

Industrial Capital Intensity and Comparative Advantages Dynamism of Indonesian Export Products

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Abstract

The development of new trade theory which incorporates the interaction between trade and international capital flows indicates if the possibility of changes in a country's comparative advantage due to the opening of international capital flows. International capital flows allow for changes in the industrial structure of a country depends on the composition of the products produced in that country. More capital-intensive types of products produced by a country, the greater the need for capital and the higher marginal rate of capital that can be given to attract greater international capital flows. Therefore, a comparative advantage should be seen as dynamic rather than static. As a country with large population, Indonesia tends to specialize in labor-intensive products. The other hand, efforts to attract foreign direct investment are very intensively conducted. The estimation results indicate if there was a shift in the pattern of industrial specialization Indonesia, from labor-intensive tends toward capital intensive.

Keywords: neoclassical models, capital movements, business, comparative advantage

JEL Classification: F11, F21, F23, L60

Intensitas Modal Industri dan Dinamisme Keunggulan Komparatif Produk Ekspor Indonesia

Abstrak

Perkembangan dalam teori perdagangan internasional baru yang menunjukkan adanya interaksi antara perdagangan barang dengan aliran modal internasional mengindikasikan adanya kemungkinan perubahan keunggulan komparatif sebuah negara. Adanya aliran modal internasional memungkinkan terjadinya perubahan dalam struktur industri sebuah negara yang tergantung pada komposisi produk yang dihasilkan di negara tersebut. Jika sebuah negara semakin memiliki struktur industri yang bersifat padat modal, maka semakin besar kebutuhan akan modal dan semakin tinggi *marginal rate of capital* yang bisa diberikan untuk menarik semakin besar modal internasional untuk mengalir masuk. Karena itu, sifat keunggulan komparatif suatu negara seharusnya lebih bersifat dinamis, dibandingkan dengan statis. Sebagai sebuah negara yang memiliki populasi besar, Indonesia akan cenderung berspesialisasi dalam produk-produk yang bersifat padat karya. Di sisi lain, upaya untuk menarik aliran modal internasional semakin gencar dilakukan. Hasil estimasi mengindikasikan jika telah terjadi perubahan pola spesialisasi industri di Indonesia, dari yang awalnya bersifat padat tenaga kerja menjadi cenderung ke arah padat modal.

Kata kunci: model neoklasik, capital movements, bisnis, keunggulan komparatif

Klasifikasi JEL: F11, F21, F23, L60

1. Introduction

Two important phenomena that develop in the global economy is the integration of trade and finance as well as increased labor force or

productivity in developing countries. Economic integration has pushed the international strategic alliances across countries. Trade liberalization not only allows the growth of exports but

also brings in a more competitive environment in the domestic markets and regional trade (Widodo, 2009). In line with the process, the question arises as critical of specific specialties and dynamic shifts in the pattern of comparative advantage of each country. Classical trade theory states that if international trade was opened, a country will tend to specialize in products that have a comparative advantage. The products are used labor-intensive techniques should be produced in developing countries that tend to be richer in labor where labor costs are relatively low. In contrast, products that use capital-intensive techniques should be produced in the rich and developed countries where the cost of capital is relatively low. In other words, the developing countries should have a comparative advantage in labor-intensive products, while the developed countries have a comparative advantage in capital-intensive products.

In theory, the developing countries should take advantage of their backwardness by importing modern technology as well as developing institutions. Some countries can be said to be successful, but not for others in raising the level of industrialization. Conditions to allow a developing country to move from export products of labor-intensive industries to sectors with more advanced technology and modern not only requires a change of dynamic private sector which may be the last booster. History shows if the government policy as a catalyst for private sector growth is needed (Lin and Chang, 2009). The Government should adopt various methods of measurement to promote industrialization and technological upgrading. If used correctly, the power possessed by the government can be used to start as well as encourage long-term economic improvement in factors and industrial productivity.

However, several studies confirm if comparative advantage is more dynamic rather than static. Integration and globalization that occurred has transformed the industrial structure (Aiginger, 1999). Studies conducted by Balassa and Noland (1989) showed a dramatic change in the pattern of specialization in Japan and America from labor intensive products to capital-intensive products and both showed

improvement with a comparative advantage in high-tech products. Widodo (2009) tested the dynamism of comparative advantage in the region of ASEAN + 3 and discover if an increase in comparative advantage as a whole is driven by the increase higher comparative advantage in the products group that do not have or only have low comparative advantage previously, as a result of high productivity growth, as happened in Japan. Several other studies related to changes in comparative advantage occur after applied deeper trade integration (Imbz and Wacziarg, 2003; Beine and Coulombe, 2004; Sanguinetti *et al.*, 2004).

As a country with large population, Indonesian industrial structure tends to be labor intensive. Indonesia is one of the largest developing countries in the world with GDP reaching US \$ 878 billion in 2012. The average economic growth in Indonesia reached 11.85% for more than two decades. In 2012 Indonesia's GDP growth ranges from 3.75% after experiencing high economic growth in prior periods. Indonesia therefore becomes the largest country in Southeast Asia which contributed nearly 40% of total GDP in ASEAN and 16 in the world rankings (Tijaja and Faisal, 2014).

Compared with other ASEAN countries, Indonesian population is the largest with an average growth of 1.48% per year. Indonesia is a very open and active country in international trade. One indicator of a country integration size in international trade is the ratio of exports and imports of goods and services in Gross Domestic Product (GDP). Value ratio of trade (net exports) to Indonesia's GDP reached 57.76% on average per year. The highest trade occurred in 1998, which reached nearly 96.18% (of GDP) and the lowest occurred in 2009 were only 45.51% of the total GDP. Indonesia's involvement in international trade deepened with the approval of the AEC which allows more free flow of goods and capital to Indonesia, especially from the ASEAN region.

This paper tries a closer look at Indonesian industrial structure and its dynamism. Using Indonesian statistical data of medium and large industrial firms, the comparative advantage development of each industry group in the 3-digit level will be the trend. The analysis will also be supported by the trend of productivity,

output, number of firms and labor used in each industry so that it can be seen are there any systematic changes in the industrial structure of Indonesian export products.

2. Research Method

2.1. Data and Methodology

The main objective of this study is to see whether there is a change in the comparative advantage structure of Indonesian export products. This study uses Indonesian medium and large industries data at the firm level started the period 1990 to 2012. Due to specialization and industry restructuring takes time, it is advisable to use a minimum five years time frame when conducting analysis.

The analysis will be carried out through two stages of analysis. First, estimates the capital intensity used by each industry in Indonesia. The firms will be put into groups according to ISIC code at the three-digit level. Capital intensity values are used in each industry estimates by sought a way (Shirotori et al., 2010):

$$RCI_{jt} = \frac{K_{jt}}{L_{jt}} \quad 1)$$

where K_{jt} is capital stock of industry j at period t , while L_{jt} is labor force of industry j at period t . Capital stock for each industry at period t sought by summing the estimated value of capital goods period $t-1$ to the value of the addition or improvement of capital goods period t (after deducting the value of the reduction or sale).

Measurement indicators commonly used to separate an industry into capital-intensive industry category or a labor-intensive is the average value of all industry capital intensity as the cutoff point. The first stage should be done is to calculate the average capital intensity for the entire industry during 1990 to 2012. The second stage is to compare the capital intensity of each industry with average capital intensity. If the capital intensity of the industry j is greater than the average capital intensity, then industry j categorized as a capital intensive industry. Conversely, if the capital intensity of the industry j is lower than the average capital intensity of the entire industry, then industry j

is said to be labor intensive (Ohno and Imaoka, 1987; Das and Kalita, 2009).

The second step is analyzing the comparative advantages of each industry. The size of the comparative advantages of a product from one country is usually indicated by the value of revealed comparative advantage (RCA). RCA index is calculated by (Bowen et al., 2012):

$$RCA = \frac{\frac{X_{ij}}{X_{wj}}}{\frac{X_i}{X_w}} \quad 2)$$

where X_{ij} shows export value of product j from country i , X_{wj} is world total export of product j , X_i is country i total export, and X_w is world total export. If the RCA index is greater than one, then product j is said to have a comparative advantage. Conversely, if under one it does not have a comparative advantage. Because the RCA indices are not comparable on both sides of its neutral value, ie one, then the RCA index is made to be symmetrical, and became known as symmetric revealed comparative advantage (RSCA), the method (Laursen, 2015):

$$RSCA = \frac{RCA - 1}{RCA + 1} \quad 3)$$

RSCA index values can vary from one to minus one ($-1 \leq RSCA \leq 1$). $RSCA_{ij}$ value of greater value than zero means the country i has comparative advantage in product j . Conversely, if the value $RSCA_{ij}$ smaller than zero indicate if the country i do not have a comparative advantage in product j .

RCA or RSCA is a measure of international specialization and is not a measure of performance or level of competition. RCA index or RSCA is relative and not an absolute measure. The value of this size have implications no matter how weak or strong the performance of a country, by definition, a country would specialize in something and therefore will always have an index of RCA / RSCA high for some sectors of the economy and low value for other sectors. RCA / RSCA distribution then used to analyze the comparative advantage dynamism (Laursen, 2015; Widodo, 2009; Balassa and Noland, 1989). RSCA value each industry sector will be calcu-

lated throughout the study period.

RSCA standard deviation is used to see the comparative advantage distribution. Positive value of skewness coefficient during the period indicated if Indonesia is concentrate on products that have a low comparative advantage. Conversely, if the value of the skewness coefficient of industrial RSCA is negative means that Indonesia is concentrate on products that have a high comparative advantage. By accounting the value of the skewness coefficient over time, it can be analyzed specialization tendency or comparative advantage shifting.

The methodology used to test the stability of the trade pattern of is (Laursen, 2015):

$$RSCA_j^{t_2} = \alpha_j + \beta_j RSCA_j^{t_1} + \epsilon_j \quad 4)$$

where t_1 and t_2 refers to initial and end of analysis period. Dependent variable $RSCA_j^{t_2}$ refers to sector j RSCA at period t_2 test on RSCA value in previous period, t_1 , as independent variable. Basically the value of β measures the stability of a country specialization pattern between the two periods. Low value of β indicates a high degree of turbulence. However, if the value is not different from one significantly, means the pattern of specialization has not changed. The value of β/R (where R is the correlation coefficient regression) measure whether the level of specialization increased or decreased between the two periods. If $\beta/R > 1$, specialization is said increasing. But if $\beta/R < 1$, specialization decreases. When the value of $\beta < 0$, no conclusions can be drawn, the pattern of specialization may be random or have been reversed (Widodo, 2009).

Because the data used is cross sectional, it is necessary to note the assumptions used in the regression model here. The problem that often arises in cross section data is heteroscedasticity. However, it remains to be examined the possibility of autocorrelation. White Heteroskedasticity test will be used to detect whether there is a problem of heteroscedasticity in the model, while Breusch-Godfrey test was used to detect the presence of autocorrelation. There are two approaches that can be used to overcome these two problems, namely Heteroscedas-

ticity Consistent Covariance (White) and HAC Consistent Covariance (Newey-West). If both problems do not occur, then the OLS can be applied properly. However, if heteroscedasticity appears, then the White method will applied. If autocorrelation and heterosce C V C dasticity happens, it will be used HAC Consistent Covariance (Newey-West) method.

3. Results and Discussion

3.1. Comparative Advantage Trend of Indonesian Export Products

During the period 1966 - 1998, the Indonesian economy experienced rapid and sustained growth that allows Indonesia to escape the status of poor countries with low income to be one of eight countries in Asia that have high performance in early 1990. Along with Malaysia and Thailand, Indonesia categorized as a second newly industrialized country by the World Bank due to high manufacturing exports since the late 1980s (Wie, 2006).

Some of the reforms carried out in the mid-1980s, including the reform of customs duty, exemption tariff to replace export subsidies, ex-ante tax exemption unconditionally or various ex-post pieces have extended access domestic enterprises to input markets internationally while reducing business costs and uncertainty significantly (Tijaja and Faisal, 2014). These reforms contribute to boost export competitiveness. In 1997/1998 countries in Asia have to face the economic crisis that began with the collapse of the Thai Baht. Indonesia is among countries worst affected. According to the agreement with the International Monetary Fund (IMF), significant reforms to trade policies are taken to reduce tariff and non-tariff impediments and encourage exports.

Table 1 shows the types of industries that have a comparative advantage based on the average rankings RSCA from 1990 - 2012. Table 1 directly shows if all Indonesian export products that have a comparative advantage are labor-intensive industries. Products goods of wood and woven goods (product code 202) is industry that has highest comparative advantage, while the processing of tobacco products (product code 160) has lowest comparative ad-

vantage. Three products, each man-made fibers (product code 243), paper and paper products (product code 210), as well as radio and television (product code 323) shifted significantly, from did not have a comparative advantage in the beginning of the 1990s into products that have a comparative advantage.

In another part, Table 2 (Appendix) shows the industrial groups that do not have comparative advantage. However, two industrial groups, namely 1) Rubber and rubber products (product code 251), and 2) other transport equipment (product code 359) indicate a tendency to be products with comparative advantage. Inversely to the Textiles industry (product code 172) shows a decline in comparative advantage. The

textile industry was formerly a leading Indonesian product with high comparative advantage, but since 1994 the industry competitive ability has decreased.

This confirms the results of an earlier empirical study if Indonesian industry technology investment on export-oriented products, namely textiles, garments and electronics, both for domestic firms and firms owned by foreign investors was very small in term of adaptability improving or the ability to change, especially a change in the process or production technology that is intended to adapt to local conditions (Wie, 2006).

Table 1. Industrial Group with Comparative Advantage

Ranks	Product Code	Nature of Comparative Advantage	Product Type	Product Description
1	202	With comparative advantage	Labor intensive	Manufacture of products of wood, cork, straw and plaiting materials
2	192	With comparative advantage	Labor intensive	Manufacture of footwear
3	171	With comparative advantage	Labor intensive	Spinning, weaving and finishing of textiles
4	151	With comparative advantage	Labor intensive	Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats
5	181	With comparative advantage	Labor intensive	Manufacture of wearing apparel, except fur apparel
6	314	With comparative advantage	Labor intensive	Manufacture of accumulators, primary cells and primary batteries
7	243	Without comparative advantage --> with comparative advantage	Labor intensive	Manufacture of man-made fibres
8	361	With comparative advantage	Labor intensive	Furniture
9	210	Without comparative advantage --> with comparative advantage	Labor intensive	Manufacture of paper and paper products
10	222	With comparative advantage	Labor intensive	Printing and service activities related to printing
11	173	With comparative advantage	Labor intensive	Manufacture of knitted and crocheted fabrics and articles
12	201	With comparative advantage	Labor intensive	Sawmilling and planing of wood
13	323	Without comparative advantage --> with comparative advantage	Labor intensive	Manufacture of television and radio
14	272	With comparative advantage	Labor intensive	Manufacture of basic precious and non-ferrous metals
15	160	With comparative advantage	Labor intensive	Manufacture of tobacco products

Source: Author's calculation

None of the companies included in this industry that has made innovative efforts or make changes that can improve change processes in large scale or in production technology, which basically is needed to achieve and maintain international advantage. Even further study conducted on Indonesian industry Indonesia conducted by the World Bank indicates if the garment industry become an industry that is shifted to backward in technology, which is reflected by an increase in labor productivity.

In theory, a country will concentrate on products that have a comparative advantage, and therefore they will increasingly specialize in these products. When compared with other products, the comparative advantages of these products will be higher, whereas other products will remain or may deteriorate. If this happens, then the difference in comparative advantages between products will be even greater.

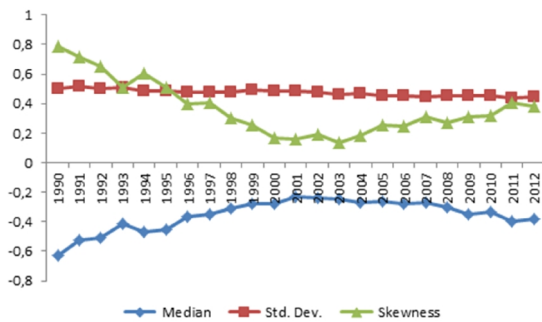


Chart 1. Trend of RSCA Median, Standard Deviation, and Skewness of Indonesian Export Product in 1990 - 2012

Source: UNComtrade, Author's calculation

Chart 1 indicates trend of the median value, standard deviation and skewness coefficient of the comparative advantage owned Indonesian export products. Some common patterns that appear are the differences across the Indonesian industrial products comparative advantages of are likely to decline over time. A decrease in standard deviation which followed by an increase in the median implies if an increase in the overall comparative advantage could be caused by an increased of product comparative advantage that did not have, or had low comparative advantage previously (Widodo, 2009).

Positive skewness coefficient values indicate if Indonesia concentrate on products that have low comparative advantage. However, it tends to to industrial products with comparative advantages as indicated by the lower the of skewness coefficient. However, from 2003 there are indications of changes in the concentration back to industries that have lower comparative advantages. It is also seen from the median value declining from 2003.

3.2. Indonesian Trade Specialization Pattern Stability

Assumptions in the economics evolution said that if the technology is one important determinant in international specialization (Laursen, 2015). Given the technology is relatively stable across time and space, the strength of the relationship between technology and trade specialization will bring trade specialization patterns also tend to be stable over time. An important aspect of the technology is that they tend to be specific and rooted in the individuals and institutions characteristics and accumulates over time (Lin and Chang, 2009). Moving on from these assumptions, the companies producing goods which are technically different from the goods produced by others, in the context of the technology used.

Krugman (1987) adopted a different theoretical perception and propose a model that predicts the specialization pattern of a country based on economies of scale. In the model, sectors productivity of the country in accordance with existing resources depends on the experience accumulation, which he called *learning by doing*, which creates economies of scale at the industry level. Thus, once the specialization pattern has been formed (which may be due to chance), then the pattern will not change. Changes in relative productivity function to lock the specialization pattern. Therefore, regardless of the theory used, the pattern of trade specialization will be relatively stable over time.

Indonesian trade specialization pattern test indicates different results with the theory, as shown in Table 3. As industry restructuring takes time, specialty testing analysis of trading patterns carried out at least within five years. Tests in the period 1990 - 2012 were also done

to see changes in the long-term.

Estimation results indicate if there are changes of the Indonesian industry trade specialization generally in the long term. The value of β/R smaller than one, that is equal to 0.625887, indicating if the Indonesian industry specialization tends to decrease (de-specialization) and changing specialization patterns of Indonesian industry in the long term significantly. This can be seen from the probability value of Wald test rejects the null hypothesis significantly. Indonesian industry specialization decline occurred throughout the study period, which indicated significant decrease in specialization both for the medium term and long term. β values are relatively low, especially in the period 1990-2012 shows the magnitude of changes in the Indonesian industries comparative advantage. These results corroborate indications of declining industrial specialties Indonesia previously seen in decline trend of RSCA standard deviation. Specialization is said to be decreased or de-specialization can occurs when a country has achieved comparative advantage in an industry that does not have specialization previously and loss of comparative advantage in an industry that had reached specialties.

Declining of Indonesian industry specialization occur in both types of industry, labor intensive and capital intensive. Specialization capital-intensive industries indicates an increase briefly in the period 1995 - 2000, but not change the specialization pattern that have been there before significantly. The turbulence in capital-intensive industries are relatively higher than the labor-intensive industries, it is seen from the value of the coefficient β estimated from capital-intensive industries lower than estimated value of β on labor-intensive industries. Changes in specialization patterns are random, or even upside down from the previous pattern, occurred significantly in the period 1990 - 1995 and reflected in the long term (1990-2012).

A significant decline also occurred in the specialization pattern of labor-intensive industries. Specialization increase had occurred in the period 2000 - 2012 but not changes the pattern of specialization that has been there before. Changes in comparative advantage of labor-

intensive industries relatively large in medium time frame, the biggest change occurred in the period 1990 - 1995. However, labor-intensive industry specialization changes is quite large in long term because the β value only 0.527561.

Since the early 1990s, policy makers and academics have argued that Indonesia's manufacturing sector must develop a sustainable source of comparative advantage, primarily by improving technological capabilities and institutional (Wie, 2006). Lall (1998, in Wie, 2006) criticized the technology and industrial capabilities Indonesia and indicates if the Indonesian industrial structure has some drawbacks in terms of technology used. These weaknesses, if not addressed, will inhibit the growth and development of the industry in the long term. Among the few drawbacks are: 1) shallow and the backwardness of the technology base, particularly in comparison to other East Asian countries, 2) the weak and the small domestic ability to absorb and improve complex technology, 3) underdevelopment of capital goods sector, and 4) size of government investment in improving technology. The results shows if the industry specialization of Indonesian export products are not stable, and even tends to decrease and changes from previous specialization patterns. The empirical results indicate if Indonesia does not specialize in the right industry type to be developed which should rooted in comparative advantage.

Unlike Korea, where the government still encourages the promotion of exports with consistent pressure on the leaders companies to achieve export target specific products, the Indonesian Government in its export promotion policy never gives the same impetus to manufacturing firms. Indonesian government has never attempted to put pressure on the export performance target of potential certain products. Thus, it is not surprising 50 large Indonesian companies' contribution in the mid-1990s only 16% of total manufacturing exports (World Bank, 1994; Wie, 2006). Even manufacturing exports was mostly generated by foreign companies and small and medium sized companies that export garments and other products that are labor intensive with low skill requirements.

A study conducted by Hall and Rao (1995,

in Wie, 2006) found if Indonesian manufacturing exports was led by a number of products that are supported by low wages and access to natural resources. Even though these advantages can be improved and developed, but this is very risky types of products to compete with products from newcomer competitor such as China which has low wage and low growth in domestic demand.

Results of the study indicate if the Indonesian manufacturing exports sustainability needs expansion and deepening of the existing export products, multiply the local component in the export activity, and increased activities that provide high value added. Because Indonesian manufacturing companies also face market failures, it takes a strong and active government roles particularly in eliminate policies that could lead to distortions and costs which reduce private sector competitiveness.

Table 6 displays the average value of Indonesian industrial exports value during the period 1990-2012. Almost all industries showed an increase in exports except for goods of wood (product code 202), optical instruments (product code 332), Motor vehicles bodies (product code 342), and Clocks, watches and other similar products (product code 333). Three out of these products are labor-intensive products. If viewed from the RSCA, industrial goods of wood (product code 202) is a product of labor-intensive industries with highest RSCA in the early period (1990), but the comparative advantages possessed showed declining trend. The condition was confirmed when an average value of processing and preservation of meat, fish, fruits, vegetables, oils and fats (product code 151) exports during 2001 - 2012 became a product with largest export, surpassing the export of goods from wood. Clocks, watches and other similar products Clocks, watches and other similar products (product code 333) is a product with lowest export value growth rate as well as has lowest comparative advantage index. Industry with the lowest export value is Goods from coal (product code 231) and always in the lowest ranks but its growth is quite large in the amount of 303%.

Referring to the exports growth, the biggest surprise was the increase in capital intensive

products export. Industries with the largest export growth was Manufacture of motor vehicles (product code 341), while the second largest export is Manufacture of parts and accessories for motor vehicles and their engines (product code 343). Looking at the overall analysis results, there is a trend shift in the pattern of Indonesian industry specialization leads to products that are capital intensive, even when seen from the value of RSCA, capital-intensive products do not have comparative advantage at the moment. However, the RCA trend show comparative advantages of these products are likely to increase

An industry which at the beginning had a comparative advantage can be shifted to industries that do not have the advantage, and vice versa. Pattern introduced by Hollis Chenery provide an empirical analysis of the process of gradual development where economic, industrial and institutional structure of the developing countries are transformed over time that allow new industries to replace traditional industries as the engine of growth. According to Chang (Lin and Chang, 2009), through a process of accumulation and build technological capacity factor makes every backward country to accumulate capabilities in new industries and new industries to enter before they have the right resources and in spite of the necessity to follow a comparative advantage.

4. Conclusions

Comparative advantages owned by a country turns out to be dynamic and not static as predicted at the beginning. It was clear from empirical studies conducted in several previous studies, including studies of industrial structure in Indonesia. As a developing country, with a relatively more labor compared with the investment, Indonesia is expected to be concentrated in the industrial products that are labor intensive as the main export.

Some earlier studies did show if Indonesia superior products industry are labor-intensive products but tended to decline, but there is no empirical analysis that can show such a shift. At the beginning of the study here, the products of labor intensive exports were dominated Indonesia, with high comparative advantage. However, the estimation results indicate if the pat-

tern of Indonesian export products specialization changes significantly and indicated the tendency towards capital-intensive industrial structure. Even in the period of research such capital-intensive products does not have comparative advantage, but RSCA shows an increasing trend over time.

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7. Appendix

Table 2. Industrial Group Without Comparative Advantage

Ranks	Product Code	Nature of Comparative Advantage	Product Type	Product Description
1	232	No comparative advantage	Labor intensive	Manufacture of refined petroleum products
2	251	No comparative advantage --> tend to with comparative advantage	Labor intensive	Manufacture of rubber products
3	359	No comparative advantage --> tend to with comparative advantage	Labor intensive	Manufacture of transport equipment
4	261	No comparative advantage	Labor intensive	Manufacture of glass and glass products
5	172	With comparative advantage --> without comparative advantage	Labor intensive	Garments and carpets
6	369	No comparative advantage	Labor intensive	Other processing
7	269	No comparative advantage	Labor intensive	Manufacture of non-metallic mineral
8	191	No comparative advantage	Labor intensive	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness
9	154	No comparative advantage	Labor intensive	Manufacture of other food products
10	241	No comparative advantage	Labor intensive	Manufacture of basic chemicals
11	313	No comparative advantage	Labor intensive	Electrical cables and telephone
12	311	No comparative advantage	Labor intensive	Manufacture of accumulators, primary cells and primary batteries
13	281	No comparative advantage	Labor intensive	Manufacture of structural metal products, tanks, reservoirs and steam generators
14	315	No comparative advantage	Labor intensive	Manufacture of electric lamps and lighting equipment
15	252	No comparative advantage	Labor intensive	Manufacture of plastics products
16	319	No comparative advantage	Labor intensive	Manufacture of other electrical equipment n.e.c.
17	300	No comparative advantage	Capital intensive	Manufacture of office, accounting and computing machinery
18	351	No comparative advantage	Labor intensive	Building and repairing of ships and boats
19	332	No comparative advantage	Labor intensive	Manufacture of optical instruments
20	271	No comparative advantage	Labor intensive	Manufacture of basic iron and steel
21	289	No comparative advantage	Labor intensive	Manufacture of other fabricated metal products; metal working service activities
22	242	No comparative advantage	Labor intensive	Manufacture of other chemical products
23	312	No comparative advantage	Capital intensive	Manufacture of electricity distribution and control apparatus
24	153	No comparative advantage	Labor intensive	Manufacture of grain mill products, starches and starch products, and prepared animal feeds
25	321	No comparative advantage	Labor intensive	Manufacture of electronic valves and tubes and other electronic components
26	293	No comparative advantage	Labor intensive	Manufacture of domestic appliances
27	342	No comparative advantage	Capital intensive	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
28	343	No comparative advantage	Capital intensive	Manufacture of parts and accessories for motor vehicles and their engines
29	322	No comparative advantage	Labor intensive	Communication equipment
30	291	No comparative advantage	Capital intensive	Manufacture of general purpose machinery
31	152	No comparative advantage	Capital intensive	Manufacture of dairy products
32	292	No comparative advantage	Capital intensive	Manufacture of special purpose machinery
33	333	No comparative advantage	Labor intensive	Manufacture of watches and clocks
34	331	No comparative advantage	Labor intensive	Manufacture of medical appliances and instruments and appliances for measuring, checking, testing, n.e.c

35	155	No comparative advantage	Capital intensive	Manufacture of beverages
36	221	No comparative advantage	Capital intensive	Publishing
37	341	No comparative advantage	Capital intensive	Manufacture of motor vehicles
38	353	No comparative advantage	Capital intensive	Manufacture of aircraft and spacecraft
39	182	No comparative advantage	Capital intensive	Dressing and dyeing of fur; manufacture of articles of fur
40	231	No comparative advantage	Capital intensive	Manufacture of coke oven products

Source: Author's calculation

Table 3. Indonesian Trade Specialization Stability Estimation

	Time Frames				
	I (1990 – 1995)	II (1995 – 2000)	III (2000 – 2005)	IV (2005 – 2012)	V (1990 – 2012)
Whole Industry					
β	0.83281 *** (0.070944)	0.915166 *** (0.035915)	0.891298 *** (0.038384)	0.921642 *** (0.036854)	0.625887 *** (0.086421)
β/R	0.97996	0.98845	0.934078	0.980838	0.887452
Wald Test	0.0184	0.0182	0.0046	0.0335	0.0001
Prob.					
Prob. Chi-Square - White Test	0.4668	0.5793	0.1485	0.0779	0.3734
Prob. Chi-Square - B-G	0.571	0.0389	0.1344	0.5884	0.8695
LM Test					
Conclusion	Specialization decreased, and changes the pattern of specialization significantly	Specialization decreased, and changes the pattern of specialization significantly	Specialization decreased, and changes the pattern of specialization significantly	Specialization decreased, and changes the pattern of specialization significantly	Specialization decreased, and changes the pattern of specialization significantly

Source: Author's calculation

Table 4. Trade Specialization Stability Estimation of Indonesian Capital Intensive Industry

	Time Frames				
	I (1990 – 1995)	II (1995 – 2000)	III (2000 – 2005)	IV (2005 – 2012)	V (1990 – 2012)
Capital Intensive Industry					
β	-0.54285 (0.52989)	0.587352 (0.61592)	0.878511 *** (0.120218)	0.63368 *** (0.15294)	-0.550019 (0.571728)
β/R	-1.83937	1.37071	0.964757	0.811693	-1.974364
Wald Test	0.0036	0.5029	0.3122	0.0166	0.0067
Prob.					
Prob. Chi-Square - White Test	0.4003	0.0276	0.5605	0.4075	0.0789
Prob. Chi-Square - B-G	0.4927	0.8768	0.1275	0.2278	0.4395
LM Test					
Conclusion	Specialization random or reverse and change patterns of specialization significantly	specialization increased, but do not change the specialization pattern significantly	Specialization decreased, but did not change the specialization pattern significantly	Specialization decreased, and changes the pattern of specialization significantly	Specialization random or reverse and change patterns of specialization significantly

Source: Author's calculation

Table 5 . Trade Specialization Stability Estimation of Indonesian Labor Intensive Industry

	Time Frames				
	I (1990 – 1995)	II (1995 – 2000)	III (2000 – 2005)	IV (2005 – 2012)	V (1990 – 2012)
Labor Intensive Industry					
β	0.745963*** (0.082284)	0.885756 *** (0.065584)	0.906965 *** (0.05378)	0.928376 *** (0.046133)	0.527561*** (0.105003)
β/R	0.90955	0.96052	0.968646	1.0022	0.84814
Wald Test Prob.	0.002	0.0815	0.0836	0.1205	0.0001
Prob. Chi-Square - White Test	0.7032	0.6845	0.2836	0.0836	0.7114
Prob. Chi-Square – B-G LM Test	0.3781	0.0867	0.1203	0.5334	0.8554
Conclusion	Specialization decreased, and changes the pattern of specialization significantly	Specialization decreased, and changes the pattern of specialization significantly	Specialization decreased, and changes the pattern of specialization significantly	Specialization increased, but do not change the specialization pattern significantly	Specialization decreased, and changes the pattern of specialization significantly

Notes: *standard error* in parenthesis. *Wald test* conducted to test hypothesis, $H_0: \beta = 1$, and $H_1: \beta \neq 1$. Sign***, means sig.at $\alpha = 1\%$, ** sig.at $\alpha = 5\%$, * sig. at $\alpha = 10\%$. Regression models were identified to heteroskedasticity and autocorrelation have been overcome by the White and HAC Consistent Covariance (Newey-West) methods.

Source: Author's calculation

Table 6. Average Values of Indonesian Export Products

Product Code	Average Export Value (1000 US\$)			Product Description
	(1990 - 2000)	(2001 - 2012)	Growth (%)	
151	3,125,914.17	12,194,664.01	290.12	Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats
272	1,136,284.67	5,186,780.72	356.47	Manufacture of basic precious and non-ferrous metals
181	2,852,428.91	4,485,297.84	57.24	Manufacture of wearing apparel, except fur apparel
210	1,681,791.75	3,930,344.94	133.70	Manufacture of paper and paper products
241	1,505,361.30	3,873,155.49	157.29	Manufacture of basic chemicals
323	1,644,591.80	3,032,974.32	84.42	Manufacture of television and radio
232	547,733.88	2,943,024.18	437.31	Manufacture of refined petroleum products
202	4,096,440.43	2,656,790.63	-35.14	Manufacture of products of wood, cork, straw and plaiting materials
171	2,075,761.36	2,541,569.47	22.44	Spinning, weaving and finishing of textiles
242	656,386.21	2,215,514.42	237.53	Manufacture of other chemical products
300	1,009,187.44	2,000,808.15	98.26	Manufacture of office, accounting and computing machinery
192	1,757,664.59	1,897,709.12	7.97	Manufacture of footwear
361	886,751.51	1,728,749.76	94.95	Manufacture of furniture
251	338,335.70	1,354,669.89	300.39	Manufacture of rubber products
271	423,905.05	1,289,291.34	204.15	Manufacture of basic iron and steel
321	334,801.96	1,246,320.01	272.26	Manufacture of electronic valves and tubes and other electronic components

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369	1,170,016.95	1,182,568.82	1.07	Manufacturing n.e.c.
291	217,488.20	1,141,276.15	424.75	Manufacture of general purpose machinery
173	519,375.50	1,094,855.33	110.80	Manufacture of knitted and crocheted fabrics and articles
343	105,046.99	963,881.45	817.57	Manufacture of parts and accessories for motor vehicles and their engines
154	256,877.38	944,509.94	267.69	Manufacture of other food products
252	282,712.95	939,794.26	232.42	Manufacture of plastics products
292	156,902.74	860,176.50	448.22	Manufacture of special purpose machinery
341	58,780.07	847,554.08	1341.91	Manufacture of motor vehicles
243	349,463.07	809,970.79	131.78	Manufacture of man-made fibres
311	266,297.89	779,792.89	192.83	Manufacture of electric motors, generators and transformers
319	170,859.34	641,058.05	275.20	Manufacture of other electrical equipment n.e.c.
289	327,987.03	633,621.23	93.18	Manufacture of other fabricated metal products; metal working service activities
314	255,097.22	568,202.22	122.74	Manufacture of accumulators, primary cells and primary batteries
351	150,900.28	555,873.94	268.37	Building and repairing of ships and boats
269	229,528.85	538,503.14	134.61	Manufacture of non-metallic mineral
312	90,205.51	514,579.88	470.45	Manufacture of electricity distribution and control apparatus
172	356,820.52	502,059.12	40.70	Garments and carpets
201	274,059.67	489,054.89	78.45	Sawmilling and planing of wood
322	202,527.59	417,781.10	106.28	Communication equipment
261	202,046.50	387,785.86	91.93	Manufacture of glass and glass products
359	198,381.71	369,081.75	86.05	Other transport equipments
313	138,001.63	366,281.22	165.42	Electrical cables and telephone
331	44,813.51	346,895.77	674.09	Manufacture of medical appliances and instruments and appliances for measuring, checking, testing, n.e.c
281	120,206.10	327,628.36	172.56	Manufacture of structural metal products, tanks, reservoirs and steam generators
160	128,883.17	325,001.82	152.17	Manufacture of tobacco products
293	64,668.48	258,154.05	299.20	Manufacture of domestic appliances
191	157,707.04	243,490.50	54.39	Leather and goods made from leather
315	52,653.96	178,242.70	238.52	Manufacture of electric lamps and lighting equipment
332	195,360.75	177,774.71	-9.00	Manufacture of optical instruments
353	26,026.91	145,225.11	457.98	Manufacture of aircraft and spacecraft
222	97,089.48	131,816.33	35.77	Printing and service activities related to printing
153	51,908.82	100,810.75	94.21	Manufacture of grain mill products, starches, and animal feeds
152	15,922.77	95,362.96	498.91	Manufacture of dairy products
155	16,365.18	56,931.70	247.88	Manufacture of beverages
221	16,280.96	55,973.49	243.80	Publishing
342	37,947.70	34,150.67	-10.01	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers

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333	39,208.05	6,469.59	-83.50	Manufacture of watches and clocks
182	557.46	1,481.81	165.81	Dressing and dyeing of fur; manufacture of articles of fur
231	146.91	593.01	303.65	Manufacture of coke oven products

Source: UNComtrade