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# An analysis of the characteristics of Indonesian industrial sectors: 2005-2010

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**Abstract.** The purpose of the current study is to analyze the characteristics of Indonesian industrial sectors from 2005 through 2010. The study employs the analysis instruments from the Input-Output (IO) analysis, namely the indices of the power of dispersion, and the sensitivity of dispersion. For 2005 and 2010, the study focuses on nine and seventeen industries, respectively. The results show that industry 3, manufacturing, placed the quadrant I on the analysis period. The fact shows that, from 2005 through 2010, the industry had a strong influence on the Indonesian economic activities, and received high impacts from the external aspects. In other words, the industry has great potency for the Indonesian economy. From the results one can also see that sector 4, electricity and gas, included in the quadrant I in 2010. This fact explains that the sector has also great potency for the economic activities of Indonesia. Thus, the Indonesian government should prioritize the industries development.

## 1. Introduction

Industrial sectors have important roles on the economy of one country. The roles can be seen on the micro and macro aspects. On the former aspect, the roles can be observed from the economic interactions between industries and households. On the other hand, using the aggregate level, the latter one is represented by the interactions between industries and government.

One can argue that the roles itself cannot be separated from the unique characteristics of industrial sectors because it might describe how they behave in the economic system. Therefore, an analysis of the characteristics of industries can also be viewed as an effort to know the roles. Further, the proposals for improving the economic conditions of analyzed country might be generated from the analysis.

The examples of previous studies which conduct the analysis are [1], [2], [3], [4], [5], [6], [7], and [8]. The mentioned previous studies, however, focus on the specific industries. In other words, the research focuses on the analysis for the whole sector of specific country is still needed. The research is required in order to know the whole view regarding the characteristics of the industries of analyzed country so the suggestions for improving its economic conditions can be made properly. The current study is conducted in order to fulfill the gap.

The purpose of the study is to analyze the characteristics of Indonesian industrial sectors from 2005 through 2010. The period of analysis is aligned with the newest data. One can argue that, in both years, the Indonesian government politically had transitional situations because the presidential elections were conducted in 2004 and 2009. The study employs the Input-Output (IO) analysis as an analysis instrument because it is a suitable tool in describing the characteristics.

The rest of this paper is described as follows. Section 2 scientifically explains the methodology of the current study. Section 3 explores the results of calculations. The discussions for the results are also conducted on the section. The final section, section 4, gives the conclusions of the study, and suggestions for the further researches.



## 2. Methodology

This part scientifically explores the methodology of the current study. The first step of the methodology is to explain the data sources of the study. The data sources are the Indonesian IO tables for 2005 and 2010. The tables are obtained from [9] and [10], respectively. The former table consists of nine industrial sectors, and uses the producer's prices. On the other hand, the latter one has seventeen industries, and utilizes the basic prices. Because of the data characteristic, the years of data describe the analysis period of the study, namely from 2005 through 2010. The second step is to describe the industrial sectors of Indonesia used in this study. Tables 1 and 2 show the industries for 2005 and 2010, respectively.

**Table 1.** Indonesian industrial sectors used in this study, 2005.

Sector Number	Sector Name
1	Agriculture, livestock, forestry, and fishery
2	Mining and quarrying
3	Manufacturing industry
4	Electricity, gas, and water supply
5	Construction
6	Trade, hotel, and restaurant
7	Transport and communication
8	Financial, real estate, and business services
9	Services

Source: [11]

**Table 2.** Indonesian industrial sectors used in this study, 2010.

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 identify the characteristics of Indonesian industrial sectors on the analysis period. The methods applied in the calculations are the (1) index of the power of dispersion, and (2) index of the sensitivity of dispersion. Both methods are the analysis tools from the IO analysis. The former index is used to analyze the strength of one particular sector in influencing entire industries. A stronger influence is aligned with the higher index value. The detail of the index is explained by [12] as follows:

$$\text{Index of the power of dispersion by sector} = \frac{b_{*j}}{\bar{B}} \quad (1)$$

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

$$b_{*j} = \sum_i^n b_{ij} \quad (2)$$

$$\bar{B} = \frac{1}{n} \sum_j b_{*j} = \frac{1}{n} \sum_i \sum_j b_{ij} \quad (3)$$

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

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

$$\text{Index of the sensitivity of dispersion by sector} = \frac{b_{i*}}{\bar{B}} \quad (4)$$

In this index, the numerator is each sum of row in the table of inverse matrix coefficients while the denominator describes 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 explained as follows:

$$b_{i*} = \sum_j^n b_{ij} \quad (5)$$

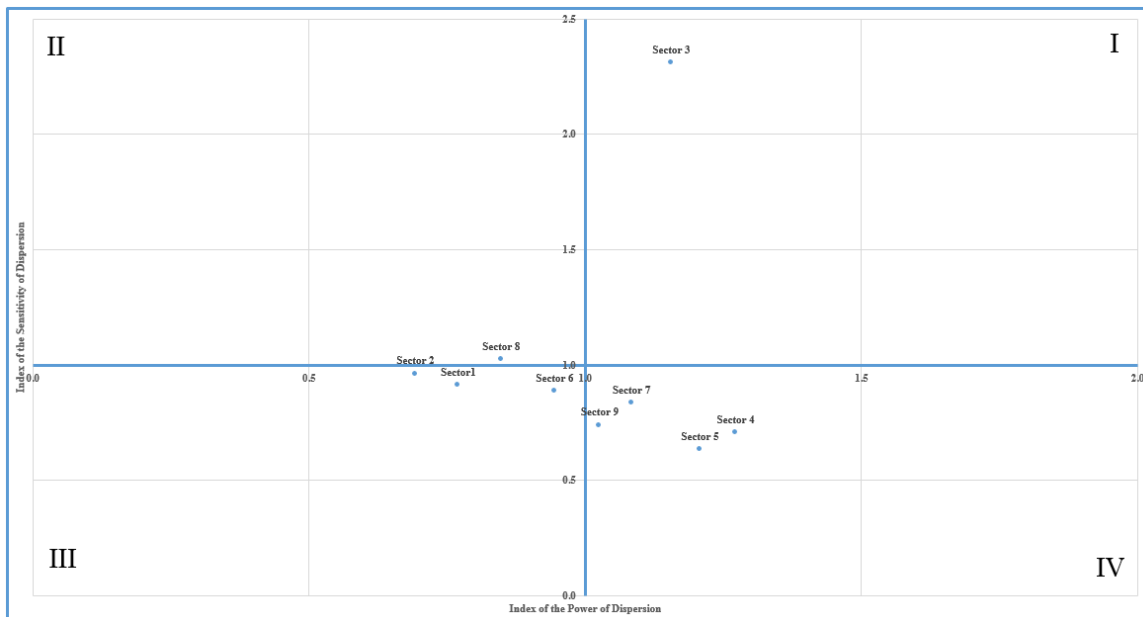
$$\bar{B} = \frac{1}{n} \sum_i b_{i*} = \frac{1}{n} \sum_i \sum_j b_{ij} \quad (6)$$

In order to get a compatibility sense with the previous index, equation (5) is slightly modified from the original source. More specifically, the part explains the total number of discussed industries,  $n$ , is added into the equation. As with the previous explanation,  $b_{ij}$  is the value of Leontief inverse from sector  $i$  to sector  $j$ . The next step is to analyze the characteristics of Indonesian industrial sectors on the analysis period. Conclusions of this study, and suggestions for further researches are described on the final step.

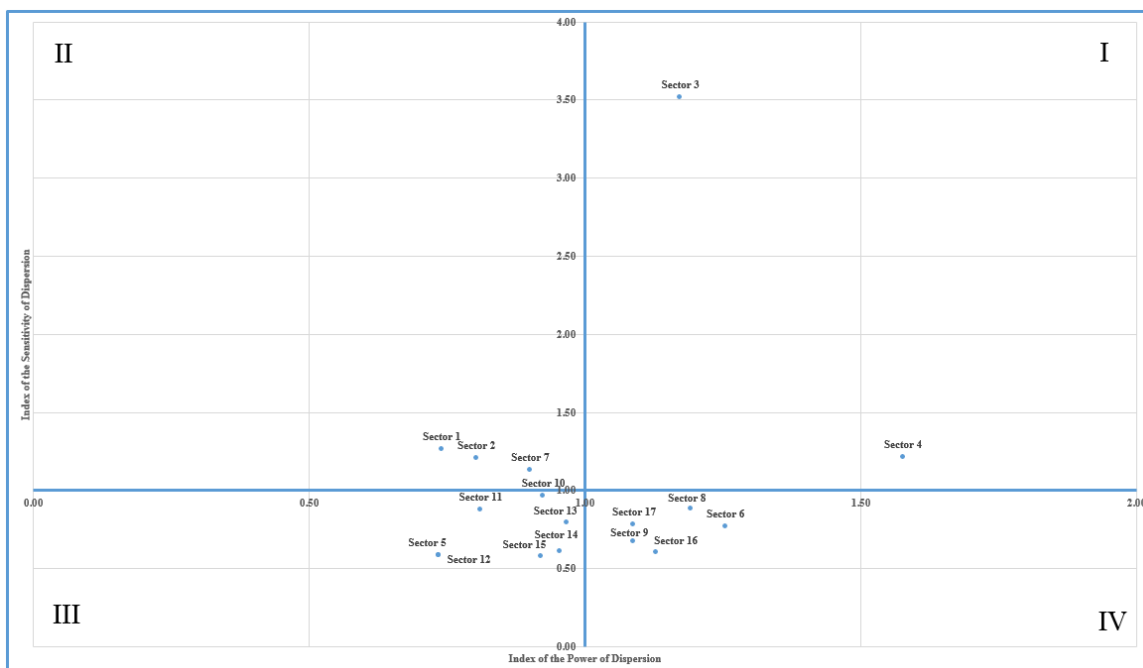
### 3. Results and analysis

Figures 1 and 2 plot the analyzed sectors, and combine both indices used in this study in one chart for 2005 and 2010, respectively. More specifically, the horizontal axis of the chart explains the values of the index of the power of dispersion while the vertical axis places the values of another index. The chart has four quadrants. Each discussed sector has a specific quadrant in the chart.





**Figure 1.** The quadrants for Indonesian industrial sectors based on the indices of the power of dispersion, and the sensitivity of dispersion, 2005 (Source: [11]).



**Figure 2.** The quadrants for Indonesian industrial sectors based on the indices of the power of dispersion, and the sensitivity of dispersion, 2010.

Each quadrant has unique characteristics. More specifically, the quadrant I is a place where the values of both indices are more than one. In other words, the sectors include in this quadrant are those most affected by the external aspects as well as have strong influences on the entire industries. The opposite phenomena can be observed on the sectors which include in the quadrant III. On the other hand, quadrant II is an area 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 argue that the industries include in this quadrant are those which have weak influences on the entire industries but they get high impacts from the changes of external aspects. The opposite characteristics are owned by the sectors which include in the quadrant IV.

Based on the information in both figures, one can say that sector 3 placed the quadrant I on the analysis period. From tables 1 and 2, this is a manufacturing sector. The fact shows that, from 2005 through 2010, the sector had a strong influence on the Indonesian economic activities, and received high impacts from the external aspects. Sectors 5 and 12 in the latter figure have close positions because the indices values of both industries in 2010 were similar. Tables 3 and 4 summarize the quadrants of analyzed industries in 2005 and 2010, respectively.

**Table 3.** The quadrants of Indonesian industrial sectors, 2005.

Sector Number	Sector Name	Quadrant
1	Agriculture, livestock, forestry, and fishery	III
2	Mining and quarrying	III
3	Manufacturing industry	I
4	Electricity, gas, and water supply	IV
5	Construction	IV
6	Trade, hotel, and restaurant	III
7	Transport and communication	IV
8	Financial, real estate, and business services	II
9	Services	IV

**Table 4.** The quadrants of Indonesian industrial sectors, 2010.

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

#### 4. Conclusions and further researches

This study analyzes the characteristics of Indonesian industrial sectors from 2005 through 2010. The study employs the analysis instruments from the IO analysis, namely the indices of the power of dispersion, and the sensitivity of dispersion. For 2005 and 2010, the study focuses on nine and seventeen industries, respectively.

The results show that industry 3, manufacturing, placed the quadrant I on the analysis period. The fact shows that, from 2005 through 2010, the industry had a strong influence on the Indonesian economic activities, and received high impacts from the external aspects. In other words, the industry has great potency for the Indonesian economy. Thus, the Indonesian government should prioritize the industry development.

From the results one can also see that sector 4, electricity and gas, included in the quadrant I in 2010. This fact explains that the sector has also great potency for the economic activities of Indonesia. Therefore, the sector enhancement should be considered by the Indonesian government.

Comparing with the previous study, the deeper understanding regarding the characteristics of Indonesian industrial sectors is obtained from the current study. However, the study uses the aggregated industries. In other words, the study is still far from describing the whole perspective about the characteristics. The perspective is needed in order to know better the conditions of Indonesian national economy so the comprehensive policies for enhancing those in the future can be developed. Therefore, as a further research, the study proposes the same analysis for the disaggregated Indonesian industries.

The other suggested further research from the study is to conduct the international comparison using the same analysis. The comparison can be done among developing as well as developed-developing countries. The comparison might describe the characteristics of the industries of compared countries so the similarities and differences among those can be investigated. The similar concept can be applied in order to compare the characteristics of the industrial sectors of regional organizations.

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