The dynamics of total outputs of Indonesian industrial sectors: A further study

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Abstract. The purpose of the current study is to extend the previous studies which analyze the impacts of final demands modifications on the total outputs of industrial sectors of a particular country. More specifically, the study conducts the analysis regarding the impacts on the total outputs of Indonesian industrial sectors. The study employs a demand-pull Input-Output (IO) quantity model, one of the calculation instruments in the IO analysis. The study focuses on seventeen industries. There are two scenarios used in this study, namely other final demands and import modifications. The "whole sector change" condition is implemented in the calculations. An initial period in this study is 2010. The results show that the positive impacts on the total outputs of focused sectors are distributed by scenario 1, the change of other final demands. On the contrary, the negative impacts are delivered by scenario 2, the modification of imports. The suggestions for improving the total outputs of discussed industries are based on the results.

1. Introduction

One of the important aspects in the economic activities of one country is industrial sectors. The importance can be seen not only on the micro level but also macro. Therefore, an analysis of industries cannot be separated from the investigation of economic activities of one or several countries. Further, the suggestions for improving the economic conditions of focused countries might be generated from the analysis.

The examples of previous studies which conduct the analysis are [1], [2], [3], [4], [5], and [6]. These previous studies focus on the impacts of final demands changes on the total outputs of industrial sectors of analyzed countries. The previous studies, however, only focus on the specific industries. In other words, the study focuses on identifying the impacts on the whole sector of particular countries is still needed. This identification is required in order to know the characteristics of industries when the final demands changes appear so the suggestions for improving the sectors can be formalized properly. The current study is conducted in order to fulfill the gap.

The purpose of the study is to extend the previous studies which analyze the impacts of final demands modifications on the total outputs of industrial sectors of a particular country. More specifically, the study aims to conduct a further analysis regarding the impacts by using the new data as well as new approach, namely to analyze all industrial sectors. The study focuses on the case of Indonesia, and employs the Input-Output (IO) analysis as an analysis tool.

2. Methodology

The methodology of the current study refers to the previous studies which were conducted, for example, by [1] and [2]. The first step of the methodology is to describe the data source. The data source of this study is the 2010 Indonesian IO table. The table is obtained from [7]. The second step is to explore the industrial sectors of Indonesia used in this study. Table 1 shows the industries. The table consists of seventeen industrial sectors.

Table 1. Indonesian industrial sectors used in this study.

Sector Number	Sector Name
1	Agriculture, forestry, and fishing
2	Mining and quarrying
3	Manufacturing
4	Electricity and gas
5	Water supply, sewerage, waste management, and remediation activities
6	Construction
7	Wholesale and retail trade; repair of motor vehicles and motorcycles
8	Transportation and storage
9	Accommodation and food service activities
10	Information and communication
11	Financial and insurance activities
12	Real estate activities
13	Business activities
14	Public administration and defence; compulsory social security
15	Education
16	Human health and social work activities
17	Other services activities

The third step is to conduct the calculations in order to determine the impacts of final demands changes on the total outputs of analyzed industries. A demand-pull IO quantity model, one of the calculation instruments in the IO analysis, is employed in the calculations. [8] explain that the following equation is a representation of the model:

$$\mathbf{x}^1 = \mathbf{L}^0\mathbf{f}^1 \tag{1}$$

where **x**, **L**, and **f** are the matrices of the total outputs of sectors, the Leontief inverse, and the final demands of sectors, respectively. 0 and 1 describe initial and future periods, respectively. An initial period in this study is 2010. The scenarios of final demand modification are exposed in table 2. There are two scenarios used in this study, namely other final demands and import modifications.

The condition of "whole sector change" is considered in the calculations. In this condition, the change on each scenario is addressed to all Indonesian industries. The analysis regarding the impacts is focused on the next step. Conclusions of this study, and suggestions for further researches are explained on the final step.

Table 2. The scenarios of final demand modification used in this study.

The component of the final demand	Scenario	
	1	2
	Other final demands modification	Import modification
Other final demands	Increase 30%	Constant
Import	Constant	Increase 30%

3. Results and analysis

Table 3 describes the total outputs of analyzed sectors for each scenario. Figures 1-17 explain in more details the dynamics of the total outputs of discussed sectors for each scenario. Based on the information in the tables and figures, the positive impacts on the total outputs of analyzed sectors are distributed by scenario 1, the modification of other final demands. On the contrary, the negative impacts are given by scenario 2, the change of import.

The suggestions for improving the total outputs of focused sectors are based on above results. One can argue that the Indonesian government should encourage the national economic activities so Indonesian industrial sectors have a trigger to produce more. One of the actions that the Indonesian government can do is to increase the exports goals. Conversely, they should set carefully the rate of imports.

Table 3. The total outputs of analyzed sectors for each scenario (billion Rupiah).

Sector Number	Sector Name	(X_t), t = 2010	(X_{t+1}), Scenario 1	(X_{t+1}), Scenario 2
1	Agriculture, forestry, and fishing	1,187,980.10	1,648,768.93	1,083,584.83
2	Mining and quarrying	941,316.80	1,317,181.73	847,846.61
3	Manufacturing	4,370,817.00	6,245,824.25	3,807,054.70
4	Electricity and gas	309,493.10	414,711.10	297,123.00
5	Water supply, sewerage, waste management, and remediation activities	23,812.60	34,274.55	20,493.95
6	Construction	1,724,302.60	2,251,344.60	1,714,550.91
7	Wholesale and retail trade; repair of motor vehicles and motorcycles	1,369,971.40	1,823,341.44	1,327,592.74
8	Transportation and storage	550,887.80	740,514.52	526,527.12
9	Accommodation and food service activities	440,129.50	589,359.29	422,939.01
10	Information and communication	409,067.60	554,793.66	386,061.77
11	Financial and insurance activities	333,056.60	449,446.55	316,583.11
12	Real estate activities	246,308.00	322,624.98	243,883.64
13	Business activities	202,971.50	285,019.26	181,815.15
14	Public administration and defence; compulsory social security	418,489.30	547,896.01	414,629.37
15	Education	311,211.20	405,825.55	309,960.20
16	Human health and social work activities	149,315.20	196,603.07	146,821.64
17	Other services activities	119,990.10	158,969.25	117,008.30

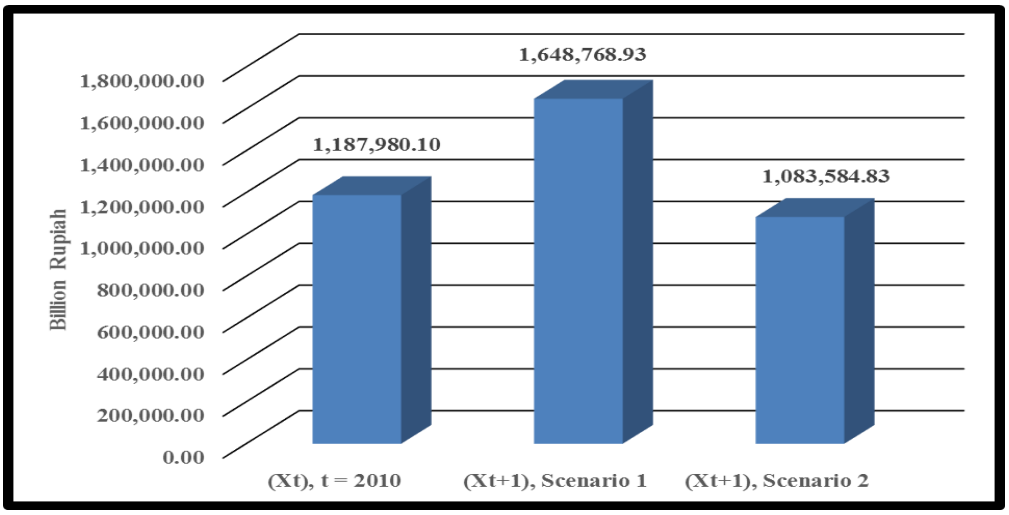

Figure 1. The dynamics of the total output of the agriculture, forestry, and fishing sector.

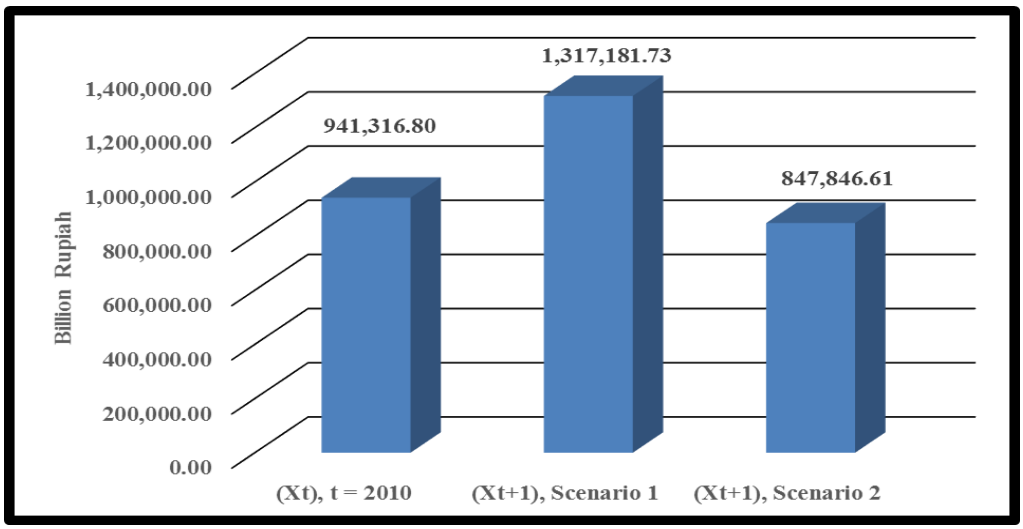

Figure 2. The dynamics of the total output of the mining and quarrying sector.

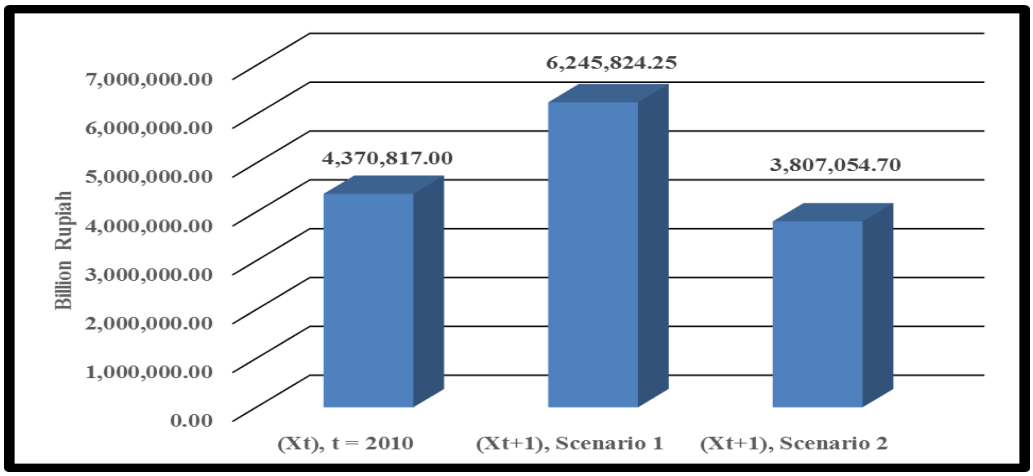

Figure 3. The dynamics of the total output of the manufacturing sector.

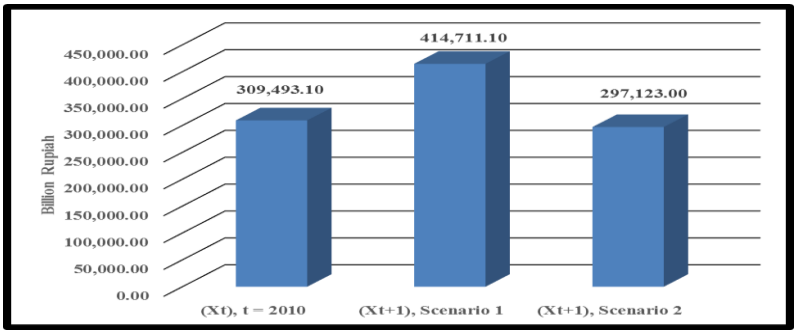

Figure 4. The dynamics of the total output of the electricity and gas sector.

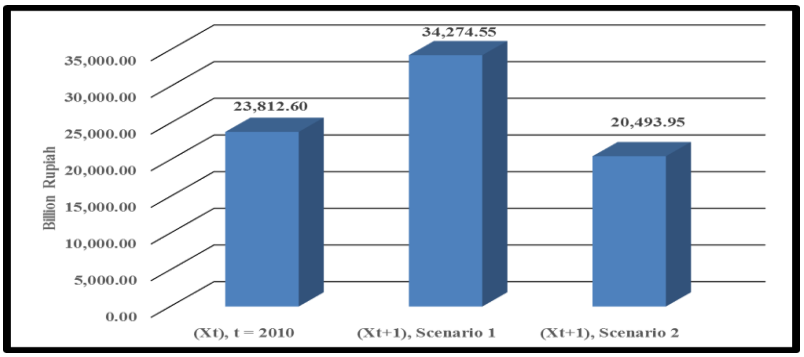

Figure 5. The dynamics of the total output of the water supply, sewerage, waste management, and remediation activities sector.

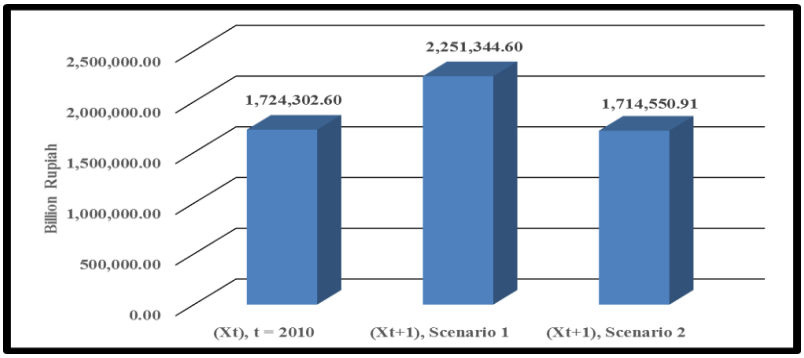

Figure 6. The dynamics of the total output of the construction sector.

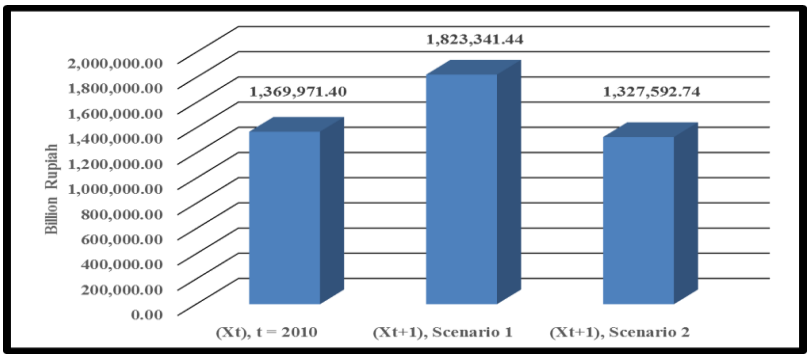

Figure 7. The dynamics of the total output of the wholesale and retail trade; repair of motor vehicles and motorcycles sector.

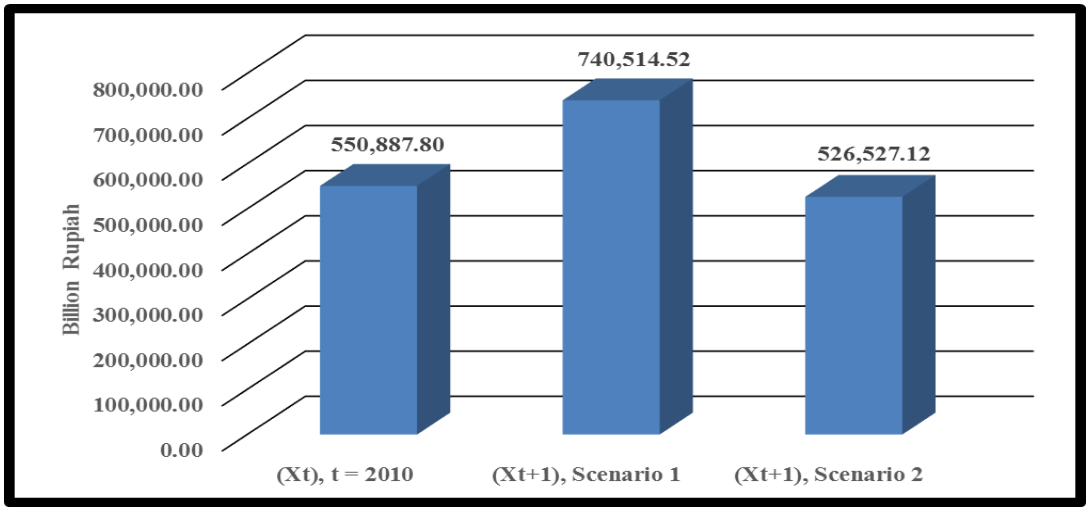

Figure 8. The dynamics of the total output of the transportation and storage sector.

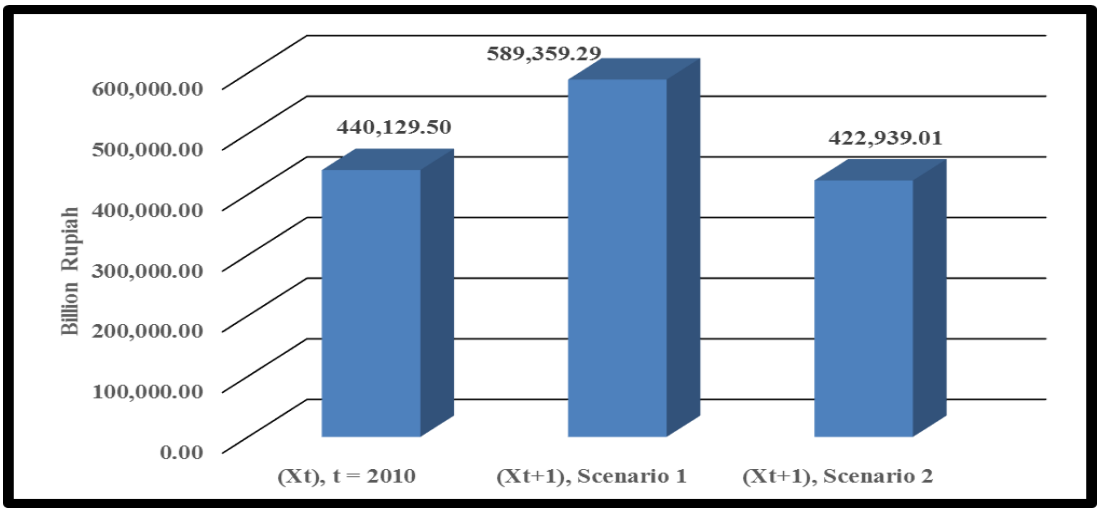

Figure 9. The dynamics of the total output of the accommodation and food service activities sector.

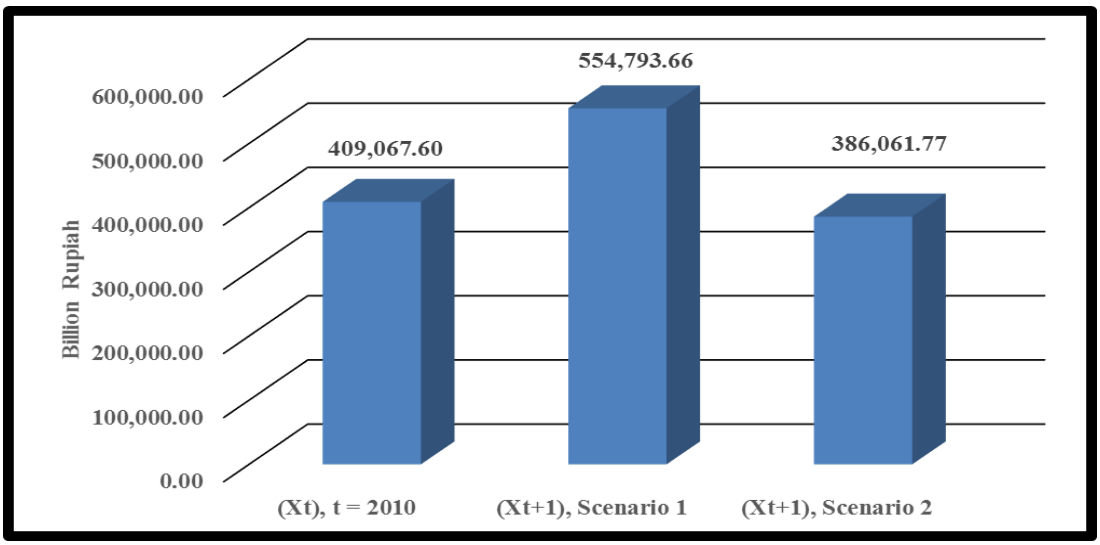

Figure 10. The dynamics of the total output of the information and communication sector.

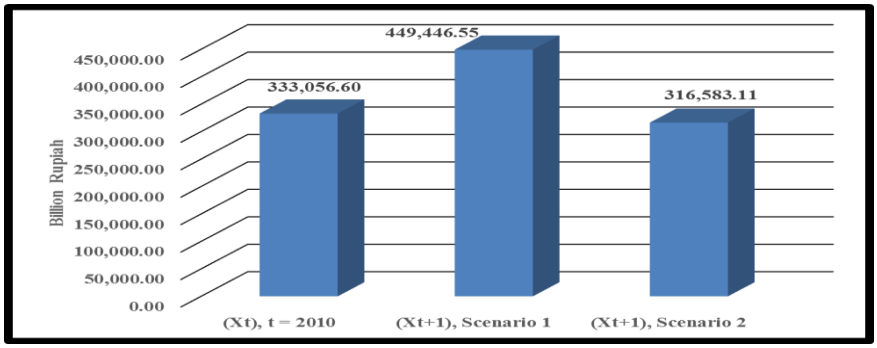

Figure 11. The dynamics of the total output of the financial and insurance activities sector.

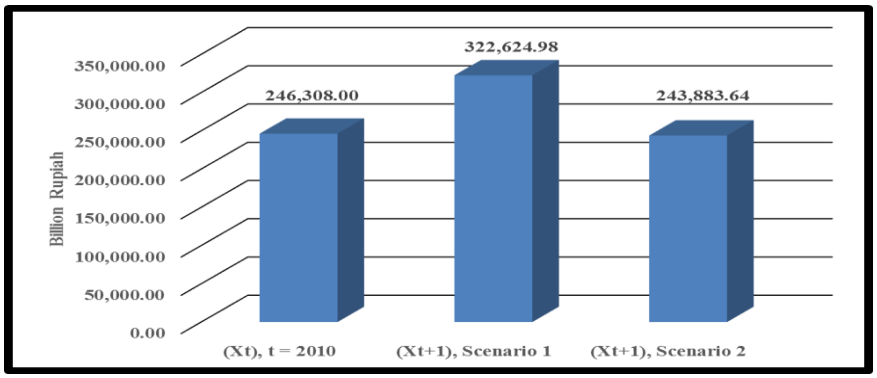

Figure 12. The dynamics of the total output of the real estate activities sector.

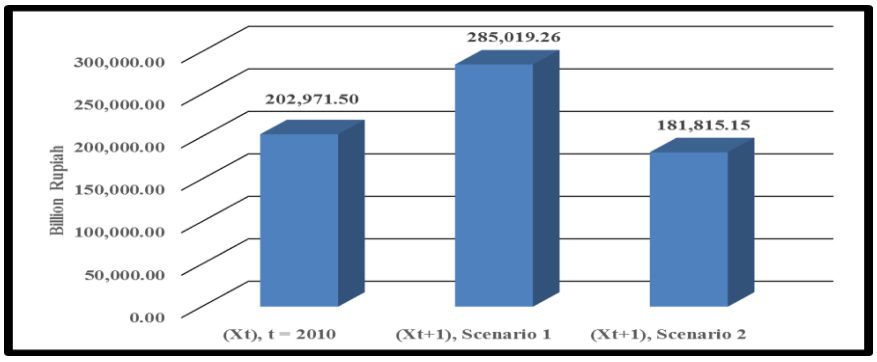

Figure 13. The dynamics of the total output of the business activities sector.

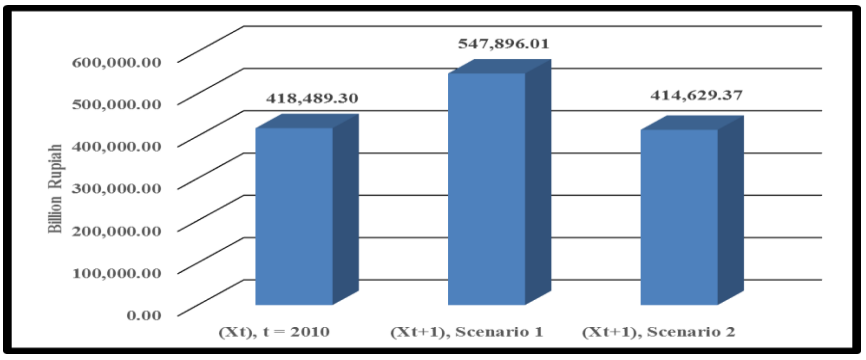

Figure 14. The dynamics of the total output of the public administration and defence; compulsory social security sector.

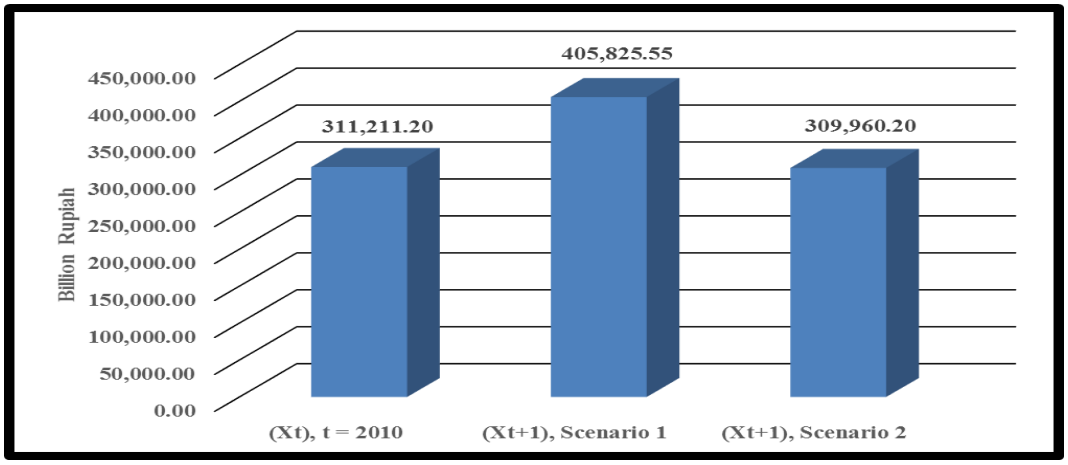

Figure 15. The dynamics of the total output of the education sector.

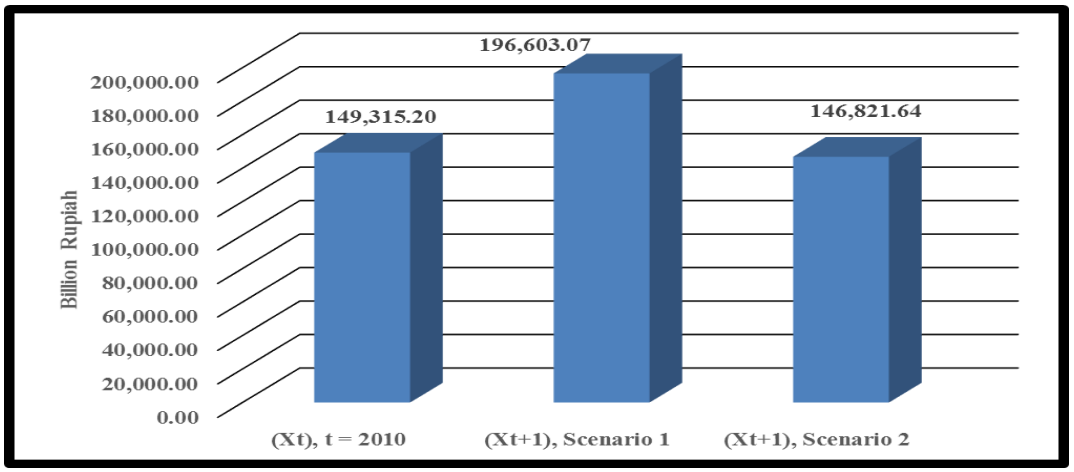

Figure 16. The dynamics of the total output of the human health and social work activities sector.

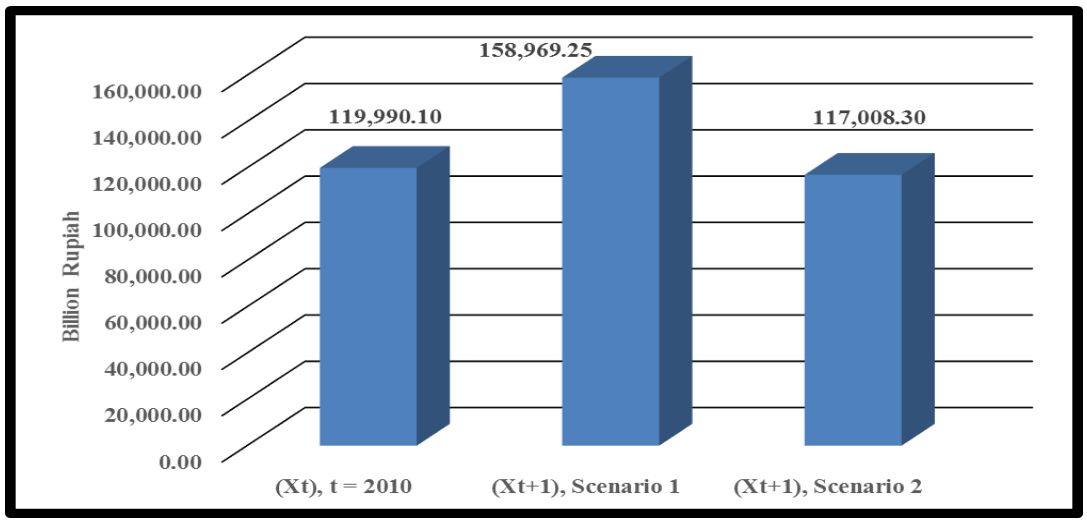

Figure 17. The dynamics of the total output of the other services activities sector.

4. Conclusions and further researches

This study, as a continuation study of previous ones, conducts the analysis regarding the impacts of the modifications of final demands on the total outputs of Indonesian industrial sectors. This study employs a demand-pull IO quantity model, one of the calculation instruments in the IO analysis. This study focuses on seventeen industries. The "whole sector change" condition is implemented in the calculations. In this condition, the modification on each scenario is addressed to all analysed industries. An initial period in this study is 2010.

The results show that the positive impacts on the total outputs of focused sectors are distributed by scenario 1, the change of other final demands. On the contrary, the negative impacts are delivered by scenario 2, the modification of imports. The suggestions for improving the total outputs of discussed industries are based on the results. One can say that the Indonesian government should push the activities of national economy so Indonesian industrial sectors have a trigger in producing more products. One of the steps that the Indonesian government can do is to accelerate the exports targets. On the contrary, they should assign carefully the rate of imports.

The deeper insight regarding the impacts of the changes of final demands on the total outputs of Indonesian industries is obtained from this study. However, this study focuses on the aggregated industrial sectors. In other words, this study is still far in explaining the whole view about the impacts on the Indonesian national economy. This view is needed in order to know better the circumstances of Indonesian national economy so the comprehensive regulations for increasing those in the future can be formalized. Therefore, as a further research, this study proposes the same analysis for the disaggregated Indonesian industries. The other suggested further research from this study is to implement the same analysis on the specific regional area. This analysis might be useful in exposing the characteristics of countries in the area in responding the impacts. The examples are to implement the analyses for the ASEAN and EU countries.

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