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Productivity Growth and Local Content Requirement of the Manufacturing Industry in Banten Province

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Abstract: Productivity growth needs to be optimized not only to produce quality products, increase exports, and reduce dependence on imports but also to support the performance of the manufacturing sector. This study aims to determine the manufacturing industry map in Banten Province, measure manufacturing industry productivity growth, and analyze the effect of Local Content Requirement (LCR) on manufacturing industry productivity growth from 2005 to 2017 by employing the use of K-Means cluster and panel data regression analysis. For this purpose, Total Factor Productivity (TFP) is the indicator used to measure productivity growth. 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 result of panel data regression analysis shows that the TFP of all manufacturing industry sub-sectors has increased and was influenced by LCR, total production, domestic investment, import, and provincial minimum wage. As a result, 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

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Introduction

The economic structure based on the national long-term development plan from 2005 to 2025 was reinforced by placing the industrial sector as the driving force, supported by the agricultural, marine, and mining (Bappenas, 2007). In the Java Island region, the manufacturing industry sector in West Java, Banten, and Central Java provinces has contributed the most to the value of Gross Regional Domestic Product (GRDP) from 2016 to 2018 (Statistics Indonesia, 2019). The contribution of the manufacturing industry sector in Banten Province experienced the most decline with an average of 0.71 percent per year. As a leading sector, the manufacturing industry sector in Banten Province has an important role in shaping the total value of GRDP and its regression has greatly produced an impact to its economy. From 2010 to 2018, the manufacturing industry sector had the most output value compared to other sectors, on average reaching 37.24 percent of the total GRDP of Banten Province with an average growth of 6.04 percent per year.

According to Rahmayani and 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 by 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. Based on the number of workers, the manufacturing industry sector is divided into four groups: large industry, medium industry, small industry, and home industry (Statistics Indonesia, 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. 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). Consequently, this will lead to an increase in exports while reducing dependence on imported products. The changes in exports and imports will affect economic growth in the region through production, consumption, and distribution (Astuti & Ayuningtyas, 2018). The value and growth of export and import of Banten Province are shown in Figure 1.

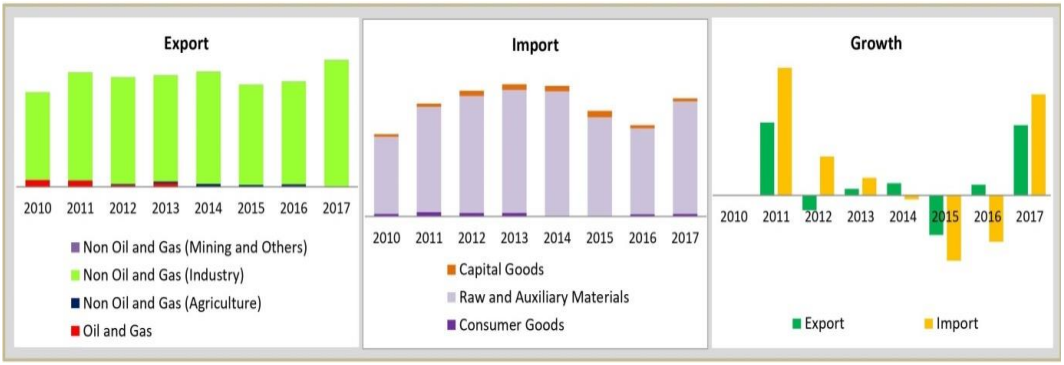

Figure 1 Value and Growth of Export and Import of Banten Province 2010-2017
Source: Statistics Indonesia, 2018

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 Requirement (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 requirement 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 requirement 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 and Yunanto (2013) shows that the factors that influence the Total Factor Productivity (TFP). are inflation, net export, R&D budgets, and the level of education of workers. On the other hand, Fazri et al. (2018) show that export, foreign investment, and domestic investment affect TFP. Research by De Souza and Da Cunha (2018) shows that productivity decreased in the industrial sector, while productivity increased in the agricultural sector and service sector. Several previous research on the effects and benefits of Local Content Requirement (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 and Kinyondo (2016) shows that the LCR policy has less influence on countries that already have natural resources than countries that have just discovered natural resources (oil). 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). At the same time, the increase in output has an adverse side effect such as 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, it is needed to conduct research that can see more thoroughly the effect of LCR and other factors on productivity growth. This research will show how the LCR influences the productivity of the

manufacturing industry even at a more specific level, specifically at the sub-sector level of the manufacturing industry.

Previous research has discussed the productivity growth of the manufacturing industry and LCR policy separately and has not seen the relationship. In this case, the discussion on the productivity growth of the manufacturing industry focused more at a regional level or on the industrial sector as a whole and was not specific to the industrial sub-sector level. The discussions on LCR policy also focused more on achieving LCR targets in industrial sectors. The novelty in this research is to see how the relationship between LCR policy and manufacturing industry productivity growth at a specific level, namely the manufacturing industry sub-sector. In addition, this study aims to determine how the manufacturing industry maps, measures the manufacturing industry growth and analyze the factors that affect the manufacturing industry productivity growth in Banten Province. The results of this research are expected to give recommendations to the government and business actors to decide the right LCR policy to increase productivity and develop the manufacturing industry sector.

Research Method

Data Types and Sources

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

Research Variable

This research used variables which were determined based on the research objectives. The variables used to determine the manufacturing industry map consist of five independent variables, which are output, input which is in the form of capital, labor, and intermediate inputs, and LCR from each MLI. The variables used to measure the manufacturing industry productivity growth consist of one dependent variable and three independent variables. The dependent variable is the output, and the dependent variables are capital, labor force, and intermediate input. The variables used to analyze the effect of LCR and other factors on manufacturing industrial productivity growth consist of one dependent variable and six independent variables. The dependent variable is TFP, and the dependent variables are LCR, total production, domestic investment, foreign investment, export, import, and minimum wage generated by the manufacturing sub-sector. The description of variables is shown in Table 1.

Table 1 The Description of Variables

No.	Research Objectives	Variables	Definition
1	Determine manufacturing industry map	Y	Output
		C	Capital
		L	Labor Force
		I	Intermediate Input
		LCR	Local Content Requirement
2	Measure manufacturing industry productivity growth	Y	Output
		C	Capital
		L	Labor Force
		I	Intermediate Input
3	Analyze the effect of Local Content Requirement (LCR) and other factors on manufacturing industry productivity growth	TFP	Total Factor Productivity
		LCR	Local Content Requirement
		PROD	Total Production
		DIV	Domestic Investment
		FIV	Foreign Investment
		EXP	Export
		IMP	Import
		PMW	Provincial Minimum Wage

Source: Statistics Indonesia and Ministry of Investment.

Method of Analysis

The analytical method used is descriptive and quantitative analysis. Descriptive analysis is used to provide an overview of Medium Large Industry (MLI) based on the manufacturing industry sub-sector. Descriptive analysis was also carried out by looking at the results of cluster analysis to determine the manufacturing industry map, apart from tables and figures. Quantitative analysis used in this research is panel data analysis. Panel data analysis is used to measure manufacturing industry productivity growth and analyze the effect of Local Content Requirement (LCR) and other factors on the manufacturing industry productivity growth in Banten Province.

K-Means cluster analysis for the manufacturing industry map

The cluster analysis method used is the K-Means cluster method based on the 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 determine the center point (centroid) for each cluster; (3) Calculate the distance between the data and the centroid in each cluster by using Euclidean Distance; (4) Grouping data based on the closest distance to the centroid; and (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 the manufacturing industry productivity growth

The variables used to measure the manufacturing industry productivity growth in Banten Province were determined based on research by Mayashinta and Firdaus (2014) and Fazri et al. (2018). The equation is written as follows:

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

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), α: Constant, β_1, β_2, β_3,: Regression Coefficient, ε: Error Term, i: 836 Medium Large Industry, t: Period 2005-2017.

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

$$TFP_{it} = LnY_{it} - \beta_1 LnC_{it} - \beta_2 LnL_{it} - \beta_3 LnI_{it} \quad (2)$$

Where:
TFP_{it} : Productivity Growth (percent)

Panel data regression analysis for the effect of local content requirement and other factors on the manufacturing industry productivity growth

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

$$TFP_{it} = \alpha + \beta_1 LCR_{it} + \beta_2 LnPROD_{it} + \beta_3 LnDIV_{it} + \beta_4 LnFIV_{it} + \beta_5 LnEXP_{it} + \beta_6 LnIMP_{it} + \beta_7 LnPMW_{it} + \varepsilon_{it} \quad (3)$$

Where:
TFP_{it}: Productivity Growth (percent), LCR_{it}: Local Content Requirement (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, β_1, β_2, β_3, β_4, β_5, β_6, β_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, (2020). A classical regression assumption test was performed to ensure 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).

Result and Discussion

Overview of Medium Large Industry

The manufacturing industry sector provided the most 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. 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 (Statistics Indonesia, 2018).

Based on the number of Medium Large Industry (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), since this is composed of as many as 1067 MLI or 42.43 percent of the total companies. From 2005 to 2017, MLI in Banten Province increased by 55.25 percent. The number of manufacturing industries used in this research 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 research is sufficient and comparable to the population of MLI in Banten Province.

Overview of the Local Content Requirement Policy

The implementation of the Local Content Requirement (LCR) policy for companies does not only apply to the industrial sector but also to 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 are shown in Table 2.

Table 2 Results of the K-Means Cluster Analysis of Manufacturing Industry

Variabel	1st Cluster:	2nd Cluster:	3rd Cluster:
	695 MLI	**21 MLI**	**120 MLI**
Output	(0.34)	0.48	1.90
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 Requirement	0.06	-0.31	-0.29

Based on Table 2, the largest number of Medium Large Industry (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:

1. The first cluster consists of 83.13 percent of MLI in Banten Province. Based on the estimation results, the total productivity component of the MLI in the first cluster is below the average, and the percentage of Local Content Requirement (LCR) is above the average compared to other clusters;

2. The second cluster consists of 2.51 percent of MLI in Banten Province. Based on the estimation results, 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; and

3. The third cluster consists of 14.35 percent of MLI in Banten Province. Based on the estimation results, the total 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 MLI in Banten Province have low productivity component values and high LCR percentages. This condition may occur because it is suspected that the domestic components used, such as local raw and auxiliary materials, are low-quality products. As a result, the increase in the use of local raw and auxiliary materials did not lead to an increase in 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), as 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 areas. 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).

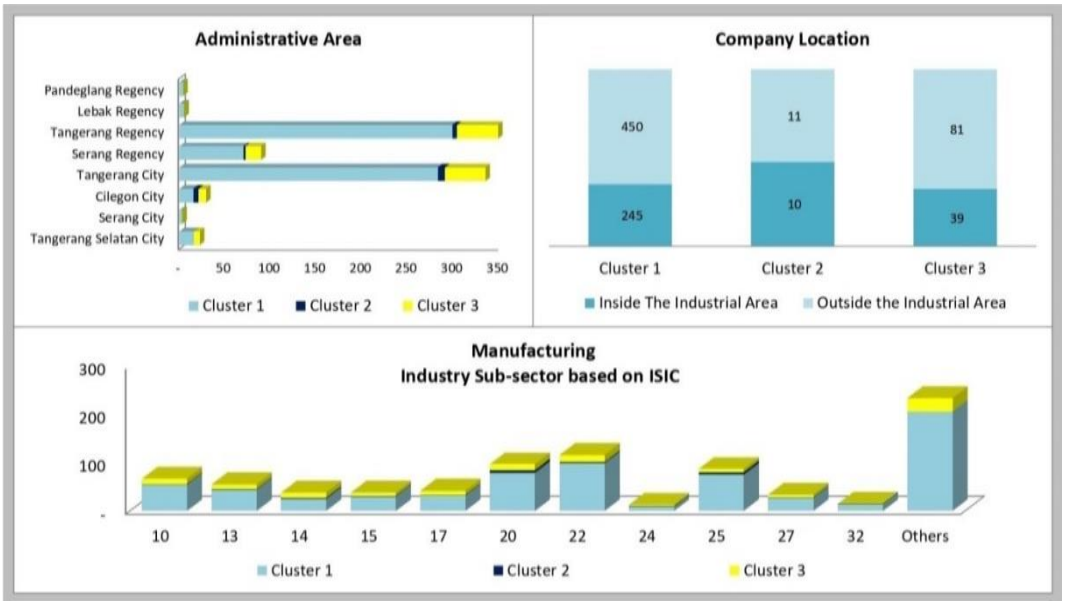

Figure 2 Numbers of Medium Large Industry by Administrative Area, Company Location, and Manufacturing Industry Sub-sector based on ISIC

The characteristics of each cluster are also known based on capital status, business scale, Local Content Requirement (LCR) percentage, and the Indonesian National Standard (SNI) provisions, as shown in Figure 3. Based on capital status, the largest number of Medium Large Industry (MLI) in all clusters is a domestic investment. Based on the business scale, the largest number of MLI in the first cluster is medium scale industry, while in the second and third clusters, the largest number of MLI is large scale industry. Based on the percentage of LCR, the largest number of MLI in all clusters has met the minimum requirement, which is 25 percent of LCR. Based on SNI provisions, the highest number of MLI in all clusters are MLI that do not have an SNI certificate.

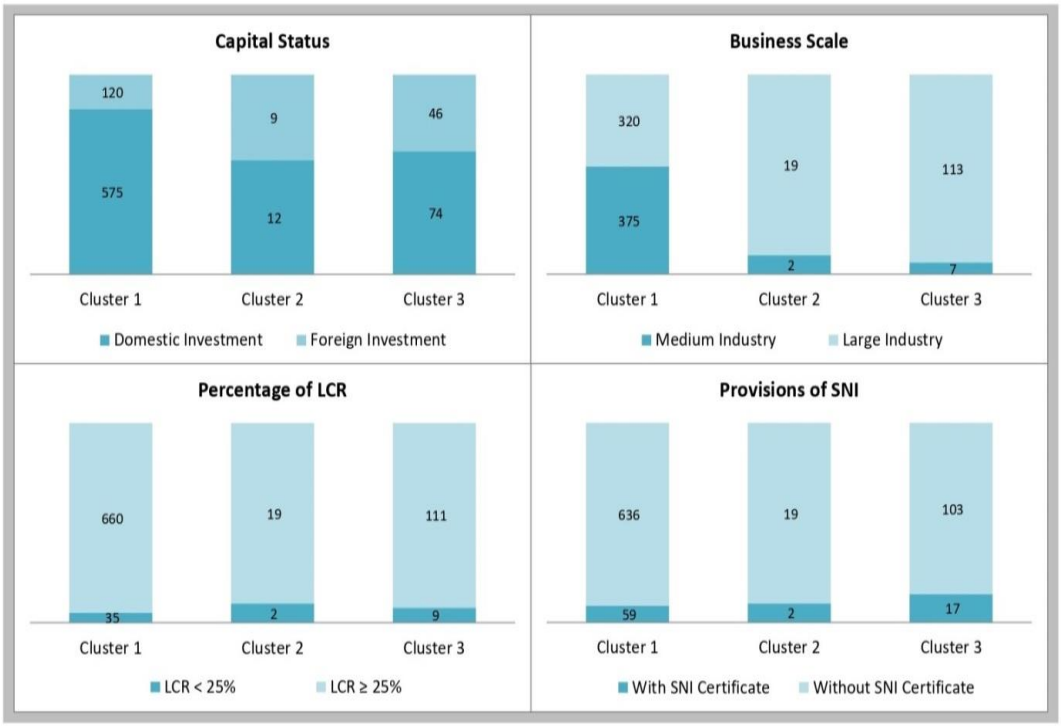

Figure 3 Numbers of Medium Large Industry by Capital Status, Business Scale, Percentage of LCR, and Provisions of SNI

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). Given that 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,further analysis is needed, specifically through the use of panel data regression analysis.

Manufacturing Industry Productivity Growth

Based on Hausman's test results, the resulting probability value is 0.73 which is greater than the α value of 5 percent (0.05). Thus, it may be concluded that REM is the best model. The correlation value generated by the variable capital, labor force, and intermediate

input is less than 0.80. Hence, it is safe to say that there is no multicollinearity problem. Based on the heteroscedasticity test results, the probability value generated is 0.00. This means that there is a heteroscedasticity problem. Based on the autocorrelation test results, the resulting probability value is 0.50. Consequently, we could posit 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 results of panel data regression with a robust model are shown in Table 3.

Table 3 Panel Data Regression Results for The Manufacturing Industry Productivity Growth

Variables	Coefficient	Standard Error	z-statistics
Constant	5.45685	1.521209	3.59
Capital	(0.0069606)	0.0074406	(0.94)
Labor Force	0.3691084	0.3524136	1.05
Intermediate Input	0.5391041*	0.0625052	8.62

Note: Significant at * α= 1%.

Based on Table 3, the F-test results show that the probability value is 0.00, which means that simultaneously, the variables of capital, labor force, and intermediate input have a significant effect on output. The Z-test results show that the probability value of the variable capital, labor force, and intermediate input is 0.35; 0.29; and 0.00, which means 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 means 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, (2014) and Fazri et al., (2018) which shows that the value of the raw material coefficient is greater than the other variable coefficients. To describe the condition of the manufacturing industry in Banten Province, Total Factor Productivity (TFP) measurement in this research was carried out by grouping each Medium Large Industry (MLI) into 20 manufacturing industry sub-sectors. The TFP values in each manufacturing industry sub-sector are shown in Table 4.

Based on Table 4, 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 presumed 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 with the manufacturing industry sector in 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 in 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.

Table 4 Total Factor Productivity 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

Note: International Standard 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.

Effect of Local Content Requirement and Other Factors on the 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 Local Content Requirement (LCR), production, domestic investment, foreign investment, export, import, and Provincial Minimum Wage (PMW) is smaller than 0.80. With this, we could conclude that there is no multicollinearity problem. Based on the heteroscedasticity test results, the probability value generated is 0.00. Thus, there is a heteroscedasticity problem. Based on the

autocorrelation test results, the resulting probability value is 0.06. Hence, 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 results of panel data regression with a robust model are shown in Table 5.

Table 5 Panel Data Regression Results for the Effect of Local Content Requirement and Others Factor on The Manufacturing Industry Productivity Growth

Variables	Coefficient	Standard Error	z-statistics
Constant	(2.336716)	0.8154068	(2.87)
Local Content Requirement	0.0036988*	0.0036988	3.25
Total Production	0.1812462*	0.1812462	5.41
Domestic Investment	0.0054558***	0.0054558	1.84
Foreign Investment	0.0029283	0.0029283	0.91
Export	(0.0312951)	(0.0312951)	(1.53)
Import	0.0249503**	0.0249503	2.61
Provincial Minimum Wage	0.2414062*	0.2414062	3.30

Note: Significant at * α= 1%, ** α = 5%, *** α = 10%

Based on Table 5, the F-test results show that the probability value is 0.00, which means that simultaneously, the variables of Local Content Requirement (LCR), total production, domestic investment, foreign investment, export, import, and Provincial Minimum Wage (PMW) have a significant effect on the Total Factor Productivity (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 means that the variables of LCR, production, domestic investment, import, and PMW have a significant effect on the TFP. The Goodness of Fit test results shows that the coefficient of determination is 0.6215, which means 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 the TFP following the research hypothesis. The positive effect of LCR is in line with research conducted by Negara (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 and Firdaus (2014), which 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), which shows that increasing domestic investment will allow Medium Large Industry (MLI) to do more innovations. The positive effect of import is in line with research conducted by Negara (2016), which shows that increasing import in terms of raw materials will provide better access to foreign knowledge and technology for local industries. The positive effect of PMW is in line with research conducted by Gehringer et al. (2015) and Kim (2015), which 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 in Banten Province.

The panel data regression results also show that the biggest factor influencing the productivity growth of the manufacturing industry is the value of PMW and total production. The smallest factor that influences 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 the Total Factor Productivity (TFP), which is not following the research hypothesis but in line with research conducted by Kim (2015) and Yalcinkaya et al. (2016). Kim (2015) shows that export has no effect on the TFP in the durable goods and consumables industry sector in Japan. Yalcinkaya et al. (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 in 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 the TFP, which is not following the research hypothesis but in line with research conducted by Budiwati and Yunanto (2013). The insignificant influence of foreign investment may occur because the percentage of Medium Large Industry (MLI) with foreign investment status in 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.

Conclusion

The results of this study contribute to making improvements for the Local Content Requirement (LCR) policy on productivity growth in the manufacturing industry. The contribution given by this recommendation is beneficial for the government and business actors in such a sub-sector. To increase productivity growth, it is recommended to determine the priority industrial sub-sectors that are suitable with LCR policy.

The manufacturing industry in Banten Province is mapped into three clusters. The cluster industry with large scale MLI members has a relatively high productivity component value and a relatively low percentage of LCR. Meanwhile, the cluster industry with medium scale

MLI members has a relatively low productivity component value and a relatively high percentage of LCR. All cluster industries show similar characteristics in locations outside the industrial area, domestic investment status, the percentage of LCR that has met the minimum requirement and does not have an Indonesian National Standard (SNI) certificate.

The productivity growth of the manufacturing industry in Banten Province is positive. The highest productivity growth occurred in chemicals and goods made of chemicals by the industrial sub-sector (ISIC 20). The productivity growth of the manufacturing industry is 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. This is because 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 policy in the manufacturing industry sector.

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