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PRODUCTIVITY GROWTH AND LOCAL CONTENT REQUIREMENTS IN THE MANUFACTURING INDUSTRY AT BANTEN PROVINCE

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Abstract

Productivity decrease and high dependence on import may affect the performance of the manufacturing industry. This paper aims to map the manufacturing industry at Banten Province, measure productivity growth, and analyze the effect of local content requirements (LCR) on productivity growth for the period 2005-2017 by employs the K-Means cluster and panel data regression analysis. For this purpose, Total Factor Productivity (TFP) is the indicator used to measure productivity growth. While the LCR is known as the percentage of local raw and auxiliary materials used in the production process. According to K-Means cluster analysis results, industrial companies are grouped into three clusters with different characteristics. The panel data regression analysis results show that the TFP of all manufacturing industry sub-sectors has increased and is influenced positively by LCR, total production, domestic investment, import, and the minimum wage of the province. The government should integrate the LCR and other policies, such as the Indonesian National Standard, to increase productivity growth.

Keywords: K-Means Cluster, LCR, Manufacturing Industry, Panel Data, TFP

JEL Classification: C38, L60, C33

Introduction

The national long-term development plan for 2005 to 2025 stipulates that the economic structure is strengthened by placing the industrial sector as the driving force supported by the agricultural, marine, and mining sectors (Bappenas, 2007). According to BPS (2018), the manufacturing sector in West Java, Banten, and Central Java Provinces provided the largest contribution to the Gross Regional Domestic Product (GRDP) value at Java Island from 2016 to 2018. But, the contribution of the manufacturing sector at Banten Province has the largest decline, with an average of 0.71 percent per year. As a leading sector, the manufacturing industry sector at Banten Province has an important role in shaping the total value of GRDP. From 2010 to 2018, on average, the manufacturing industry sector had the largest output value compared to other sectors, reaching 37.24 percent of the total GRDP of Banten Province with an average growth of 6.04 percent per year.

According to Rahmayani & Sugiyanto (2014), the economic growth of a region is determined by the level of productivity of its production factor components. Productivity means a combination of effectiveness in producing outputs and efficient use of inputs. Productivity measurements can be carried out on each input separately (partial) or all inputs (total). Total productivity measurement is carried out on several inputs, using the total factor productivity (TFP). TFP is an indicator used to measure productivity growth and is part of the output which may not be explained by some of the inputs used in the production process (BPPT, 2012). Analysis of productivity growth in the manufacturing industry sector needs to be carried out to see the sustainability of output growth (Surjaningsih & Permono, 2014) and to identify sources of output growth that will help policymakers identify factors that contribute to industrial development (Mustapha et al., 2013).

The manufacturing industry is an economic activity that carries out activities to change a basic good into finished or semi-finished goods, and or goods of less value to goods of higher value. And based on the number of workers, the manufacturing industry sector is divided into four groups that are a large industry, medium industry, small industry, and home industry (BPS, 2018). From 2010 to 2017 the number of medium-large industry (MLI) labor has always increased, but labor productivity has decreased in 2011, 2016, and 2017. A reduction in labor productivity may partially affect total productivity and ultimately affect the contribution of the manufacturing industry sector to the GRDP of Banten Province. Industrial productivity needs to be optimized to produce better quality products, to increase added value and competitiveness. And strategies that can be taken to increase industrial competitiveness are to improve the quality of human resources and provide incentives to industries that can carry out and increase the proportion of raw materials (Nuraini & Setiartiti, 2017). So that in the end it will increase exports while reducing dependence on imported products. The value and growth of export and import of Banten Province are shown in Figure 1.

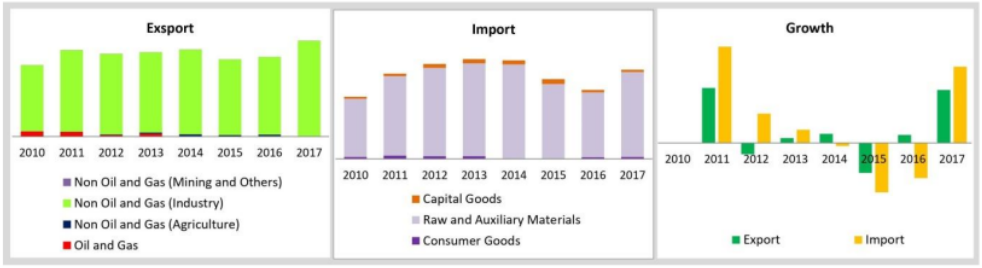

Figure 1. Value and Growth of Export and Import of Banten Province 2010-2017
Source: BPS, 2018.

Based on Figure 1, it may be seen that from 2010 to 2017, the export value of the oil and gas sector has decreased by an average of 0.49 percent per year. Meanwhile, the export value of the non-oil and gas sector has increased. In this case, the average export value of the non-oil and gas sector for agricultural products increased by 48.42 percent, industrial products increased by 6.03 percent, and mining and other products increased by 89.01 percent per year. Furthermore, the import value increased from 2010 to 2017. On average, the import value of consumer goods products increased by 117.53 percent, raw and auxiliary material products increased by 7.37 percent, and capital goods products increased by 8.42 percent per year. Overall, the export value of Banten Province increased by 4.90 percent per year or less than the increase in import value which reached 7.05 percent per year. This means that Banten Province has a fairly high level of dependence on imported products, especially on products of raw and auxiliary materials.

One of the government efforts made to increase industrial productivity, increase export and reduce dependence on imported products at the same time is by establishing a Local Content Requirements (LCR) policy. Based on the Regulation of the Minister of Industry No.16/M-IND/PER/2/2011, LCR is defined as a limit or value that represents the level of local content requirements in a product or service. In the industrial sector, the LCR policy is carried out to strengthen, expand, and deepen the national industrial structure, both to the import substitution industry strategy and the export-oriented industrial strategy. Based on Government Regulation No.29/2018, domestic products that must be used in the procurement of goods and services must have a total LCR value and a Company Benefit Weight (CBW) value of at least 40 percent or an LCR value of at least 25 percent.

Research results that related to productivity growth and local component requirements using cluster analysis and panel data, were used as reference and comparison to this research. Several previous research on the factors affecting productivity growth has shown different results. The research of

Budiwati SV (2013) shows that the factors that influence the TFP are inflation, net export, R&D budgets, and the level of education of workers. But, Fazri *et al.* (2018) show that export, foreign investment, and domestic investment affect TFP. And research by De Souza and Da Cunha (2018) shows that productivity decrease in the industrial sector, while productivity increase in the agricultural sector and service sector. Several previous research on the effects and benefits of LCR policy has shown different results. The research of Negara (2016) shows that there is an effect of imported inputs on the level of productivity, added value, output, exports, and the number of jobs in the manufacturing sector in Indonesia. Kolstad & Kinyondo (2017) shows that the LCR policy has less influence on countries that already have natural resources than countries that have just discovered natural resources (oil). And research by Deringer et al. (2018) shows that the LCR policy in the heavy vehicle industry affects increasing output in Brazil, Russia, India, China, and South Africa (BRICS). But at the same time, the increase in output has an adverse side effect, namely changes in prices. Changes in prices will have a greater impact on the overall economic sector than the gains in industrial output in a particular sub-sector. To fill in the gaps from the limitations of previous research, so it is needed to research that can see more thoroughly how the effect of LCR and other factors on productivity growth. And this research will employ how the LCR influences the productivity of the manufacturing industry even at a more specific level, namely at the sub-sector level of the manufacturing industry.

The main problem in this paper is how to map the manufacturing industry, how about the value of productivity growth, and how the influence of LCR and other factors on the productivity growth of the manufacturing industry at Banten Province. The purpose of this paper was to determine the map of the manufacturing industry, measure productivity growth in and analyze the effect of LCR and other factors on productivity growth in the manufacturing industry in Banten Province.

Research Methods

Data Types and Sources

The type of data used is secondary data, with panel data of 836 MLI from 20 manufacturing industry sub-sectors for the period 2005 to 2017. The data sources used are from the annual Medium-Large Industry Survey (MLI) conducted by the Central Statistics Agency (BPS) of Banten Province, and the Investment Coordinating Board (BKPM) of Banten Province. In this case, data related to output, input, export, import, LCR, and minimum wage were obtained from BPS. Data related to the value of a domestic investment and foreign investment were obtained from BKPM. The data obtained are then selected and adjusted to the research method, resulting in balanced panel data.

Research Variable

The variables used to mapping the manufacturing industry at Banten Province are the output value, the input value, and the percentage of LCR from each MLI. The output used is the output value of the IBS company in the form of goods produced, electricity sold, industrial services, the difference in stock value for semi-finished goods, and other revenues. While the input used is the input value of IBS companies in the form of capital, labor, and intermediate inputs.

The variables used to measure productivity growth are output, capital, total labor, and intermediate input. The definition of capital is the estimated value of fixed capital goods used by IBS companies, consisting of land, buildings, machinery and equipment, vehicles, software/database, and other fixed capital. Meanwhile, total labor is the amount of labor used by the MLI, consisting of production workers and other workers. And the intermediate input is the input value of MLI in the form of raw and auxiliary materials, energy materials, capital leases, and other expenses.
The variables used to determine the effect of LCR and other factors on productivity growth were the LCR, total production, domestic investment, foreign investment, export, import, and minimum wage.

The definition of LCR is the percentage of local raw and auxiliary materials used by MLI. Total production is the production value generated by the manufacturing sub-sector. Domestic investment is the value of domestic investment carried out by the manufacturing sub-sector. Foreign investment is the value of a foreign investment by the manufacturing sub-sector. Exports are the total value of exports made by the manufacturing sub-sector. Imports are the total value of imports made by the manufacturing sub-sector. The minimum wage is the value of the minimum wage set by the Provincial Government.

Method of Analysis

The analytical method used is descriptive and quantitative analysis. Descriptive analysis is used to provide an overview of MLI based on the manufacturing industry sub-sector. Apart from tables and graphs, descriptive analysis was also carried out by looking at the results of cluster analysis to map the manufacturing industry. The quantitative analysis used in this paper is panel data analysis. Panel data analysis is used to measure TFP and to determine the effect of LCR and other factors on productivity growth in the manufacturing industry in Banten Province.

Cluster analysis

The cluster analysis method used is the K-Means cluster method based on information research of Setyaningsih (2012) and Karaca (2018). The clusters produced are groups with a high degree of similarity. Each cluster will contain very similar data. The stages carried out in the K-Means cluster analysis are as follows:

1. Determine the number of clusters to be formed, where the number of clusters must be less than the number of data (k <n).
2. Randomly determines the center point (centroid) for each cluster
3. Calculate the distance between the data and the centroid in each cluster. The formula that is commonly used to calculate the distance between the data and the centroid using Euclidean Distance.
4. Grouping data based on the closest distance to the centroid.
5. If all data already have clusters, and there are no data moving clusters, the cluster analysis process has been completed, or it is called convergent.

Panel data regression analysis for productivity growth

The productivity growth of the manufacturing industry is known throughout by the TFP. The TFP concept employs a Cobb Douglas production function theory framework and a neoclassical growth model. TFP is calculated as residue, that is the amount of output growth remaining after calculating the growth of measurable factors (BPPT, 2012). The equation is written as follows:

$$LnY_{it} = \alpha + \beta_1 LnC_{it} + \beta_2 LnL_{it} + \beta_3 LnI_{it} + TFP_{it} \quad (1)$$

Where:

Y_{it}	:	Output Value (million IDR)
C_{it}	:	Capital Value (million IDR)
L_{it}	:	Total Labor Force (people)
I_{it}	:	Intermediate Input Value (million IDR)
TFP_{it}	:	Productivity Growth (percent)
α	:	Constant
$\beta_1, \beta_2, \beta_3,$	:	Regression Coefficient
i	:	836 MLI
t	:	Period 2005-2017

Panel data regression analysis for the effect of LCR and other factors

The variables used to determine the effect of LCR and other factors on productivity growth in the manufacturing industry at Banten Province were determined based on research by Mayashinta (2014) and Negara SD (2016). The equation is written as follows:

$$TFP_{it} = \alpha + \beta_1 LCR_{it} + \beta_2 LnPROD_{it} + \beta_3 LnDIV_{it} + \beta_4 LnFIV_{it} + \beta_5 LnEXP_{it} + \beta_6 LnIMP_{it} + \beta_7 LnPMW_{it} + \varepsilon_{it} \quad (2)$$

Where:

TFP_{it}	:	Productivity Growth (percent)
LCR_{it}	:	Local Content Requirements (percent)
$PROD_{it}$	:	Total Production Value in Manufacturing Industry Sub-sector (million IDR)
DIV_{it}	:	Domestic Investment Value in Manufacturing Industry Sub-sector (million IDR)
FIV_{it}	:	Foreign Investment Value in Manufacturing Industry Sub-sector (thousand USD)
EXP_{it}	:	Export Value in Manufacturing Industry Subsector (thousand USD)
IMP_{it}	:	Import Value in Manufacturing Industry Subsector (million IDR)
PMW_{it}	:	Provincial Minimum Wage Value (IDR)
α	:	Constant
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$	:	Regression Coefficient
ε	:	Error Term
i	:	20 Manufacturing Industry Sub-sectors
t	:	Period 2005-2017

The best model selected between the Fixed Effects Model (FEM) and the Random Effects Model (REM) was done by using the Hausman test (Firdaus M, 2020). A classical regression assumption test was performed to ensuring that the panel data model selected has provided the Best Linear Unbias Estimator (BLUE) prediction result. The interpretation of the panel data regression estimation results is carried out by looking at the statistical test results, by the simultaneous significance test (F-test), partial significance test (T-test), and the Goodness of Fit test that indicated by the coefficient of determination (R-Square).

Results and Discussion

Overview of Medium-Large Industry (MLI)

The manufacturing industry sector provided the largest contribution, with 37.39 percent of the total GRDP of Banten Province or 127 trillion IDR per year. After the manufacturing industry sector, the wholesale, retail trade and repair of cars and motorbikes sector contributed 13.35 percent or 45 trillion IDR. The construction sector contributed 8.85 percent or 30 trillion IDR, and the real estate sector contributed 7.94 percent or 27 trillion IDR. Then the transportation and warehousing sectors contributed 6.36 percent or 22 trillion IDR. And 12 other sectors contributed 26.07 percent or 89 trillion IDR to the total GRDP of Banten Province. The manufacturing industry sub-sector that has the largest output value is the chemical and goods made of chemicals (ISIC 20), which is 95 trillion IDR per year or 24.29 percent (BPS, 2018).

Based on the number of MLI, the largest population of MLI comes from the four manufacturing industry sub-sectors, which are the rubber, rubber and plastic goods; the food industry; the chemical and goods made of chemical; and the metal goods, non-machinery and equipment (ISIC 22, 10, 20 and 25), as many as 1067 MLI or 42.43 percent of the total companies. From 2005 to 2017, MLI at Banten Province increased by 55.25 percent. The number of manufacturing industries used in this paper was 33.24 percent of the total MLI in 2017. Most MLI samples came from the manufacturing industry sub-sector with ISIC 22, 20, 25, and 10, that is 367 MLI or 43.90 percent of the total MLI

sample used. The composition of the sample used in this paper is sufficient and comparable to the population of MLI in Banten Province.

Overview of The Local Content Requirements (LCR) Policy

The implementation of the LCR policy for companies does not only apply to the industrial sector but also government-run projects. To support the production process in the industrial sector, the government may grant import licenses for companies that already have an LCR certificate. Besides, the LCR certificate also functions for companies wishing to act as providers of goods and services in government strategic projects. The LCR certificate is issued by a surveyor institute designated by the Ministry of Industry, such as PT. Surveyor Indonesia and PT. Sucofindo.

Manufacturing Industry Map

K-Means cluster analysis is used to map the manufacturing industry in Banten Province based on the characteristics equation owned by MLI. The data used in cluster analysis is MLI data in 2017. The number of clusters used is three clusters. The results of the K-Means cluster analysis in the manufacturing industry are shown in Table 1.

Table 1. Results of the K-Means Cluster Analysis in the Manufacturing Industry at Banten Province

Variabel	1st Cluster: 695 MLI	2nd Cluster: 21 MLI	3rd Cluster: 120 MLI
Output	-0.34	0.48	1.9
Capital	-0.19	4.96	0.23
Labor Force	-0.28	0.86	1.47
Intermediate Input	-0.32	0.27	1.82
Local Content Requirements	0.06	-0.31	-0.29

Source: BPS, 2021 (processed).

Based on Table 1, it is known that the largest number of MLI is in cluster one, which is 83.13 percent of the total number of MLI in Banten Province. While the number of MLI is at least in cluster two, which is 2.51 percent of the total number of MLI in Banten Province. In general, the results of the analysis of each cluster may be explained as follows:

a) The first cluster consists of 695 MLI which in general represent the condition of most of the manufacturing industries at Banten Province. Based on the estimation results, it is known that the percentage of LCR in the first cluster has a positive sign and is the variable with the highest value compared to the others. The other variables, such as output value, capital value, total labor, and intermediate cost, have a negative sign and are the variables with the lowest value compared to other clusters. This condition shows that the productivity component of the MLI in cluster one is below the average, and the percentage of LCR is above the average compared to other clusters.
b) The second cluster consists of 21 MLI which in general may not represent the conditions of the manufacturing industry at Banten Province. Based on the estimation results, it is known that almost all variables in the second cluster have a positive sign, except for the percentage of LCR. It is only capital value with the highest value compared to others. This condition shows that the total productivity component of MLI in the second cluster is on average, and the percentage of LCR is below the average compared to others.
c) The third cluster consists of 120 MLI which in general represent the condition of a small portion of the manufacturing industry at Banten Province. Based on the estimation results, it is known that output value, number of workers, and cost value in the third has a positive sign and the highest value compared to others. LCR percentage variable has a negative sign. This condition shows that the productivity component of the MLI in the third cluster is above the average and the percentage of LCR is on average compared to others.

Overall, the results of the cluster K-Means analysis show that the companies in the first cluster are MLI with low productivity component values and high LCR percentages. Companies in the second and third clusters are MLI with high productivity component values and low LCR percentages. Thus, it may be seen that most of the MLIs at Banten Province have low productivity component values and high LCR percentages. This condition may occur because it is suspected that the domestic components used, as local raw and auxiliary materials, are low-quality products. So that the increase in the use of local raw and auxiliary materials, in the end, has not been able to increase the output value produced by each MLI, which is indicated by the value of the low productivity component.

Cluster characteristics

The characteristics of each cluster are known based on the distribution of the number of MLI according to the administrative area, company location, and manufacturing industry sub-sector (2-digits of ISIC) are shown in Figure 2. Based on the Regency/City administrative area, the largest number of MLI in all clusters came from the Regency and the City of Tangerang. Based on company location, the largest number of MLI in all clusters are outside industrial area. Based on the manufacturing industry sub-sector (2-digits of ISIC), the largest number of MLI in the first and third clusters came from the rubber, rubber, and plastic goods industrial sub-sector (ISIC 22) and the chemical and goods made of chemicals industrial sub-sector (ISIC 20). The second cluster came from the chemical and goods made of chemicals industrial sub-sector (ISIC 20) and the metal goods, non-machinery, and equipment industrial sub-sector (ISIC 25).

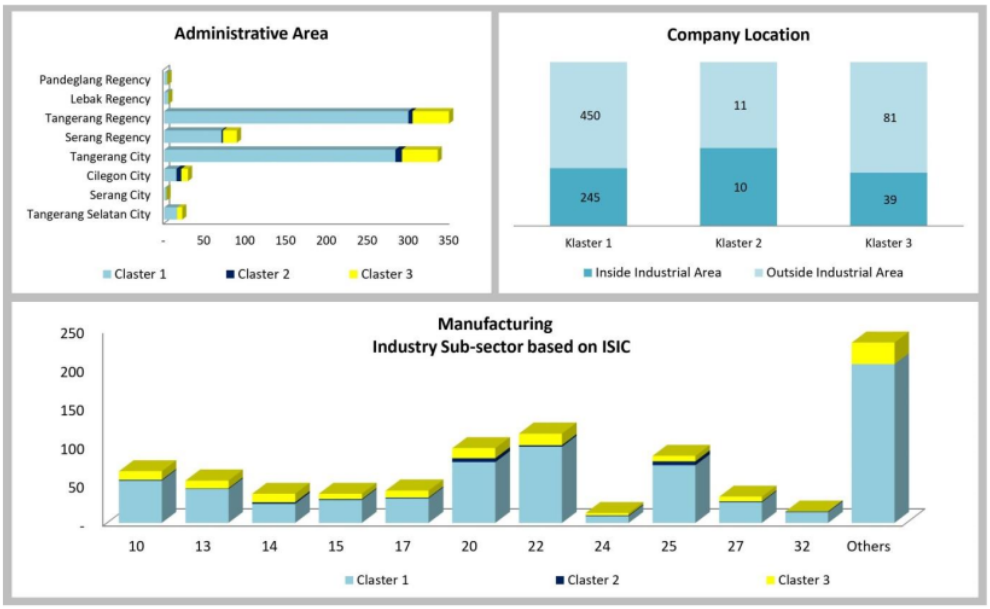

Figure 2 Number of MLIs by Administrative Area, Company Location, and Manufacturing Industry Sub-sector based on ISIC
Source: BPS, 2021 (processed).

The characteristics of each cluster are also known based on capital status, business scale, LCR percentage, and the provisions of the Indonesian National Standard (SNI) is shown in Figure 3. Based on capital status, the largest number of MLIs in all clusters is a domestic investment. Based on the business scale, the largest number of MLIs in the first cluster is medium-scale industrial enterprises,

while in the second and third clusters, the largest number of MLIs is large industrial scale businesses. Based on the percentage of LCR, the largest number of MLIs in all clusters has met the minimum requirement of 25 percent. Based on SNI provisions, the highest number of MLIs in all clusters are MLIs that do not have an SNI certificate.

Figure 3 Numbers of MLIs by Capital Status, Business Scale, Percentage of LCR, and Provisions of SNI
Source: BPS, 2021 (processed).

Overall, it may be seen that the differences in MLI characteristics in each cluster occur in terms of administrative areas, industrial sub-sectors based on ISIC, and business scale. Characteristics of the first cluster are MLI with a medium industry business scale, which is located in all districts and cities, with the main sub-sector being the rubber, rubber and plastic goods industry sub-sector (ISIC 22), and the chemical and goods made of chemical industry sub-sector (ISIC 20). Characteristics of the second cluster are the MLI with a large industry business scale, which is located in regency and large cities only, with the main sub-sector being the chemical and goods made of chemical industry sub-sector (ISIC 20) and the metal goods, machines, and equipment industry sub-sector (ISIC 25). Characteristics of the third cluster are the MLI with a large industry business scale, which is located in regency and large cities only, with the main sub-sector is the rubber, rubber, and plastic goods industry sub-sector (ISIC 22) and chemical and goods made of chemical industry sub-sector (ISIC 20). Because the results of this cluster analysis have not been able to show the relationship between the effect of LCR on the productivity growth of the manufacturing industry, especially over a relatively long period. So that further analysis is needed, namely with panel data regression analysis.

Manufacturing industry productivity growth

Based on Hausman's test results, the resulting probability value is 0.73, and it is greater than the α value of 5 percent (0.05). Then it may be concluded that REM is the best model. The correlation value generated by the variable capital, labor, and intermediate input is less than 0.80. Then it may be concluded that there is no multicollinearity problem. Based on the heteroscedasticity test results, the probability value generated is 0.00. Then it may be concluded that there is a heteroscedasticity problem. Based on the autocorrelation test results, the resulting probability value is 0.50. Then it

may be concluded that there is no autocorrelation problem. With a violation of one of the classical regression assumptions in the model, correction is needed, by using a model that is robust to violations of this assumption.

The panel data regression estimation results with a robust model are looking at by statistical test results. The F-test results show that the probability value is 0.00, which is mean that simultaneously the variables of capital, labor, and intermediate input have a significant effect on output. The Z-test results show that the probability value of the variable capital, labor, and intermediate input is 0.35; 0.29; and 0.00, which is mean that the intermediate input variable has a significant effect on output. The Goodness of Fit test results shows that the coefficient of determination is 0.8278, which is mean that 82.78 percent of the output diversity may be explained by the variables used. These results are in line with the research conducted by Mayashinta and Firdaus (2013) and Fazri et al. (2017) which shows that the value of the raw material coefficient is greater than the other variables coefficient. To describe the condition of the manufacturing industry at Banten Province, TFP measurement in this paper was carried out by grouping each MLI into 20 manufacturing industry sub-sectors. The TFP value in each manufacturing industry sub-sector is shown in Table 2.

Table 2. TFP Values by Manufacturing Industry Sub-sector (percent)

ISIC	Total Factor Productivity (TFP)								Average
	2006	2008	2010	2012	2014	2015	2016	2017	
10,11	3.69	4	4.1	4.03	4.27	4.27	4.15	4.42	4.08
13	3.78	4.06	4.19	3.93	4.09	4.14	4.32	4.35	4.09
14	3.29	4.59	3.64	3.69	3.82	3.85	3.97	4.26	3.91
15	3.5	3.51	3.58	3.97	4.04	4.24	3.92	3.9	3.75
16	3.36	3.52	3.47	3.2	3.71	3.7	3.7	3.93	3.57
17	3.75	3.78	4.1	4.23	4.07	4.25	4.04	4.13	4.03
18	3.11	2.96	3.34	3.46	3.77	3.56	3.5	3.99	3.45
19	3.6	3.54	3.16	3.51	3.59	3.69	3.55	4.22	3.55
20	4.4	4.37	4.43	4.85	5.16	5.02	4.47	4.43	4.61
21	3.42	3.44	3.55	3.88	4.02	4.05	3.93	3.89	3.71
22	3.67	3.83	3.8	3.88	4.12	4.33	4.41	4.15	3.98
23	3.62	3.53	3.85	4.34	4.26	4.25	4.3	4.19	3.97
24	4.18	4.27	4.13	4.42	4.66	4.33	4.17	4.29	4.37
25	3.81	4.03	4.18	4.34	4.23	4.23	4.19	4.21	4.14
26	3.91	3.56	3.49	3.95	4.16	4.35	3.65	3.85	3.79
27	4.03	3.8	3.93	4.14	4.41	4.22	4.58	4.13	4.07
28	3,63	3.62	3.77	4.07	4.73	5.12	4.06	4.02	3.99
29	3,81	4.14	3.92	4.28	4.52	4.69	4.77	4.56	4.18
30	3,60	3.86	3.99	4.07	4.26	4.31	4.39	4.49	4.04
31,32,33	3,34	3.32	3.53	3.53	3.91	4.12	4.62	4.02	3.69

Source: BPS, 2021 (processed).

Note: International Standart Industrial Classification (ISIC) Code as follow: 10, 11 Food and drink; 13 Textiles; 14 finished clothes; 15 Leather, articles of leather and footwear; 16 Wood, articles of wood and cork (excluding furniture) and wicker articles of bamboo, rattan, and the like; 17 Paper and paper articles; 18 Recording media reproduction and printing; 19 Products from coal and petroleum refining; 20 Chemicals and goods made of chemicals; 21 Pharmacy, chemical medicinal products, and traditional medicines; 22 Rubber, rubber and plastic goods;

23 Non-metal minerals; 24 Base metals; 25 Metal goods, non-machinery and equipment; 26 Computers, electronic and optical goods; 27 Electrical equipment; 28 Machinery and equipment not included in other; 29 Motor vehicles, trailers, and semi-trailers; 30 Other means of transportation; 31, 32, 33 Furniture, other processing, repair services, and installation of machines and equipment.

Based on Table 2, the average TFP of the manufacturing industry has increased in all industrial sub-sectors. Based on the manufacturing industry sub-sector, from 2006 to 2017 the highest average TFP occurred in the chemical and goods made of chemicals industrial sub-sector (ISIC 20) at 4.61 percent per year. The lowest average TFP occurred in the recording media reproduction and printing industrial sub-sector (ISIC 18) at 3.45 percent per year. The highest TFP value in the chemical and goods made of chemicals industrial sub-sector (ISIC 20) is thought to occur because the output value produced by the industrial sub-sector is the largest compared to others. The lowest TFP value in the recording media reproduction and printing industrial sub-sectors (ISIC 18) is thought to occur because the output value produced by the industrial sub-sector is the smallest compared to others.

Overall, from 2006 to 2017 the highest TFP occurred in 2015 and the lowest TFP occurred in 2006. The manufacturing industry sector at Banten Province with average productivity growth of 4.39 percent per year. This means that the resulting output is 4.39 times the input used by MLI at Banten Province. A positive TFP value indicates that the output growth that occurs is greater than the input growth. A positive TFP may indicate that the use of production factors is quite efficient.

The effect of LCR and other factors on manufacturing industry productivity growth

Based on Hausman's test results, the resulting probability value is 0.93 and is greater than the α value of 5 percent (0.05). Then it may be concluded that REM is the best model. The correlation value generated by the variables LCR, production, domestic investment, foreign investment, export, import, and PMW is smaller than 0.80. Then it may be concluded that there is no multicollinearity problem. Based on the heteroscedasticity test results, the probability value generated is 0.00. Then it may be concluded that there is a heteroscedasticity problem. Based on the autocorrelation test results, the resulting probability value is 0.06. Then it may be concluded that there is no autocorrelation problem. With a violation of one of the classical regression assumptions in the model, correction is needed, by using a model that is robust to violations of this assumption. The statistical test results of panel data regression with a robust model are shown in Table 3.

Tabel 3. Panel Data Regression Results for the Influence of LCR and Others Factor

Variable	Coefisient
Constant	-2.336716
Local Content Requirements	0.0036988*
Total Ptoduction	0.1812462*
Domestic Investment	0.0054558***
Foreign Investment	0.0029283
Export	-0.0312951
Import	0.0249503**
Provincial Minimum Wage	0.2414062*

Source: BPS and BKPM, 2021 (processed).
Note: Standard errors, * α<0.01, ** α <0.05, *** α <0.10

Based on Table 3, the F-test results show that the probability value is 0.00, which is mean that simultaneously the variables of LCR, total production, domestic investment, foreign investment, export, import, and PMW have a significant effect on TFP. The Z-test results show that the

probability value of the variables LCR, total production, domestic investment, foreign investment, export, import, and PMW is 0.00; 0.00; 0.06, 0.36; 0.13; 0.00; and 0.00, which is mean that the variables of LCR, production, domestic investment, import, and PMW have a significant effect on TFP. The Goodness of Fit test results shows that the coefficient of determination is 0.6215, which is mean that 62.15 percent of TFP diversity can be explained by the variables used.

The results of the panel data regression show that LCR, total production, domestic investment, import, and PMW have a significant positive effect on TFP following the research hypothesis. The positive effect of LCR is in line with research conducted by Negara SD (2016) and Deringer et al. (2018), who show that an increase in LCR in terms of raw material input will support an increase in output. The positive effect of total production is in line with research conducted by Mayashinta (2014), who shows that an increase in total production in the manufacturing industry sub-sector may increase the efficiency of using production factors or technology absorption. The positive effect of domestic investment is in line with research conducted by Fazri et al. (2018), who show that increasing domestic investment will allow MLI to do more innovations. The positive effect of import is in line with research conducted by Negara SD (2016), who shows that increasing import in terms of raw materials will provide better access to foreign knowledge and technology for local industries. And the positive effect of PMW is in line with research conducted by Gehringer et al. (2013) and Kim (2016), who shows that an increase in PMW will have a positive effect on improving the quality of the labor force so that it may support an increase in output. Thus, an increase in LCR, total production, domestic investment, import, and PMW may simultaneously produce higher quality and highly competitive products, thereby increasing productivity growth in the manufacturing sub-sector at Banten Province.

The panel data regression estimation results also show that the greatest factor influence the productivity growth of the manufacturing industry is the value of PMW and total production. The smallest factor influence the productivity growth of the manufacturing industry is LCR. This result is not appropriate to the objectives of the LCR policy for the manufacturing industry. The LCR policy is expected to have a big impact on industrial productivity growth. This is thought to have occurred because the LCR components used as raw materials and local support did not have sufficient quality to support increased output and productivity growth in the manufacturing industry.

The panel data regression estimation results show that the export variable has no significant effect on TFP, which is not following the research hypothesis but in line with research conducted by Kim (2016) and Yalcinkaya O, Aydin HI (2016). Kim, (2016) shows that export has no effect on TFP in the durable goods and consumables industry sector in Japan. Yalcinkaya O, Aydin HI (2016) show that only export products with high technology may have a positive influence on TPF. No significant effect of export may occur because the largest export at Banten Province is the export of semi-finished goods, which may not provide maximum profit. In this case, the industrial sub-sector that has the largest export value is the chemical and goods made of chemicals (ISIC 20) with organic chemical products.

The panel data regression estimation results show that the foreign investment variable has no significant effect on TFP, which is not following the research hypothesis but in line with research conducted by Budiwati SV (2013). The insignificant influence of foreign investment may occur because the percentage of MLI with foreign investment status at Banten Province is relatively small compared to domestic investment, which only reaches 15.32 percent, so it does not have a significant effect on the productivity growth of the manufacturing industry. According to the research of Jayanti & Muqorobin, (2017), one of the efforts that can be made to increase the realization of investment value is to create a conducive business climate and increase the competitiveness of the regional economy.

Conclusions

The manufacturing industry at Banten Province is mapped into three clusters. Clusters with large-scale MLI members have a relatively high productivity component value and a relatively low percentage of LCR. Cluster with medium-scale MLI members has a relatively low productivity component value and a relatively high percentage of LCR. All clusters show similar characteristics in terms of locations outside the industrial area, domestic investment status, the percentage of LCR that has met the minimum requirement and does not have an SNI certificate.

The productivity growth of the manufacturing industry at Banten Province is positive. The highest productivity growth occurred in chemicals and goods made of chemicals industrial sub-sector (ISIC 20). The productivity growth of the manufacturing industry influenced positively by LCR, total production, domestic investment, import, and PMW. The percentage of LCR has a significant effect, but with the smallest value compared to other factors, This condition shows that LCR policy has not been able to play an important role in the productivity growth of the manufacturing industry.

The government should increase the percentage of LCR in the large-scale industry and improve the quality of local raw and auxiliary materials used in the medium-scale industry. It is recommended for the government to integrate the LCR and SNI policy. Besides, the government also needs to regulate the location of MLI to be in industrial estates, and improve the investment system to increase foreign investment contributions. Further research may use labor force and machines for specific LCR components and explore the other benefits or impacts of LCR policies in the manufacturing industry sector.

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