

***The Using of Normalized Location Quotient (LQn) Method  
in Order to Determine the Leading Commodities  
in Regional Economic Activities***

**Sri Endang Kornita**

(Departement of Economics, Faculty of Economics,  
University of Riau, Pekanbaru, Indonesia)  
(email : [cei@unri.ac.id](mailto:cei@unri.ac.id) cp: 62811766366)

*This paper is interested to study the Location Quotients (LQ) such as an index to measure of overspecialization or underspecialization from certain sector in the regional economy. LQ is often used to determine the leading sector in regional economic activities as leading commodities, but LQ only used secondary data published. Other methods to measure the leading commodities in regional economic activities are Comparative Exponential Method (CEM) and Borda Method (BM). CEM is used to determine alternative decision priority by using some criterial, while Borda method is used to establish priority rank and also used to determine the leading commodities in regional economic activities. Both of CEM and Borda method use primary data from key reports.*

*Finally, this paper contributes to give a general idea about determining method for the leading commodities in regional economic activities by combining both methods above. The result of CEM and Borda Method combining to normalized Location Quotient (LQn). The valid analysis to determine of the leading commodities in regional economic activities by using two types of data, primary data is used by CEM and the secondary data is used by BM to the normalized Location Quotient (LQn) respectively.*

*Keywords : Normalized, LQ, CEM, Borda, The Leading Commodities.*

## **1. Introduction**

This paper proposed how to determinate the leading commodities in the regioal economic of any country. The idea which to find the determination of great commodities by combining the two methods of analysis (primary and secondary data analysis) which during the time commonly use by individually in determination of great commodity of regional economic activity. This methods based on several studies conducted in the determination of great commodities that was indicated the using of the comparative exponential method and Borda method by use the opinions

of key informants in the field. The results of calculations based on primary survey data at the existing condition is occasionally difference with the results of secondary data analysis from use the past data publications which calculated by the method of location quotient (LQ). As we have known, GDP data is one of our data that can be used in the analysis of LQ, from the GDP data we can see the direction of economic development which doing with macro.

It is according to related to past statements, so the hence usage of primary data analyze method based to existing conditions which we are mixing secondary data analysis based to the economic structure of the region as a publication series in the last part five years which depicting the direction of regional economic development policy expected that can yield the determination of great commodity which more scalable and well validation.

## **2. The Determining Methode for The Leading Commodities in Regional Economic Activities**

Additionally, the Comparative Exponential Method (CEM) is a method used to determine decision alternative priority sequence by using multiple criteria (Marimim, 2004). CEM formula is as follows:

$$TN_i = \sum_{j=1}^m (RK_{ij})^{TKK_j}$$

Where:

- TN<sub>i</sub> = Total Value Alternative to i
- RK<sub>ij</sub> = degree of the relative importance of criteria to the decision-j;  
TKK<sub>j</sub> > 0;
- n = Number of Decision Alternative
- m = Number of Criteria Alternative

meanwhile, the criteria which used for Comparative Exponential Method (CEM) shall be as follows :

1. The 4 score is for market reach
2. The 3 score is for amount of bussiness unit
3. The 2 score is for available of raw material
4. The 1 score is for the contribution to economic

Furthermore, the result of analysis by CEM continued by doing generalizing to all sectors of the commodity by using the Borda method. The Based on results of observation by the CEM then the selection of leading commodities used the Borda method. Borda method is a method used to specify sequence of rank (Marimin, 2004). Based on result of calculation with Borda method specified to exceed for each sector / sub sector of the economy in the region that we observe.

Hence, in the regional development analysis, macro-economic indicators related to economic indicators for identify the great sectors with economic annalysis of bases is often uses in development and regional study. The annalysis to economic bases sector in observation region used the secondary data with LQ (Location Quotient) annalysis method . In this application the LQ technique can be used to analysis the economic potential of the domestic income (Gross Domestic Product). LQ formula using the variable contribution of GDP (Bendavid-Val, 1992 in Kuncoro, 2004 and Alkadri in Ambardi, 2002) with the formulation as follows:

$$LQ = \frac{E_i^R / E^R}{E_i^N / E^N}$$

where:

$$\begin{aligned} E_i^R &= \text{amount of contribution of GDP on the sector } i \text{ in region } R \\ E^R &= \text{amount of contribution of GDP in the region } R \\ E_i^N &= \text{number of sector contribution to GDP in the reference } i \text{ } N \\ E^N &= \text{amount of contribution of GDP in the reference } N \end{aligned}$$

Values LQ calculation criteria are:

If  $LQ > 1$ , the region is relative specialization redudantly (overspecialised) on economic activity (sector) is concerned.

If  $LQ = 1$ , the region relative unspecialization or less specialization in economic activity in question.

If  $LQ < 1$ , the region relative less specialized in economic activity in question.

To be more precise on analysis of great commodity in the region economy combined analysis of primary data (CEM and Borda) with secondary data analysis (LQ) by conducting of normalization to the results of the analysis of LQ (LQn) which made as the sector weight for the great commodity in the annalysis of primary data (existing data). This result becomes more valid because consider the role of development in each economics sector based on time series analysis of LQ.

### **3. How to used LQn to Determine of The Leading Commodities**

#### **a. Stages for Determining The Leading Commodities**

##### **Primary data:**

- Stage to make Weight Criteria

At this stage the criteria make weight for CEM. The value of this weight applies equally to all administrative regions analyzed.

- Stage for Determining commodity value per district by using CEM

Based on the list of great commodity throughout the district at city or obtained from secondary data sources, the selection of commodity districts using the following criteria:

1. Number of units / households in each village and district sourced from secondary data / statistics.
2. Market, with a range of criteria commodity marketing / product (perception of a resource)
3. Availability of raw materials / production facilities (saprodi / saprotan) and or business facilities (perception of a resource)

#### 4. Contribution of commodities / products / types of business to the economy of districts areas (the perception of a resource)

In fact, the analysis to find a large number of commodities is based on using the Comparative Exponential Method (CEM). Assessment of each alternative set of commodity based on assessment / opinion of a resource obtained through the mechanism of meetings or Focus Group Discussion (FGD) or a visit to the township with the resource persons at district level (adjusted to the conditions districts in each region) of all sub-districts.

Based on the analysis of CEM set a maximum 5 (five) great commodities for each sector / sub sector of the economy at the district level.

- Stage for Determining Great commodity with the Borda method in the District / City

Based on the results of great commodity of all districts in the regency / municipality with CEM method, and then do the selection of great commodity in districts / cities with the Borda method. Borda method is a method used to determine the order of rank (Marimin, 2004). Based on calculations with the Borda method determined the maximum 10 (ten) great commodity for each sector / sub sector of the economy at the district / city.

#### **Secondary data:**

- Stage for Determining by Sector Base using LQ method (Location Quotient). LQ analysis performed on time series data (5 years) were available in the publication of GDP data at the observation area and reference areas. This data is then produce sectors into the economic base.

- Stage of LQ Normalization (LQn)

Based on the results of the LQ analysis of time series that have been obtaining then performed a normalization of LQ values have been obtaining per sector / sub sectors.

- The combine of calculated value between the value of CEM and Borda with LQn

At this stage the calculation of great commodity that have been obtaining rank by Borda based on analysis of CEM has been done before it value multiplied by the value LQn by each sector / subsector to the commodity obtained. LQn serves to validate the data great commodity based on analysis of primary data to better fit with the direction of regional economic development policy based on the LQ analysis by using GDP data.

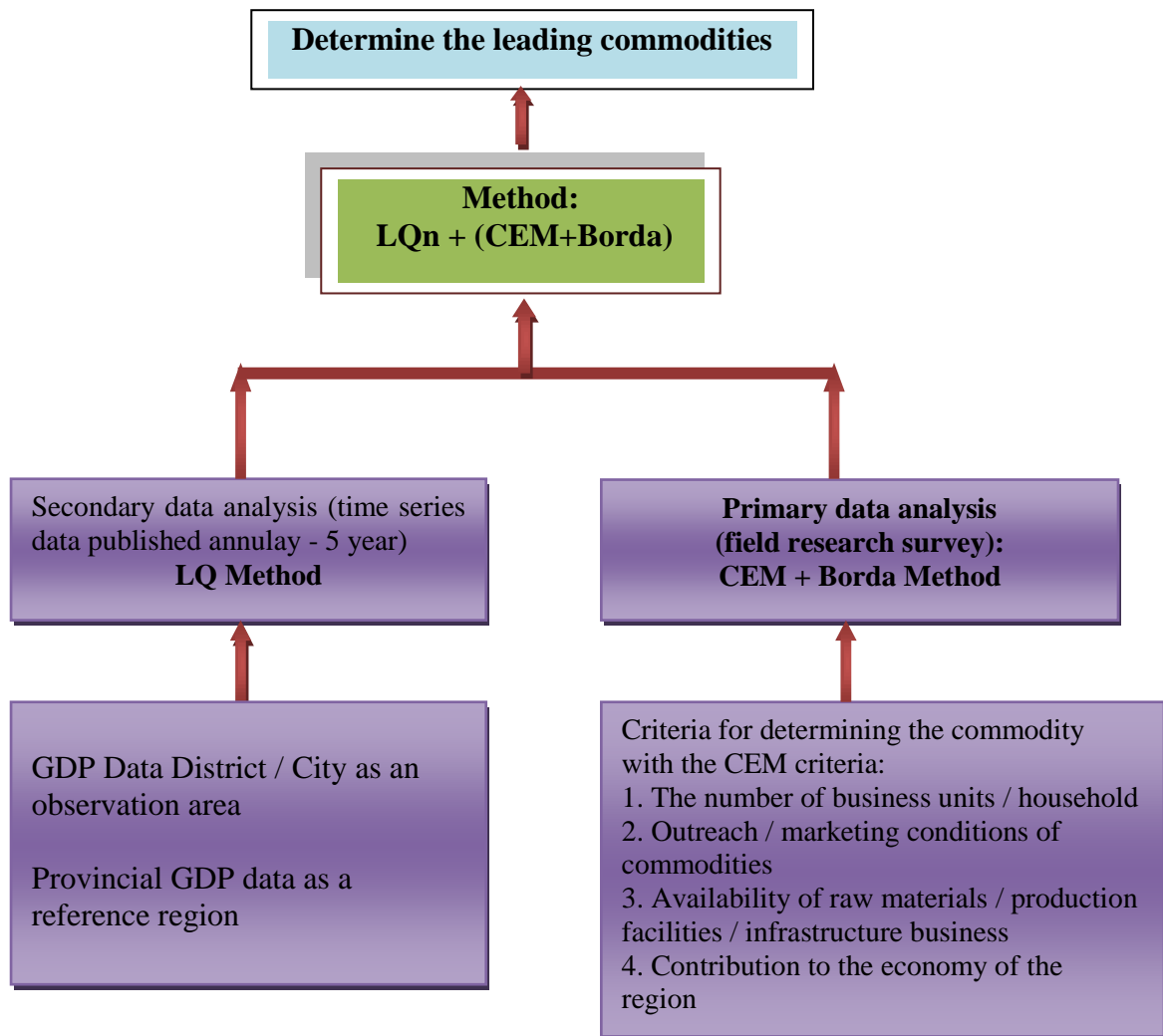


Figure 1: The Stages for determining great commodity

### Example by Analysis of The Great Commodity Determination at Siak

#### Regency, Riau Province

Economic bases analysis is good to knowing the potential of regions based on the structure of the economy by using analyzer Location Quotient (LQ). The potential of Siak Regency in 2004-2008 by using analysis of Location Quotient (LQ), showing the results of calculations that the potency economics of sub-province of Siak very big on Sector 3 (Industry), and so do in community life and economic structure in the Siak Regency is also the sector most responsible for the processing industry.

The percentage of contribution of each sector in the economic structure of Siak Regency per sector in 2008 based on the Constant Price, seen that the percentage of the biggest contribution sectors that is manufacturing industry sector, and sector contributor which have smallest average is the electricity sector, gas and clean water utilities, as seen in the following picture (please See Figure 2).

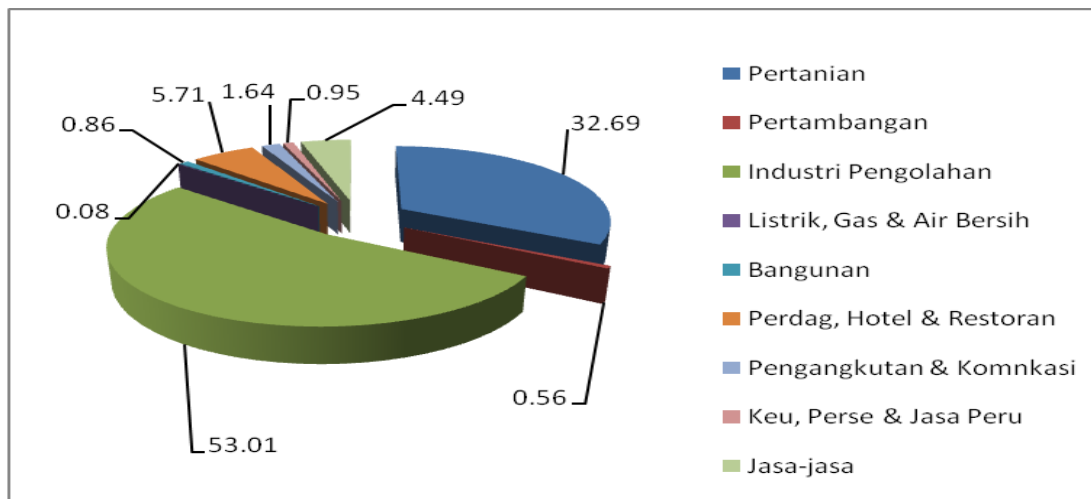


Figure 2: Percentage Contribution to GDP Persektor Siak Regency, at Year 2008 based on the Constant Price

Based on analysis of the sector to existing economic structure in GDP Siak district, then the uppermost sector its role dominantly based on the results of the analysis of LQ is the Industry Sector processing. The average contribution of the sector in the economic structure pursuant figures seen in the table below.



Table 1 : The Base and Non Base Sector in Economy Structure of Siak Regency by Contribution GRDP Per Sector, Year 2004-2008 based on the Constant Price.

Year	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8	Sector 9
<b>Economic Structure (%)</b>									
2004	33.73	0.56	52.63	0.09	0.77	5.38	1.55	0.90	4.38
2005	33.38	0.58	52.70	0.09	0.78	5.46	1.56	0.97	4.47
2006	33.41	0.57	52.52	0.09	0.80	5.55	1.60	0.97	4.48
2007	33.07	0.57	52.68	0.08	0.82	5.67	1.63	0.97	4.51
2008	32.69	0.56	53.01	0.08	0.86	5.71	1.64	0.95	4.49
Rata-rata	33.26	0.57	52.71	0.09	0.81	5.56	1.60	0.95	4.47
<b>Basis/ Non Basis</b>									
<b>LQ</b>	0.84	0.46	3.09	0.18	0.12	0.33	0.27	0.42	0.45

Source: BPS and Bappeda Siak Regency, several editions, processed.

Description:

Sector 1 = Agriculture, Livestock, Forestry & Fisheries

Sector 2 = Mining and Quarrying

Sector 3 = Processing Industry

Sector 4 = Electricity, Gas and Water Supply

Sector 5 = Building

Sector 6 = Commerce, Hotels and Restaurants

Sector 7 = Transport and Communications

Sector 8 = Finance, Leasing & Service Companies

Sector 9 = Services

Evaluated from the economic activity in Siak district, indeed the existence of the processing industry in this area become activator of other economic activity. The largest exporting commodity of Siak Regency that is constantly increasing from year to year are commodity of paper commodity group and paper products, next paper materials, and commodity of plywood.

Knowing the great potential in Siak Regency is very important to economic development and improving people's welfare. Stipulating of great effort type and commodity conducted with stipulating great effort type and commodity of district storey level. The result of stipulating great effort type and commodity at district storey level conducted with Comparison Exponential Method (CEM).

The results of great effort type and commodity determined by the criteria which have been specified previously, and determination was based on objective criteria and also importance weigh each the interests of the goals to be achieved in the economic development community was performed using the Comparative Exponential Method (CEM) by 4 (four) criteria and the importance weight is such as those which expressed previously.

Furthermore, based on great commodity in each sector in each district was aggregation processed to determine determination of great commodity per sector / sub sector of Siak Regency. Aggregation process is conducted by using Borda method of great commodity per sector / sub sector by rank. Throught Borda method specified by great commodity persector/sub sector the rank of Siak district which having highest score value.

Based on the results of CEM analysis that have in aggregation with the Borda method, the effort type and commodity can be to developed per district in Siak Regency ranked by conducting enumeraton the value of Borda with LQ values that have normalized (LQn). The results are as follows:

Table 2 : The Potential Commodity for Community Economic Development in Siak Regency

The commodities sectors	Borda Value	Value of : LQn*Borda
Ayam potong/ Poultry	1336663	182,950.40
Sawit/ Palm	52400	7,172.04
Cabe/Chili	49780	6,813.44
Sapi/ Cow	44830	6,135.93
CPO/derivative/ CPO dan turunannya	11295	5,664.00
Penangkapan Ikan/Udang Perairan Umum	24862	3,402.89
Padi Sawah / Padi	20220	2,767.53
Semangka/ Water melon	19265	2,636.82
Karet/ Rubber	18160	2,485.58
Ikan tambak/ Pond's Fish	17078	2,337.48
Pembiayaan konsumen/ Leasing	32740	2,228.02
Padi Ladang	15859	2,170.64
Tahu/Tempe	4317	2,164.80
Kedai harian/Mini Market	40095	2,140.97

Jagung/Corn	15027	2,056.76
Tenun Siak	3724	1,867.44
Nenas/Pineapple	13041	1,784.93
Alas Kaki	3550	1,780.18
Dodol Durian	3522	1,766.14
Tas Dari Kepal	3330	1,669.86
Klinik Kesehatan	22694	1,644.83
Batu Bata	3230	1,619.72
Durian	11599	1,587.57
Bengkel Sepeda Motor	21780	1,578.58
Bank/BPR	22662	1,542.19
Anyaman Pandan	2634	1,320.85
Ojek	26647	1,181.90
Kacang Panjang	8346	1,142.33
Kop/Usaha Simpan Pinjam	16436	1,118.50
Ubi kayu/Cassava	7925	1,084.70
Kambing/Goat	7910	1,082.65
Lembaga Pembiayaan	14178	964.84
Ayam Ras Petelur	6958	952.35
PLTD/Non PLN	26733	765.34
Angkutan Barang	16932	751.00
Rmh Makan/Restoran	9797	523.13
Pdg Pakaian/Tekstil/Sepatu	6211	331.65
Bengkel Mobil	4550	329.78
Ruko/Perkantoran	15848	312.40
Pdg Bahan Bangunan	5550	296.36
Istana Siak	3900	282.67
Pelatihan Gajah	3900	282.67
Usaha Air Bersih	9063	259.46
Entertainment/ alat pesta	3152	214.50
Air Isi Ulang	6927	198.31
Jasa Salon/Pangkas	1878	136.11
Pemanfaatan Gambut	1700	127.58
Bus AKDP	2868	127.21
Rent Alat Berat/Eskavator	1826	124.26
Danau Koto Gasib	1700	123.21
Benteng Belanda	1700	123.21
Rent Transportasi	1691	115.08
Travel/Sub Urban	2477	109.86
Galian C	1420	106.57
Jasa Penjahit	1448	104.95

Kursus B Inggris/Bimbel/Komputer	1424	103.21
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Therefore, the Siak Regency has high potential commodity that very potential to be developed and competent to be given by investment in different commodities and type of great effort examples poultry, oil palm, chili, cow and CPO/derivatives. Consumption of poultry are very high at Siak and potential to be developed and will give very big impact on the economy region.

Hence, the combination of factors such as land, labor and facilities to making palm oil request a great effort, at the same time, this specific commodity can have great prospects to development in the closed future. The requirement of seed raw material of palm oil to various requirement of industry which progressively mount to represent added value which is proper to reckoned to remain to be developed

On the other hand, we still with higher dependency on chilli which we still imported from other provinces to fullfill the requirement in province/district, the conditions making Siak develop chilli cultivation to fullfill their own needs. This matter is evidenced by the emergence of chili as a commodity of Siak after poultry and palm.

Moreover, the society priciples concerning about animal production such as Cows to support the income of many families. Because the production of Cow can be quickly sold and consumed made the cow as a commodity which enough draw attention society to be developed. The focus of investment can be channeled into this commodity.

Usage of cosmetics, soaps and others that every time increasing also, automatically will improve requirement of CPO / derivative representing raw material for downstream industries such products. Siak Regency take this opportunity to develop

the CPO / derivatives so that it becomes a commodity that increasingly developed in Siak. Need very potential invesment addition for the development of CPO/derivative.

Furthermore, if we seen the CEM analysis per sector of economy seen the results that have been in aggregation with the Borda method, the great commodity which can be developed per district in Siak Regency had ranked by conducting the value of Borda with LQ values that have normalized (LQn). The results are as follows:

Table 4 : The Potential Commodities for Economic Development by Sector / Subsector Agriculture

Agriculture commodity	Value of Borda	Value of LQn*Borda
Ayam Ras Potong/ Poultry	1336663	182,950.40
Sawit/ Palm	52400	7,172.04
Cabe/ Chili	49780	6,813.44
Sapi/ Cow	44830	6,135.93
Penangkapan Ikan/Udang Perairan Umum	24862	3,402.89
Padi Sawah/ rice	20220	2,767.53
Semangka/ watermelon	19265	2,636.82
Karet/ ruber	18160	2,485.58
Budidaya Kolam/ aquaculture ponds	17078	2,337.48
Padi Ladang/ rice field	15859	2,170.64
Jagung/ corn	15027	2,056.76
Nenas/ pineapple	13041	1,784.93
Durian	11599	1,587.57
Kacang Panjang/ green beans	8346	1,142.33
Ubi Kayu/ cassava	7925	1,084.70
Kambing/ goat	7910	1,082.65
Ayam Ras Petelur/ chicken	6958	952.35

The agricultural sector which can be commodity is a sequence of poultry, palm oil, chili, cow, fishing / shrimp waters, rice, watermelon, rubber, aquaculture ponds, rice fields, corn, pineapple, durian, green beans, sweet wood, goat and chicken. As wrote on the great commodity at Siak Regency mostly come from the agriculture sectors / subsectors . the High consumption in the agricultural commodity sector makes this sector produces potential commodities to investment in Siak Regency.

Table 5: The Potential Commodities for Economic Development by Sector / Subsector Industry

Commodity of manufacturing industry	Value of Borda	Value of LQn*Borda
CPO/Turunannya/ cpo n derivative	11295	5,664.00
Tahu/Tempe / tofu n tempe	4317	2,164.80
Tenun Siak	3724	1,867.44
Alas Kaki/ footwear	3550	1,780.18
Dodol Durian	3522	1,766.14
Tas Dari Kepal	3330	1,669.86
Batu Bata	3230	1,619.72
Anyaman Pandan	2634	1,320.85

The leading commodities is CPO / derivatives, tofu / tempe, tenun siak, footwear, dodol durian, a bag of lump, brick, screw pine matting . usage and exploiting of natural resources for the industry of processing in order to fullfilling requirement societyand permeate labour seen at this sector.

Table 6 : The Potential Commodities for Economic Development by Sector / Subsector Trade

The Trade commodity	Value of Borda	Value of LQn*Borda
Mini Market/Kedai Harian	40095	2.140,97
Rmh Makan/Restoran	9797	523,13
Pdg Pakaian/Tekstil/Sepatu	6211	331,65
Pdg Bahan Bangunan	5550	296,36

Society using mini market for trade processes of commerce give good impact and benefits and utilization of the diner / restaurant by food also needs for many communities. Traders clothing / textiles / shoes and traders of building materials is also have demand as a commodity in Siak.

Table 7 : The Potential Commodities for Economic Development by Sector / Subsector Tourism

The Commodity Sector of Tourism	Value of Borda	Value of LQn*Borda
Istana Siak	3900	282,67
Pelatihan Gajah	3900	282,67
Danau Koto Gasib	1700	123,21
Benteng Belanda	1700	123,21

Siak palace become the main attraction for domestic tourists to visit the Siak. The location of the training of elephants, Lake Koto Gasib and Dutch Fort are the interesting places to visit by many people from Siak or from other regions.

Table 8 : The Potential Commodities for Economic Development by Sector / Subsector Transport / Communication

The Commodity Sector of Transport/Communications	Value of Borda	Value of LQn*Borda
Ojek	26647	1.181,90
Angkutan Barang	16932	751,00
Bus AKDP	2868	127,21
Travel/Sub Urban	2477	109,86

For the transport sector / communications using motorcycles as transportation make motorcycles is dominant for transportation. It is also related to the condition of the area more quickly reached by two-wheeled transportation. By using AKDP bus and Travel/sub Urban for society of Siak Regency as transport from or/and to Siak which connect with other region is increase.

Table 9 : The Potential Commodities for Economic Development by Sector / Subsector Mining / Quarrying

The Commodity Sector of Mining Quarrying	Value of Borda	Value of LQn*Borda
Pemanfaatan Gambut	1700	127,58
Galian C	1420	106,57

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Utilization of peatlands for the economic activities of society and quarrying C in Siak Regency is a commodity that work in the economy on the mining and quarrying sector.

Table 10 : The Potential Commodities for Economic Development by Sector / Subsector Electricity / Water

The Commodity Sector of Electricity/ Water	Value of Borda	Value of LQn*Borda
PLTD/Non PLN	26733	765,34
Usaha Air Bersih	9063	259,46
Air Isi Ulang	6927	198,31

Electrics infrasturcture is an important need for the community. Till now, PLN not yet can be fullfill entire request of people who will need electricity. The usage of diesel electric / non-PLN to be very high in Siak. Commodity which respective with electrics become to exeed to accomplishment of requirement ofof electrics in this area. Requirement for clean drinking water and potable fast-food society makes the need for water refill and clean water more and more business. Commodity of business as of drinking water refill and clean water is very promising effort to developed.

Table 11 : The Potential Commodities for Economic Development by Sector / Subsector Building/ Construction

The commodity sector of building/contruction	Value of Borda	Value of LQn*Borda
Ruko/Perkantoran	15848	312,40

The regional development which rapidly increasing make founding of building a shop / office used for business premises and do the society economic activity has increased. This commodity become to exeed in build/construction sector in Siak Regency.



Table 12 : The Potential Commodities for Economic Development by Sector / Sub sector Finance

The commodity Sector of Finance	Value of Borda	Value of LQn*Borda
Pembiayaan Konsumen	32740	2.228,02
Bank/BPR	22662	1.542,19
Kop/Usaha Simpan Pinjam	16436	1.118,50
Lembaga Pembiayaan	14178	964,84
Alat Pesta/Entertainment	3152	214,50
Rent Alat Berat/Eskavator	1826	124,26
Rent Transportasi	1691	115,08

Requirement for financial institutions that aim to the requirement of the community whether it's to the credit needs of business development and consumption in the Siak increase along with increased public awareness to utilize this facility and the various facilities offered by the financing institution. Banking institutions of that goodness commercial banks and rural banks into the second alternative for the people of Siak Regency to get credit for business development and for consumption.

In addition to financing and banking institutions, there are cooperatives / savings and loans, equipment leasing party / entertainment, transportation rental, heavy equipment rental / excavator and consumer finance becomes a commodity and type of business champions Siak in the financial sector.

Table: The Potential Commodity for Economic Development by Sector / Subsector Services

The commodity of Services	Value of Borda	Vakue of LQn*Borda
Klinik Kesehatan	22694	1.644,83
Bengkel Sepeda Motor	21780	1.578,58
Kursus B Inggris/Bimbel/Komputer	1424	103,21
Jasa Salon/Pangkas	1878	136,11
Bengkel Mobil	4550	329,78
Jasa Penjahit	1448	104,95

The Utilization for health clinics, including the usage of hospital at Siak Regency by the population as supporter to support healthy and healthy system for the peoples. The number of motor vehicles, especially motorcycles from time to time in the Siak is rapidly increasing. This situation is exploited by the businessmen to open a motorcycle repair shop. Actually the type of bike repair shop business into other types of businesses that excel in the services sector. .

Attention and awareness to improve the standard of education in the community to make English language courses / tutoring / computer is in great demand. In addition to improve education and the special skills to the type of business courses can also increase the income of business actors. Service salon / barbershop, car repair shop and tailor services is also an excellent commodity and type of business in the services sector.

#### **4. Conclusion**

Determining method for the great commodities could be use of combine (collectively) methods in primary and secondary data analysis. Based on research to determine of great commodities in economic activity in regional economics has done by use the CEM method, Borda and LQn to produce the type of commodity in accordance with the potential of the region.

Each region has a different potential, then the determination of commodity for the region's economic activity needs to be done on an ongoing basis. Development of analytsis methods for determining the great commodity of a region should also be conducted continuously.

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