STRUCTURAL TRANSFORMATION AND SPATIAL INEQUALITY BETWEEN NORTH AND SOUTH CORRIDORS OF CENTRAL JAVA AND YOGYAKARTA

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Abstract: This study is the preliminary research of spatial inequality in Central Java and Yogyakarta. Inequality within the same country occurred because of the differences in structural transformation at the same time in different regions. Java has two centers of growth, Jakarta and Surabaya. This two centers create an axis from west to east. This axis was started in 1808-1811 when the Dutch build the `Grote post weg´ connecting west Java (Anyer) to east Java (Panarukan) in the north coastal region of Java, later it was built until Banyuwangi. Among this two centers, Central Java plays as the `transit´ region.

This study analyzes structural transformation using Location Quotient, to identify the shift away from agriculture to non-agriculture over the time intervals 1990 until 2000, 10 years before the decentralization policy was implemented and 10 years after it. Williamson Index is used to show the inequality trend between north and south corridors of Central Java and Yogyakarta provinces.

This study shows that the transformation from agriculture to non-agriculture in north corridor implies a decline in the inequality trends. Many regions in south corridor are in primary sectors especially in agriculture and at the same time, the inequality goes up.

1. Introduction

1.1 Indonesian Issues

Thus far, Java has always been the most important island in Indonesia. It is the center of political, economic and cultural in Indonesia. Based on national census, the population shares 64 % (1970), 62% (1980), 60% (1995), 59% (2000), 58% (2010) of the national population (Statistics Indonesia, 2014b). From 1990-2010, Java has contributed 59,03 % of total Indonesia GDP[1] with DKI Jakarta (15,98%) as highest contribution and shared around 60 % of total employee in Indonesia with the highest absorption in East Java.

The major issues of economic dispersion in Indonesia is always concerning about Java and outside Java. Java hosts more than 83% of medium and large manufacture industries in Indonesia (Statistics Indonesia, 2014a). The major non-oil industries are mostly concentrated in the capital of provinces due to the infrastructure accessibility. Those are Greater Jakarta (Jabotabek[2]), Bandung (west Java), Greater Surabaya (East Java) (Hill, 1990; Resosudarmo et al., 2002). This spatial concentration has induced the agglomeration in west part (greater Jakarta) and east part of Java (greater Surabaya) (Kuncoro, 2002). Both provinces has been recorded as the most dense population in Java (Statistics Indonesia, 2014b). Some of manufacturing are also found in Semarang and few regions in Central Java (Henderson, J. Vernon and Ari Kuncoro, 1996). The rapid economic growth of Java has always attracted people from outside Java to migrate and overcrowd Java.

[1] GDP (Gross Domestic Product) refers to national and province level.
[2] Jabotabek is abbreviation from Jakarta, Bogor, Tangerang, and Bekasi. (Jakarta and the adjacent regencies as the hinterland). Nowadays Depok Regency has been included in Greater Jakarta known as Jabodetabek.

1.2 Central Java Issues

Jakarta, West Java and East Java provinces have been contributing approximately 65 % of total employment and 71 % of total production in Java. Those regions are an evident as a substantial industrial spill over. The differences in the employment share of manufacturing industries can mainly cause spatial disparities within regions (Kuncoro, 2002)

As main cities, Jakarta and Surabaya has created an axis from west to east Java in north coastal region. It is a bipolar pattern of urban growth. It can be said that this pattern has been found as the manifestation of De Grote Post Weg[3] (known also as PANTURA[4] road) built by Daendels in north Java. This road takes a significant part in distribution of goods and services from West to East Java (Nas and Pratiwo, 2002). From East Java, the goods later will be distributed to East Indonesia. By the goods and services distribution flows from west to east, Central Java is only a traversed region.

The area of this study consists of two provinces, Central Java and Yogyakarta Provinces[5]. The land slope in both provinces is identified as flat land in coastal region and mountainous region with many active volcanoes in interior region. Based on the natural characteristic as one of the influence factors in spatial development strategies, the spatial as the geographical unit in this study refers to the north, mid and south region[6]. North and South regions development are clearly explained as the priority in national and regional spatial plan development strategy especially in infrastructure development (Central Java Province, 2011; Coordinating Ministry for Economic Affairs, 2011). The regions that crossed by De Grote Post Weg and adjacent to Java Sea are known as the north regions. The south regions are the regions that adjacent to the Indian Ocean. Yogyakarta province lies in mid corridor and south corridor of Java.

In this study, the location quotient (LQ) analysis identifies the structural transformation. Then the transformation is compared to the Williamson Index as an inequality trend index. At the end, the inequality index will be equated to the inverted U-shaped curve from Kuznets.

2. Economic Dualism and Structural Transformation

2.1. Economic Dualism

The economic growth focuses on only three key sectors: agriculture, industry, and services (Kuznets, 1973). The economic dualism theory divides the economic sector into two sectors: the agriculture sector as the traditional sector and the industrial sector as representing of the modern sectors (Boeke, 1978). Economic development implies the agriculture s share of gross economic product decr industry s share increased. The structural transformation later will cause the shift of employment structure and of the education degree required of the occupation. Also, it will enlarge a new employment opportunity and increase the population in urban areas.

Most of the regions in Central Java and Yogyakarta are still on the first stage of development that refer to agriculture, mining and quarrying which are the primary sector. The secondary sectors are manufacturing industry; electricity, gas and water supply and construction. From 1990-2010, the contribution of the primary sectors to GDP and employment in Central Java and Yogyakarta provinces tend to decline. Figure 1 indicates that since early 1990s, the position of the primary sectors in Central Java and Yogyakarta have been gradually replaced by the secondary sectors as the main contribution of GDP. Though the growth and the transformation is not as aggressive as in Central Java, the secondary sector has been growing continuously in Yogyakarta.

[3] Grote Post Weg come from the Dutch language which means the great post road.
[4] PANTURA is abbreviation from Pantai Utara Jawa (the north coast of Java, Indonesian, red)
[5] Central Java Province consists of 29 regencies and 6 cities. Yogyakarta Province consists of 4 regencies and 1 cities.
[6] North, mid and south regions lie as the corridors.

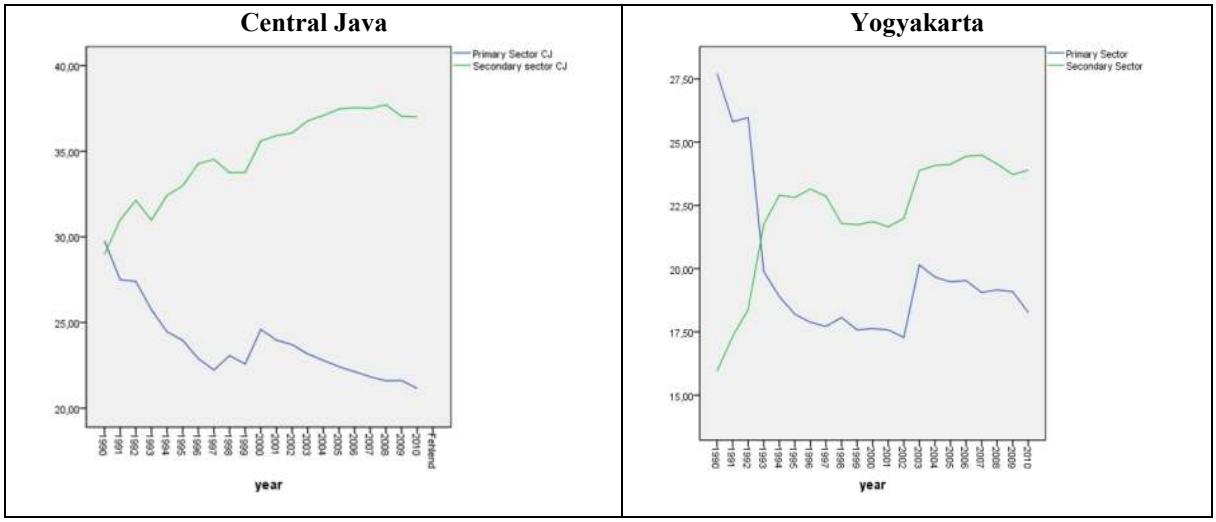


Figure 1. The Primary sectors and the secondary sectors in Central Java and Yogyakarta provinces from 1990-2010.

2.2. Structural Transformation and Regional Specialization

The structural transformation will be measured by the simple Location Question ( ) indicator. is used to rate the regional specialization in certain economic sector and in particular time[7]. This formula will identify the shift of the employment[8] structure in each region and corridor. The specialization index is defined as follows,

[1] or

Where is the employment in sector in given city/ regency is the employment in industry in the region; is the total employment in state *J* and is the total employment of region. The result from this formula if > , it means that the ratio of certain employment in particular industry in given state at year is bigger than the ratio of region in the same item comparison. The city/ regency is more concentrated in that certain sector compared to the region. And if < , it means that the ratio of the certain sector in GDP and employment in particular industry in given city/ regency at year smaller than the ratio of the reference region.

Figure 2 indicates that the agriculture is concentrated and specialized in south corridor. The trend line in fact fluctuated but it tends to decrease ($_{995}$ = 1,29; $_{2000}$ = 1,23; $_{2005}$ = 1,35; $_{20\ 0}$ = 1,29). The south corridor, precisely in Cilacap[9], has natural endowment especially in oil and gas. Thereby at early 1990 s, the manufacture industry (non-oil and oil industry) contribution[10] to GDRP corridor could surpass the manufacture industry contribution to GDRP in north corridor. But after 2005, it has slightly decreased due to the fluctuation world oil-gas price and productivity.

[7] Concept (Bendavid-Val, 1991; Isard, 1998) in general is a comparison of two levels relationships between certain region in selected variable and the reference variable in reference area in higher level (national level) during in particular time.

[8] The data is not included the informal sector

[9] The Refinery Unit (RU) IV Cilacap is the major Refinery Unit in Java. It supplies 34 percent of the national fuel or 60 percent of the fuel needs in Java. Currently Cilacap refinery capacity has reached 348 thousand barrels per day (BPSD). In 2015 the capacity processing will increases 17,8 % barrels per day. It is the largest among the five other oil refinery run by PERTAMINA as RU II Dumai, RU III Plaju, RU V Balikpapan, RU VI and RU VII Balongan, Sorong.

[10] GDRP (Gross Domestic Regional Product) refers to cities and regencies level

The non-oil gas industries have been progressed in north corridor. The industry in north corridor is the highest among other corridors. Although some regions in north corridor remain as agriculture but the agriculture is the lowest level among other corridors.

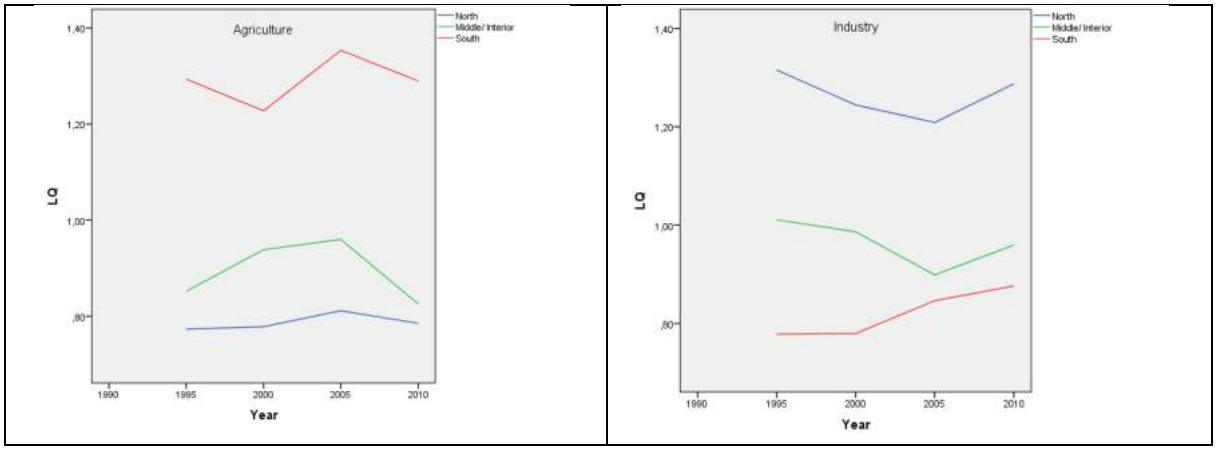


Figure 2. LQ Agriculture and non-oil Industry by employment[11] in north, mid and south corridors.

In 1995, the industry gap between mid and south corridors was relatively wide but later the south corridor ($_{995}$ = 0,78; $_{2000}$ = 0,78; $_{2005}$ = 0,85 and $_{20\ 0}$ = 0,88) could catch up the mid corridor ($_{995}$ = 1,01; $_{2000}$ = 0,97; $_{2005}$ = 0,90 and $_{20\ 0}$ = 0,96). These numbers are an evidence that the government policy to build up the manufacturing industry encourages the growth of manufacture in south corridor.

3. Patterns of Structural Transformation and Spatial Inequality

The major aspect of structural transformation will include the transformation from agriculture to non-agriculture and later from industry to service that also corresponding to labor occupation change (Kuznets, 1973). In early stage of development, the inequality will increase but later decrease, as the transformation of economic based occurred (Lewis, 1954; Kuznets, 1955). The inverted U-shaped curve from Kuznets shows that in the early stage of economic growth, all the regions were equal then become increasingly unequal but it will improve in the final stage of economic growth.

Spatial inequality refers to the level differences on some particularly variable (usually income) at the different spatial or geographical units (Lall and Chakravorty, 2005). It also describes that history, natural resources, human capital, local political economy, and cultural are the contributory factors of the spatial inequality within regions.

The inequality index will be measured by the Williamson Index. There are two ways to measure the Williamson Inequality Index (Hassan, 2004): a weighted coefficient of variation by region share of the population ( ) and unweighted coefficient of variation ( ) by region share of the population but weighted by number of regions. The Williamson Index is defines as follows:

$$= \{ \overline{[\quad (\quad ^2) / \ ]} \} /$$

$$= \{ \overline{[\quad (\quad ^2 /) \ ]} \} /$$

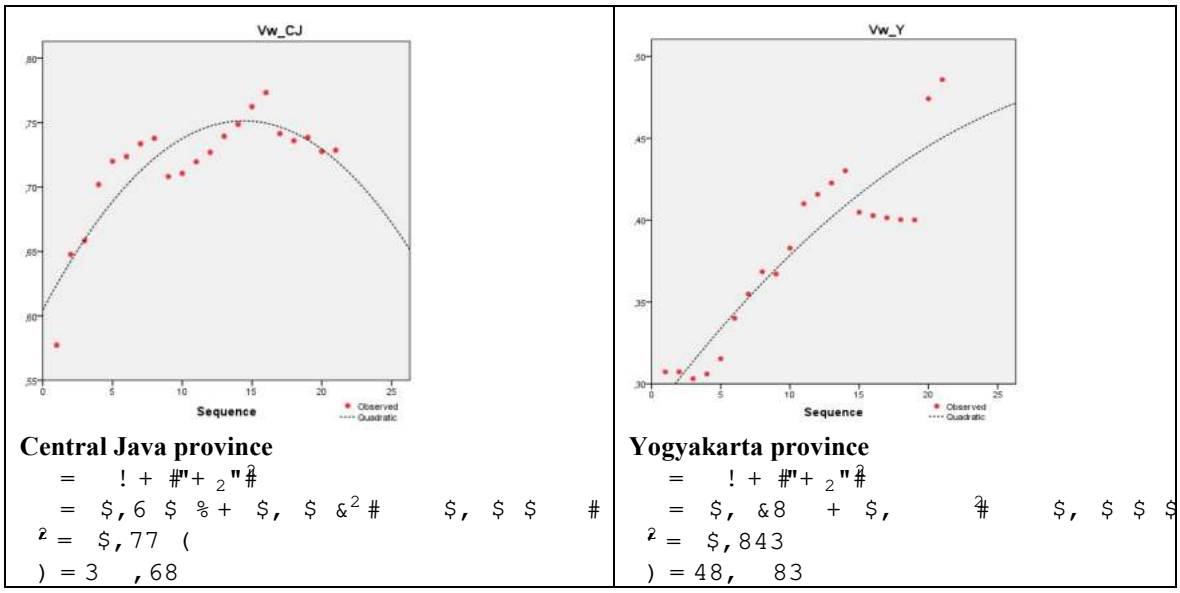
Where is weighted coefficient of variation and is unweighted coefficient of variation; is income per capita of region and is national per capita income is population in region and is

[11] The data for the employment structure is available since 1993 in all regencies and cities in Indonesia, but in 2000, the employment structure data in Yogyakarta provinces is not available.

national population; is number of region. In this study, will be used. Kuznets has explained that population has the significant role in economic growth. The high rate of growth of per capita product and of population is one of six characteristic of Modern Economic Growth. Therefore weighted coefficient by population share is more realistic. Based on the R square, the polynomial (quadratic) is a better model to assess the trend of the Williamson Index. The equation will be used:

$$= \; ! + \#" + {}_2"\#$$

Where is the year and # is the Williamson Index.



Central Java province

= ! + #" + 2"#

= $,6 $ % + $, $ &2 # $, $ $ #

2 = $,77 (

) = 3 ,68

Yogyakarta province

= ! + #" + 2"#

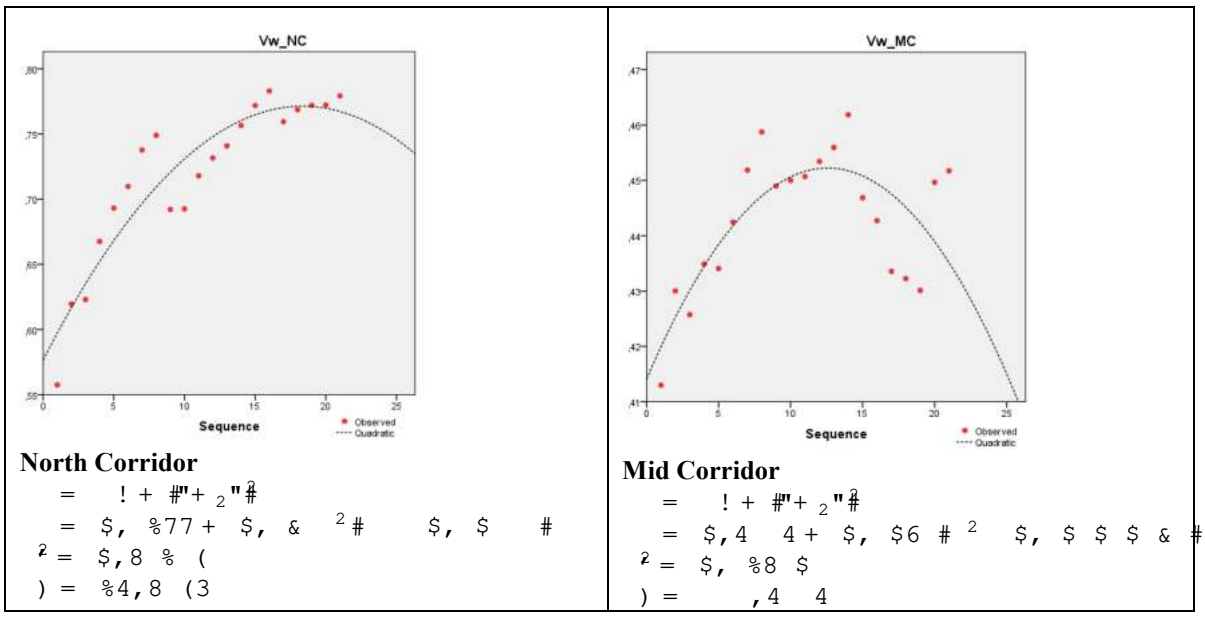
= $, &8 + $, 2# $, $ $ $ & #

2 = $,843

) = 48, 83

Figure 3. Williamson Index Estimate and Observed Curve for Central Java and Yogyakarta Provinces

Based on the inverted U-shaped curve, the inequality trend in Central Java has reached the critical point in 2005 later it tends to decrease. By contrast, Yogyakarta has not yet reached the critical point. It signifies that the inequality trends in Yogyakarta continue to increase (Figure 3). The highest index so far in Central Java 0,77 reached in 2005 and in Yogyakarta 0,49 reached in 2010.



North Corridor

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Mid Corridor

= ! + #" + 2"#

= $,4 4 + $, $6 # 2 $, $ $ $ & #

2 = $, %8 $

) = ,4 4

Figure 4. Williamson Index Estimate and Observed Curve for North and Mid Corridors.

Although the inequality trends in north and mid corridors fluctuated, figure 4 shows that both corridors have already experienced the inverted U-shaped curve and reached the critical point in 2005-2006. In south corridor (figure 5), the inequality index increases and it has not yet reached the critical point. So far, the highest inequality index ( ) in north corridor was 0,76 in 2006 and in south corridor was 0,85 in 2008.

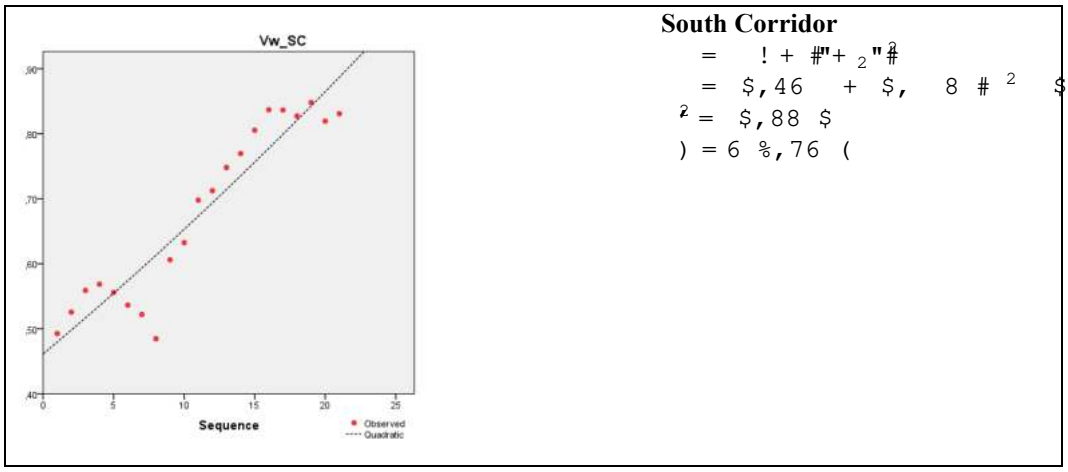

Figure 5. Williamson Index Estimate and Observed Curve for South Corridor.

The pattern of the structural transformation and the spatial inequality can be defined as an inverse relationship. The industry trend line in regional specialization (figure 2) has the opposite direction to the inequality trend line (figure 4). In north and mid corridors, the $_{2005}$ in industry significantly decreased that implied an increase of inequality trend. After 2005, the industry in both corridors have consistently increased and contrary, the inequality trends have gradually declined. In south corridor, the industry has been unspecialized (<1) and the inequality trend slightly goes up.

4. Conclusions

Structural transformation from agriculture to non-agriculture as the creation of the modern economy and of employment opportunity has led to the rapid growth of Central Java and Yogyakarta province. Although most of the regions in both provinces are agriculture but the contribution of agriculture to GDRP and employment tend to decrease. The secondary sectors have replaced the primary sectors as the contribution to GDP in Central Java and Yogyakarta provinces.

The spatial differences between north, mid and south corridors have carried the divergence of spatial development. The north and mid corridors, where cities and manufactures are located, have been generating higher economic growth than south corridors. The spread effect from the cities to the surrounding regencies were not as massive as the government expected especially during the centralized system before 2000. The economic dualism and the regional specialization between agriculture in south and manufacturing as the modern capitalist in north are consistently occurred. Consequently, the inequality between north and south corridors increases. The manufacture location has affected the spatial inequality

Kuznets curve shows that in early stage of development, the inequality will increase but later will decrease, as the growth and development occurred. Manufacture industry is applied as the engine of economic growth. The transformation from agriculture to manufacture industry has provoked a decline in spatial inequality.

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