International Journal of
Advances in Scientific Research and Engineering (ijasre)

E-ISSN : 2454-8006

DOI: 10.31695/IJASRE.2019.33111

Volume 5, Issue 3
March-2019

Analysis of Factors in Forming *Fiscal Stress Index* Case study: The Indonesian Government Budget

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ABSTRACT

This study aims to choose a fiscal stress index that is most suitable to assess state budget condition in Indonesia. The analysis factor is used to assess several factors that can cause stress on the state budget. SPSS is used for the purposes of the analysis. There are eleven indicators of two factors that lead to fiscal stress. The assessment revealed that there is only one fiscal stress index which is suitable to assess state budget condition in Indonesia. Factors can lead to fiscal stress in Indonesia are state expenditure, debt factors, education spending, general allocation funds, profit sharing funds, special autonomy funds, health spending, debt interest payments, state obligation, and the number of population.

***Key Words*:** Fiscal Stress, State Budget, State Expenditure, State Revenue

1. INTRODUCTION

Fiscal policy is a government policy in the field of state finance that is implemented through the government's budget with the aim of financing the implementation of state government as an effort to achieve national development targets. The problem that subsequently arises is that state expenditure needs are increasing, but on the other hand, state revenues cannot afford to offset their expenditure needs. Fiscal conditions like this can lead to fiscal stress. One of the causes of the emergence of fiscal pressure is the role of economic cycles that describe declining economic conditions and recessions [1].

The impact of the financial crisis that occurred in 1997 also occurred in the government's budget because the central government's income and expenditure sector became unstable. The condition of Indonesia's state revenues and expenditures during 2000 to 2013 reflects that state expenditure is greater than the state revenue. Based on Law Number 17 of 2003 concerning State Finance, the details of state expenditure including the central government budget according to type of expenditure consist of personnel expenditure, goods expenditure, capital expenditure, debt interest payments, subsidies, expenditure grants, social assistance, and other expenditures - other. During the period 2000 to 2013, the state budget increased by 13.15%, which was from Rp 221,466.7 billion in 2000 to Rp 1,683,011.1 billion in 2013 [2]. This increase indicates the increasing need for governance and funding development carried out by the government.

Low state income will not be able to finance all state expenditures. This condition certainly creates a deficit in the government budget that can trigger stress or pressure. Stress that occurs in the government budget is caused by an imbalance between state income and state expenditure. This condition of imbalance is caused by a component in state revenues that is unable to balance the components of state expenditure. To find out the development of stress that occurs can be seen through the index. Therefore, the purpose of this study is to choose a fiscal stress index that is most suitable for assess state budget condition in Indonesia from 2000 to 2013.

2. LITERATURE REVIEW

Fiscal stress has a lot of understanding so it is difficult to be defined definitively and has several different indicators. Some literature states that fiscal stress is a condition of imbalance in the government budget. [3] argues that fiscal stress is a result of an imbalance between government revenues and expenditures in a certain period. Fiscal stress occurs when the calculated government expenditure exceeds the available income [4]. Fiscal stress also is a pressure of the government budget because of limitations in revenue or income that aim to finance the implementation of development and are able to increase regional independence [5]. Then, [6] concluded that fiscal stress is a condition where there is limited funding for government operations due to problems in budget growth. Based on some of these explanations, it can be concluded that fiscal stress occurs because the size of the state budget exceeds state revenues.

The amount of the budget is due to the large budget allocation to finance government spending that is mandatory or binding. The binding government expenditure is in the form of routine expenditure items, including employee expenditure, subsidy spending, debt interest payments, and the high number of government mandatory spending. The definition of mandatory spending is state expenditure on certain programs that are mandated or required by the provisions of the applicable legislation [2]. Mandatory spending is government expenditure that is compulsory or binding in the context of fulfilling the rights of every citizen, namely the need for education, health, and basic public services. The number of mandatory spending from 2007 to 2012 experienced a substantial increase and in 2012, the number of mandatory spending almost doubled from 2007 [7]. The increase was due to the determination of the amount of mandatory spending as a percentage of the government's budget or regional budget. The greater the amount of the government's or regional budget, the greater the amount of mandatory spending that must be spent from all government's or regional funds.

[8] shows that fiscal stress is a result of too much interest expense and debt installments to be paid by the government because of the crisis resulting in increased new debt and the depreciation of the currency. Thus, the total burden of government debt obligations (domestic debt and foreign debt) will put pressure on the government budget and will take a portion of state revenues so that it can increase fiscal stress. In addition, fiscal stress can arise as a result of contingent liabilities [8]. Contingent liabilities are obligations or costs that must be incurred by the government if certain events or events occur [9]. This obligation can be triggered by uncertain conditions. When compared with other government obligations, this obligation requires government expenditure outside the existing budget, creating a burden on the budget.

3. RESEARCH METHODS

The unit of analysis in this study is the Indonesian government's budget. This study wants to find indicators that can lead to fiscal stress by using thirteen variables, which consist of fiscal and demographic variables in the form of tax revenues, non-tax state revenues, education spending, general allocation funds, profit sharing funds, special autonomy funds, health spending, fuel subsidies, payment of debt interest, employee expenditure, state obligation, primary balance, and population. The fiscal and demographic variables of Indonesia used in this study are varied, but there are trial and error in the data processing process so that only a few fiscal variables and Indonesian demographics can be used in this study. Trial and error must indeed be present in this study to determine which variables are chosen for further analysis. Data samples in this study are fiscal and Indonesian demographics from 2000 to 2013 and also secondary data in the form of annual time series data.

Furthermore, the thirteen variables are grouped into four factors according to their respective scope. The factors in question are revenue stress, expenditure stress, debt stress, and demographic factors. The four factors are formed based on grouping indicators in research conducted by [6]. In addition to the [6] study, there were three previous studies which also used grouping indicators to explain the factors that led to fiscal stress, namely the research of [10], [11], and [12]. When compared with the previous three studies, the [6] study has a grouping of indicators that are in accordance with the fiscal conditions in Indonesia.

The analysis technique used in this study is factor analysis. The factor analysis process tries to find relationships between a number of variables that are mutually independent from one another so that one or several sets of variables can be made that are fewer than the initial number of variables. There are three assumptions that must be fulfilled in factor analysis. The first assumption, the correlation between independent variables must be quite strong, which is above 0.5. In SPSS, this number can be seen from the *Kaiser-Meyer-Olkin Measure of Sampling Adequacy* found in KMO and *Bartlett's Test*. The second assumption, the amount of partial correlation or correlation between two variables by assuming that the other variables must have a small value or have a significance below 0.05. The third assumption is that there is a significant correlation between several variables. This test can be seen from the amount of Bartlett test of Sphericity or *Measure Sampling Adequacy* (MSA). The number of MSA ranges

DOI: 10.31695/IJASRE.2019.33111

from 0 to 1. Variables that have MSA = 1, then these variables can be predicted without errors by other variables. Variables with MSA> 0.5, these variables can still be predicted and can be further analyzed. Variables that have MSA <0.5 means that the variable cannot be predicted and cannot be analyzed further or the variable is excluded from other variables.

The next step is to form a fiscal stress index of two factors that have been formed in accordance with the results of processing the data above using factor analysis techniques. The fiscal stress index is a composite index or composite index consisting of variables that have been tested using factor analysis. In calculating the composite index, there are two stages. First is the stage of calculating the index of each variable.

$$I_{it} = \frac{X_{it} - X_i \min}{X_i \text{maks} - X_i \min} \quad \text{.... (1)}$$

where I_{it} is variable index i in year t, X_{it} is variable value i in year t, $X_i$min is variable smallest value I, $X_i$maks is the biggest value of variable i, and n is number of variables.

Once obtained I_{it} each variable for each year, then a fiscal stress index will be prepared for each year. The fiscal stress index arrangement can be explained by the equation below

$$Fiscal\ Stress\ Index_t = \frac{1}{n} \sum_{i=n}^{n} I_{it} \quad \text{.... (2)}$$

where Fiscal Stress Index $_t$ is fiscal stress index in year t, n is number of variables, and I_{it} is variable index i in year t.
In equation (2) above, it is shown that the fiscal stress index is the average value of the index of each variable in a given year (t).

4. RESULTS AND DISCUSSION

First, to find out which variables can influence and can be used as indicators of fiscal stress in Indonesia, factor analysis tests must be carried out for thirteen variables used in this study. Testing of factor analysis is done because the thirteen fiscal stress variables are not necessarily feasible to be indicators of the causes of fiscal pressure in Indonesia. There are several assumptions that must be fulfilled in processing data using factor analysis. In this study three experiments have been conducted so that these assumptions can be fulfilled, namely by reducing the tax ratio and primary balance variables because the *Measuring Sampling Adequacy* (MSA) has a value of less than 0.5 so that there are only eleven variables that pass the assumption test and worthy of further analysis. After that, from eleven variables that can be analyzed further, a factoring process can be carried out which divides the variables into several groups of factors.
Figure 1 below is the result of factors formed from processing data through factor analysis. The number of variables that have passed the assumption test are eleven variables, namely education expenditure, general allocation funds, profit sharing funds, special autonomy funds, health expenditure, debt interest payments, state obligation, population, non-tax state revenues, fuel subsidies, and personnel expenditure. Then, these variables can be divided into two factors, namely Factor 1 and Factor 2. Furthermore, from the two factors the results of the analysis above can be made into two fiscal stress indices.

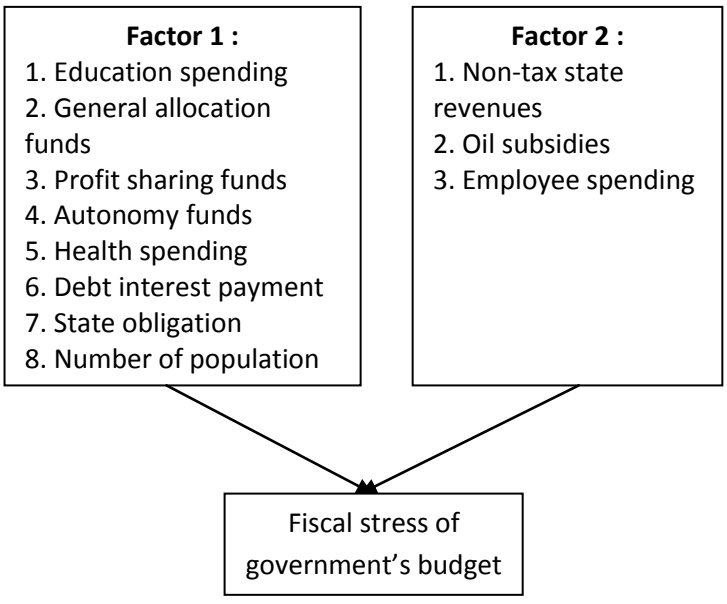
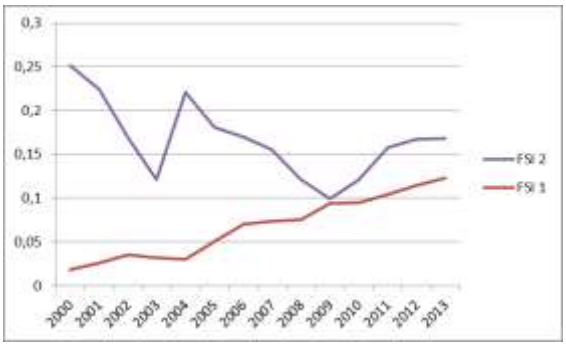


Figure 1. Factors Affecting State Budget Fiscal Pressure in Indonesia

DOI: 10.31695/IJASRE.2019.33111

After calculating the fiscal stress index from 2000-2013, namely FSI 1 and FSI 2, in Figure 3 below, it can be seen that the trend of the FSI 1 movement tends to increase and experience stress which is always above the average. The highest stress level occurred in 2013, but had experienced a decline in 2003 to 2004 and experienced an increase again in 2005. While the trend of the FSI 2 movement in the period 2000-2013 tended to decline and always had stress levels above the average. The biggest stress level occurred in 2000 and tended to continue to decline, but began to increase in 2010 to 2013.



Source : result

Figure 2. *Fiscal Stress Index*

Furthermore, the correlation between the two fiscal stress indices with the basic macroeconomic assumptions variable needs to be analyzed with the aim of finding out which index is most appropriate to measure the condition of Indonesia's fiscal pressure. The two fiscal stress indices are compared with the basic assumptions of macroeconomics because the basic macro assumptions have a significant impact on the Indonesian Budget because these basic assumptions can be targets that must be achieved [7]. The basic macroeconomic assumption indicators used are economic growth, inflation, exchange rates, interest rates, and oil prices (ICP).

The correlation between FSI 1 towards growth is 0.743 which means FSI 1 and growth has a strong correlation because the correlation number is above 0.50. The FSI 1 correlation to the interest rate and inflation each has a negative correlation because the correlation number shows a negative number, namely -0.757 and -0.449. The FSI 1 correlation with the exchange rate has a correlation number below 0.50 so the correlation is very weak. The correlation between FSI 1 and ICP is very strong because it has a correlation number that is far above 0.50, which is equal to 0.917. FSI 2 correlation with growth, exchange rate, and ICP has a negative correlation because it shows a negative correlation number, which is -0,273; -0,289; and -0,403. The FSI 2 correlation to the interest rate and inflation is very weak because it has a correlation number below 0.50, which is equal to 0.351 and 0.364. Based on the correlation above, the relevant fiscal stress index used is FSI 1.

In addition to looking at the correlation between the *fiscal stress index* and the basic assumptions of macroeconomics, it is also necessary to look at the correlation between the fiscal stress index and fiscal variables. The fiscal variable used is a variable that describes the condition of fiscal stress. Based on Fiscal Monitor [14], fiscal variables that are commonly used to determine the fiscal condition of a country are overall balance and output gap. After seeing the development of fiscal variables, overall balance and output gap, both the fiscal stress index and overall balance and output gap data were processed using SPSS to see how strong the correlation between the variables. The aim is to find a relevant *fiscal stress index* to be used as a measure of fiscal pressure in Indonesia.

Table 1. FSI 1 and FSI 2 Correlations of *Overall Balance* and *Output Gap*

	Overall balance	Output Gap
FSI 1	-0,728	0,936
FSI 2	0,142	-0,4

Source : result (SPSS)

Based on Table 1 above, the FSI 1 correlation to *overall balance* has a number of -0.728. That is, FSI 1 with *overall balance* has a strong correlation but has a relationship that is inversely proportional because the correlation rate is negative and is above 0.50. The inverse relationship means that when *fiscal stress* increases, the *overall balance* condition experiences a deficit. The FSI 1 correlation with the *output gap* has a very strong correlation because it has a correlation number of 0.936. FSI 1 and the *output gap* have a relationship that is directly proportional, meaning that when *fiscal stress* increases, the *output gap* will also

DOI: 10.31695/IJASRE.2019.33111

increase. The increase that occurs in the *output gap* means that the actual GDP is greater than potential GDP. This condition indicates that the economy is experiencing *overheating* due to economic growth that exceeds economic capacity.

The FSI 2 correlation with *overall balance is* very weak because it has a correlation number below 0.50, which is only 0.142. The FSI 2 correlation with the *output gap* variable has a weak correlation and has an inverse relationship because the correlation number is below 0.50 and has a negative number, which is -0.400. Based on the two correlations above, the *fiscal stress index* that is relevant to use is FSI 1.

5. CONCLUSION

This study aims to choose a fiscal stress index that is most assess state budget condition in Indonesia. Before forming a fiscal stress index, it is needed first to form several groups of factors that can describe the condition of fiscal stress. The formation of a group of fiscal stress factors is carried out using factor analysis techniques. The conclusion of this study, formed two factors that can measure fiscal stress in Indonesia. Fiscal stress indicators included in factor 1consist of education expenditure, general allocation funds, profit sharing funds, special autonomy funds, health expenditure, debt interest payments, state obligation, and population. Fiscal stress indicators are included in factor 2, namely non-tax state revenues, oil subsidies, and employee expenditure.

Based on these two factors, each fiscal factor is formed so that there are two fiscal stress indices, namely FSI 1 which represents factors 1 and FSI 2 which represent factors 2. From the second fiscal stress index, only the relevant FSI 1 is used as fiscal stress index to measure fiscal stress that occurs in Indonesia. Therefore, factors that can lead to fiscal stress in Indonesia are state expenditure, debt factors, and demographic factors which consist of education spending indicators, general allocation funds, profit sharing funds, special autonomy funds, health spending, debt interest payments, state obligation, and number of population.

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