

# Agglomeration on Food and Beverage Industry : Case study in the Province of East Java

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# Agglomeration on Food and Beverage Industry : Case study in the Province of East Java

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## ABSTRACT

The aim of this research is to calculate and analyze the regions in East Java province that is superior in their food and beverage industries during the period of 2012-2015. The methods used in this research are Static Location Quotient (SLQ), Dynamic Location Quotient (DLO), and Shift Share. The result of this research shows that : (1) food and beverage industries nowadays are starting to become the basis sector in almost all regencies/ Cities in East Java province, (2) sub-sector of food and beverage is becoming the leading industries in Pacitan regency, Ponorogo regency, Tulungagung regency, Blitar Regency, Kediri regency, Malang regency, Jember regency, Bondowoso regency, Situbondo regency, Sidoarjo regency, Jombang regency, Nganjuk regency, Madiun regency, Magetan Regency, Ngawi Regency, Lamongan regency, Pamekasan regency, Sumenep regency, Blitar city, and Surabaya city, (3) Commodity industries of food and beverage have some competitive advantages in Ponorogo regency, Tulungagung regency, Jember regency, Banyuwangi regency, Bondowoso regency, Situbondo regency, Probolinggo regency, Pasuruan regency, Jombang regency, Bojonegoro regency, Tuban regency, Lamongan regency, Bangkalan regency, Sampang regency, Pamekasan regency, Sumenep regency, Blitar city, Surabaya city, and Batu city.

**Keywords:** Industry, Food, Beverage, Agglomeration, East Java.

## 1. INTRODUCTION

Industrialization is the changing process from agricultural economic structure toward industrial economic structure (Sodik, 2005). Manufacturing sector nowadays are becoming the main sector to promote the economic growth from the supply side, because this sector has a relatively fast capital investment's growth rate (Kumiati and Yanfitri, 2010). The average contribution percentage from the manufacturing sector in East Java Province for the period of 2010-2015 is 17.54%. The contribution from manufacturing sector is also the second-biggest one after West Java Province.

Meanwhile, the average contribution from the sub-sector of food and beverage are 8.08% from the total PDRB of 27.74% from the total process-manufacturing industry (BPS 2015). These data indicate that food and beverage industries are two examples of the vital industries in East Java province, and they still have a big potential for development, which is very suitable to be done in East Java (BPS, 2011)

Agglomeration economies or localized industries, according to Marshall begins when an industry chooses their first business location that enables them to run their business for a long time, so the surrounding societies can receive some benefits from the industry (Beenstock and Felsenstein, 2009). Glaeser, et. al. (1992) in Taringan (2005) also explained that an important element of dynamic externalities is knowledge spillover, where innovations and improvements that occur in a company can also increase the productivity of other companies in the same region. Knowledge spillover can be done by spreading ideas and information between companies that technologically similar to each other.

**Table 1.1.**  
**Differences between Theories of Dynamic Agglomeration Externalities**

Characteristic	Effect on Industrial and Urban Long Run Growth	
	MAR	Jacobs
Specialization	+	-
Diversity	-	+
Competition	-	+

Source : (Beger, 2001)

Furthermore, according to the base theory, the main factor that determined economic growth in a region is the demand for goods and services from outside the region. This theory views the extent of export activities as the determinant of the rate of economic growth.

In this case, because the food and beverage sector contributes a substantially large percentage in the process-manufacturing industry and the total PDRB of East Java Province, this sector is considered to be important in encouraging the acceleration of economic growth in East Java. Therefore, whether this sector is made to become the basis industry in the city/district area or not, as well as the analysis of agglomeration in each district/city in East Java province, is important in order to know what sector(s) should be determined to be the leading sector in the area.

## 2. RESEARCH METHODOLOGY

### 2.1 SLQ and DLQ Method

SLQ analysis is used to determine what sectors are being the basis or non-basis in an area. Here is the equation to calculate the value of SLQ according to Tarigan (2005:35):

$$SLQ_{ir}^t = \frac{Y_{ir}^t / Y_r^t}{Y_{in}^t / Y_n^t}$$

$SLQ_{ir}^t$  : industry's value of SLQ in year t

$Y_{ir}^t$  : PDRB from food and beverage industries in a city/region in East Java Province in year t

$Y_r^t$  : PDRB from process manufacturing industry in a city/region in East Java Province in year t

$Y_{in}^t$  : PDRB from food and beverage industries in East Java Province in year t

$Y_n^t$  : PDRB from process manufacturing industry in East Java Province in year t

With:

1. SLQ value > 1 for basis sector.
2. SLQ value < 1, for the non - basis sector.

Limitation of SLQ analysis is that the basis is static and is only used to estimate sectoral changes in a given year only (Santoso et al., 2012).

Dynamic Location Quotient (DLQ) analysis is used to overcome the limitations that come up when using SLQ analysis. Here is the equation to calculate the value of DLQ according to Kadariyah (1994):

$$DLQ = \left\{ \frac{(1 + g_{in}) / (1 + g_n)}{(1 + G_i) / (1 + G)} \right\}^t$$

$DLQ$  : Value of DLQ in East Java province in year t

$g_{in}$  : Average growth rate of food and beverage industries in a city/region in East Java Province in year t

$g_n$  : Average growth rate of process manufacturing industry in a city/region in East Java Province in year t

$G_i$  : Average growth rate of food and beverage industries in East Java Province in year t

$G$  : Average growth rate of process manufacturing industry in East Java Province in year t

$t$  : Year of observation

With:

1. DLQ value  $> 1$ , if the  $i$  industry has the potential to grow faster than the same industry in another area in East Java province
2. DLQ value  $< 1$ , if the  $i$  industry has the potential to grow slower than the same industry in another area in East Java province

**Table 2.1.**

**LQ Classifications (for SLQ and DLQ)**

LQ	SLQ $> 1$	SLQ $< 1$
LQ		
DLQ $> 1$	Leading industries	Key industries
DLQ $< 1$	Prospective industries	Underdeveloped industries

Source : Kuncoro (2000:70)

Table 2.1. can be described as follows:

1. If SLQ  $> 1$  and DLQ  $> 1$  it is the *leading* industries.
2. If SLQ  $> 1$  and DLQ  $< 1$ , it is *prospective* industries.
3. If SLQ  $< 1$  and DLQ  $> 1$ , it is *key* industries.
4. If SLQ  $< 1$  and DLQ  $< 1$ , it is *under-developed* industries.

## 2.2 Shift Share Method

Shift share analysis provides a more detailed explanation by describing the industry's growth factors in a particular area in relation to the national economy (Tarigan, 2005: 85). Shift Share Analysis also provides an understanding in the selection of leading industries/sectors in an area. This analysis is relevant to be used in a regional and sectoral analysis.

Here is the equation of *value component*:

$$C_{ij} = Y_{ij} \times (r_{ij} - r_{in})$$

$C_{ij}$  : Competitive value component

$Y_{ij}$  : PDRB from food and beverage industries in  $i$  city/region in East Java Province

$r_{ij}$  : Growth rate of food and beverage industries in  $i$  city/region in East Java Province

$r_{in}$  : Growth rate of food and beverage industries in East Java Province

According to Rupasingha and Patrick (2010) in Setiono (2011), if the competitive value component is positive, then that region can increase the employment rate in the industry. But if the competitive value component is negative, then that region can't increase the employment rate in the industry because it doesn't need a lot of labor force.

Irmawati (2016) also said that if the *competitive value* is positive, the commodity will also have competitive advantages. But if the *competitive value* is negative, the commodity won't also have eve advantages.

## 3. RESULT AND DISCUSSION

### 3.1 SLQ Calculation Result

**Table 3.1.**

**Basis and Non-Basis Sector Qualifications of Food and Beverage Sub-sector in the 38 Cities/Regions of East Java Province**

Name of the City/Region	SLQ				Average SLQ	Additional Information
	2012	2013	2014	2015		
Pacitan	1.27	1.29	1.30	1.30	1.27	Basis
Ponorogo	1.67	1.68	1.69	1.70	1.68	Basis
Trenggalek	1.52	1.51	1.51	1.51	1.52	Basis
Tulungagung	1.16	1.16	1.16	1.16	1.16	Basis
Blitar	1.42	1.39	1.39	1.39	1.40	Basis
Kediri	1.21	1.25	1.25	1.25	1.23	Basis
Malang	1.14	1.14	1.12	1.12	1.13	Basis

Lumajang	1.98	1.94	1.90	1.90	1.94	Basis
Jember	1.02	1.13	1.13	1.13	1.08	Basis
Banyuwangi	1.88	1.88	1.88	1.89	1.88	Basis
Bondowoso	1.35	1.39	1.43	1.42	1.37	Basis
Situbondo	2.49	2.52	2.54	2.51	2.50	Basis
Probolinggo	2.34	2.33	2.32	2.32	2.32	Basis
Pasuruan	1.32	1.33	1.28	1.27	1.31	Basis
Sidoarjo	1.25	1.26	1.28	1.27	1.27	Basis
Mojokerto	1.50	1.51	1.49	1.51	1.50	Basis
Jombang	1.18	1.19	1.21	1.21	1.18	Basis
Nganjuk	1.20	1.20	1.22	1.25	1.20	Basis
Madiun	1.87	1.89	1.92	1.89	1.87	Basis
Magetan	1.87	1.87	1.87	1.86	1.86	Basis
Ngawi	1.25	1.25	1.25	1.26	1.25	Basis
Bojonegoro	0.89	0.88	0.89	0.90	0.87	Non basis
Taban	0.22	0.22	0.23	0.24	0.22	Non basis
Lamongan	2.03	2.05	2.09	2.06	2.04	Basis
Gresik	0.67	0.65	0.65	0.68	0.66	Non basis
Bangkalan	0.85	0.86	0.87	0.85	0.85	Non basis
Sampang	0.86	0.86	0.91	0.89	0.87	Non basis
Pamekasan	1.26	1.28	1.27	1.25	1.26	Basis
Sumenep	1.80	1.82	1.87	1.85	1.82	Basis
Kediri	0.06	0.06	0.06	0.06	0.06	Non basis
Blitar	1.24	1.28	1.30	1.33	1.27	Basis
Malang	0.64	0.62	0.65	0.66	0.64	Non basis
Probolinggo	0.71	0.71	0.72	0.72	0.71	Non basis
Pasuruan	0.77	0.76	0.75	0.75	0.76	Non basis
Mojokerto	0.95	0.93	0.91	0.89	0.92	Non basis
Madiun	0.81	0.80	0.81	0.78	0.80	Non basis
Surabaya	1.23	1.22	1.21	1.22	1.22	Basis
Batu	2.53	2.54	2.55	2.48	2.52	Basis

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If the  $SLQ > 1$ , it means that sector is able to meet the economic needs of its region and is able to export its products beyond its economic boundaries. If the  $SLQ < 1$ , it means that the sector is only able to meet the needs of local economy alone. There is also a possibility for them to import when they are not able to meet their local needs.

### 3.2 DLQ Calculation Result

Table 3.2.  
Values of Dynamic Location Quotient (DLQ) of 38 Cities/Regions in East Java Province

Name of the City/Region	DLQ				Average DLQ
	2012	2013	2014	2015	
Pacitan	5.06	3.78	3.18	2.63	3.66
Ponorogo	1.54	0.94	1.25	0.90	1.16
Trenggalek	0.67	0.73	0.55	0.88	0.71
Tulungagung	4.05	2.69	0.01	5.08	2.95
Blitar	0.07	0.27	2.37	2.00	1.18
Kediri	0.25	2.48	3.82	1.24	1.95
Malang	1.76	0.35	1.16	0.79	1.01
Lumajang	1.25	0.96	1.17	0.36	0.93
Jember	2.31	1.44	1.71	0.24	1.42
Banyuwangi	0.89	0.88	0.72	1.29	0.95
Bondowoso	1.94	1.72	3.15	1.31	2.03
Situbondo	1.54	1.11	1.38	0.77	1.20

Probolinggo	1.34	1.07	0.59	0.74	0.93
Pasuruan	0.69	1.35	0.15	0.72	0.73
Sidoarjo	1.16	1.38	1.81	0.46	1.20
Mojokerto	0.64	0.48	0.46	1.32	0.72
Jombang	3.65	3.42	2.26	2.07	2.85
Nganjuk	2.78	1.67	1.45	1.77	1.92
Madiun	2.05	1.46	0.89	0.86	1.31
Magetan	1.16	0.93	0.94	1.01	1.01
Ngawi	2.26	0.87	2.04	2.07	1.81
Bojonegoro	1.50	0.50	0.42	0.73	0.79
Tuban	3.52	0.82	2.27	1.80	2.10
Lamongan	1.30	0.95	2.52	0.82	1.40
Gresik	0.28	0.23	1.53	2.44	1.12
Bangkalan	0.93	0.54	0.73	1.19	0.85
Sampang	0.43	0.59	0.66	0.96	0.66
Pamekasan	1.50	1.29	0.60	1.19	1.14
Sumenep	1.73	1.44	2.08	0.68	1.48
Kediri	3.47	2.31	1.77	1.50	2.26
Blitar	4.51	1.83	2.00	1.01	2.34
Malang	1.17	5.75	1.46	4.78	3.29
Probolinggo	1.85	0.36	1.34	1.01	1.14
Pasuruan	1.29	0.52	0.96	1.46	1.06
Mojokerto	0.55	0.69	1.11	1.58	0.98
Madiun	0.72	0.39	1.52	0.26	0.72
Surabaya	1.25	1.95	0.93	0.54	1.17
Batu	1.14	0.92	0.78	0.42	0.82

Based on Table

3.2., if the value

of  $DLQ > 1$ , it means the food and beverage industries in that area has a higher potential growth rate than other areas in East Java province. And if the value of  $DLQ < 1$ , it means that the food and beverage industries in that area has a lower potential growth rate than other areas in East Java Province.

**Table 3.3.**

**The Calculation Results on Competitive Value Component of the Food and Beverage Sub-Sector in 38 Cities/Regions of East Java Province**

Name of the City/Region	Cij				Average Cij	Result
	2012	2013	2014	2015		
Pacitan	-66.68	-188.64	-249.85	-461.76	-241.73	NO
Ponorogo	241.29	-70.48	128.76	-157.00	35.64	YES
Trenggalek	-441.58	-420.07	-707.69	-324.65	-473.50	NO
Tulungagung	2996.55	2125.51	-7765.41	6590.40	986.76	YES
Blitar	-4054.01	-3246.96	25.46	-450.64	-1931.54	NO
Kediri	-3818.58	1092.79	2629.65	-1454.61	-387.69	NO
Malang	5678.81	-8176.92	2169.16	-2334.71	-665.91	NO
Lumajang	913.13	72.33	850.61	-4681.40	-711.33	NO
Jember	4732.96	2823.52	3897.43	-7927.81	881.53	YES
Banyuwangi	-232.56	-298.61	-1240.20	2432.66	165.32	YES
Bondowoso	2828.00	929.79	621.89	-1319.84	764.96	YES
Situbondo	1657.19	1113.13	1726.96	333.31	1207.65	YES
Probolinggo	2086.92	1169.39	-1881.44	-1144.64	57.56	YES
Pasuruan	8739.58	35545.33	-32443.04	18006.12	7462.00	YES
Sidoarjo	-43086.90	-28088.71	24253.26	-34910.85	-20458.30	NO
Mojokerto	-3698.59	-9095.70	-9814.07	14734.20	-1968.54	NO
Jombang	1278.74	1298.99	11.39	-373.14	554.00	YES
Nganjuk	450.72	-115.80	-281.61	-73.31	-5.00	NO

Based on	Madiun	478.58	187.00	-316.84	-521.15	-43.10	NO
	Magetan	-370.061	-620.564	-615.411	-808.302	-603.584	NO
	Ngawi	83.73658	-446.448	33.64069	60.69077	-67.0949	NO
	Bojonegoro	1849.945	533.2654	500.6976	108.405	748.0783	YES
	Tuban	1294.538	-520.63	835.4219	743.8471	588.2942	YES
	Lamongan	1422.824	1057.909	3357.59	1229.376	1766.925	YES
	Gresik	-10405.4	-13660.1	-5203.62	25210.55	-1014.64	NO
	Bangkalan	202.4996	-42.2876	52.49277	-121.442	22.81575	YES
	Sampang	40.90886	-190.201	454.8354	-185.053	30.12241	YES
	Pamekasan	244.9159	226.7314	-71.2423	295.628	174.0082	YES
	Sumenep	693.8511	615.3487	1080.411	-225.325	541.0715	YES
	Kediri	393.07	-383.726	-892.858	-1766.93	-662.61	NO
	Blitar	322.3687	120.8952	148.5451	-33.0179	139.6978	YES
	Malang	-815.252	-3781.9	-3015.89	-6211.49	-3456.13	NO
	Probolinggo	110.1889	-430.153	-0.91525	-156.016	-119.224	NO
	Pasuruan	-206.256	-507.819	-328.169	-285.554	-331.949	NO
	Mojokerto	-202.285	-197.496	-116.296	-76.4999	-148.144	NO
	Madiun	-30.8689	-362.787	441.3646	-830.871	-195.791	NO
	Surabaya	31245.67	24188.94	23838.09	62.6292	19833.83	YES
	Batu	276.5545	199.3343	114.6496	-295.748	73.6975	YES
*YES : Has some <i>competitive advantages</i>				*NO : Has no <i>competitive advantages</i>			

Table3.3., if the value of Cij is positive, it means that area has some *competitive advantages*, and if the value of Cij is negative, it means that area has no *competitive advantages*

#### 4. CONCLUSIONS

1. Based on the SLQ calculations, sub-sector of food and beverage in the region of Bojonegoro, Tuban, Gresik, Bangkalan, and Sampang, and the city of Kediri, Malang, Probolinggo, Pasuruan, Mojokerto, and Madiun is a non-basis sector, while in other regions/cities, sub-sector of food and beverage becomes the basis sector. And based on the value of DLQ, the region of Trenggalek, Lumajang, Banyuwangi, Probolinggo, Pasuruan, Mojokerto, Bojonegoro, Bangkalan, Sampang, and the city of Mojokerto, Madiun, and Batu has a higher potential growth rate than other areas.

2. Based on the combination of SLQ and DLQ values, sub-sector of food and beverage is becoming the *leading industries* in the region of Pacitan, Ponorogo, Tulungagung, Blitar, Kediri, Malang, Jember, Bondowoso, Situbondo, Sidohigherrarjo, Jombang, Nganjuk, Madiun, Magetan, Ngawi, Lamongan, Pamekasan, and Sumenep, and in the city of Blitar and Surabaya. Sub-sector of food and beverage is becoming the *key industries* in the region of Tuban and Gresik, and in the city of Kediri, Malang, Probolinggo, and Pasuruan. Sub-sector of food and beverage is becoming the *prospective industries* in the region of Trenggalek, Lumajang, Banyuwangi, Probolinggo, Pasuruan, and Mojokerto, and in the city of Batu. Sub-sector of food and beverage is becoming the *underdeveloped industries* in the region of Bojonegoro, Bangkalan, and Sampang, and the city of Mojokerto and Madiun.

3. Based on the calculation on *competitive value components*, food and beverage industry commodity has some competitive advantages in the region of Ponorogo, Tulungagung, Jember, Banyuwangi, Bondowoso, Situbondo, Probolinggo, Pasuruan, Jombang, Bojonegoro, Tuban, Lamongan, Bangkalan, Sampang, Pamekasan, Sumenep, and Blitar, and in the city of Surabaya and Batu, while commodities in other districts do not have any competitive advantage. Therefore the industries need to be empowered in term of research and development.

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GRADEMARK REPORT

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FINAL GRADE

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GENERAL COMMENTS

**Instructor**

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