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Manufacturing Industry Growth Patterns and Analysis of Variables Affecting Value Added (Case Study: China, Malaysia, Thailand, Indonesia, and England 1998-2005)

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ABSTRACT

The purpose of this research is to examine and understand the pattern of manufacture industry growth towards labor force absorption and also to examine and analyze variables that have influence towards manufacture industry value added in China, Malaysia, Thailand, Indonesia, and England in the year 1998–2005 and also to see if there is any significant disparity between each country for the manufacture industry value added. The analysis tool that used to answer the purpose of this research is kendal correlation test and data panel regression using country dummy. Result of analysis it can be concluded that proportionaly growth pattern increased labor force absorption only in Malaysia, while in England doesn't show a proportional pattern. Variables that influenced manufacture industry value added in monitoring country is foreign investment and export. Meanwhile the data panel regression using the country dummy showed that there are significant disparities between each country for the manufacture industry value added.

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1. INTRODUCTION

Industrialization is the main strategy to achieve the fastest economic growth rate and the highest standard of living in several developing countries (Ferdian, 2005:1). Some of the reasons underlying this argument are first, the economies of developed countries are usually more industrialized than the economies of developing countries; secondly, industrialization is sometimes seen as the main solution to the problem of unemployment and job shortages in developing countries; third, industrialization is believed to change the current economy and social structure in developing countries which are not conducive, because industrialization guarantees high economic growth (Tambunan, 2001:42).

In the increasingly sharp global competition, the manufacturing industry of a country is required to be able to produce output efficiently if it is to survive. Efficiency in production can be achieved if the available resources can be allocated effectively and efficiently. This can be developed with the role of the government to intervene in increasing productivity, efficiency, and national capability (Hidayati and Kuncoro, 2004: 7).

The history of the success of developed countries such as Germany, Britain, the United States in advancing the economy through the industrialization process, has stimulated many developing countries to slowly carry out structural transformations, namely shifting economic activities that were originally concentrated in the primary sector, namely agriculture, to the secondary industrial sector. service.

Kuncoro (2007:6) argues that the sources of global manufacturing products look uneven. The majority of manufacturing production is concentrated in a small number of countries. Nearly three-quarters of the world's manufactured products are in the US, Western Europe and Japan. Meanwhile, Dickens in Kuncoro (2007:8) said that in the context of developing countries, it can be said that 13 NICs are able to contribute four-fifths of the total manufacturing production of all developing countries.

Although its implementation varies between countries, the period of industrialization is a logical stage in the process of changing economic structure, this stage is realized historically through the increasing contribution of the manufacturing industry sector in consumer demand, production, exports, and employment opportunities. When viewed from the side of growth, the countries in East and Southeast Asia are very dynamic regions. Indonesia as one of the countries in the Southeast Asia region contributes quite dominantly in terms of output.

During the last few decades there has been a basic change in the pattern of global competition in international production and trade, where not only natural resources and cheap labor, but technological capabilities have also become a very even more important factor in determining the level of competitiveness (competitive advantage). manufacturing sector of a country. In countries with a very advanced level of industrialization, it proves that the endowments factor is not an obstacle to compete with countries rich in natural resources because they are very superior in human resources with high education (Tambunan, 2001:74). On the other hand, the export growth rate is achieved by manufacturing industries which directly or indirectly invest in research and development activities (R&D).

In addition to the contribution of output, the level of industrialization of a country can also be seen from the added value of the manufacturing industry per capita. The results of Aswicahyono's study in Tambunan (2001:43) using World Bank data show that, during the 1965-1995 period, Indonesia was still lagging behind in the industrialization process compared to other countries. In 1995, Indonesia's level of industrialization was on par with Malaysia, and lower than that of China and Thailand.

According to Tambunan (2001:33) the difference in the value added share of the manufacturing industry between sub-sectors is caused by different factors according to industry groups, which are internal and external. Internal factors include the type of technology and raw materials used, available human resources, production processes and management patterns as well as existing internal constraints. Meanwhile, the external factors of which the most important are the characteristics of the market served (buyers by income group and form and level of competition). All of these factors are different according to the different characteristics of the type and product made.

2. RESEARCH METHOD

2.1 Types of research

The type of research used in this research is in the form of quantitative descriptive. The definition of descriptive itself is a research that makes a clarification of a phenomenon or social reality by describing a number of variables relating to the problem and unit under study. While quantitative is a study that uses a numerical scale (numbers).

2.2 Measurement of Research Variables

There are several variables that are considered in measuring the added value of the manufacturing industry. This study tries to test more measurable variables, the independent variables in this study include: Education, as indicated by the number of workers with high school education in the manufacturing industry sector (person/year); Foreign investment, indicated by the net foreign investment value entering all sectors (dollars/year); Exports, indicated by the value of manufacturing exports (revision.3) (dollars/year). Technology, indicated by the amount of state expenditure for R&D activities (dollars/year). The dependent variable used is the total value added of the manufacturing industry (ISIC revision 3).

However, it is possible to use qualitative variables as long as these variables are dichotomous binary variables (only have two alternative answers), so that the value can be divided into 0 and 1. The variable is called a dummy variable because its status is not a real variable. As an independent variable, the number of dummy variables used depends on the number of categories to be distinguished. If only two categories are to be distinguished, then only one dummy variable is used. In general, if we have n categories, we only need n-1 dummy variables.

2.3 Data Types and Sources

This study uses secondary data, namely data published by the Central Statistics Agency (BPS), UN Statistics Division, World Bank, Comtrade, and UNCTAD, as well as from other literature studies related to the research theme. The data used in the form of time series data 1 (time series) during the period 1998-2005 and cross-sectional data 2 (cross section), namely several countries in the research sample.

2.4 Method of collecting data

The data in this study were obtained from various sources taken via the internet. In collecting data, the authors took data that is free (free) through publications of the UN, World Bank, Comtrade, and UNCTAD which are the main tools in this research. The data obtained were adjusted to the research period, namely 1998-2005.

2.5 Data analysis technique

The method used in estimating the existing model in this study uses regression analysis with panel data. While the technique used is OLS (Ordinary Least Square). The proposed hypothesis will be answered with certain analytical tools. To answer the first hypothesis, the Tau Kendal correlation test will be used, while to test and analyze the second and third hypotheses, panel data regression analysis will be used.

a. Identification of the Effect of Growth on Labor Absorption

To measure how to see the influence of manufacturing industry growth on employment, the identification process includes the following steps: first. for each country the output data is changed in the form of growth, while the labor data (people) is changed in the form of the difference between years (thnstlh-thnsblm). Second, giving an average based on output growth and labor absorption for each country. The determination of the two things above is carried out with the consideration that when there is growth in the manufacturing sector (percent) how much labor (people) is absorbed in the manufacturing sector.

b. Kendal Tau Correlation Test

Meanwhile, to determine the significance of the proportion of manufacturing growth on employment, a correlation test was conducted. Before carrying out the correlation test process, you must first go through the following steps: First, the output data for each country is changed in the form of growth, while the labor data (people) is changed in the form of the difference between years (thnstlhnya-thnsblm). Second, giving a rating of 3 for output growth and labor absorption in each country. Third, based on the ranking of output growth and labor absorption, a tau kendal correlation test was carried out to determine a "proportional" growth pattern.

c. Panel Data Regression

By considering the advantages of panel data, this study uses panel data in estimating the existing model. Panel data regression is a regression that combines time series data with cross section data.

d. Classic assumption test

To have an unbiased and efficient estimator value from the regression equation using the OLS method for three or more observed variables, it must pass the following classical assumption tests: multicollinearity test, heteroscedasticity test, autocorrelation test, normality test.

e. Statistic test

Hypothesis testing was carried out statistically through the following testing stages: F test, t test and R2 test.

3. RESULTS AND DISCUSSIONS

3.1 Panel Data Regression Analysis

The results of the panel data regression analysis are divided into 5 parts, namely (1) classical assumption test examination, (2) initial regression model, (3) regression model specification using the backward method, (4) F-test results, t-test, and R2 (5) hypothesis testing.

3.2 Classic assumption test

The regression model in this study is divided into 2, namely the initial model and the final model, the final model is the initial model that is re-specified using the backward method. The following are the results of the classical assumption test in the regression model.

a. Normality test

This test is carried out to check whether the data is normally distributed. The normality of the data was measured using the Kolmogorov–Smirnov test on the residual model. If the significance is greater than = 0.05 (error rate 5%), it can be said that the data is normal.

Table 1. Final Regression Normality Test (Backward)

	Residual
N	40
Kolmogorov-Smirnov z	0.796
Sig	0.551

The results of the analysis show a significance value of 0.551 > 0.05, which means the data has been normally distributed.

b. Multicollinearity Test

In this study, the multicollinearity test used was VIF (Varance Inflation Factor), if VIF < 10, the independent variable did not contain multicollinearity problems. The following are the results of the multicollinearity test in the initial model:

Table 2.Multicollinearity Test

Variable	Tolerance	VIF
Education (X1)	0.017	57,932
Foreign Investment (X2)	0.234	4,266
Export (X3)	0.162	6,167
China (d1)	0.023	43,743
Malaysian (d2)	0.123	8,099
Thai (d3)	0.138	7,225
Indonesian (d4)	0.049	20,456

The results of the initial model estimation of the multicollinearity test contain several weaknesses due to multicollinearity problems. Therefore, the following test will show the assumption of multicollinearity in the final model (backward method).

Table 3. Multicollinearity Test of Final Regression (Backward)

Variable	Tolerance	VIF
Foreign Investment (X2)	0.236	4,238
Export (X3)	0.181	5.525
China (d1)	0.619	1,616
Malaysian (d2)	0.169	5,926
Thai (d3)	0.138	7,224
Indonesian (d4)	0.102	9,803

In this study, the final model that has been analyzed is a model that is free from multicollinearity.

c. Heteroscedasticity Test

Heteroscedasticity is a condition where each confounding error has a different variance. The method used to detect the heteroscedasticity problem is the Park Test. If the significance value of the independent variable is greater than 0.05, it means that there is no heteroscedasticity and vice versa. Because in the initial model there were no symptoms of heteroscedasticity, the results of the heteroscedasticity test in the backward model are shown below:

Table 4. Heteroscedasticity Test of Late Regression (Backward)

Variable	Coefficient	sign.
C (Constant)	59.968	0.277
Foreign Investment Ln (X2)	0.609	0.928
Export Ln (X3)	-28,279	0.161
China (d1)	0.194	0.822
Malaysian (d2)	-1.522	0.349
Thai (d3)	0.028	0.987
Indonesian (d4)	0.985	0.638

In this study, the final (backward) model that has been analyzed is a model that is free from Heteroscedasticity.

d. Autocorrelation Test

To test the presence of autocorrelation in the initial model, it can be seen from Durbin Watson (DW) which was obtained from the estimation results. If the DW value is greater than the upper bound (U), then there is no positive autocorrelation. Second, if the DW value is lower than the lower bound (L), then there is a positive autocorrelation. Third, if the DW value lies between the upper and lower limits, it cannot be concluded (doubtful). With n = 40, k = 6, the critical value at the 5% significance level is dL = 1.175, dU = 1.854. The value of DW = 1.748 is between dL and dU, so the decision of the Durbin Watson test is in the area of doubt.

Table 5. Autocorrelation Test for Final Regression (Backward)

	DW Test Bounds		DW value
	dL	dU	Statistics
Mark	1.175	1,854	1,748

Furthermore, the non-autocorrelation test decision was carried out using a non-parametric statistical run test method. If the value of sig. greater than 0.05 means that there is no autocorrelation problem.

Table 6: Autocorrelation Decision Test

	Unstandardized Residual
Test Value(a)	0.00146
Cases < Test Value	20
Cases >= Test Value	20
Total Cases	40
Number of Runs	16
Z	-1,442
asymp. Sig. (2-tailed)	0.149

The results of the run test with a value of sig = 0.149 give the conclusion that the model does not contain autocorrelation problems.

3.3 Research Hypothesis Testing Analysis

- **R2 Test (Coefficient of Determination)**

From the results of panel data regression calculations, the coefficient of determination R2 is 0.984 or 98.4%, while Adjusted R2 is 0.981 or 98.1%, which means that the independent variable is able to explain the dependent variable by 98.1 percent, so only 1.9 percent explained by other variables outside the model.

- **Simultaneous Significant Test (F-Test)**

The results of the F test, t test and R2 discussed in this study are based on the results of the backward (final) model analysis. The existence of a violation of the multicollinearity assumption in the initial model causes the results of the F and t tests to be invalid.

The results of the calculations carried out in the regression analysis are known that the calculated F is 335,798, while the F table at 5% with db regression = 6 and db residual = 33 is 2,389 with sig = 0.000. The comparison between the calculated F and the F table shows that the F count > F table is 335.798 > 2,389, meaning that simultaneously the independent variables have a significant effect on the added value of the manufacturing industry.

- **Partial Effect Significance Test (t Test)**

This test is used to test the significance of the partial effect of the independent variable on the dependent variable. To test whether there is an influence of each independent variable individually (partial) on the variables, it can be known through the t test by comparing the t count value with the t table. If t count > t table, it is declared significant, namely the independent variable partially has an influence on the dependent variable or has a significant effect. And vice versa if t count < t table then it is declared insignificant, namely the independent variable partially does not have a significant effect on the dependent variable or has no significant effect.

Table 8. Partial Test (t Test)

Variable	Coefficient	t-stats	t test	Description	
(Constant)**	4.253	4,508	sigf.	t-table*	2.037
logX1.education*	0.051	0.329	No.Sigf	t-table**	2.035
logX2.foreign investment**	0.057	2.038	sigf.	*R-square***	0.984
logX3.export**	0.569	7,960	sigf.	Adj.R-sqr**	0.981
d1 China**	0.28	8.186	sigf.		
d2 Malaysia**	-0.561	-8,555	sigf.		
d3 Thai**	-0.314	-4,342	sigf.		
d4 Indonesia**	-0.192	-2.281	sigf.		

The panel regression equation obtained from the estimation results using the backward method obtained three independent variables that make up the best model of the four independent variables previously formulated. The three variables are foreign investment, exports, and the country

dummy (China, Malaysia, Thailand, and Indonesia). While the variable experiencing reduction is the education variable.

Education is not a variable that affects the added value of the manufacturing industry because the participation of secondary education in the countries of observation (Indonesia, Malaysia, Thailand, and China) is still very low when compared to the UK (developed). In addition, the education reflected in the model does not include work experience and does not take into account skills and expertise (unskills). The same thing is also stated by Gundlach in Etienne and Leslie (2006:25) that knowledge and expertise indicate the achievement of real human capital measurements.

Based on the explanation above, in general it can be said that the added value of the manufacturing industry in some observed countries is influenced by foreign investment and export variables, while country differences (dummy) have a significant effect on the added value of the manufacturing industry. Thus the second and third hypotheses are statistically proven.

4. CONCLUSION

The conclusion of this study is to answer the formulation of the problem and based on the discussion that has been carried out, so the conclusions of this study are:

- In the observation period (1998-2005) it was found only in Malaysia that the growth pattern proportionally increased labor absorption, while in the UK it did not show a proportional growth pattern. While in China, Thailand, and Indonesia, although the coefficient is positive, it is not certain that the growth pattern will be proportional, this is evidenced by the results of the calculation of the correlation test which is not significant.
- The variables that affect the added value of the manufacturing industry in China, Malaysia, Thailand, Indonesia, and England in the observation period (1998-2005) are foreign investment and export variables. While the education variable did not show significant results in the calculation.
- The results of panel data regression analysis using a country dummy show that there are significant differences between countries for the added value of the manufacturing industry during the period 1998-2005.

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