

Comparative and Competitive Advantages Analysis of Rubber as A Featured Product of West Sumatera to Support of Spatial Interaction

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Abstract. This study focusses on the spatial interaction of West Sumatera province with the centers of the Sumatra economic corridor. The research methodology is using the growth center approach with regional economic analysis method, Krugman model and Junichi Goto Model. Those models are used to find the connectivity with the centers of the Sumatra economic corridor and to build its vertical integration. The results of the study indicate that West Sumatera Province as a hinterland region of the centers of the Sumatra corridor have to support industrial economic activities that located in the center of the corridor for the economic transactions in the surrounding regions. West Sumatera Province plays an important role as a buffer zone for rubber production in Sumatra and national level. This role has not been impacted the rubber farmers welfare.

Keywords: Featured Product; Comparative and Competitive Advantages; Spatial Interaction

1 Introduction

The fluctuation international commodity price in world trade has increased interest and understanding spatial market integration of domestic market both international like rubber market [1], [2], [3], [4], [5], [6]. The center of Sumatra economic corridors is the city of Medan, Pekanbaru, Palembang, and Lampung have industrial areas as well as its buffer zone (hinterland). The center of Sumatera economic corridor needs to build a spatial interaction with the hinterland that produced featured commodities such as oil palm, rubber, coal, and iron ore. West Sumatera Province is one of the hinterland regions for the centers of Sumatra economic corridor,[7][8].

The province should support the industrial economic activities in the center of the corridor so that economic transactions occur between the center and the hinterland region. This study obtained to find a model for market integration of West Sumatera featured commodity with the center of Sumatra economic corridor. It also provides the market integration with Sumatra economic corridors as well as ASEAN countries and building regional cooperation between West Sumatera Province with centers of the Sumatra Economic corridor.

West Sumatera Province is part of Sumatra corridor as the center for production and processing of national crops such as rubber, palm oil, coal, iron and steel. West Sumatera Province has a strong base on natural resources like rubber and oil palm plantation. In the other

hand that this situation has not been able to encourage the economy to move towards an industrial and innovation-based economy development.

The local center for featured commodity has to be interconnected through business, trade and economic networks with the major centers in the West Sumatra Province. The West Sumatra region can be part of Sumatra economic corridor as a buffer zone for the economic system and synergizes with other growth centers.

The research question on this study is how to develop the economic potential and advantages of West Sumatra Province to support the development of Sumatra economic corridors? Is there any connection of economic centers and industrial clusters with the economic network system and Sumatera bussiness corridor?

2 Research Methods

This study use a growth center model and regional economic analysis approach [9],[10]. The empirical data of this study are primary and secondary data. Primary data is obtained by observations and interviews with the commodity entrepreneurs and other stakeholders in the area of local center of excellence and industry. Secondary data is obtained from published data of Statistical Agency (BPS) in both districts and Central BPS as well as publications of Bank of Indonesia. Analysis method for regional comparative advantage using Location Quotient (LQ) and Shift Share Analysis (SSA) while to examine the degree of trade integration between the growth centers using panel data regression [1]. Research locations for rubber production centers are Sijunjung and Dharmasraya districts.

3 Results and Discussion

Rubber Economic Potential

The area of Indonesian rubber plantation in 2017 reached 3.67 million ha and most widely located in Sumatra with covering of 2.60 million ha or 71% of the total area of rubber plantation in Indonesia. Then it followed by Kalimantan with 911,800 ha or as large as 25% while the rest is spread out in on Java, Bali and Nusa Tenggara. Maluku and Papua have a very small area of rubber plantation compared to other regions. The highest growth of rubber plantation area in the last ten years occurred in Kalimantan with 62.24% followed by Maluku and Papua at 26.91%. Both regions experienced high growth of rubber plantation area which is above the average growth of national rubber plating rate that only reached 17.69%. The growth of rubber plantation area in Sumatra was 8.87% and in Java, Bali and Nusa Tenggara were 10.55%. Sulawesi experienced a negative growth of 63.97% or an average of 6.4% annually.

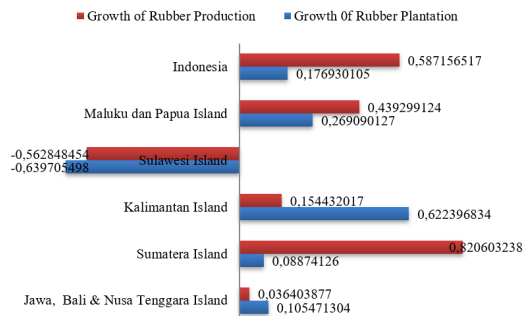


Fig.1. The growth of Production and area of Rubber Plantation in Indonesia (2007-2017)

The data shown that the growth of rubber plantation area in Indonesia for the last 10 years was concentrated in Kalimantan, Maluku and Papua. On the other hand, the growth of rubber production was contributed by Sumatera and Maluku-Papua regions. This means that rubber production is optimal in Sumatera, but it not yet optimal in Kalimantan, Maluku and Papua. Sulawesi have experienced negative growth of plantation area and production for the last ten years (Figure 1).

The potential economic of rubber in Indonesia then only dominated by Sumatera even though in Kalimantan had a large planting area with low growth of production to Sumatera region. The role of Sumatera is 98.50% in the national rubber planting area while the production portion of Sumatera is 78% of national rubber production. The rest of national production and rubber plating area are contributed by Kalimantan for production of 19.48% and planting area of 24 .84%, Nusa Tenggara for production of 3.74% and planting area of 3.87%.

Sumatra consists of ten provinces and potential of the rubber planting area are dominated by South Sumatra, Riau, Jambi and North Sumatra and West Sumatra and Lampung. There are four provinces that have small planting and rubber production areas namely Kepri, Bangka Belitung, Aceh and Bengkulu provinces.

Figure 2 describe the West Sumatra Province as a research area gives a portion of rubber production by 5.79% while it contributes 4.51% into the national production. The portion of rubber planting area in the region is 5.02% equal to national average of 4.95%. Therefor West Sumatra Province is a buffer zone for rubber production in the Sumatra and National level. Its also describe the production and rubber planting area of West Sumatra province which is still small portion against national rubber production as well as in the Sumatra region. As part of buffer zone then it is necessary to make connection and integration of West Sumatra's rubber production and trading to Sumatra and National level.

Furthermore, the significance of the rubber economy in the study area can be seen from the large volume of rubber exports and its value to the total volume and export value of Sumatra region. The amount of rubber exports in Sumatra reached 38.66% of the total value of Indonesia's exports in 2017. This figure described that rubber exports provided more than a third of Indonesia's export value itself.

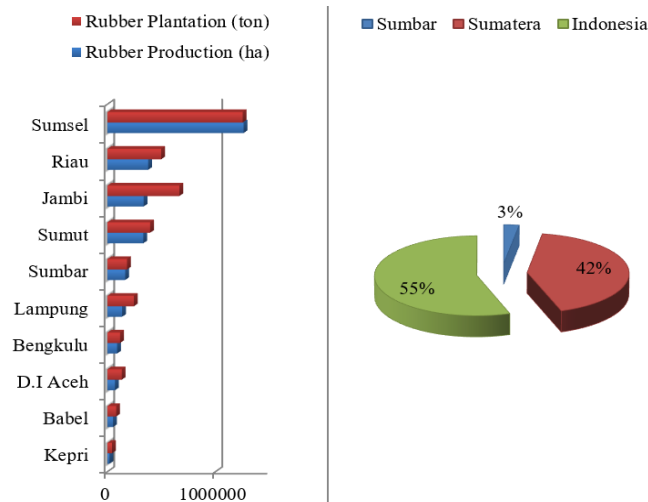


Fig.2. Comparison of Rubber Planting Area and Production in Sumatera Region and National Level (2017)

The highest value of rubber exports was contributed by the South Sumatra Province which reached 61% of the total value of rubber exports of Sumatera. It then followed by Bengkulu and Jambi Provinces respectively at 14.84% and 14.15%. The export value of West Sumatra is the smallest one which is only 0.02% of the total value of rubber exports in Sumatera. In contrast to the value of rubber export that the rubber export volume is dominated by Riau, West Sumatra and South Sumatra Province. Riau Province has the largest share of rubber export volume of 52% followed by West Sumatra as 34% and South Sumatra reached 13% of the volume of rubber exports in Sumatera.

Based on data from figure 3 that the West Sumatra Province has export volumes which include in the top three rubber export. Therefore, West Sumatera Province acted as buffer zones for Sumatera. In term of the export value is far less than the export value of South Sumatra and Riau Provinces and even other provinces. This is because of the trading of the rubber commodity still in the form of rubber lumps (Bokar) from the nagari market into the exporters. The rubber processing industry has not yet developed in West Sumatra Province then the rubber industry only export it in the form of latex. It is not yet processed into latex rubber and crumb rubber, which can be forwarded to various household goods and equipments industries.

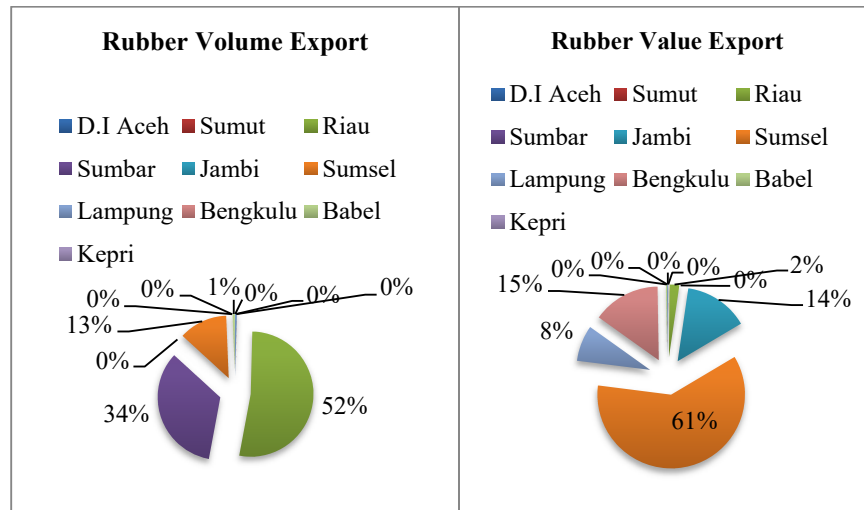


Fig.3. Comparison of volume and value of Rubber Export in Sumatera Region

Since the rubber industry chain in West Sumatra is short where it was only in its first derivative as rubber latex (rubber chunk). Then this has been caused the value of rubber exports in West Sumatra Province is lower when it compared to of South Sumatra, Jambi, Riau and Bengkulu. The results of interviews with farmers and rubber traders in Sijunjung and Dharmasraya districts revealed that the volume of rubber trading was mostly traded in Jambi and Riau provinces rather than into Padang (interviews with collecting traders in Dharmasraya District, 2018).

Table 1. provides information on the three largest rubber exports volume is found in Riau, West Sumatra and South Sumatra Provinces. On the other hand, the largest percentage of rubber production is in South Sumatra, but its rubber exports volume is only 12.55% while its export value is the first rank in the Sumatera region. This is related to the export value of South Sumatera is much higher than other provinces. In the mean while the export volume is small due to the rubber export commodity is in the form of third or fourth derivative products that provide higher added value, even though the volume is smaller.

West Sumatra Province has a number of potentials of rubber export volume with a production of 5.79% of rubber production in Sumatera. It has the lowest value of rubber exports as 0.02% of the total value of Sumatera's rubber exports. This means that the export volume is quite large, but the export value is very small. That is due the quality of rubber which traded at the household level still in the form of rubber latex (Bokar). It's also related to the quality of processed rubber are still in the form of latex and crumb rubber which will has implications for the low export rubber value from West Sumatra.

Tabel 1. Volume and Export Value of Rubber in Sumatera

Province	Percentage of rubber production	Percentage of rubber export volume	Percentage of rubber export value	LQ of rubber export volume	LQ of rubber export
D.I Aceh	2,44	0,34	0,15	0,38	27,63

Sumut	11,72	0,07	0,03	2,95	44,83
Riau	13,31	52,53	2,11	6,94	1,56
Sumbar	5,79	33,85	0,02	11,80	0,47
Jambi	11,81	0,03	14,15	0,00	0,15
Sumsel	44,52	12,55	60,51	0,57	309,09
Lampung	4,79	0,02	7,89	0,00	11,45
Bengkulu	3,16	0	14,84	-	94,38
Babel	1,81	0,61	0,29	0,70	2,59
Kepri	0,64	0	0	0	0

Another implication of the rubber economic condition in West Sumatra related poverty level where the has large planting area such as Sijunjung, Dharmasraya and Pasaman Regencies[11]. The number of poor in West Sumatra was 371,550 (2016) and it spread the largest in the three regencies of rubber planting area.

Table 2. Poverty level in West Sumatera Province

Regency	Number of poor (person)	Percentage of poor	Poverty level index	Poverty severe index
Mentawai	13090	15,12	2,56	0,60
Pessel	35860	7,92	1,17	0,27
Solok regency	34060	9,32	1,19	0,25
Sijunjung	17120	7,60	1,25	0,28
Tanah Datar	19630	5,68	0,81	0,15
Padang Pariaman	36340	8,91	1,36	0,38
Agam	37550	7,83	0,96	0,19
Lima Puluh Kota	28570	7,59	1,06	0,21
Pasaman	20830	7,65	0,42	0,05
South Solok	11910	7,35	1,23	0,31
Dharmasraya	16240	7,16	1,21	0,30
West Pasaman	30760	7,40	1,09	0,23
Padang	42560	4,68	0,55	0,11
Solok	2590	3,86	0,13	0,01
Sawah Lunto	1340	2,21	0,12	0,01
Padang Panjang	3470	6,75	0,66	0,11
Bukittinggi	6810	5,48	1,05	0,30
Payakumbuh	8350	6,46	0,87	0,19
Pariaman	4470	5,23	0,90	0,22
Sumbar	371550	7,09	1,10	0,24

Table 2 shows that the average percentage of poor people in West Sumatra is 7.09 and Sijunjung, Dharmasraya and Pasaman have average of poor population above the average of West Sumatra as well as the index of severity and level of poverty. Sijunjung Regency as the center area for rubber plantations has 17120 population categorized as poor or equal to 7.60% of its total the population. This is far above the average percentage of West Sumatera poverty as 7.09%. The area of rubber plantations has the most number poor people.

Comparative and Competitive Advantages of Rubber Economy

West Sumatra, Riau and North Sumatra have comparative advantages for the rubber exports volume in the Sumatra corridor region. The comparative advantage of rubber economy can be

evaluate using the value of the Location Quotient (LQ) volume and value of its rubber exports[12]. However, the provinces of South Sumatra, North Sumatra and Aceh have comparative advantages to the value of rubber exports. the rubber export volume of West Sumatra has comparative advantages compared to other regions in the Sumatra corridor, but the other side that the value of rubber exports itself is much higher for South Sumatra and North Sumatra compare to West Sumatra. The low export value of West Sumatera is because the value added of the rubber is low and quality of rubber for exports is still the form of latex and crumb rubber[13][14]. The regencies and cities in West Sumatra which have comparative advantages of rubber area and production are Sijunjung, South Solok, Dharmasraya, and Sawahlunto. The high value of LQ as an indication for large of planting area and rubber production in the region.

Tabel 3. LQ dan SSA Value of Rubber Planting Area and Production in West Sumatera (2016)

District	LQ		Proportional Shift		Differential shift	
	Area	Product	Area	Product	Area	Product
Mentawai Island	0,08	0,00	8,84	0,30	8,92	-1,05
South Pesisir	0,53	0,66	-1,78	1,40	0,27	-0,25
Solok Regency	0,59	0,16	1,03	1,75	1,41	-0,03
Sijunjung	2,93	3,63	-0,50	1,04	-0,40	-0,53
Tanah Datar	0,93	0,64	0,00	2,00	-0,14	0,38
Padang Pariaman	0,20	0,25	-0,47	2,58	0,02	1,02
Agam	0,15	0,10	0,47	3,35	1,15	1,46
Lima Puluh Kota	1,61	0,76	0,32	2,34	0,38	0,54
Pasaman	2,51	3,18	-0,31	2,90	0,22	1,44
South Solok	1,28	2,19	-0,50	1,41	0,29	-0,52
Dharmasraya	1,85	3,55	-1,97	1,66	-0,16	-0,30
West Pasaman	0,23	0,37	-16,37	1,82	0,24	-0,14
Padang	0,45	0,02	0,23	-4,18	0,80	-0,33
Solok	0,30	0,03	24,71	7,78	25,69	7,45
Sawahlunto	1,47	1,33	-0,50	2,88	2,07	2,60

Data Source: Research Study, 2018.

Table 3 describes that there are four regencies that have rubber comparative advantages in terms of rubber planting area and their production namely Sijunjung, Pasaman, Solok Selatan and Dharmasraya. Their proportion over the last ten years has begun to decline as indicated by the negative proportional shift value, only Pasaman regency that still has a competitive advantage which is shown by its positive differential shift value. Therefor Pasaman have higher level of competitiveness than other production centers such as Sijunjung and Dharmasraya which have a larger planting area and production volume. This is also due to the fact that Pasaman is geographically closer to North Sumatra province which has a comparative advantage in the volume of rubber exports in the Sumatra corridor. This geographical proximity factor certainly greatly influences the level of competitive advantage of the rubber economy in this Pasaman region.

Trading Integration of West Sumatera Province and Its Regency

The integration of West Sumatra trade with its regencies and cities which consisting of 12 regencies and 7 cities was analyzed using panel data regression. The integration of West Sumatra trading is measured by the value of large and small trade in the West Sumatra GRDP and each of its regencies and cities[15][4][16]. This trade integration is influenced by a number

of variables such as economic growth, per capita income, and accessibility conditions such as length of the road [17][18][19]. The length of the road become importance since the trading in West Sumatra province is carried out by land[20][6]. Therefore the length of the road will determine trading intensity between Padang City as the capital of West Sumatra's trade activities with its districts and cities.

Regression results using trade integration panel data between the provinces of West Sumatra and their districts and cities in the form of Fixed Effect Method (FEM). It is indicated by the counting value of $X^2 = 55.53$ which is greater than the value of $X^2 (19.05)$ of 30.14. It is mean that the changes in the variables of economic growth, per capita income and length of roads in the district and city will affect the occurrence of trade integration by the constant value of 207832.8 unit.

The positive impact of changes in trading integration are found in Padang City, Pasaman Barat, 50 Kota, Agam and Pesisir Selatan, while the rest of regencies and other cities have the negative changes. Among the four regencies and cities that have the greatest impact on the trading integration of West Sumatra are Padang City, West Pasaman and Limah Puluh Kota.

Meanwhile, in districts of rubber production centers such as Sijunjung, Dharmasraya and Pasaman that the impact of trading integration is less integrated with regional trading in West Sumatra. This lack of integration is due to the increased of accessibility of these three districts with their neighboring provinces such as Jambi, Riau and North Sumatra. It means that the major production areas of rubber are less integrated West Sumatra trading system. The trading integration is decreasing in line with changes in economic growth, income per capita and increased accessibility, especially in districts and cities where the centers of rubber production[21]. The decreased of trading integration with the trade center of West Sumatra province is reflected by the less competitive rubber exports compared to neighboring provinces such as Riau, Jambi and North Sumatra.

4 Conclusion

Based on the the analysis that has been carried out to this study that a number of conclusions can be put forward as follows: 1) The Sumatra region is the main center of plantation and rubber production in Indonesia with its central production areas located in South Sumatra, Riau, Jambi, North Sumatra and West Sumatra. While the biggest trading, industrial processing and rubber export centers are South Sumatra and North Sumatra since they have the highest added value of rubber products; 2) West Sumatra region has a comparative advantage in planting area and rubber production, but it is less able to compete in increasing the value of its rubber exports because the rubber processing industry is still at the level of latex and crumb rubber; 3) Sijunjung, Dharmasraya and Pasaman regions are the most important rubber plantation centers in West Sumatra.

At the same time are, those areas have dominant poor households so that rubber plantation has not been able to provide welfare for the farmers' households; and 4 (The integration of the rubber trading between Padang and the centers of rubber production (Sijunjung, Dharmasraya and Pasaman) has not yet occurred, because the trading integration more likely towards Pekanbaru and Medan.

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