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SURAT KETERANGAN

Nomor: 1428/UNUSA-LPPM/Adm-I/VIII/2022

Lembaga Penelitian dan Pengabdian Kepada Masyarakat (LPPM) Universitas Nahdlatul Ulama Surabaya menerangkan telah selesai melakukan pemeriksaan duplikasi dengan membandingkan artikel-artikel lain menggunakan perangkat lunak **Turnitin** pada tanggal 28 Juli 2022.

Judul	:	*Do The Energy Industries Have Important Roles In The Japanese Economy?*
Penulis	:	Ubaidillah Zuhdi, Yohan Kurniawan, Rizqi Putri Nourma Budiarti
` No. Pemeriksaan	:	2022.08.05.462

Dengan Hasil sebagai Berikut:

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paper3

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Submission date: 28-Jul-2022 09:48AM (UTC+0700)
Submission ID: 1876030513
File name: paper3.pdf (678.59K)
Word count: 4409
Character count: 23148

Do the Energy Industries Have Important Roles in the Japanese Economy?

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Abstract. The purpose of this study is to analyze the roles of energy sectors in the Japanese national economy. This study employs Input-Output (IO) analysis as an analyis tool. More specifically, this study uses the parts of IO analysis, namely simple output multiplier, simple household income multiplier, index of the power of dispersion, and index of the sensitivity of dispersion as analysis devices. The analysis period of this study is 1985-2005. The results show that, by using both multipliers, the analyzed energy industries did not include in the top five Japanese industrial sectors from 1985 through 2005. On the other hand, by using both indices, one of the analyzed sectors, petroleum refinery products, occupied quadrant I on the analysis period. This fact explains that the sector had a strong influence on the economic activities of Japan, and received great impacts from the external aspects on the analysis period. Generally, the industries occupied quadrants I, II, and IV from 1985 through 2005.

Keywords: Energy sectors, National economy, IO analysis, Petroleum refinery products

1 Introduction

The contributions of industrial sectors to the national economy can be seen not only in the developed countries, but also in the developing countries. The contributions can be viewed on micro and macro levels. It should be understood that the contribution portion of existing industrial sectors varies from country to country. One of the industrial sectors that interesting to be discussed in this matter is the energy industry.

There are many previous studies discuss the contribution or role of the energy sector in the economy. For example, [1] develops a model of Corporate Social Responsibility (CSR) under a time-consistent emission tax in a market of monopoly. Besides, this previous study analyzes the impacts of CSR behavior on economic welfare and the environment too. On the other hand, [2] analyzes the impacts of energy innovation and policy on the growth of income. This previous study focuses on the case of the United States. Furthermore, [3] shows the model of algorithmic to analyze and quantify the impact of the renewable generation participation on the Spanish electricity market prices by presenting the results of various simulation.

Meanwhile, [4] compares the designs of market for access regulation of a bottleneck transmission line, and study their effect on the decisions for investment by an incumbent enterprise with an available dirty technology and entrant with an uncertain future low-carbon technology. Reference [5] explores the effect and cost-effectiveness of the Plug-in Electric

Vehicle (PEV) subsidy program of China. Besides, [6] review the spectrum of estimation methods for the private cost of capital for the projects of renewable energy, and discuss suitable use of the methods to generate unbiased results. This previous study focuses on 46 countries which the analysis period is from 2009 through 2017. Furthermore, [7] proposes a stylized model characterizing the degree of Solar Radiation Management (SRM) dissemination that is globally efficient, i.e. that maximizes global Gross Value Added (GVA).

On the other hand, [8] proposes a model of formal decision considering the prosumer's risk-aversion and obtain the prosumer's optimal investment in renewable Distributed Energy Resources (DERs) to analyze the insurace effect. Reference [9] empirically analyzes the effect of renewable energy use on firm profit. This previous study focuses on 920 firms from 59 countries from a very large number of sectors. This previous study uses panel data which the period of analysis is from 2014 through 2018. Meanwhile, [10] analyzes the impacts of Information and Communication Technology (ICT) on the structural changes of Japanese energy sectors. This previous study employs statistical and Input-Output (IO) analyses in analyzing the impacts. The analysis period of this previous study is from 1985 through 2005.

Based on the aforesaid previous studies, the use of IO analysis in analyzing the roles of energy sectors in the national economy of a specific country is still lack. IO analysis is a tool in investigating the linkages of industries in one or more countries. Therefore, the tool is an appropriate tool in analyzing the roles. The importance and originality of this study are that it explores the roles by using several calculation methods from IO analysis which focusing on the national economy of Japan.

The purpose of this study is to analyze the roles of energy industries in the national economy of Japan. This study employs IO analysis as an analyis device. More specifically, this study utilizes the parts of IO analysis, namely simple output multiplier, simple household income multiplier, index of the power of dispersion, and index of the sensitivity of dispersion as analysis devices. The period of analysis of this study is 1985-2005. The rest of this paper is described as follows. Section 2 explains the methodology of this study. Section 3 shows the results of calculations. Also, the discussions for the results can be seen on this section. The next section, section 4, describes the conclusions of this study, and suggested further researches.

2 Methodology

The methodology of this study is explained as follows. The first step is to described the data used. The study uses Japanese IO tables for 1985, 1990, 1995, 2000, and 2005 as data. Initially, the tables consist of 84, 91, 89, 89, and 89 industrial sectors, respectively. All tables use the producer's prices. After conducting the adjustment process, the tables have 78 industries. Those industries can be seen in Appendix 1. The next step is to show the Japanese energy sectors used in this study. Table 1 describes those sectors.

Table 1. Japanese energy sectors used in this study (Source: [10] with the slight modifications).

Sector number	Sector name
8	Coal mining, crude petroleum, and natural gas
26	Petroleum refinery products
27	Coal products

The third step is to conduct the calculations by applying simple output multiplier, and simple household income multiplier. Reference [11] explains the equations of both multipliers as follows:

$$m(o)_j = \sum_{i=1}^{n} l_{ij} \tag{1}$$

$$m(h)_j = \sum_{i=1}^{n} a_{n+1,i} l_{ij} \ . \tag{2}$$

The former model explains the simple output multiplier while the latter one describes the simple household income multiplier. More specifically, $m(o)_j$, $m(h)_j$, $a_{n+1,i}$, n, and l_{ij} are simple output multiplier for sector j, simple household income multiplier for sector j, the coefficients of labor-input, the number of analyzed sectors, and a sector-to-sector multipliers matrix, respectively.

The fourth step is to conduct the calculations in order to investigate the characteristics of Japanese industrial sectors on the analysis period, especially the Japanese energy industries. The methods utilized in the calculations are the (1) index of the power of dispersion, and (2) index of the sensitivity of dispersion. The former index is used to analyze the strength of one specific industry in influencing entire industries. A greater influence is aligned with the higher index value. The detail of the index is described by [12] as follows:

$$\text{Index of the power of dispersion by sector} = \frac{b_{*j}}{\overline{B}} \ . \tag{3}$$

The numerator is each sum of column in the table of inverse matrix coefficients while the denominator describes the mean value of the entire vertical sum in the table of inverse matrix coefficients. More specifically, the equations of numerator and denominator are explained as follows:

$$b_{*j} = \sum_{i}^{n} b_{ij} \tag{4}$$

$$\overline{B} = \frac{1}{n} \sum_{j} b_{*j} = \frac{1}{n} \sum_{i} \sum_{j} b_{ij} \ . \tag{5}$$

Further, b_{ij} and n are the value of Leontief inverse from sector i to sector j, and total number of analyzed industries, respectively.

The latter index is utilized to analyze the sensitivity of the specific industry to the external influences. A greater sensitivity is aligned with the greater index value. More specifically, one particular industry is called more sensitive to the influences from the external aspects if it has a higher index value. The detail of the index is explained by [12] as follows:

$$\text{Index of the sensitivity of dispersion by sector} = \frac{b_{i*}}{\overline{B}} \quad . \tag{6}$$

In this index, the numerator is each sum of row in the table of inverse matrix coefficients while the denominator explains the mean value of the entire horizontal sum in the table of inverse matrix coefficients. Further, the equations of the numerator and denominator of the index are described as follows:

$$b_{i*} = \sum_{j}^{n} b_{ij} \tag{7}$$

$$\overline{B} = \frac{1}{n}\sum_{i} b_{i*} = \frac{1}{n}\sum_{i}\sum_{j} b_{ij} \quad . \tag{8}$$

In order to get a compatibility sense with the previous index, equation (7) is slightly changed from the original source. More specifically, the part describes the total number of discussed industrial sectors, n, is added into the equation. As with the previous explanation, b_{ij} is the Leontief inverse value from sector i to sector j. The fifth step is to analyze the roles of Japanese industrial sectors, especially the Japanese energy industries, in the national economy on the analysis period. Conclusions of the study, and suggested further researches are described afterwards.

3 Results and Analysis

Tables 2, 3, 4, 5, and 6 explain the top five Japanese industrial sectors viewed from the values of simple output multiplier in 1985, 1990, 1995, 2000, and 2005, respectively. Reference [11] explains that an output multiplier for sector j is the total value of production in all industrial sectors of the economy that is needed in order to fulfill a currency's worth of final demand for the output of sector j. The reference also describes that, for the simple output multiplier, the total value of production is coming from the households exogenous model.

Table 2. Top five Japanese industrial sectors viewed from the values of simple output multiplier, 1985.

No.	Sector number	Sector name	Simple output multiplier
1	36	Steel products	3.456
2	65	Self-transport by private cars	3.283
3	23	Synthetic resins	3.266
4	22	Chemical basic and intermediate products	3.197
5	35	Pig iron and crude steel	3.183

Table 3. Top five Japanese industrial sectors viewed from the values of simple output multiplier, 1990.

No.	Sector number	Sector name	Simple output multiplier
1	47	Motor vehicles and repair of motor vehicles	3.104
2	36	Steel products	3.097
3	65	Self-transport by private cars	2.852
4	35	Pig iron and crude steel	2.850
5	23	Synthetic resins	2.805

Table 4. Top five Japanese industrial sectors viewed from the values of simple output multiplier, 1995.

No.	Sector number	Sector name	Simple output multiplier
1	47	Motor vehicles and repair of motor vehicles	3.063
2	36	Steel products	2.887
3	65	Self-transport by private cars	2.748
4	11	Feeds and organic fertilizer, n.e.c.	2.717
5	35	Pig iron and crude steel	2.672

Table 5. Top five Japanese industrial sectors viewed from the values of simple output multiplier, 2000.

No.	Sector number	Sector name	Simple output multiplier
1	47	Motor vehicles and repair of motor vehicles	3.112
2	36	Steel products	2.967
3	23	Synthetic resins	2.916
4	22	Chemical basic and intermediate products	2.882
5	65	Self-transport by private cars	2.820

Table 6. Top five Japanese industrial sectors viewed from the values of simple output multiplier, 2005.

No.	Sector number	Sector name	Simple output multiplier
1	47	Motor vehicles and repair of motor vehicles	3.449
2	23	Synthetic resins	3.302
3	22	Chemical basic and intermediate products	3.296
4	36	Steel products	3.237
5	65	Self-transport by private cars	2.952

Analyzed energy sectors do not include in the tables. By using this result, one can argue that the sectors did not generate the attractive effect to the economy of Japan on the period of analysis through an additional final demand. One of the interesting points from the multiplier is the sector number 36, steel products, can be seen in the tables. This facts explains the consistency of the sector in attracting the Japanese economy from 1985 through 2005. Another interesting point is the sector number 47, motor vehicles and repair of motor vehicles, occupies the first position in almost all tables. For example, the sector occupies the first rank in table 6

which the value is 3.449. This result indicates that in order to satisfy a yen's worth of final demand for the sector's output in 2005, all Japanese industries needed to produce the products which the total value was ¥3.449.

Figures 1, 2, 3, 4, and 5 show the values of simple output multiplier of all Japanese industries in 1985, 1990, 1995, 2000, and 2005, respectively. The average values of simple output multiplier of Japanese industrial sectors in these years were 2.304, 2.147, 2.089, 2.131, and 2.258, respectively. From 1985 through 1990, the average values were fluctuating.

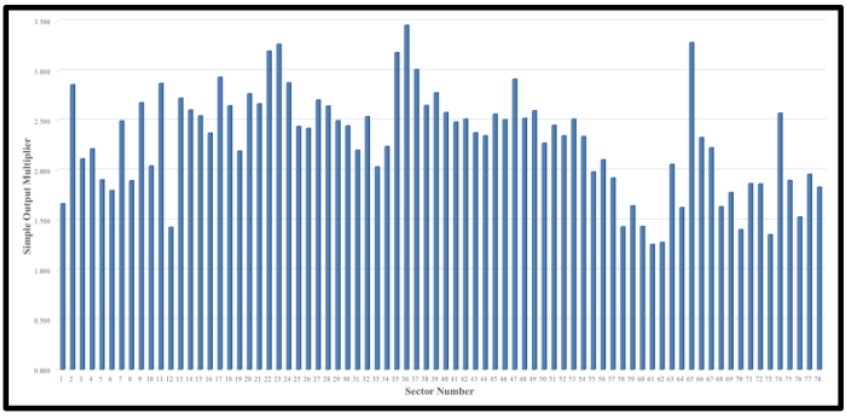

Fig. 1. The values of simple output multiplier of Japanese industrial sectors, 1985.

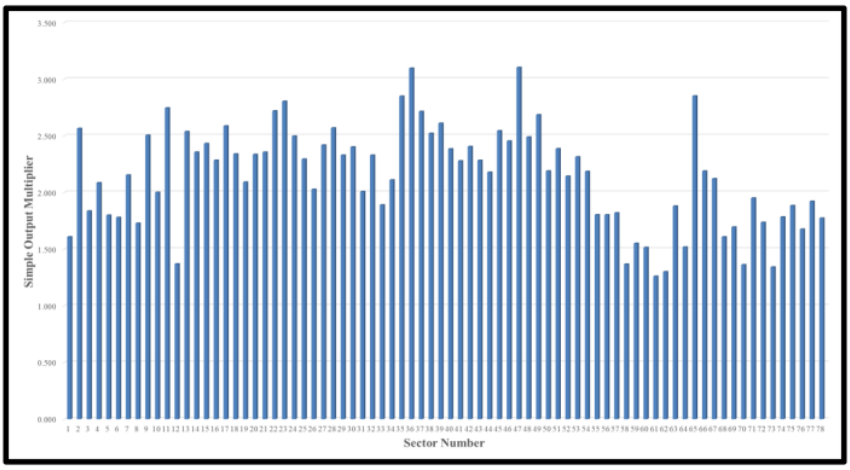

Fig. 2. The values of simple output multiplier of Japanese industrial sectors, 1990.

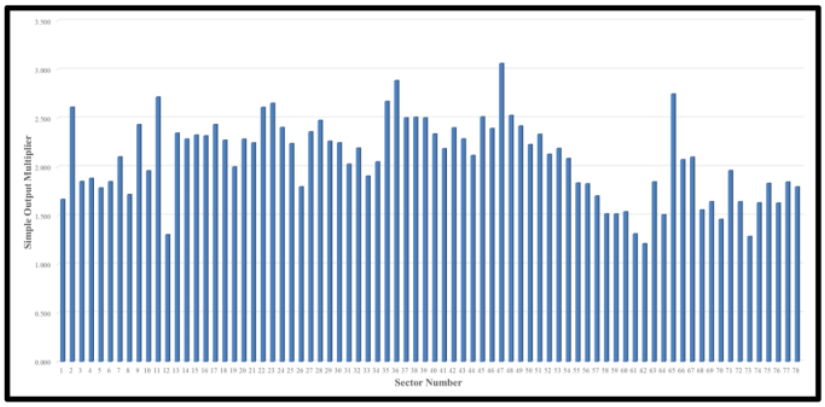

Fig. 3. The values of simple output multiplier of Japanese industrial sectors, 1995.

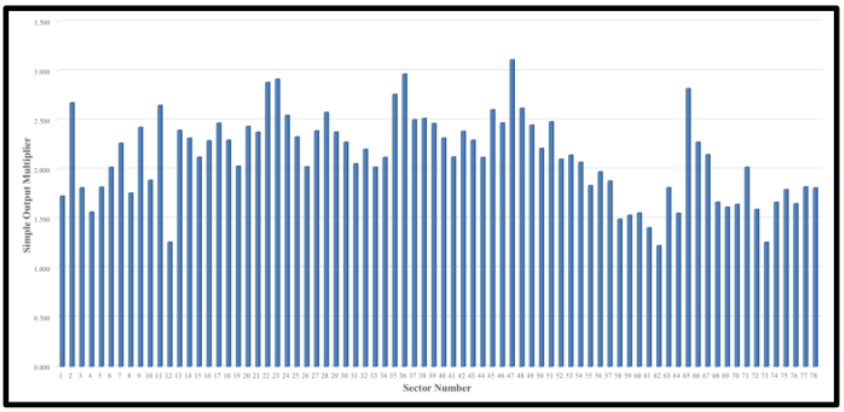

Fig. 4. The values of simple output multiplier of Japanese industrial sectors, 2000.

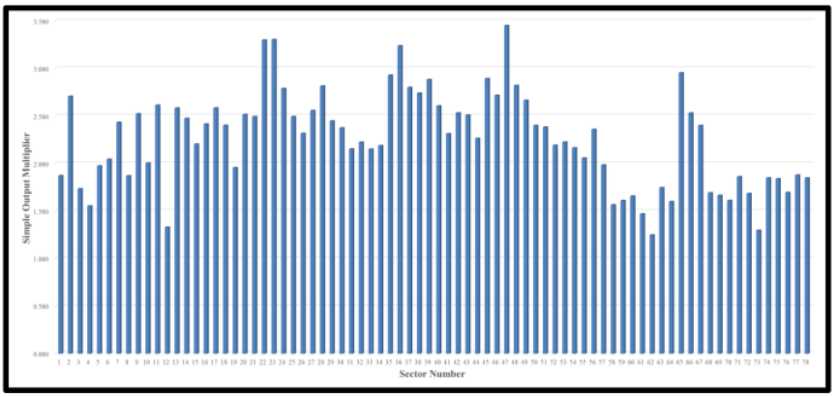

Fig. 5. The values of simple output multiplier of Japanese industrial sectors, 2005.

Tables 7, 8, 9, 10, and 11 show the top five Japanese industrial sectors viewed from the values of simple household income multiplier in 1985, 1990, 1995, 2000, and 2005, respectively. Reference [11] describes that the multiplier is used to explain the economic impacts of new final demand as measured by new households income by using the households exogenous model. The compositions of the tables on the multiplier are different if it compared with the previous multiplier.

Table 7. Top five Japanese industrial sectors viewed from the values of simple household income multiplier, 1985.

No.	Sector number	Sector name	Simple household income multiplier
1	63	Railway	0.848
2	73	Education	0.836
3	64	Road transport (except transport by private cars)	0.736
4	58	Waste management service	0.719
5	72	Public administration and activities not elsewhere classified	0.691

Table 8. Top five Japanese industrial sectors viewed from the values of simple household income multiplier, 1990.

No.	Sector number	Sector name	Simple household income multiplier
1	73	Education	0.833
2	58	Waste management service	0.739
3	64	Road transport (except transport by private cars)	0.720
4	72	Public administration and activities not elsewhere classified	0.719
5	76	Other public services	0.709

Table 9. Top five Japanese industrial sectors viewed from the values of simple household income multiplier, 1995.

No.	Sector number	Sector name	Simple household income multiplier
1	73	Education	0.838
2	72	Public administration and activities not elsewhere classified	0.723
3	76	Other public services	0.721
4	64	Road transport (except transport by private cars)	0.720
5	74	Research	0.706

Table 10. Top five Japanese industrial sectors viewed from the values of simple household income multiplier, 2000.

No.	Sector number	Sector name	Simple household income multiplier
1	73	Education	0.795
2	74	Research	0.715
3	76	Other public services	0.712
4	64	Road transport (except transport by private cars)	0.709
5	75	Medical service, health and social security	0.688

Table 11. Top five Japanese industrial sectors viewed from the values of simple household income multiplier, 2005.

No.	Sector number	Sector name	Simple household income multiplier
1	73	Education	0.780
2	76	Other public services	0.716
3	64	Road transport (except transport by private cars)	0.684
4	75	Medical service, health and social security	0.676
5	74	Research	0.658

One of the interesting points from this multiplier is two sectors include in the tables, namely road transport (except transport by private cars) and education. In 2005, the values of those sectors were 0.684 and 0.780, respectively. These values indicate that, in 2005, an additional yen of final demand for the sectors would generate ¥0.684 and ¥0.780 of new household incomes, respectively, when all direct and indirect impacts were modified into yen estimates of incomes. Another interesting point is the analyzed energy sectors do not include in the tables. This phenomenon is same with the calculation results of previous multiplier.

Figures 6, 7, 8, 9, and 10 show the values of simple household income multiplier of all Japanese industrial sectors in 1985, 1990, 1995, 2000, and 2005, respectively. The average values of simple household income multiplier of Japanese industrial sectors in 1985, 1990, 1995, 2000, and 2005 were 0.514, 0.497, 0.511, 0.504, and 0.492, respectively. As with the previous multiplier, the average values of the multiplier were fluctuating on the analysis period.

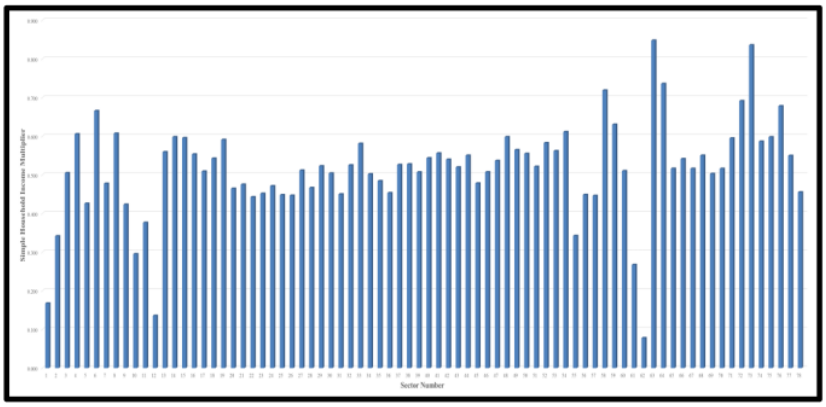

Fig. 6. The values of simple household income multiplier of Japanese industrial sectors, 1985.

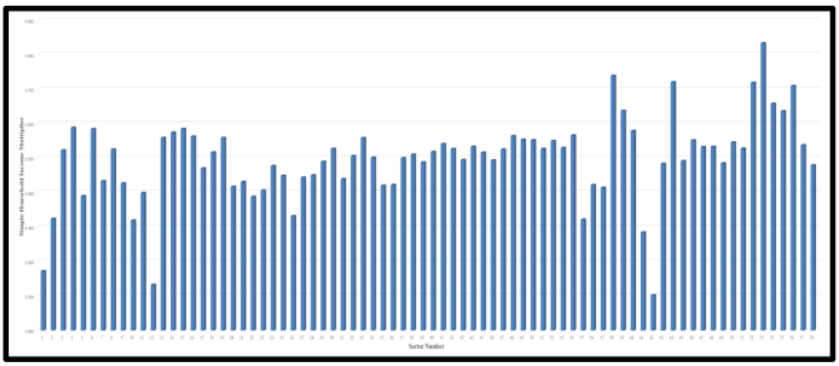

Fig. 7. The values of simple household income multiplier of Japanese industrial sectors, 1990.

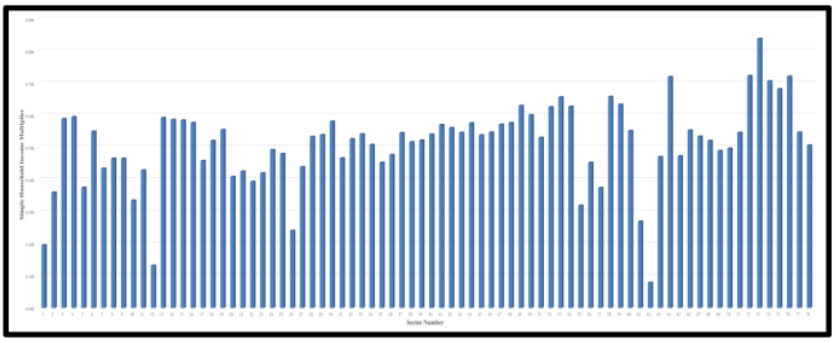

Fig. 8. The values of simple household income multiplier of Japanese industrial sectors, 1995.

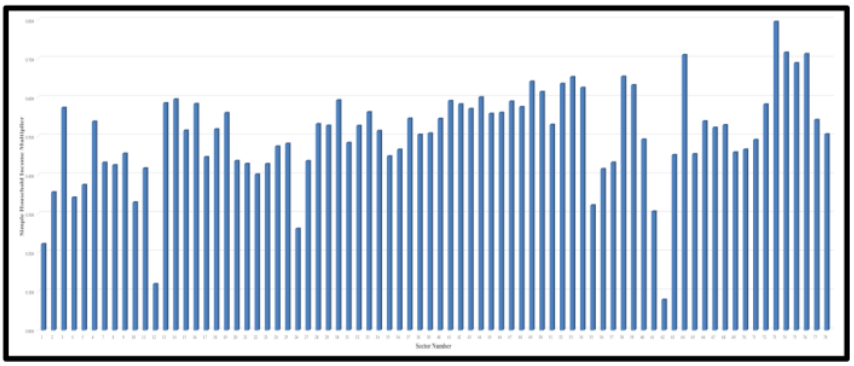

Fig. 9. The values of simple household income multiplier of Japanese industrial sectors, 2000.

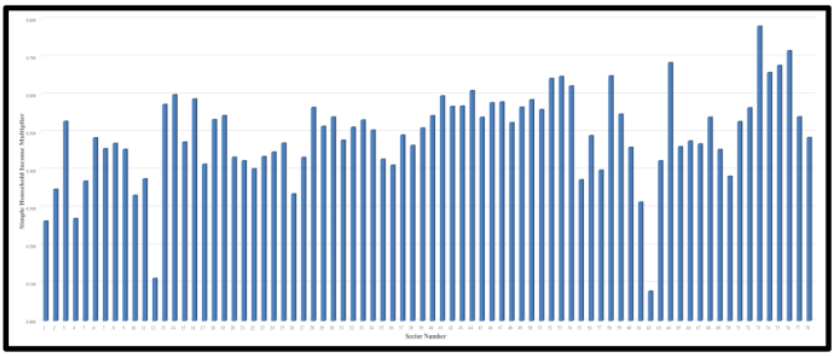

Fig. 10. The values of simple household income multiplier of Japanese industrial sectors, 2005.

Figures 11, 12, 13, 14, and 15 plot the Japanese industrial sectors, and combine both indices used in this study in one chart for 1985, 1990, 1995, 2000, and 2005, respectively. More specifically, the horizontal axis of the chart describes the values of the index of the power of dispersion while the vertical axis explains the values of another index. The chart has four quadrants. Each industry has a peculiar quadrant in the chart.

Each quadrant has specific characteristics. More specifically, the quadrant I is a place where the values of both indices are more than one. In other words, the industrial sectors include on this quadrant are those most impacted by the external aspects as well as have strong influences on the entire industries. The opposite phenomena can be viewed on the sectors which include on the quadrant III. On the other hand, quadrant II is a spot where the value of the index of the power of dispersion is less than one while the value of another index is more than one. One can say that the industrial sectors include on this quadrant are those which have weak influences on the entire industries, but they get high impacts from the shifts of external aspects. The opposite characteristics are owned by the industrial sectors which include on the quadrant IV.

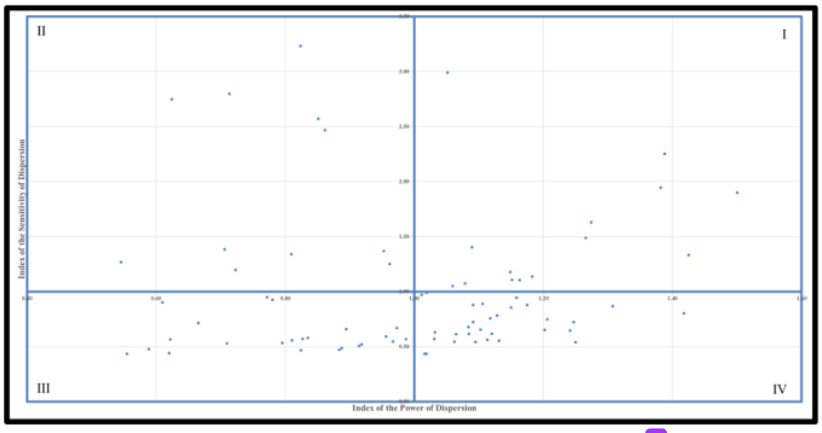

Fig. 11. The quadrants for Japanese industrial sectors based on the indices of the power of dispersion, and the sensitivity of dispersion, 1985.

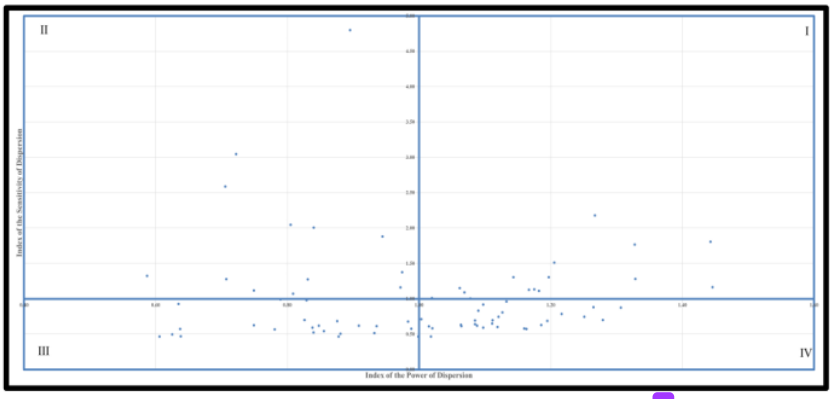

Fig. 12. The quadrants for Japanese industrial sectors based on the indices of the power of dispersion, and the sensitivity of dispersion, 1990.

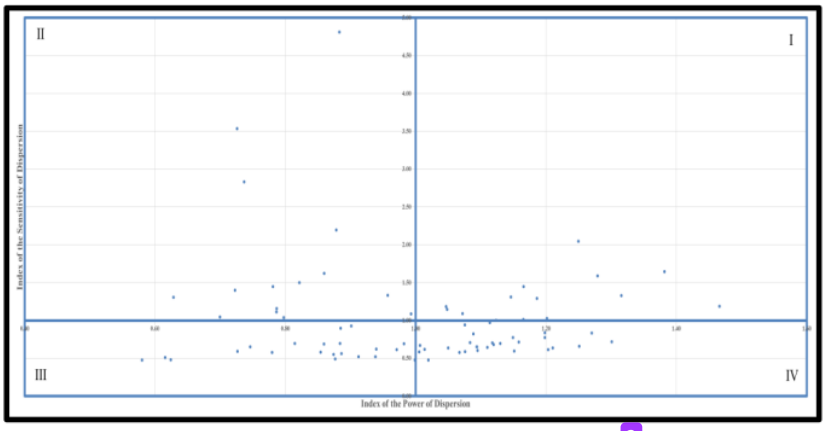

Fig. 13. The quadrants for Japanese industrial sectors based on the indices of the power of dispersion, and the sensitivity of dispersion, 1995.

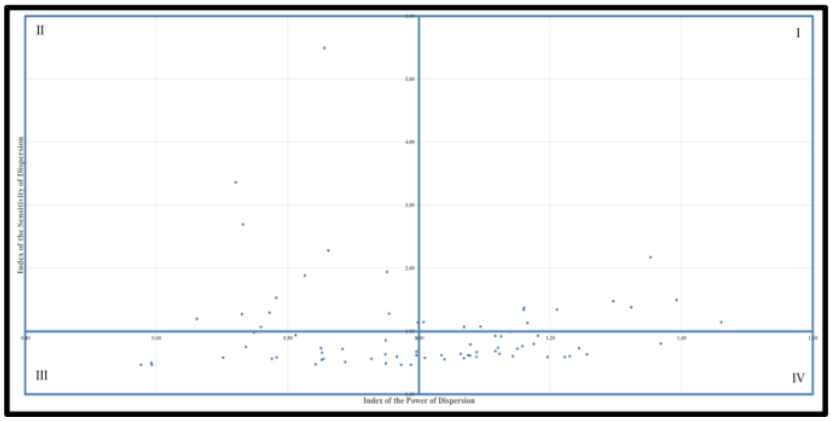

Fig. 14. The quadrants for Japanese industrial sectors based on the indices of the power of dispersion, and the sensitivity of dispersion, 2000.

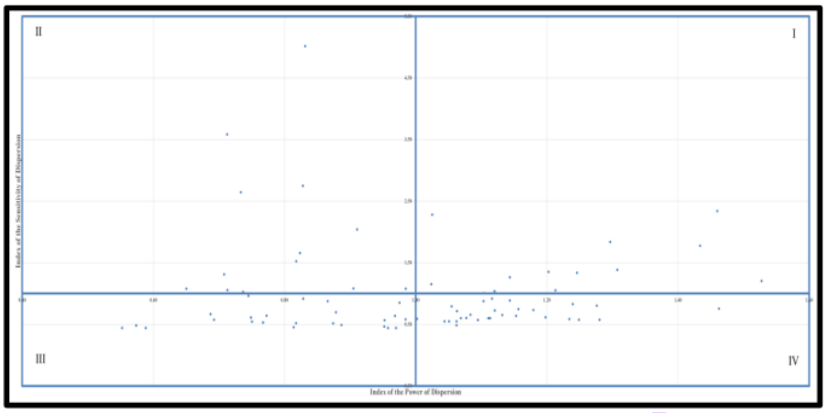

Fig. 15. The quadrants for Japanese industrial sectors based on the indices of the power of dispersion, and the sensitivity of dispersion, 2005.

Tables 12, 13, 14, 15, and 16 summarize the quadrants of analyzed energy industries in 1985, 1990, 1995, 2000, and 2005, respectively. Based on the information in the tables, from 1985 through 2005, the industries occupied quadrants I, II, and IV. The analyzed energy sector that occupied quadrant I on the analysis period was petroleum refinery products. This fact shows that the sector had a strong influence on the Japanese economic activities, and received great effects from the external aspects on the period of analysis. Based on this fact, one can argue that the Japanese government should prioritize the industry development on the future.

Table 12. The quadrants of Japanese energy sectors, 1985.

Sector number	Sector name	Quadrant
8	Coal mining, crude petroleum, and natural gas	II
26	Petroleum refinery products	I
27	Coal products	IV

Table 13. The quadrants of Japanese energy sectors, 1990.

Sector number	Sector name	Quadrant
8	Coal mining, crude petroleum, and natural gas	II
26	Petroleum refinery products	II
27	Coal products	IV

Table 14. The quadrants of Japanese energy sectors, 1995.

Sector number	Sector name	Quadrant
8	Coal mining, crude petroleum, and natural gas	II
26	Petroleum refinery products	II
27	Coal products	IV

Table 15. The quadrants of Japanese energy sectors, 2000.

Sector number	Sector name	Quadrant
8	Coal mining, crude petroleum, and natural gas	II
26	Petroleum refinery products	II
27	Coal products	IV

Table 16. The quadrants of Japanese energy sectors, 2005.

Sector number	Sector name	Quadrant
8	Coal mining, crude petroleum, and natural gas	II
26	Petroleum refinery products	I
27	Coal products	IV

4 Conclusions and Further Researches

This study analyzes the roles of Japanese energy sectors in the Japanese national economy by using IO analysis. More specifically, this study employs simple output multiplier, simple household income multiplier, index of the power of dispersion, and index of the sensitivity of dispersion as analysis tools. The analysis period of this study is 1985-2005. The analyzed Japanese energy sectors in this study are (1) coal mining, crude petroleum, and natural gas, (2) petroleum refinery products, and (3) coal products.

The results show that, by using both multipliers, the analyzed energy industries did not include in the top five Japanese industrial sectors from 1985 through 2005. On the other hand, by using both indices, one of the analyzed sectors, petroleum refinery products, occupied quadrant I on the analysis period. This fact explains that the sector had a strong influence on the economic activities of Japan, and received great impacts from the external aspects on the analysis period. Generally, the industries occupied quadrants I, II, and IV from 1985 through 2005.

The understanding regarding the roles of Japanese energy sectors in influencing the Japanese national economy on the analysis period is obtained from the current study. However, the study would be get a broader information about the roles if the study could use the longer analysis period. Therefore, as a further research, the study proposes the same analysis by using the longer period of analysis, such as from 1985 through 2015.

The other suggested further research from the study is to conduct an international comparison using the same topic. The comparison can be conducted among developed as well as developed-developing countries. The comparison might explore the roles of the energy industries of compared countries so the similarities and differences among those can be investigated. One of the examples of the comparison is Japan and China.

Acknowledgements

The authors would like to thank Universitas Nahdlatul Ulama Surabaya for providing the research funding.

Appendices

Appendix 1. Japanese industrial sectors (78 sectors) (Source: [] with a slight modification).

Sector number	Sector name
1	Crop cultivation
2	Livestock
3	Agricultural services
4	Forestry
5	Fisheries
6	Metallic ores
7	Non-metallic ores
8	Coal mining, crude petroleum and natural gas
9	Foods
10	Beverage
11	Feeds and organic fertilizer, n.e.c.
12	Tobacco
13	Textile products
14	Wearing apparel and other textile products
15	Timber and wooden products
16	Furniture and fixtures
17	Pulp and paper
18	Paper products
19	Publishing and printing
20	Chemical fertilizer
21	Basic industrial inorganic chemicals
22	Chemical basic and intermediate products
23	Synthetic resins
24	Synthetic fibers
25	Final chemical products, n.e.c.
26	Petroleum refinery products
27	Coal products
28	Plastic products
29	Rubber products
30	Leather, fur skins and miscellaneous leather products
31	Glass and glass products
32	Cement and cement products
33	Pottery, china and earthenware
34	Other ceramic, stone and clay products

35	Pig iron and crude steel
36	Steel products
37	Steel castings and forgings and other steel products
38	Non-ferrous metals
39	Non-ferrous metal products
40	Metal products for construction and architecture
41	Other metal products
42	General industrial machinery
43	Special industrial machinery
44	Other general machines
45	Machinery for office and service industry
46	Electrical appliance
47	Motor vehicles and repair of motor vehicles
48	Ships and repair of ships
49	Other transportation equipment and repair of transportation equipment
50	Precision instruments
51	Miscellaneous manufacturing products
52	Building construction
53	Repair of construction
54	Civil
55	Electricity
56	Gas and heat supply
57	Water supply
58	Waste management service
59	Commerce
60	Finance and insurance
61	Real estate agencies and rental services
62	House rent
63	Railway
64	Road transport (except transport by private cars)
65	Self-transport by private cars
66	Water transport
67	Air transport
68	Storage facility service
69	Services relating to transport
70	Communication
71	Broadcasting
72	Public administration and activities not elsewhere classified
73	Education
74	Research
75	Medical service, health and social security
76	Other public services
77	Business and office supplies
78	Personal services

References

[1] Fukuda, K., Ouchida, Y. Corporate social responsibility (CSR) and the environment: does CSR increase emissions? Energy econ. 2020; 92 (104933): 1-10.

[2] Jaimes, R., Gerlagh, R. Resource-richness and economic growth in contemporary U.S.. Energy econ. 2020; 89 (104810): 1-11.
[3] de la Nieta, A. A. S., Contreras, J. Quantifying the effect of renewable generation on day-ahead electricity market prices: the Spanish case. Energy econ. 2020; 90 (104841): 1-16.
[4] Petropoulos, G., Willems, B. Long-term transmission rights and dynamic efficiency. Energy econ. 2020; 88 (104714): 1-12.
[5] Sheldon, T. L., Dua, R. Effectiveness of China's plug-in electric vehicle subsidy. Energy econ. 2020; (104773): 1-8.
[6] Steffen, B. Estimating the cost of capital for renewable energy projects. Energy econ. 2020; 88 4783): 1-14.
[7] Rickels, W., Quaas, M. F., Ricke, K., Quaas, J., Moreno-Cruz, J., Smulders, S. Who turns the global mostat and by how much? Energy econ. 2020; 91 (104852): 1-17.
[8] Fridgen, G., Halbrügge, S., Olenberger, C., Weibelzahl, M. The insurance effect of renewable distributed energy resources against uncertain electricity price developments. Energy econ. 2020; 91 4887): 1-10.
[9] Hulshof, D., Mulder, M. The impact of renewable energy use on firm profit. Energy econ. 2020; 92 (104957): 1-10.
[10] Zuhdi, U., Mori, S. Kamegai, K. The influences of the information and communication technology on the structural changes of Japanese energy sectors from 1985 through 2005: a statistical analysis. IJESD. 2017; 16 (3): 201-227.
[11] Miller, R. U., Blair, P. D. Input-output analysis: foundations and extensions. Second edition. New York: Cambridge university press; 2009. 250-252.
[12] Ministry of Internal Affairs and Communications Japan. Chapter IV: coefficients for input-output analysis and computation methods. n.d.; https://www.soumu.go.jp/main_content/000327480.pdf (accessed September 13, 2020).

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