Reforming Spending Policy and Its Impact on Indonesia's Economy: The Case of Fuel Subsidy and Infrastructure

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Abstract

The quality of Indonesia's infrastructure up until 2014 was considered uncompetitive, and one of the reasons was that there was not enough money spent on infrastructure, and too much on fuel subsidy. In November 2014, the government of Indonesia decided to cut the expenditure for fuel subsidy and reallocate the money to invest on public services. This study was conducted with the intention to quantify the impact of the program on economic growth and income distribution in Indonesia using Social Accounting Matrix (SAM) model. Simulation results indicated that the impact from social and human capital infrastructure was bigger than that of economic infrastructure, although the simulation for both categories resulted in an increase of sectoral output and domestic income. Therefore, improving infrastructure, especially social, is vital to stimulate economic activity in the long run.

Keywords: fuel subsidy, infrastructure, SAM, output, household income
JEL Codes: C12, C67, C68, H54, H72

INTRODUCTION

Fiscal policy is one of the policies conducted by governments to stabilize a country's economy after the failure of *laissez-faire* economy. One way that governments can do to enhance the economy of a country is by investing on various sectors, and the details of all income and expenditure are recorded in State Budget. Based on the data from the Ministry of Finance (2014), Indonesia's spending increased dramatically by 71 percent from 2010 with 1042 trillion Rupiahs to 1777 trillion Rupiahs in 2014. As a result, budget deficit also worsened from only 47 trillion Rupiahs in 2010 to almost five times as high in 2014 (Table 1).

Table 1
Indonesia's Financial State 2010 – 2014

Year	Income	Spending	Deficit
	(Trillion Rupiahs)		
2010	995.27	1042.12	46.85
2011	1210.60	1295.00	84.40
2012	1338.11	1419.41	81.30
2013	1438.89	1650.56	211.67
2014	1550.49	1777.18	226.69

Source: Indonesia's Ministry of Finance

One of the reasons of the rapid surge of government spending was the consistently increasing expenditure on subsidy, particularly for fuel. In 2010, Indonesia's government spent 82 trillion Rupiahs for fuel subsidy, which then climed significantly to almost 240 trillion Rupiahs four years later. Unfortunately, most subsidized fuel consumers (86 percent) were those with upper-middle income (Diop 2014). Not only that, fiscal room for productive sectors like infrastructure had narrowed.

Based on the report from The Global Competitivenes Report (GCR) 2015, quality infrastructure can cut transportation and transaction cost and enhance the movements of goods and services, and hence reduce indequality between regions. In order to reach a sustainable and competitive development, infrastructure is one of four most important pillars of a country, alongside institution, technological readiness, and macroeconomic condition. With adequate infrastructure, a country can attract investments relatively easier and thus fasten economic growth (Schwab, 2014).

According to the data from GCR, in 2014, it can be argued that Indonesia's infrastrcture was inadequate. Out of 144 countries, Indonesia's overall infrastructure sat on the 72nd position, with the quality of roads and railroad being the worst with scores of 3.9 and 3.7, respectively (on the scale of 1 to 7). Also, inadequate supply of infrastructure was ranked 3rd for the most problematic factors in doing business in Indonesia in 2015, below only corruption and inefficient government bureaucracy. This was indicated as a result of a very limited budget for infrastructure due to fuel subsidy spending.

It is feared that uncompetitive infrastructure was one of the causes of the decreasing economic growth in Indonesia. Based on Figure 1, it is noticeable that Indonesia's GDP and GDP per capita growth experienced a decreasing trend. In 2014 (the year of the spending policy reform hence becoming the focus of this study), GDP and GDP per capita growth was 5.01 and 3.73 percent, respectively, lower than the 2010 figures. It can be argued that little infrastructure spending (less 5 percent of Indonesia's GDP in 2013 and 2014 according to Diop (2014)) played a role in this phenomena.

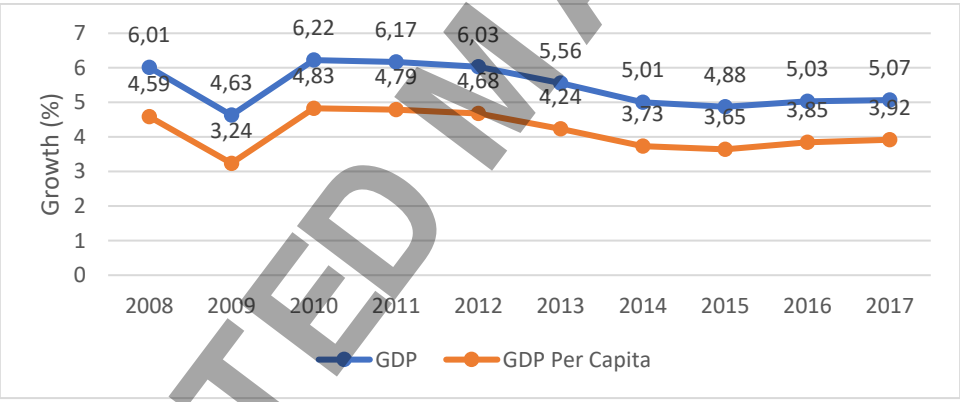

Figure 1: Indonesia's GDP and GDP Per Capita Growth
Source: World Bank

Considering how important infrastructure is for a country, Indonesia's government decided to reform their spending policy. In mid November 2014, they cut the budget for fuel subsidy from 239.99 trillion Rupiahs in 2014 to only 64.68 the year after. Fuel subsidy spending even experienced a falling trend since then (only 47.05 trillion in 2017 according to Indonesia's Ministry of Finance). The money was going to be allocated to invest on and improve infrastructure with the expectation of realizing sustainable development and enhancing Indonesia's competitiveness level.

This study aims to quantitatively estimate the impact of the budget reallocation from fuel subsidy to infrastructure on Indonesia's sectoral output growth and household income distribution. In general, there has been quite considerable amount of studies on this topic. However, this study offers a different approach by conducting two-stage policy simulation. Using Indonesia's Social Accounting Matrix (SAM), this study conducts a simulation by

reducing fuel subsidy spending and reallocating it for infrastructure. Further analysis in this study is done by conducting a paired-sample test to find out if there is a difference in household income distribution after the simulation.

LITERATURE REVIEW

Studies on government's budgeting policy have been done various times, particularly about subsidy and infrastructure. One of the earlier studies was done by Aschauer (1989) who applied Ordinary Least Square (OLS) model and found that economic infrastructure (roads, airport, drainage, and electricity) played an important role in enhancing Total Factor Productivity (TFP) in the USA. Similar model was applied by Ford & Poret (1991) whose study indicated that the decreasing trend of American TFP was due to the fact that the infrastructure spending was limited. Chani et al. (2014) proved that there was causality between human capital and income OLS model was also used in recent studies, and one of them was by Palei (2015) where she found that improved infrastructure possitively affect Russia's competitiveness level. Although econometric models are able to accomodate long-run estimation, the analysis is not very comprehensive because there is only one dependent variable and that variable is not classified into specific categories. Therefore, this study will apply a general equilibrium model (SAM) for the quantitative estimation.

Raihan (2011) applied SAM model and found that the increase in infrastructure spending would stimulate Bangladesh's economic growth and increase household income. Another general equilibrium, which is input-output (IO) model, was also used by (Bonakdarpour, Brodesky, and Campbell 2014) whose research proved that transportation infrastructure played an essential role in enhancing GDP and job opportunities in the USA. Meanwhile, Widodo et al. (2012) and Fathurrahman (2014) suggested that, using SAM simulation, the decrease in fuel subsidy spending would lower Indonesia's sectoral output and household income, but the economy could be revived by diverting the money to other sectors. That result was supported by Ogarenko & Hubacek (2013) at Cooke et al. (2014) with IO model. Meanwhile, evidence from Akinyemi, Alege, and Ajayi (2017) who applied CGE model stated that a complete removal of fuel subsidy would enhance economic growth and food security if the fund was diverted into infrastructure.

This study attempts to conduct a further analysis compared to the previous ones. Here, a hyphotesis test will be done using t test to find out if the policy simulation will make a difference in the distribution of household income.

RESEARCH METHODS

Multiplier Effect

Although the latest Indonesia's SAM was from 2008, it is still relevant until present days. That is due to the fact that the SAM multiplier is based on the Average Expenditure Propensity (AEP), and it is found that there is not much difference from 1975 and 2008 SAM AEP (see Appendix 2). It indicates that Indonesia's economy has not changed much, especially in terms of technological progress. In order to estimate the impact of a shock in the exogenous variables on the endogenous ones, this study will calculate the SAM multiplier effect using the following formula:

$$y = M_a x \quad (1)$$

Based on Equation (1), y is the endonegnous variable, M_a is the multiplier in the economy, and x is the exogenous variable. In this study, y is represented by sectoral output and household income, while x is the policy simulation where fuel subsidy spending will be reduced and

infrastructure spending will be increased. The multiplier effect tells us how much *y* will change if there is a one unit change in *x*.

Policy Simulation Scenarios

There are two policies that will be simulated in this study. The first policy is cutting expenditure for fuel subsidy, and the second policy is reallocating the money for infrastructure spending. According to microeconomic theory, the increase in price will decrease the quantity of goods demanded. Based on the data taken from Indonesia's Ministry of Energy and Mineral Resources, the consumption of oil fuel by transportation sector in 2014 was 42.26 million kilo liters, and the figure fell to 41.25 one year after (after the fuel price was increased from 6500 Rupiahs to 8500).

After calculating, it is found that the spending (in money) for oil fuel by transportation sector fell by 21.65 percent. Meanwhile, electricity sector also experienced a fall in oil fuel spending by 23.08 percent. This research chose transportation and electricity sectors for the fuel subsidy policy simulation based on the fact that the oil fuel that they use for production is subsidized by Indonesia's government. The shock for the cut in fuel subsidy spending will be calculated by multiplying the fall (in percentage) in oil fuel spending with the difference in fuel subsidy spending in Indonesia between 2014 and 2015, which was 169.03 trillion Rupiahs.

Moving on to the infrastructure policy, the World Bank classifies economic infrastructure into transportation infrastructure, electricity installation, irrigation, drainage, and telecommunication networks. Based on Indonesia's SAM, they are best classified into sector 41 (Construction). Meanwhile, social infrastructure includes education, health, and recreation, and they are best classified into sector 49 (Government and defence, education, health, other social services, film, and recreation) (Indonesia's SAM table can be seen in Appendix 1).

The underlying assumption in this research is that all money from the fuel subsidy budget cut is reallocated for infrastructure. The simulation is then divided into four different scenarios. The first and second scenarios will be allocating all money for sector 41 (construction) and 49 (education and health). Third scenario is to allocate the money for both sectors equally, and the last scenario is that 78 percent of the money is allocated for sector 41 and 22 percent for sector 49. This share is based on the articles from Indonesia's Cabinet Secretariat (2015) and KataData (2015).

Paired-sample Test

Hypothesis test in this study is based on paired-sample t test, because the sample is taken from the income of household categories that are listed on Indonesia's SAM, before and after the policy simulation is conducted. The hypotheses are formulated as follows:

H_0: Household income after the policy simulation is conducted is equal to or lower than the figure before the policy simulation is conducted

H_a: Household income after the policy simulation is conducted is higher than the figure before the policy simulation is conducted

Meanwhile, hypotheses for the proportion of household income are formulated as follows:

H_0: There is no difference in houseold income distribution between before and after the policy simulation is conducted

H_a: There is a difference in houseold income distribution between before and after the policy simulation is conducted

The conclusion of the test will rely on the significance level of the $t_{statistic}$. If the value exceeds α, H_0 is rejected (Santoso 2018). In this study, the α used is 5 percent.

RESULTS AND DISCUSSIONS

The results of this study pretty much support the results from previous studies, since it is a simulation analysis. After the simulation of reducing fuel subsidy was conducted, Indonesia's economy worsened, which was indicated by the decrease in sectoral output and household income. However, after the shock in infrastructure, the economy grew again.

Changes in Sectoral Output

At first, Indonesia's sectoral output decreased by 1.21 percent in total due to the fuel subsidy budget cut, with electricity experiencing the biggest downfall with 8.40 percent. This is due to the fact that as transportation and electricity sectors reduce their spending for oil fuel, their output decreased because oild fuel is their raw material for production and that affected the production and income of other sectors. However, the shock in infrastructure from all four scenarios resulted in the increase of sectoral output by 6.27, 6.65, 6.46, and 6.36 percent, respectively. (See Appendix 3 – 6 for the detailed results), which means that sectoral output grew by over 5 percent. Transportation and education and health experienced the highest rise of output.

This study indicates that scenario 2, which is the reallocation of the budget fully for sector 49 (education and health) resulted in the highest increase in sectoral output (in percentage). Education and health are components of human capital that are embedded in labor force and are important to improve the quality of labor and society in general, and therefore able to accelerate economic growth.

Changes in Household Income

Following the shock from the decrease in fuel subsidy expenditure, Indonesia's household income fell by 1.24 percent in general. With higher fuel price, people have to spend more to buy goods and services. The highest fall of income was experienced by upper-class urban households (code 25), which was 1.34 percent.

However, the infrastructure shock from all scenarios generated an increase in household income that was higher than the fall caused by the subsidy shock (5.89, 8.44, 7.17, and 6.45 percent, respectively for each scenario). Just like in output changes, scenario 2 resulted the highest household income increase, with upper-class rural (code 22) and upper-class urban hosueholds (code 25) benefiting from the policy (see Appendix 7 and 8). Improving infrastructure can enhance connectivity between regions so that inequality and poverty can be alleviated more quickly.

From the hypothesis test, the first t test resulted in significance levels of less than 5 percent in all four scenarios (see Appendix 9), which means that H_0 is rejected. Therefore, it can be concluded that household income after the simulation is higher than before. Meanwhile, the significance levels from the second t test indicate that there is no difference in income distribution between before and after the simulation was conducted. Farm workers (code 18) and rural households (code 20) still only taste a small share of income.

CONCLUSION

Subsidized fuel in Indonesia has always been consumed by upper-class citizens more than lower-class ones. Not only that, the budget to invest on infrastructure was narrow due to

the increasing spending for fuel subsidy. Based on that fact, at the end of 2014, the government of Indonesia cut the fuel subsidy spending and diverting it to improve infrastructure.

This study found that the increase in sectoral output and household income from the infrastructure shock was higher than the decrease caused by the subsidy shock. Moreover, human capital infrastructure played a bigger role in rising output and income, although it did not change the proportion of income among household categories. It is imperative that Indonesian government put infrastructure as one of their priorities in the future as it is capable of enhancing economic activity.

LIMITATION OF THE STUDY

This research only focused on the policy conducted in November 2014, which was reducing fuel subsidy spending. Therefore, the data taken was only from before the policy (2014) and right after the policy (2015). Not only that, there is no specific detail as to where the money from the budget cut is allocated, so it was extremely assumed that all money went to infrastructure. For future studies, it is suggested that authors seek for further information from reliable sources.

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APPENDIX 1

Endogenous Account from Indonesia's SAM

Blocks		Details		Code
Factors of Production	Labor	Farm (paid)	Rural	1
			Urban	2
		Farm (unpaid)	Rural	3
			Urban	4
		Production, transportation equipment operator, and unskilled (paid)	Rural	5
			Urban	6
		Production, transportation equipment operator, and unskilled (unpaid)	Rural	7
			Urban	8
		Administration, sales, services (paid)	Rural	9
			Urban	10
		Administration, sales, services (unpaid)	Rural	11
			Urban	12
		Management, military, professional, technician (paid)	Rural	13
			Urban	14
		Management, military, professional, technician (unpaid)	Rural	15
			Urban	16
	Non-labor			17
Institution	Household	Farm workers		18
		Agricultural entrepreneur		19
		Lower-class entrepreneur, administration, traveling salesman, freelancer, individual services, unskilled labor	Rural	20
		Non labor force and unclear category		21
		Upper-class entrepreneur, non-agricultural entrepreneur, manager, military, professional, upper-class technician, teacher, and administration		22
		Lower-class entrepreneur, administration, traveling salesman, freelancer, individual services, unskilled labor	Urban	23
		Non labor force and unclear category		24
		Upper-class entrepreneur, non-agricultural entrepreneur, manager, military, professional, upper-class technician, teacher, and administration		25
	Firm			26
	Government			27
Industries (+ Domestic & Imported Commodities + Margin)	Agriculture	Crops		28
		Other plants		29
		Livestock		30
		Forestry		31
		Fishery		32
	Mining	Coal, metal ore, and crude oil		33
		Other mining & excavation		34
	Manufacturing	Food, beverage, and tobacco		35
		Spinning, textile, clothing, and leather		36
		Wood		37
		Paper & printing, transportation equipment		38
		Chemical, fertilizer, clay, cement		39
		Electricity, Gas and drinking water		40
		Construction		41
	Wholesale, Restaurant & Hotels, Transportation & Communication	Wholesail & retail		42
		Restaurant		43
		Hotels		44
		Transportation		45
	Financial Institutions, Real Estate, Governmental, Social Services and Cultures,Entertainment, Individual Services	Banking and insurance		47
		Real estate and company services		48
		Government and defence, education, health, films, and recreation		49
		Individual and other services		50

Source: Statistics Indonesia
Note: This is a modified SAM from a 102x102 sector Indonesia's SAM

APPENDIX 2

Average Expenditure Propensity (AEP) from Indonesia's SAM 1975 and 2008

AEP from Indonesia's SAM 1975

Code	1	2	3	4	5	6	7	8	9
1	0.00%	0.00%	0.00%	0.00%	0.00%	24.72%	0.00%	0.00%	0.00%
2	0.00%	0.00%	0.00%	0.00%	0.00%	38.29%	0.00%	0.00%	0.00%
3	100.00%	43.43%	2.16%	16.35%	9.16%	0.00%	0.00%	0.00%	0.00%
4	0.00%	47.06%	0.00%	0.78%	0.00%	0.00%	0.00%	0.00%	0.00%
5	0.00%	0.73%	1.20%	37.53%	0.00%	0.00%	0.00%	0.00%	0.00%
6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	90.35%	0.00%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.47%	18.52%
8	0.00%	0.00%	83.98%	0.00%	53.40%	28.35%	100.00%	0.00%	0.00%
9	0.00%	0.00%	5.70%	0.00%	6.13%	8.63%	0.00%	0.00%	0.00%

AEP from Indonesia's SAM 2008

Code	1	2	3	4	5	6	7	8	9
1	0.00%	0.00%	0.00%	0.00%	0.00%	25.95%	0.00%	0.00%	0.00%
2	0.00%	0.00%	0.00%	0.00%	0.00%	23.75%	0.00%	0.00%	0.00%
3	99.80%	31.91%	1.13%	2.25%	15.75%	0.00%	0.00%	0.00%	0.00%
4	0.00%	64.40%	0.92%	9.21%	7.10%	0.00%	0.00%	0.00%	0.00%
5	0.00%	0.00%	2.22%	33.92%	14.37%	0.00%	0.00%	0.00%	0.00%
6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	89.16%	0.00%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.77%	10.49%
8	0.00%	0.00%	77.71%	0.00%	21.92%	40.39%	100.00%	0.00%	0.00%
9	0.00%	0.00%	9.01%	0.00%	1.38%	9.91%	0.00%	0.00%	0.00%

APPENDIX 3

Changes in Sectoral Output from Scenario 1

Code	Initial Output	New Output	Changes	Growth
	(Trillion Rupiahs)			(%)
28	1091.58	1138.54	46.96	4.30%
29	438.37	454.15	15.78	3.60%
30	624.30	652.77	28.46	4.56%
31	116.82	128.21	11.40	9.76%
32	428.95	448.22	19.26	4.49%
33	1384.44	1411.87	27.43	1.98%
34	190.53	217.05	26.52	13.92%
35	2245.56	2332.18	86.62	3.86%
36	654.70	670.51	15.81	2.42%
37	390.80	419.74	28.94	7.41%
38	3395.65	3554.85	159.20	4.69%
39	2864.69	2984.14	119.45	4.17%
40	330.54	313.06	-17.48	-5.29%
41	2463.96	2854.74	390.77	15.86%
42	3074.87	3207.20	132.33	4.30%
43	588.12	615.13	27.01	4.59%
44	98.41	100.96	2.54	2.59%
45	1440.64	1444.05	3.41	0.24%
47	548.73	574.12	25.39	4.63%
48	633.27	666.24	32.96	5.20%
49	1004.34	1042.69	38.35	3.82%
50	297.09	308.15	11.06	3.72%
Total	24306.36	25538.56	1.232.21	5.06%

Source: Indonesia's SAM after simulation

Note: This is a result from the decrease in output caused by subsidy plus (1.21% decrease in output) the increase in output caused by infrastructure shock (6.27% increase in output)

APPENDIX 4

Changes in Sectoral Output from Scenario 2

Code	Initial Output	New Output	Changes	Growth
	(Trillion Rupiahs)			(%)
28	1091.58	1185.79	94.21	8.63%
29	438.37	461.20	22.83	5.21%
30	624.30	675.90	51.60	8.26%
31	116.82	119.17	2.35	2.01%
32	428.95	460.88	31.93	7.44%
33	1384.44	1405.57	21.13	1.53%
34	190.53	193.12	2.59	1.36%
35	2245.56	2395.21	149.65	6.66%
36	654.70	677.70	23.01	3.51%
37	390.80	398.89	8.10	2.07%
38	3395.65	3498.48	102.84	3.03%
39	2864.69	2960.76	96.07	3.35%
40	330.54	315.89	-14.64	-4.43%
41	2463.96	2474.45	10.48	0.43%
42	3074.87	3224.81	149.95	4.88%
43	588.12	625.46	37.34	6.35%
44	98.41	101.96	3.55	3.61%
45	1440.64	1454.71	14.07	0.98%
47	548.73	577.33	28.61	5.21%
48	633.27	667.17	33.89	5.35%
49	1004.34	1442.68	438.34	43.65%
50	297.09	311.79	14.70	4.95%
Total	24306.36	25628.95	1322.59	5.44%

Source: Indonesia's SAM after simulation

Note: This is a result from the decrease in output caused by subsidy shock (1.21% decrease in output) plus the increase in output caused by infrastructure shock (6.65% increase in output)

APPENDIX 5

Changes in Sectoral Output from Scenario 3

Code	Initial Output	New Output	Changes	Growth
	(Trillion Rupiahs)			(%)
28	1091.58	1162.17	70.58	6.47%
29	438.37	457.68	19.31	4.40%
30	624.30	664.33	40.03	6.41%
31	116.82	123.69	6.87	5.88%
32	428.95	454.55	25.60	5.97%
33	1384.44	1408.72	24.28	1.75%
34	190.53	205.09	14.56	7.64%
35	2245.56	2363.70	118.13	5.26%
36	654.70	674.11	19.41	2.96%
37	390.80	409.32	18.52	4.74%
38	3395.65	3526.67	131.02	3.86%
39	2864.69	2972.45	107.76	3.76%
40	330.54	314.48	-16.06	-4.86%
41	2463.96	2664.59	200.63	8.14%
42	3074.87	3216.01	141.14	4.59%
43	588.12	620.29	32.18	5.47%
44	98.41	101.46	3.05	3.10%
45	1440.64	1449.38	8.74	0.61%
47	548.73	575.72	27.00	4.92%
48	633.27	666.70	33.43	5.28%
49	1004.34	1242.68	238.35	23.73%
50	297.09	309.97	12.88	4.34%
Total	24306.36	25583.75	1277.40	5.25%

Source: Indonesia's SAM after simulation

Note: This is a result from the decrease in output caused by subsidy shock (1.21% decrease in output) plus the increase in output caused by infrastructure shock (6.46% increase in output)

APPENDIX 6

Changes in Sectoral Output from Scenario 4

Code	Initial Output	New Output	Changes	Growth
	(Trillion Rupiahs)			(%)
28	1091.58	1148.94	57.35	5.25%
29	438.37	455.70	17.33	3.95%
30	624.30	657.85	33.55	5.37%
31	116.82	126.22	9.41	8.05%
32	428.95	451.00	22.05	5.14%
33	1384.44	1410.49	26.05	1.88%
34	190.53	211.79	21.26	11.16%
35	2245.56	2346.05	100.49	4.47%
36	654.70	672.09	17.40	2.66%
37	390.80	415.15	24.35	6.23%
38	3395.65	3542.45	146.80	4.32%
39	2864.69	2979.00	114.31	399%
40	330.54	313.68	-16.86	-5.10%
41	2463.96	2771.07	307.11	12.46%
42	3074.87	3211.07	136.21	4.43%
43	588.12	617.40	29.28	4.98%
44	98.41	101.18	2.77	2.81%
45	1440.64	1446.40	5.76	0.40%
47	548.73	574.82	26.10	4.76%
48	633.27	666.44	33.17	5.24%
49	1004.34	1130.69	126.35	12.58%
50	297.09	308.95	11.86	3.99%
Total	24306.36	25558.45	1252.09	5.15%

Source: Indonesia's SAM after simulation

Note: This is a result from the decrease in output caused by subsidy shock (1.21% decrease in output) plus the increase in output caused by infrastructure shock (6.36% increase in output)

APPENDIX 7

Changes in Household Income from Scenarios 1 dan 2

Scenario 1:

Code	Initial Income	New Income	Changes	Growth
	(Trillion Rupiahs)			(%)
18	176.76	184.31	7.55	4.27%
19	731.56	764.11	32.54	4.45%
20	494.23	520.39	26.16	5.29%
21	173.15	181.41	8.26	4.77%
22	468.45	489.83	21.38	4.56%
23	710.50	745.08	34.59	4.87%
24	243.91	255.27	11.37	4.66%
25	827.88	864.33	36.44	4.40%
Total	3826.44	4004.73	178.29	4.66%

Source: Indonesia's SAM after simulation

Note: This is a result from the decrease in income caused by subsidy shock (1.24% decrease in income) plus the increase in income caused by infrastructure shock (5.89% increase in income)

Scenario 2:

Code	Initial Income	New Income	Changes	Growth
	(Trillion Rupiahs)			(%)
18	176.76	187.44	10.68	6.04%
19	731.56	780.78	49.21	6.73%
20	494.23	519.08	24.85	5.03%
21	173.15	184.74	11.59	6.69%
22	468.45	511.20	42.74	9.12%
23	710.50	749.72	39.23	5.52%
24	243.91	260.37	16.46	6.75%
25	827.88	908.67	80.78	9.76%
Total	3826.44	4101.99	275.54	7.20%

Source: Indonesia's SAM after simulation

Note: This is a result from the decrease in income caused by subsidy shock (1.24% decrease in income) plus the increase in income caused by infrastructure shock (8.44% increase in income)

APPENDIX 8

Changes in Household Income from Scenarios 3 dan 4

Scenario 3:

Code	Initial Income	New Income	Changes	Growth
	(Trillion Rupiahs)			(%)
18	176.76	185.87	9.11	5.16%
19	731.56	772.44	40.88	5.59%
20	494.23	519.74	25.50	5.16%
21	173.15	183.08	9.92	5.73%
22	468.45	500.51	32.06	6.84%
23	710.50	747.40	36.91	5.19%
24	243.91	257.82	13.91	5.70%
25	827.88	886.50	58.61	7.08%
Total	3826.44	4053.36	226.92	5.93%

Source: Indonesia's SAM after simulation
Note: This is a result from the decrease in income caused by subsidy shock (1.24% decrease in income) plus the increase in income caused by infrastructure shock (7.17% increase in income)

Scenario 4:

Code	Initial Income	New Income	Changes	Growth
	(Trillion Rupiahs)			(%)
18	176.76	184.99	8.24	4.66%
19	731.56	767.77	36.21	4.95%
20	494.23	520.11	25.87	5.23%
21	173.15	182.14	8.99	5.19%
22	468.45	494.53	26.08	5.57%
23	710.50	746.10	35.61	5.01%
24	243.91	256.39	12.49	5.12%
25	827.88	874.08	46.20	5.58%
Total	3826.44	4026.13	199.69	5.22%

Source: Indonesia's SAM after simulation
Note: This is a result from the decrease in income caused by subsidy shock (1.24% decrease in income) plus the increase in income caused by infrastructure shock (6.45% increase in income)

APPENDIX 9

Hypothesis Test Results

Hypothesis for household income:

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Initial - Scenario1	-22286.18375	11988.01810	4238.40445	-32308.41769	-12263.94981	-5.258	7	.001
Pair 2	Initial - Scenario2	-34443.11750	23784.32137	8409.02746	-54327.30777	-14558.92723	-4.096	7	.005
Pair 3	Initial - Scenario3	-28364.65030	17262.16387	6103.09657	-42796.18045	-13933.12015	-4.648	7	.002
Pair 4	Initial - Scenario4	-24960.70750	14057.56903	4970.10120	-36713.12932	-13208.28568	-5.022	7	.002

Source: Indonesia's SAM after simulation

Hypothesis for household income distribution:

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Initial - Scenario1	-.00138	.00338	.00119	-.00420	.00145	-1.151	7	.287
Pair 2	Initial - Scenario2	-.00025	.00292	.00103	-.00269	.00219	-.243	7	.815
Pair 3	Initial - Scenario3	-.00013	.00146	.00052	-.00134	.00109	-.243	7	.815
Pair 4	Initial - Scenario4	-.00138	.00338	.00119	-.00420	.00145	-1.151	7	.287

Source: Indonesia's SAM after simulation