

## PROOF OF DEINDUSTRIALIZATION ON MANUFACTURING SECTOR IN CENTRAL JAVA PROVINCE

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### Abstract

In Indonesia, beside of the dangerous potencies of deindustrialization phenomenon, industrial sector policies were not in proper placed if it were compared to fiscal and monetary sectors. The manufacturing sector is placed to be complement side of the two sectors. Whereas in reality world, the real sector has contribute obviously more to public wealth. Related to the dangerous of deindustrialization and anticipated policy to alleviate it, the deep research to explore manufacturing deindustrialization is needful. The data will be organized to be panel data, which it includes to 35 regencies and cities in Central Java Province and covers to 2001 to 2011 time periods. This research will use some analytical tools to analysis, include to structural change and manufacturing economic base. From the analyses, this research identifies that deindustrialization process occur in Central Java Province. But it is just on several regions only. Other regions tend to keep in industrialization process. The fastest deindustrialization process can be detected in Regencies of Pekalongan, Batang, Sukoharjo, and also Semarang City, and Surakarta City. Although manufacturing sector being economic base, but the trends in theses region come to downward. Beside, the negative growth of manufacturing share in these regions area is following. Regencies of Tegal, Karanganyar, Semarang, Kendal, Kudus, and Pekalongan City are different. These regions are economic base in manufacturing that shows upward trend and the manufacturing share is growth positively. In these regions deindustrialization process tend to be undetected.

**Keywords:** Deindustrialization, Michaeli Index, Symmetric Location Quotient

### 1. Introduction

Economic geography theory has been emphasizing the important aspect of spatial location and focused on the relationship between transportation cost, agglomeration, and regional disparities (Puga, 2001). In addition to those, aspects of centripetal that shape the agglomeration and centrifugal that push to de-agglomeration process has been an important discussion on economic geography view (LaLiberte, 2009)

The importance of spatial location brings also to the condition of structural change impact in demographic activities. Any places where viewed as a place that contributed higher benefit are more likely inhabitable. Amos (1987) made a note that in United States any regions where the population occupied concentrated on city will generate higher income than other regions. The cities or metropolitan will rise financial or intermediatery service that it will reduce cost of capital and inter-trade (Kim, 2008).

The demographic mobility will have relationship with economic structural change. Modern sector that dominated by manufacturing and service sectors that take place on metropolitan area will grow more and rapidly than primary sector which ii dominate in farming sector location. The change of economical structure that it was signed initially by demographic mobility is being the proof on validity of the Chenery growth and Lewis dualism model (Blomqvist, 1990). It is in line with Helsel *et al.* (2006) who has stressed that manufacturing is economic key sector that determine

rate of economic growth. The opinion supports Kaldor Law that declares manufacturing sector will relate to higher life standard if it is developed well (Helsel *et al.* 2006: 83-98).

Some researches refer also the proof of the structural change phenomenon. Broadberry (2003) summarize that at the early of modernization era, the key outlook from development type in west European was the movement from farming sector to urban location that well-marked by high rate of urbanization intensity. Cook and Uchida (2006) research to garment industry in developed country and conclude that the labor workers had migrated to from lagged areas to advanced regions. UNCTAD (2006) had reported also the tendency of structural change in developed countries since the early of 1980's.

Many developing countries has showed the similar trend. Alvarez-Cuadrado (2009), on the case of 82 countries, showed that the advanced technological progress in manufacturing sector had been an attractive power to labor forces (labor push effect), while in developed country especially the technological progress in farming sector had pulled the movement of labor forced from farming sector to manufacturing sector. Wang (2002) on the case of China showed that structural change from primary sector to secondary sector has occurred from nineteen century or the early of twentieth century. Cour (2005) also showed that the tendency of structural change could be identified by the high mass migration or rural society to urban location in West Africa from 1930 to 1990.

On the perspective, the different result had been showed by Chatterjee (1995) that summarized structural change phenomenon in Indonesia. It is also by Frenkema (2007) that proved during Soeharto regime, inter or intra sector income have different rate especially the last of 1970 to early 1990. The structural change, the movement from primary sector to manufacturing and services sector, show the importance of the economic sectors in modern economics. The importance had taken to push every region try to endeavor on having industrial attraction.

From introduction observation, Central Java Province tends to have some signs of deindustrialization process. It was looked from the slowdown of manufacturing share to local economics. The trend of manufacturing share also decreases from 2006 to 2009. The growth of manufacturing sector had decreased from 4.64% on 2001 to 3,74 on 2009. The growth of manufacturing sector has been even lower also than totally economic sector since 2005. Table 1 shows the trend of economic share of manufacturing sector and its growth.

**Tabel 1. Share and Growth of manufacturing Sector and Economic Growth in Central Java Province (2001 – 2009)**

Year	Manufacturing Share (%)	Manufacturing Growth (%)	Economic Growth (%)
2001	25.44	4.64	4.12
2002	25.46	4.17	4.12
2003	25.62	4.56	3.90
2004	25.74	4.94	4.43
2005	25.72	4.32	4.42
2006	25.52	3.50	4.28
2007	25.53	4.86	4.85
2008	25.32	3.97	4.80
2009	25.09	3.74	4.72

Source: Indonesian Center of Statistic Agency, 2003 – 2011, data processed

## 2. Problems And Research Questions

By advanced economic consideration, deindustrialization phenomenon has negative effect seriously to economic performance. The presence of deindustrialization process will impede the positive effect of manufacturing development. The positive role of manufacturing was described by Szirmai (2009) that; manufacturing development had positive correlation to the increasing of per capita income in many developing countries; the sector had special offering on capital accumulation while it was not for farming sector; the change of economic scale of manufacturing were higher rate than farming even services selectors; and the sector had inter-sector linkage and spillover effect. From this phase, researchers try to find out the proof of industrialization and deindustrialization phenomenon in Central Java Province. Therefore, this research will examine how the phenomenon of deindustrialization in every regency in Central Java Province. The detection will use structural change primary. Economic base analyses will be added to know the mapping of manufacturing potency in the regions. Generally, to know how the importance of an economic sector uses Location Quotient Index (LQ). It was used before by Hanink, *et al.* (2008) who identified the specialized economic sectors in China, and Suharto (2002) who determined economic specialization between regions in Indonesia. LQ index is used also by Hollar (2003), Harpel (2006), Mack and Jacobson (1996), de Dominicis (2007), and Isaksen (1996). Even LQ method has widely used to detect the importance role of economic sectors, the method was flubbing methodologically. The generic LQ was characterized by non-symmetric measurement. By this research, the method will update to characterize symmetrically.

## 3. Theoretical Background

Deindustrialization is effect of *Dutch Disease*. The terminology is related to the the deindustrialization characteristic that manufacturing sector (import substituting industries) tend to lower to its role and the otherwise servicing sectors (*non-traded goods industries*) tend to grow up (Yokohama, 1989). The Dutch Disease process is dangerous to economics performance which it was cause manufacturing sector being uncompetitive in international trade. Early, it was related to the invention of new natural resource which that push the movement of other resources, especially labor current, to the newest economic sector. It was happen initially in Dutch that was caused by the invention of natural gas in the North Sea (Berzins, 2010).

Williamson (2008) also noted that the deindustrialization in capitalism era had been found globally from 1870 to 1913. The process was signed by the increasing of specialization on primary product. It was happen generally to poor countries.

In the post modern era, the rapidity of deindustrialization process are met on many under developing countries, in particularly to the countries which it has high rate of debt to international funding institution, like World Bank or IMF. The institutions tend to bound the countries to product and process raw material to export market. The argumentation underlying is industrial countries have comparative advantage on manufacturing machinery and finance sufficiency, so the under developing countries were suggested to focus on mineral and other primary commodities. It has the impact to country vulnerability that are the decreasing of resources price, the increasing of price of final product, and push to higher of unbalance of economic capability among countries. There are impacting to deindustrialization on the lagged countries, increasing of the debt, informalization worker, and increasing unemployment rate (Mapuva, 2010).

Generally, industrialization process was started by labor absorption economic sector which it has lower productivity, like farming sector, to higher level, it sis manufacturing sector. The

process was continuous that make share of manufacturing sector will be stagnant, and turn to downward. In the current time, share of service sectors would increase. The stage is called deindustrialization. Deindustrialization process would happen also by the movement of resources of production factors from manufacturing to economic sector that currently booming (Baky-Haskuee, 2011).

Deindustrialization would decrease employment rate relatively and furthermore was followed by the decreasing of economic output. Rowthorn dan Wells (1987), focused to OECD countries, has drawn the kinds of deindustrialization process; positive, negative, and ambiguous deindustrialization. First, positive deindustrialization will happen if the growth of labor productivity in manufacturing sector will be higher than other economic sectors. It pushes the downward of relative labor absorption in manufacturing sector. It is not the reflection of unemployment; because it will impact encouragement of unproductive sector will absorb the labor from manufacturing. This condition is suggested be a positive effect in consequences of industrial dynamic, a sign of development process. In this type, manufacturing output is still in competitive condition in global market, per capita income increase, and total unemployment reduces.

Second, negative deindustrialization is related to the decreasing of economic performance in every step of development. On the case, other sectors will not able to absorb any workers that were thrown away from manufacturing sector. Unemployment increases and the level of income will decrease. Nevertheless, when economic recession was passed through away and the level of production increase, negative deindustrialization will stop. It indicates that negative industrialization would be in temporary timing, which depends to economic cycle. Third, ambiguous deindustrialization is related to international trade structure that rise from the reasons; net export of manufacturing output share move to other economic sectors and it will push the movement of labor and other resources. In this case, total employment effect is ambiguous that is depended to specific trend in international trade (Rowthorn dan Wells, 1987). Specifically, liberalization of trade can be cause of deindustrialization process. Shafaeddin (2006) had founded that liberalization in international trade in developing countries will push to deindustrialization, specialization to primary product, and push the country to lagged nation.

Kassem (2010) has drawn the type of deindustrialization phenomenon. When deindustrialization happened, per capita income employment rate, and manufacturing output would decrease. He mentioned that the type of the deindustrialization was premature deindustrialization. UNIDO (2004) noted that the kind of deindustrialization had hampered economic structurally, that it has suffered in Africa; Botswana, Mozambique, and Mauritius. In the countries, the downward of per capita income has happened when the economic condition was not in mature (*point of maturity*). This type of deindustrialization is seriously dangerous to society welfare.

From other perspective, Rowthorn and Coutts (2004) had explained why deindustrialization pushes the downward of labor market in manufacturing sector.

1. *Specialization*. Some specific activities like design, supplier of food and transportation that it was managed by manufacturing firms move to be managed by specialist supplier.
2. *Consumption*. If society income increases in poor countries, income proportion to food consumption will decrease and consumption to manufacturing product will increase (Engel's Law). The next stage, for post industrial society, the type of society income will shift from manufacturing to servicing product (Bell's Law). It reflect to the downward relative price of manufacturing output.

3. *Productivity*. The rate of labor productivity growth is identically by economic growth minus to growth of employment. If output from two economic sectors increase in equal periods, the economic sector which it has higher productivity will have lower growth of employment rate. Share of the most dynamic economic sector will decline.

4. *International trade*. This factor will influence manufacturing employment in many ways. The productivity increasing will be stimulated by competition and it will push domestic firm to operate efficiently. The competition with imported product will increase higher productivity also if the manufacturing sector able to reduce firm that produces output with lower value added and inefficiently.

Ueno (2010) separates deindustrialization process to two kinds; direct and indirect deindustrialization. On direct deindustrialization, labor force will shift from manufacturing sector to energy sector. The impact is the change of relative price of any goods that increase the appreciation of real price. On indirect deindustrialization, the process will be impact to spending indirectly, where the increasing of real income will increase demand of servicing output.

To detect the existing of industrialization and deindustrialization process can be observed also by economic structural change. It refers to the change of economic concentration that impact to distributional income change, where income transfers among sectors (Cook and Uchida, 2006). Specifically, it is the change of share of economic sectors or labor along the time. Critical aspect 5 on determining structural change is the change of economic activity in an area over a particular period (Memedovic dan Iapadre, 2010). In modern economic, the positive structural change can refer identically of movement economic concentration from primary sectors (farming and mining) to secondary sector (manufacturing and services). Industrialization will be detected if the movement occurs from primary sector to manufacturing. Otherwise, deindustrialization will be detected from the declining proportion of manufacturing sector.

#### **4. Research Methodology**

Industrialization or deindustrialization process of a region can be detect from its structural change. It is also relate to the trend tendency of its manufacturing economic base. By Location Quotient, manufacturing sector of a region could be identified to be base or prime economic sector. If economic base of a region tends to increase along the time, it means the role of manufacturing become more important to all of regional economy. On analyzing data, this research uses panel data, for 2000 to 2009 periods of time series and include to 35 regions in Central Java Province.

##### **4.1. Structural Change Index**

The main criterion of economic structural change is declining of share of farming sector and otherwise increasing on manufacturing and servicing sectors. It is indicated from when per capita income increase, the contribution of farming sector to Regional Domestic Product decrease. In this research, the model of structural change refers to Szanyi (2006). The structural change between  $t$  and  $s$  years as distance between the two point measured by a given metrics  $d$ . The points may represent branches shares in total manufacturing or GDP. It is suggest two types of measures, the Euclidean metrics:

$$d_E(x^t, x^s) = \sqrt{\sum_i (x_i^t - x_i^s)^2} \dots\dots\dots (1)$$

and for the regional bloc metric determined by:

$$d_M(x^t, x^s) = \sum_i |x_i^t - x_i^s| \dots\dots\dots (2)$$

This later measure is sometimes altered as follows:

$$M(t, s) = 100 \times d_M(x^t, x^s)$$

The value of  $M(t, s)$  is called to Michaeli index (Wziatek-Kubiak, 2002). Beside it useful to relative structural change an economic sector, it is used for determining the speed of structural change along  $t$  time periods (Aiginger, 2001).

This research will adopt the method, it is Michaeli Index, to detect the tendency of existence of structural change from primary sector (farming and mining sectors) and tertiary sector (servicing) to secondary sector (manufacturing). The index can reflect change of role of an economic sector in Central Java Province. It is useful to know about industrialization process in research area.

#### 4.2. Dynamic Symmetric Location Quotient

On Kuncoro (2004) opinion, determination of economic base is one of important stage on regional development planning. It can be shown by index that counted from Location Quotient Index (LQ). The value of LQ reflects to the relative measurement of economic base or non-economic base of an economic sector to a region. If the variant of LQ in economic base criteria is large, it is indicate the specialization of an economic sector to the region. Value of LQ determines also to a region as locally destination, export, or import, and it depends to the value; same to, more or less than 1 (Mack and Jacobson, 1996).

*Location Quotients Index* in this research will use to identify if a region superior on manufacturing sector or not. The trend of series of LQ will detect of what the superiority tends to increasing, stable, or decreasing. Trend of declining LQ shows the manufacturing sector slowdown its potency to actuate whole of regional economy and it can be classified in deindustrialization process.



The formula to count LQ follows Wagner, 2000:

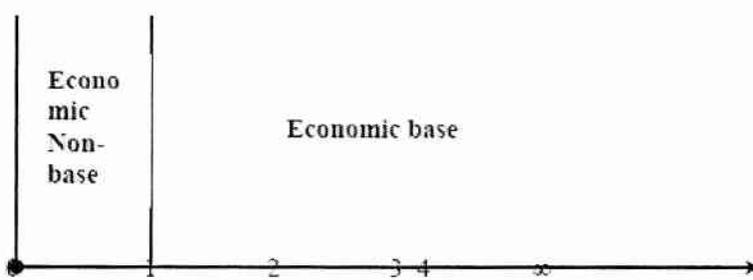
$$LQ = \frac{e_{si}/e_i}{e_s/e} \quad (3)$$

where:

- $e_{s,i}$  = product value of economic  $s$  in a region
- $e_i$  = total Regional Domestic Product the region
- $e_s$  = product value of economic  $s$  in reference area (Central java Province)
- $e$  = total Regional Domestic Product in reference area (Central java Province)

If the economic sector has an LQ value more than 1, it is indicate that the sector is being leading sector, economic base value, otherwise to the LQ value less than 1.

Generally, even LQ analyses widely used to detect economic base, the indices value contains problem which is appeared from the value is not in symmetric. It can be shown from the range of the value, null to unlimited positive value (Picture 1). To solve this problem, this research try to make Symmetric LQ which it is counted from the basic LQ and convert to the limit value between -1 to 1.



Picture 1. Range of Static LQ to Base and Non-Base Economic

It is founded in international trade study that to detect any potencies of a product or an economic sector will use *Revealed Comparative Advantage Index* or (RCA). It shows specialization value of the product or economic sector. Dalum, *et al* (1998) formulates the RCA as follows:

$$RCA_{ip}^j = \frac{X_{ip} / X_p}{X_{ij} / X_j} \quad (4)$$

RCA Index for  $p$  product in  $i$  country or region is defined by share of total expor  $p$  product from  $i$  country divided by share of total of other product export ( $j$ ) in  $i$  country.

In the same manner as LQ, the RCA is characterized by its symmetrical value. To solve this problems, Widodo (2008) develop the measurement to produce symmetric RCA, it is called *Revealed Symmetric Comparative Advantage* (RSCA):

$$RSCA_{ip} = (RCA_{ip} - 1) / (RCA_{ip} + 1) \dots\dots\dots (5)$$

The value will produce any value in distance of  $\{-1 \leq RSCA_{ip} \leq 1\}$ . If  $RSCA_{ip}$  is more than 0, it shows that an  $i$  region have comparative advantage on  $p$  product or economic sector. Otherwise, if value of  $RSCA_{ip}$  less than 0 the product of the region will have comparative disadvantage (Widodo, 2009). The value plot of RSCA will tend to spread between the range of  $-1 \leq SRCA \leq 1$ . It is different to regular RCA that tend to collect on the range of  $0 \leq RCA \leq 1$ , and to the range of  $1 \leq RCA \leq \infty$  the value will spread.

To detect the stability of the specialization trend from comparative advantage with the RSCA value, simple regression method can be applied. Dalum, *et al* (1998) uses this formula:

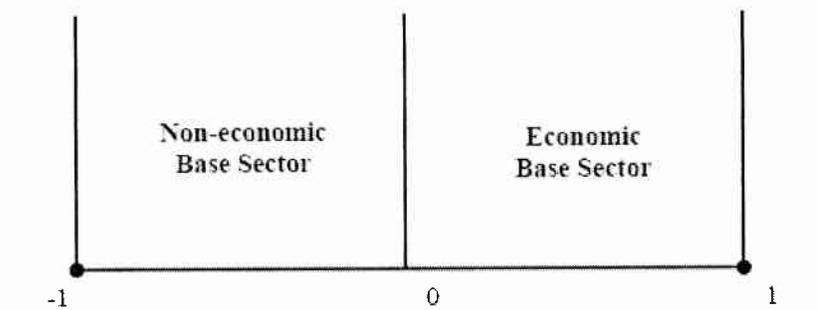
$$RSCA_{ij}^{t2} = \alpha_i + \beta_i RSCA_{ij}^{t1} + \varepsilon_{ij} \dots\dots\dots (6)$$

The value of  $t_2$  and  $t_1$  shows initial time and the last time. Depended variable of RSCA for  $i$  economic sector in  $t_2$  year is examined by its independent variable for  $t_1$  time.  $\alpha$  and  $\beta$  show the coefficients of linier regression, and  $\varepsilon$  is residual factor.

Because the formula of LQ and RCA is identical basically, LQ can be extended with the RSCA model. So, standard LQ can be reformulated to be Symmetric LQ (Sym LQ) as follows:

$$SymLQ = (LQ_{si} - 1) / (LQ_{si} + 1) \dots\dots\dots (7)$$

where,  $s$  is an economic sector in region  $i$ . At this formula, the same distance of base and non-base economic can be acquired.



Picture 2. Range of Symmetric LQ for Base and Non-Base Economic

It is so to detect stability of SymLQ to tend increasing or decreasing. RSCA simple regression can be applied to SymLQ:

$$SymLQ_{si}^{t2} = \alpha_i + \beta_i SymLQ_{si}^{t1} + \varepsilon_{si} \dots\dots\dots (8)$$

To detect the dynamic form, this research needs to examine the Dynamic Symmetric Location Quotient (DLQ). Researcher use a measurement to find out the manufacturing potencies tends to growing up or declining by simple trend method;

$$Y_{ij} = a + bT + e \dots\dots\dots (9)$$

where:

$Y_{ij}$  = Static Symmetric Location Quotient value in manufacturing sector at  $t$  year in a particular regency

$T$  = time periods of observation

From the measurement, the  $b$  coefficient will have positive (+) or negative (-). Positive quantified indicates that the manufacture base on the region is increasing, while negative value can be summarized that the role of the sector tends to decrease.

## 5. Empirical Result

At recently years, Indonesian economy has threatened seriously by deindustrialization process. The manufacturing sector for all this time that has not been placed in proper portion can boost the deindustrialization process. The policy has placed monetary and fiscal side dominantly than industrial sector. Policy of industrial sector has been always considered to be complement of monetary and fiscal policy. In reality, this real sector gives more contribution to majority of societies. The industrial role can be seen from the large benefit that accumulated to economic welfare.

Government policy that applied to industrial sector is classified to macro policy and to specific policy. The macro policy emphasize to that manufacturing sector has spread linkage to other economic sector or even to intra sub sector. For specific policy, it is signed by development of manufacturing sector in specific region.

Like any other countries, the policy of industrialization in Indonesia was started from 8 imported substitution industry policy. This stage purposed to create home country production for any consumption goods which it is imported before. Strategy of the policy coincided with high level protection to (*infant industry*). The next stage was opening the protection by several deregulation act. It was hoped that industrialization process would generate manufacturing export product. The domestic product will face to globalization era and free market (Hamsar, 2010).

Since 1970's, industrialization process in Indonesia went on rapidly that followed by significant economic growth and dramatically structural transformation. The process was not only on output or employment, but also coinciding with industrial transition to capital intensive and skill labor intensive schemas, higher productivity and labor wage, and also spreading industrial base to the beyond Java Island (Hill, 1990).

From its industrial process, manufacturing sector has been convinced to have locomotion and boosted economic development, and also pushed non-oil and natural gas export. Since 1970, the manufacturing development had substituted the role of farming sector which the contribution to economic has slowed down. It can be detected at 2008 that manufacturing contributed to National Domestic Product more than 28%, while farming sector contributed 14% only.

The manufacturing sector has developed coincide with the higher level of investment (domestic and foreign). The dramatic growth was repressed by monetary crises at 1998. The weakening of industrialization process would be started by the decreasing of the demand in domestic market and export demand. It is worried that deindustrialization has emerged because the vulnerability of manufacturing sector by global effect. It is appropriate as Craft (1996) who had warned degeneration of manufacturing sector caused by deindustrialization will happen systematically on the long run. The declining will be followed also by servicing sector (Pike, Dawley and Tomaney, 2010).

Indonesian industry was estimated on deindustrialization process before attained to maturity stage. Ruky (2009) stressed that the type of Indonesian deindustrialization was negative deindustrialization. The decreasing of Indonesian economic growth coincided with the increasing of unemployment rata. Ruky (2009) detected that the deindustrialization in Indonesia was characterized by

1. The shifting of labor absorption structure. The job demand moved from manufacturing sector to farming sector, and the human resources moved from formal to informal sector. The absorption on labor in industrial sector was counted in low level if compared by other economic sectors, particularly from 1980 to 2007.

2. The trend of economic growth did not have special feature. The top of growth level was at 2004, it was 6.38%, but on the next years become less.

3. Since 2005, the manufacturing value added decreased.

4. The composition of non-oil and gas export on the 2003 to 2007 periods showed declining. Processing of industrial output to export oriented became shrinking.

Kuncoro (2009) noted also the indication of deindustrialization process in Indonesia. It was detected by lowering of manufacturing growth since economic crises 1988. On the period of 1987 to 1996, manufacturing has grown up to 12%. Since reformation era at 1998, the growth was 5.7% per years only for 2000 to 2008 periods.

### **5.1. Structural Change**

To knowing the deindustrialization phenomena in Central Java Province, first identification is to know how the growth disparities among region in the Province. In the province, Region with the highest of manufacturing value is Kudus Regency. It contributes to total value of province manufacturing 19.91%. Semarang Regency is the next with contribution to 14.38%. Other regions with the manufacturing value more than average value are Jepara, Kendal, Semarang, Sukoharjo, Karanganyar, Cilacap Regency, and Surakarta City.

In the province, manufacturing growth tends to up and down for 2000 – 2009 periods. Annual growth the economic sector is average 4.28%. The growth is different for each region. For dispersion measurement, this table give an information that manufacturing performance in each 9 region in Central Java tends to fluctuate. It is also detected from the growth variation. The table shows an initial identification the unbalanced of the growth of manufacturing development for each region.

**Table 2. Variation and Standard Deviation of Manufacturing Growth Regions in Central Java Province**

Year	Manufacturing Regional Domestic Product		Manufacturing Growth	
	Variation	Standard Deviation	Variation	Standard Deviation
2001	1.3449	1.1597	0.00062	0.02493
2002	1.3567	1.1648	0.00032	0.01788
2003	1.3584	1.1655	0.00048	0.02199
2004	1.3753	1.1727	0.00082	0.02866
2005	1.3720	1.1713	0.00050	0.02244
2006	1.3580	1.1653	0.00066	0.02574
2007	1.3487	1.1613	0.00050	0.02226
2008	1.3454	1.1599	0.00021	0.01443
2009	1.3526	1.1630	0.00030	0.01731

Source: Indonesian Center of Statistic Agency, 2003 – 2011, data processed

**Table 3. Growth of Manufacturing Share (Average to 2001 – 2009)**

No	Regions	Growth	No	Regions	Growth
1	Wonogiri	2.63%	19	Pemalang	-0.13%
2	Brebes	2.60%	20	Tegal City	-0.24%
3	Tegal	2.09%	21	Banjarnegara	-0.31%
4	Pati	1.62%	22	Wonosobo	-0.39%
5	Purworejo	1.28%	23	Batang	-0.48%
6	Blora	1.09%	24	Jepara	-0.49%
7	Sragen	0.89%	25	Sukoharjo	-0.51%
8	Karanganyar	0.67%	26	Grobogan	-0.70%
9	Purbalingga	0.59%	27	Pekalongan	-0.87%
10	Rembang	0.56%	28	Kota Magelang	-0.91%
11	Demak	0.46%	29	Klaten	-0.93%
12	Semarang	0.44%	30	Salatiga City	-1.06%
13	Pekalongan City	0.39%	31	Semarang City	-1.18%
14	Kendal	0.25%	32	Banyumas	-1.20%
15	Kudus	0.12%	33	Cilacap	-1.30%
16	Temanggung	0.05%	34	Surakarta City	-1.58%
17	Kebumen	0.04%	35	Boyolali	-1.97%
18	Magelang	0.03%			

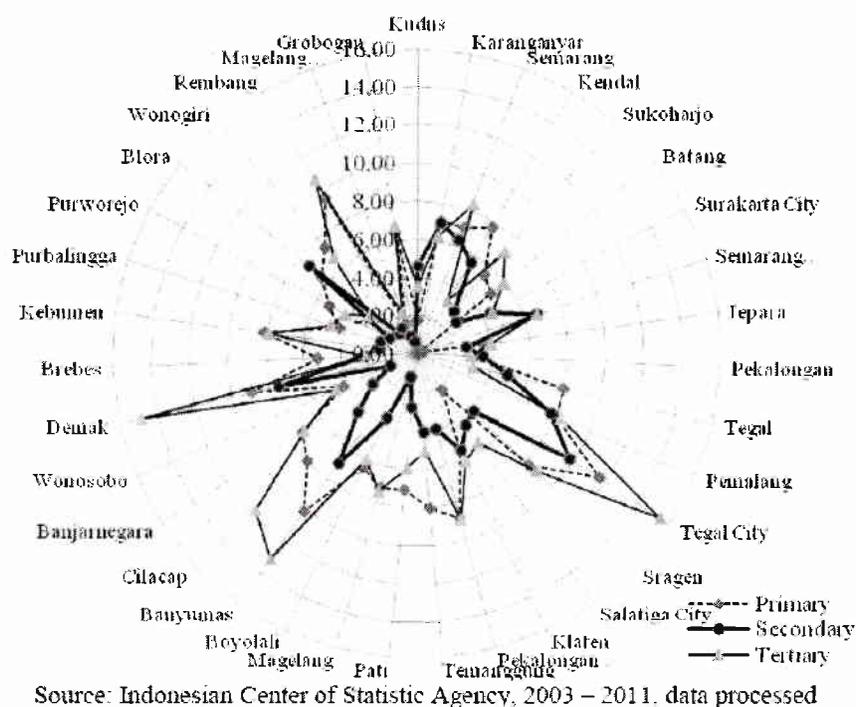
Source: Indonesian Center of Statistic Agency, 2003 – 2011, data processed

On the manufacturing developing process, the growth of manufacturing share to its local economic for each region has variation. It is counted that from 15 regions with its manufacturing share is more than Central Java manufacturing share level, 9 region show negative growth. Table 3 shows the share of manufacturing progress. The table is showing also that some regions with higher share of manufacturing tends to decrease its growth of share. Some regions with the manufacturing has little portion for its economic also tend to decrease. Banjarnegara, Wonosobo,

Grobogan, and Banyumas are the example of regions with concentration to primary sector which its manufacturing growth of share show decline. Compared to table 1 that indicates that since 2005 the manufacturing growth tends to decline, deindustrialization process shows intense. The share of 10 manufacturing sector tend to decrease, coincide with the slowly of manufacturing growth. Table 3 shows that the regions number 19 to 35 can be identified had been in deindustrialization process.

Next identification shows that the structural change occurs in many regions in Central Java Province. It can be shown by the positive value ( $>0$ ) of Michaeli Index. The quantity reflects speed of structural change also. Higher index at a region shows that the region is more intense for its structural change, to its manufacture sector, than other regions.

The counted index shows that the speed of structural change for every region is different. Average index for its manufacturing sector is 4.05. From the Picture 1, the lowest is Grobogan (0.66) and the highest is Tegal City (9.75). The value of 0.66 in Grobogan indicates that it is almost no structural change in manufacturing sector at the region. Grobogan Regency is knows as a region with lagged area on manufacturing. This economic sector tends to stagnant at Grobogan. Otherwise, the value of Michaeli Index in Tegal City is 9.75 that show that the region is the most dynamic in economic structural change. However, this dynamically tends to negative for manufacturing sector. Combined to table 3, it can be declared that deindustrialization is in faster process. As the city type, economic sectors in the regency shift to servicing sector.



**Picture 3. Michaeli Index to Each Region In Central Java Province**

## 5.2. Trend of Economic Base

Star to the weakness of ordinary measurement of LQ, this research develops a Symmetric Location Quotient (SymLQ). The value shows that  $\text{SymLQ} > 0$  indicates that manufacturing sector is economic base sector in a region. Otherwise,  $\text{SymLQ} < 0$  shows its indicate manufacturing is not being economic base sector. For stability testing of the model, it indicates that the SymLQ has passed the statistic testing. In the stability test, SymLQ for  $t$  period will be influenced by the previous value of SymLQ, with the error probability less than 1% (Table 4). 11

For long time periods investigation, table 4 shows that Sym LQ keeps on stable. The correlation value of SymLQ on  $t$  period with SymLQ on  $t-n$  period has positive value and the error probability is less than 1 for all correlation stage. For the linkage inter periods, longer time period of SymLQ will decrease the SymLQ correlation.

The counting of SymLQ shows that the value of SymLQ is positive to eleven regions in Central Java Province. It is indicated manufacturing sector is being economic base sector to the eleven regions. While other regions with negative SymLQ indicate its manufacturing is not economic base sector.

**Table 4. Correlation Value Among Value of SymLQ in All Periods**

	LQ <sub>t-1</sub>	LQ <sub>t-2</sub>	LQ <sub>t-3</sub>	LQ <sub>t-4</sub>	LQ <sub>t-5</sub>	LQ <sub>t-6</sub>	LQ <sub>t-7</sub>	LQ <sub>t-8</sub>	LQ <sub>t-9</sub>
LQ <sub>t</sub>	0,9997	0,9993	0,9985	0,9973	0,9960	0,9947	0,9929	0,9922	0,9909
LQ <sub>t-1</sub>		0,9998	0,9994	0,9984	0,9973	0,9962	0,9944	0,9936	0,9923
LQ <sub>t-2</sub>			0,9997	0,9990	0,9981	0,9970	0,9952	0,9945	0,9933
LQ <sub>t-3</sub>				0,9995	0,9989	0,9978	0,9961	0,9954	0,9941
LQ <sub>t-4</sub>					0,9996	0,9988	0,9974	0,9965	0,9951
LQ <sub>t-5</sub>						0,9997	0,9987	0,9980	0,9967
LQ <sub>t-6</sub>							0,9995	0,9989	0,9977
LQ <sub>t-7</sub>								0,9996	0,9984
LQ <sub>t-8</sub>									0,9992

Information: all correlation is in error probability less than 1%

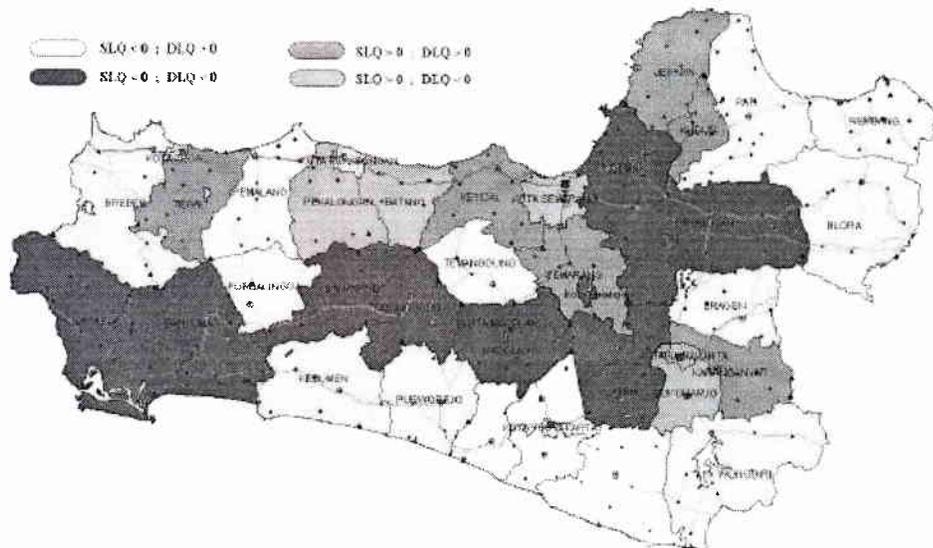
Source: Indonesian Center of Statistic Agency, 2003 – 2011, data processed

Accompanying dynamic factor to detect the tendency of manufacturing to be economic base sector, it is resulted Dynamic Symmetric Location Quotient value to detect the trend Sym LQ, moving upward or downward. In some regions which its manufacturing is being economic base, positive trend of Sym LQ shows that the role of manufacturing is increasing strength, and negative trend shows the region decreases its potencies of manufacturing sector. For some regions with negative SymLQ, the upward of SymLQ shows that the potency of manufacturing sector is increasing, and the downward shows the region go to lagged manufacturing area. Picture 2 shows the mapping of SymLS on manufacturing sector.

**Tabel 5. Value of Symetric Location Quotient (SymLQ) Each Region in Central Java Province (2000 – 2009)**

No	Region	SymLQ	No	Region	SymLQ
1	Kudus	0.4113	19	Pati	-0.1388
2	Karanganyar	0.3376	20	Magelang	-0.1435
3	Semarang	0.2909	21	Boyolali	-0.1921
4	Kendal	0.2175	22	Banyumas	-0.1995
5	Sukoharjo	0.0897	23	Cilacap	-0.2626
6	Batang	0.0609	24	Banjarnegara	-0.2756
7	Kota Surakarta	0.0534	25	Wonosobo	-0.3915
8	Kota Semarang	0.0507	26	Demak	-0.4072
9	Jepara	0.0460	27	Brebes	-0.4244
10	Pekalongan	0.0412	28	Kebumen	-0.4447
11	Tegal	0.0324	29	Purbalingga	-0.4470
12	Pemalang	-0.0490	30	Purworejo	-0.4614
13	Kota Tegal	-0.0699	31	Blora	-0.6126
14	Sragen	-0.0851	32	Wonogiri	-0.7096
15	Kota Salatiga	-0.0968	33	Rembang	-0.7300
16	Klaten	-0.1015	34	Kota Magelang	-0.7572
17	Kota Pekalongan	-0.1107	35	Grobogan	-0.7626
18	Temanggung	-0.1219			

Source: Indonesian Center of Statistic Agency, 2003 – 2011, data processed



Information: SLQ means Static Symmetric LQ, and DLQ means Dynamic Symmetric LQ  
 Source: Indonesian Center of Statistic Agency, 2003 – 2011, data processed

**Picture 4. Mapping of Regional Typology based on SymLQ Value**

Related to deindustrialization process that is detected from structural change analyses, this Location Quotient analyses shows how seriously of deindustrialization process in all regions. The massive deindustrialization can be detected in Regencies of Pekalongan, Batang, Sukoharjo, and also Semarang City, and Surakarta City. These five regions are regions with its manufacturing sector being economic base, but it tends to downward. It is coincide with the negative growth of manufacturing share in these regions area. It is different with Regencies of Tegal, Karanganyar, Semarang, Kendal, Kudus, and Pekalongan City. These regions are economic base in manufacturing that shows upward trend and the manufacturing share is growth positively.

## **6. Closing**

This research identifies that deindustrialization process occur in Central Java Province. But it is just on several regions only. Other regions tend to keep in industrialization process. From economic structural change, it is the movement of role of an economic sector to other, all regions in Central Java is detected to experience. This empirical works appropriate to other empirical works before that showed identically, they are (Chatterjee (1995), Wang (2002), Broadberry (2003); Cour (2005), UNCTAD (2006); Frenkema (2007), and Alvarez-Cuadrado (2009)).

In Central java province, the largest structural change is in Tegal City. This city is more attractive in servicing sector than manufacturing even farming sector. The growth of manufacturing share tends to downward that coincide with the rapid of servicing development. Otherwise, Grobogan Regency is identified to be a region where it is not attractive for manufacturing advanced and the sector also experience in deindustrialization process.

The fastest deindustrialization process can be detected in Regencies of Pekalongan, Batang, Sukoharjo, and also Semarang City, and Surakarta City. Although its manufacturing sector being economic base, but the trends in theses region come to downward. Beside, the negative growth of manufacturing share in these regions area is following. Regencies of Tegal, Karanganyar, Semarang, Kendal, Kudus, and Pekalongan City are different. These regions are economic base in manufacturing that shows upward trend and the manufacturing share is growth positively. It means in these last five regions deindustrialization process tend to be undetected.

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