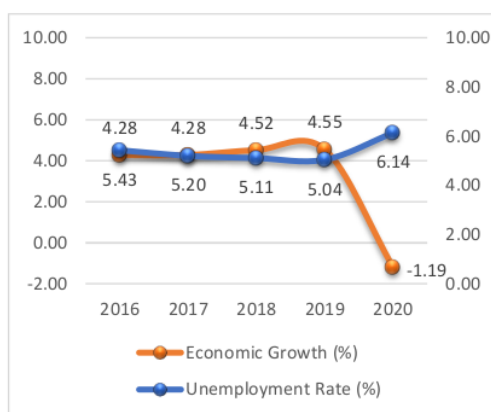
Table 1 shows the open unemployment rate (TPT) in the middle of the year, namely August 2020, reached 7.07 percent, an increase of 1.84 percentage points compared to August 2019. The achievement of the unemployment rate in 2020 can be said to be relatively high even though it is still below 10%. Furthermore, [4] also documented the fact that there were 29.12 million people (14.28 percent) of the working age population affected by COVID-19, consisting of unemployed due to COVID-19 (2.56 million people), Non-Working Forces due to COVID-19 (0.76 million people), temporarily not working due to COVID-19 (1.77 million people), and working residents who experienced reduced working hours due to COVID-19 (24.03 million people).

Based on Table 1, the problem of economic recession and high unemployment also occurred at the regional level where in 2020 economic growth contraction occurred in almost all islands in Indonesia,

of which the islands that experienced negative economic growth were the islands of Sumatra, Java, Bali and Nusa Tenggara, and Kalimantan. There are only two islands that experienced positive economic growth, namely Sulawesi Island and Maluku and Papua Island. On the other hand, in 2020 there is an island that has a fairly high unemployment rate, namely Java Island with a figure of 8.09%. This figure is higher than the unemployment rate for other islands and even above the unemployment rate for Indonesia (7.07%). Meanwhile, the lowest unemployment rate is in Bali and Nusa Tenggara, which is 4.69% in 2020.

One of the islands experiencing an economic downturn and a relatively high unemployment rate is Sumatra Island. In 2020 the economic growth of Sumatra Island experienced a contraction with an achievement of -1.19 percent, as shown in Figure 1. In fact, during the 2016-2020 period the economic growth rate of Sumatra Island was relatively below the national economic growth.

Meanwhile, Figure 1 shows the unemployment rate indicator, it turns out that the unemployment rate on the island of Sumatra is relatively high at an average of 5.38 percent in the 2016-2020 period, almost close to Indonesia's average unemployment rate (5.74 percent). In 2020 the unemployment rate on the island of Sumatra is 6.14 percent. The achievement of these indicators indicates that the island of Sumatra is experiencing a slowdown in economic growth and is still facing unemployment problems. On the other hand, Sumatra Island also has a GRDP per capita which is lower than GRDP per capita during the period between 2016-2020.



Source: Author's Plot from The Central Statistics Agency, 2021

**Figure 1: Economic Growth and Unemployment Rate on Sumatra Island in 2016-2020**

According to [5] high and persistent unemployment rates and accompanied by increasing inequality can be a negative determinant of economic growth. Countries that experienced rising unemployment and inequality levels during the crisis also face the prospect of a slower recovery and lower long-term growth. High unemployment also implies lower aggregate demand; not only does lower consumption hinder growth, but private investment in physical and human capital is also reduced, undermining future production capacity. Likewise, [6] mentions unemployment as one of the most important macroeconomic indicators.

Unemployment can have an adverse effect on growth through lower savings available for investment [7]. On the other hand, [8] report the welfare costs of Great Depression unemployment through lower consumption in the long run. Correspondingly, high unemployment will also increase the fiscal burden through lower incomes and higher welfare spending. The higher fiscal burden is likely to reduce public investment and increase public debt, constraining future capacity growth.

On the other hand, inequality will adversely affect economic growth and then the welfare of the people in an area will also experience a decline [9]. According to [10] inequality has an impact on growth both directly and indirectly through investment and accumulation of physical and human capital. Investment plays an important role in encouraging the development process so that economic growth is expected to increase.

A number of empirical studies that aim to analyze the effect of the variables of unemployment, inequality and investment on economic growth have produced strong findings that there is a relationship between economic growth, unemployment, inequality, and investment. [11] found that there is a two-way causality between unemployment and economic growth. The same finding was made by [12], [13] who found a negative relationship between economic growth and unemployment.

[14], [15] prove that simultaneously both inequality and growth have a negative impact on each other. [16] find that economic growth and inequality go in opposite directions. In line with this, [17] also proves that there is a significant negative relationship between inequality and long-term economic growth. In addition, [18] found that inequality has a negative impact on growth in the short, medium and long term. Meanwhile, physical and human capital investment, trade, urbanization, and privatization have a positive and significant impact on growth.

The concepts of unemployment and economic growth are both very important in terms of the formulation of economic and social policies. Economic growth is the most important indicator to achieve macroeconomic targets for developed and developing countries. Meanwhile, the concept of unemployment is a very important indicator in terms of social indicators. These variables are important because they both have the power to influence economic and social [6] [19]. Thus, the main objective of this research is to examine the effect of unemployment, inequality and investment on economic growth on the island of Sumatra.

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

[20] defines economic growth as a long-term increase in the ability of a country to provide more types of economic goods to its population; this capability grows with advances in technology, and the institutional and ideological adjustments it requires. [21] stated that economic growth is one of the most important indicators in analyzing the economic development that occurs in a country. Economic growth shows the extent to which economic activity will generate additional income for the community in a certain period.

One growth model that contributes to neoclassical growth theory is the Solow growth model. The Solow neoclassical growth model is a development of the Harrod-Domar formulation by adding a second factor, namely labor, and introducing a third independent variable, namely technology, into the growth equation. However, unlike the Harrod-Domar model which assumes constant returns to scale with standard coefficients, Solow's neoclassical growth model adheres to the concept of diminishing returns to scale from labor and capital inputs if they are analyzed separately; if both are analyzed simultaneously, Solow also uses the assumption of the fixed yield scale. Technological progress is determined as a residual factor to explain economic growth in the long run, and the high and low growth itself by Solow and other theorists is assumed to be exogenous or not influenced by other factors. Solow's neoclassical growth model uses the standard aggregate production function, namely:

$$Y = K^\alpha (AL)^{1-\alpha} \quad (1)$$

where Y is the gross domestic product, K is the stock of physical and human capital, L is labor, and A is the productivity of labor, whose growth is determined exogenously. Because the rate of technological progress is determined exogenously, Solow's neoclassical model is sometimes also referred to as the "exogenous" growth

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model. The symbol represents the elasticity of output to capital (or the percentage increase in GDP that comes from 1 percent increase in physical capital and human capital). It is usually calculated statistically as the share of capital in the calculation of a country's national income [22].

Furthermore, in economic theory, Okun's law is known, namely the law introduced by Arthur Okun (1962) to empirically test the relationship between unemployment and economic growth. Okun's law states that there is a linear negative relationship between unemployment and economic growth, ie a 1% increase in the unemployment rate will cause a decrease in economic growth by 2% or more [23]. [24] explain that the output gap (potential output-actual output) will increase by 2 percent. The loss of economic output is an aggregate calculation of the loss of individual income. The amount of lost income is different for each individual, distributed in its own way. In general, this impact is felt by the poor more than the rich. So it can be said that unemployment results in an unequal distribution of income.

Unemployment rates that are too high are seen as a national concern, as this indicates that many people are unable to support themselves and at the same time do not contribute to national output [25]. The main impact of unemployment on the economy is the loss of production and worsening of income distribution. Unemployment indicates the unused human resources, this is a form of wasting resources. Resources that exist but are not used for the production process will result in the economy's output not being at its optimal value [26].

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Theories linking growth and inequality assume that inequality impacts growth both directly and indirectly through investment and accumulation of physical and human capital. Inequality tends to reduce growth when credit markets are imperfect or high inequality creates barriers to productive investment in human and physical capital, especially among the poor, worsening inequality raises birth rates, reduces investment in human capital, weakens domestic demand; pressure to increase government redistributive tax policies (median voter model), social tensions and an unstable socio-political environment reduce investment by creating a weak business climate, and technology and mobility concentrate highly skilled workers in certain sectors [27]. High inequality can slow down the pace of growth, leading to undesirable social and economic impacts ([28];[29]). Conversely, lower levels of inequality can accelerate growth, the poor earn higher incomes and are enabled to share more in total growth [30].

Based on the theoretical basis put forward, the hypothesis formulated in this study is that the unemployment rate, inequality, and investment are thought to have a significant influence on economic growth.

### 3. RESEARCH METHODOLOGY

This study utilize the dataset which are sourced mainly from the Central Statistics Agency. Including GRDP on the basis of constant prices, unemployment rate, gross fixed capital formation (PMTB) as a proxy for investment variables from all regencies/cities on the island of Sumatra from 2015 to 2020.

This study uses multiple linear equation econometric models (multiple regression) for panel data which is a combination of cross sections, namely 154 districts/cities on Sumatra Island with a time series of six years (2015-2020). To obtain an estimate of each variable and parameter, statistical data and models were processed using Stata 15 software.

According to [31] some of the advantages of using panel data are as follows:

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a. Able to control the heterogeneity of variables that are not included in the model (unobserved heterogeneity),
- b. Can provide intensive data, reduce collinearity between variables, increase degrees of freedom and be more efficient,
- c. Better to study dynamics of adjustment,
- d. Able to identify and measure effects that simply cannot be overcome in only cross section data or time series data only,
- e. Can minimize the bias generated by individual aggregation due to more data units.

The form of the multiple linear regression model that will be used in this study is multiple linear regression with the dependent variable, namely the economic growth variable (proxied by GRDP) and the independent variable, namely the variable unemployment, inequality, and investment (proxied by PMTB). The equation function formulated is as follows.

$$GROWTH = f(UNEMP, INEQ, INV) \quad (2)$$

with:  
*GROWTH*: Economic Growth  
*UNEMP* : Unemployment Rate  
*INEQ* : Inequality  
*INV* : Investment

To estimate the panel data regression model, there are three commonly used approaches, namely the common effect model (CEM) or also known as Pooled Least Square (PLS), fixed effect model (FEM), and random effect model (REM) [32]. Statistical results obtained from data processing are used to test hypotheses. This hypothesis test is useful for checking or testing whether the regression coefficient obtained is significant (significantly different). The meaning of this significance is a regression coefficient value which is not statistically equal to zero. If the slope coefficient is equal to zero, it means that there is not enough evidence to state that the independent variable has an influence on the dependent variable [33]. Thus, in detail the test of the criteria is carried out as follows.

- a. Economic criteria (signs and quantities) of economic theory.
- b. Statistical criteria consisting of the following.
  - T test (test for individual parameter significance/partial test), to test each explanatory variable that significantly affects endogenous variables.
  - Fisher/F test (simultaneous significance test), to test the explanatory variables together/as a whole able to explain the variation of endogenous variables
  - R<sup>2</sup> test (coefficient of determination test), to see the model's ability to explain the behavior of endogenous variables.

#### 4. RESULT AND DISCUSSION

Based on the results of data processing that has been carried out, this study produces an equation model that is considered the best by using the variables of economic growth (proxied by GRDP), unemployment rate, inequality (proxied by Williamson index) and investment (proxied by PMTB). Thus, the equation formulated is as follows.

$$\ln GROWTH_{it} = \beta_0 + \beta_1 UNEMP_{it} + \beta_2 \ln INEQ_{it} + \beta_3 INV_{it} + \varepsilon_{it} \quad (3)$$

With:

- GROWTH : Real GRDP (Billion Rupiah)
- UNEMP : Unemployment Rate (%)
- INEQ : Inequality (Williamson Index)
- INV : Gross Fixed Capital Formation (Billion Rupiah)

After obtaining the equation of the model, then the right approach for panel data may be determined, namely using pooled least squares, fixed effect models

(FEM) or random effects models (REM). Therefore, the first step is to choose between pooled least square or fixed effect model (FEM). Based on the results of the F-test conducted, the probability F-statistical equation of the model is 0.0000, which is smaller than the 5% real level, so Reject H<sub>0</sub>, which means that the FEM approach is more appropriate to be chosen for the model equation.

Then, the next step is to choose between FEM or REM which is carried out with the Hausman test. Based on the Hausman test conducted on the equation, a p-value of 0.0000 was obtained. This shows that the test results are significant (p-value < 5%) so that H<sub>0</sub> is rejected, which means that the correct approach is Fixed Effect Model (FEM) for the model equation. The estimation results carried out on the model equations can be briefly shown in Table 2.

**Table 2: Estimation Result**

Variable	Coef.	Std. Err.	t	P> t
<i>unemp</i>	-.0133028	.0016	-8.27	0.000 (***)
<i>ln_ineq</i>	-.0182977	.0087	-2.09	0.037 (*)
<i>inv</i>	.0000447	0.0000	13.17	0.000 (***)
C	880.266	.0364	241.59	0.000 (***)
<i>R-squared</i>	0.2751			
<i>Prob &gt; F</i>	0.0000			
N	924			

Source: Estimate with Stata ver 15

Based on the tests carried out on the estimation of the model equation, the F-statistic probability results are less than 1%, which means that the regression model used is good/significant or in other words, the independent variables together have a significant effect on the dependent variable. Meanwhile, based on the test, the R-squared (R<sup>2</sup>) value is 0.2751 which indicates that the model obtained is able to explain the variation of economic growth of 27.51 percent.

##### 6 a. Analysis of the Effect of Unemployment Rate on Economic Growth

This study provides the main focus of analysis on the effect of the unemployment rate on economic growth. The proxy used to measure economic growth is to use real GRDP (at constant prices). Based on the results of the regression analysis, it is known that the unemployment rate has a significant influence on economic growth. The coefficient of the unemployment rate variable in the model equation is -0.013 and has shown a negative sign. This means that the variable unemployment rate has an effect on reducing economic

growth. Thus, the meaning is that if there is an increase in the unemployment rate by 1 percentage point (percentage points), real GRDP will decrease by 0.013 percent.

The unemployment rate variable in this study has a negative and significant effect on economic growth on the island of Sumatra. The decline in economic growth is in accordance with the theories and the results of previous research that have been previously stated in which unemployment has an impact on reducing economic growth. The coefficient value obtained from the unemployment rate variable can be said to have an impact on the decline in economic growth on the island of Sumatra. This means that for example the average real GRDP of Sumatra Island is 2,200 trillion rupiahs per year and if there is an increase in the unemployment rate by 1 percentage point (percentage points), the real GRDP of Sumatra Island will decrease by around 29 trillion rupiahs (down 0.013 percent of real GRDP).

By looking at the trend of the unemployment rate on the island of Sumatra, which has relatively decreased over the last few years, it will have an influence on increasing economic growth on the island of Sumatra. Therefore, if there is a decrease in the unemployment rate in the coming years, it will certainly result in higher economic growth on the island of Sumatra. To achieve increasing economic growth, great attention is needed from the Regional Government throughout Sumatra Island to expand employment opportunities so that there is an increase in the number of working population in the workforce. This means that efforts must be made to increase the level of employment opportunities for the population. On the other hand, the greater absorption of labor will encourage an increase in economic capacity so that the level of production will increase, and the purchasing power of the population will also increase due to increased employment opportunities.

#### **b. Analysis of the Effect of Inequality on Economic Growth**

Based on the results of the regression analysis, it is known that inequality has a significant effect on economic growth. In addition, the inequality coefficient obtained from the model equation is -0.018. The negative sign on the coefficient indicates that the inequality variable has an influence in reducing economic growth on the island of Sumatra. This means that the inequality variable has proven to have a negative and significant effect on economic growth. The decline in economic growth is also in line with similar theories and previous research. The coefficient of

inequality variable which is -0.018 can be interpreted that if there is a 1 percent increase in inequality (Williamson index) it will reduce real GRDP by 0.018 percent.

As an increase of 1 percent of inequality (Williamson index), it is in line with a decrease in economic growth of 0.018 percent has shown that the inequality variable has a large enough influence on the decline in economic growth, even greater than the coefficient of the unemployment rate. This means that suppose that the average real GRDP of Sumatra Island is 2,200 trillion rupiah per year and if there is an increase in inequality (Williamson index) of 1 percent, the real GRDP of Sumatra Island will decrease by about 40 trillion rupiah (a decrease of 0.018 percent from real GRDP).

By looking at the trend of the Williamson index on the island of Sumatra, which has relatively decreased over the last few years, it will have an impact on increasing economic growth on the island of Sumatra. Therefore, if there is a decrease in inequality (Williamson index) in the coming years, it will certainly result in higher economic growth on the island of Sumatra. To achieve increasing economic growth, it requires great attention from local governments throughout the island of Sumatra to optimize the management of their potential resources. This is because one of the efforts to reduce inequality is to increase the concentration of the leading sector economy so that it can increase the value of trade, encourage increased production, and increase regional revenues which will increase the degree of fiscal dependence. In fact, another effort is to improve the quality of human resources owned (demographic quality).

#### **c. Analysis of the Effect of Investment on Economic Growth**

Based on the results of the regression analysis, it is known that investment has a significant effect on economic growth. The investment coefficient obtained from the model equation is 0.000045. The positive sign on the coefficient indicates that the investment variable has an influence in increasing economic growth on the island of Sumatra. By looking at these numbers, the meaning is that if there is an increase in investment (Gross Fixed Capital Formation) of 1 billion rupiah, the real GRDP will increase by 0.000045 percent. Thus, it can be said that the investment variable has a positive and significant influence on economic growth on the island of Sumatra.

This increase in economic growth is in line with previous theory and research which states that investment has an impact on increasing economic growth. The coefficient value obtained from the investment variable (Gross Fixed Capital Formation) can be said to have an impact on increasing economic growth on the island of Sumatra. This means that for example the average real GRDP of Sumatra Island is 2,200 trillion rupiah per year and if there is an increase in investment (GFCF) of 1 billion rupiah, the real GRDP of Sumatra Island will increase by about 0.099 trillion rupiah (an increase of 0.000045 percent of real GRDP).

It is important for local governments on the island of Sumatra to encourage investment because of its positive impact on accelerating economic growth. By looking at the investment trend (as measured by the value of Gross Fixed Capital Formation) on the island of Sumatra, which has relatively increased over the last few years, it will have an impact on increasing economic growth on the island of Sumatra. Therefore, if there is an increase in investment in the coming years, it will certainly result in higher economic growth on the island of Sumatra. To achieve increasing investment, it requires great attention from local governments throughout Sumatra to open up opportunities for investors to invest in Sumatra. This is achieved by simplifying regulations and bureaucracy, creating a favorable investment climate and promoting regional investment. In addition, these efforts must also be accompanied by an increase in local government spending to build supporting infrastructure and good infrastructure.

## 5. CONCLUSION

All in all, this study suggests several significant findings as follows: Firstly, the unemployment rate negatively associated with economic growth (real GRDP) on the island of Sumatra. From the estimation results, the coefficient value of the unemployment rate variable is -0.013 which shows the percentage change in real GRDP for each percentage change from the unemployment rate. Likewise, inequality (Williamson index) shows a negative (decreasing) correlation with economic growth (real GRDP) on the island of Sumatra. Meanwhile, there is a variable that has a positive (increasing) and significant effect on economic growth (real GRDP) on the island of Sumatra, namely the investment variable (Gross Fixed Capital Formation). Thus, this study shows significantly association among the three independent variables (unemployment rate, inequality and investment) on the dependent variable (economic growth). These three variables are relevant to

be the concern and focus of the Regional Government on Sumatra Island as a determinant in encouraging economic recovery in the midst of regional economic conditions that are experiencing a recession due to the COVID-19 pandemic that has hit all countries including Indonesia.

## 6. LIMITATION AND STUDY FORWARD

Despite some fruitful findings, this study also has several limitations, as follows: Firstly, this study only use three independent variables (unemployment rate, inequality, and investment) and yet confirm null findings for other factors or variables outside the model which can also affect the dependent variable (economic growth). The measurement of goodness of fit (R-squared) in the model equation shows only 27.51%. This coefficient of determination indicates by overall of three independent variables only determinate 27.51 % of the likelihood of regional economic growth. And, the rest 72.49 % among other variables outside the model may relate to economic growth's variation in Sumatra Island. Secondly, this study yet has not been already concerned with stationarity of the timeseries datasets and its lag for some variable impacts towards growth into years in stochastic process. For further research, it is better to be able to conduct model using variables other than those in this research model in order to see other variables that also have an influence on economic growth at other regional levels. And, for more robust findings, also to run some stationarity testing for timeseries panel dataset.

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