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Cocoa Powder Competitiveness In Industry Medium Scale Using The Policy Analysis Matrix (Pam)

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Abstract

The study aims to determine the competitiveness of cocoa powder in the medium industry (Chocolate Processing Factory, Food Science and Technology). The types and sources of research data are primary data and secondary data. Research data collection techniques used direct interviews and literature studies. Research variables include tradable inputs, non-tradable inputs, private prices, social prices, and production. Analysis of the data used the Policy Analysis Matrix (PAM). The results showed that cocoa powder in the Intermediate Industry (Chocolate Processing Factory, Food Science and Technology) is competitive at the social price level or has a comparative advantage with the Domestic Resource Cost Ratio (DRCR) value of 0.78 which is smaller than one. However, it does not have competitiveness at the private price level or does not have a competitive advantage with a Private Cost Ratio (PCR) value of 2.60 which is greater than one.

Keywords: Cocoa powder, comparative, competitive, competitiveness

Introduction

Cocoa is one of the leading commodities in the plantation sub-sector in Indonesia which is prioritized for export activities so that it can contribute to increasing the country's foreign exchange. Goenadi et al. (2007), Aigbokhan (2011), Olukunle (2013), Adebile, O. A., & Amusan (2011); Obike et al. (2017), emphasized that cocoa is a national leading commodity that contributes the third largest foreign exchange after oil palm and rubber. This shows that cocoa has an important role in improving the economy. However, statistical data shows that there has been a decline in the number of Indonesian cocoa bean exports from 30,835.1 tons as of December 2019 to 1,050.4 tons as of January 2021 (BPS, 2021). This is due to one of the

government policies contained in Government Regulation Number 21 of 2020 concerning large-scale social restrictions in the context of accelerating the handling of Covid-19 which has an impact on the economic aspect, namely restrictions on the movement of people and goods for a particular province or district/city.

Limited access to commodities, including the commodity of the plantation sub-sector, cocoa, both between districts, provinces, and at the national level, has led to a significant decline in exports. In addition, the decline in cocoa bean exports was also caused by the implementation of the Minister of Finance Regulation No. 67 of 2010 concerning the determination of export goods subject to export duties and tariffs. Tresliyana et al. (2015), explained that the stipulation of rules regarding the existence of export duty rates for export commodities, including exports of cocoa beans, aims to develop the domestic cocoa bean processing industry so that processed cocoa products are able to be competitive and begin to shift exports from cocoa beans to processed cocoa products. Furthermore, Nauly et al. (2014), added that the policy on export duty tariffs is aimed at ensuring the availability of raw materials and is an effort to increase the competitiveness of the domestic processing industry.

The problem is that the market demand for processed cocoa products in Indonesia is still quite low (Akiyama, T., & Nishio, 1997; Neilson, 2007; Indah et al., 2021; . This is supported by the ITC in Tresliyana et al. (2015) which states that the prospect of processed cocoa products in Indonesia such as cocoa paste, cocoa butter, cocoa powder is still low, with a market share of less than 6%. This condition is due to the fact that most of Indonesia's cocoa is still exported in the form of raw or cocoa beans. Tresliyana et al. (2015) also added that the difference in export value which is quite high between cocoa beans and processed products shows that the cocoa industry has not yet developed.

Seeing these conditions, the Food Science and Technology Chocolate Processing Factory, which is one of the medium-scale industries in the Southeast Sulawesi Province, processes cocoa beans into cocoa powder processed products as an effort to develop downstream industries. The medium industry is expected to be able to compete with other cocoa processing industries, both at home and abroad. However, the results of the field survey show that cocoa beans used as raw materials in processing activities into cocoa powder products at the Food Science and Technology Chocolate Processing Factory do not use fermented cocoa beans, causing low product quality and will weaken the competitive position of the cocoa powder products produced. Hasibuan et al. (2012), explained that efforts to increase the competitiveness of cocoa beans and their processed products require cocoa bean fermentation activities. The management of cocoa beans that are still traditional or not fermented causes the quality of cocoa beans to below and the price of beans and cocoa products in the international market is subject to a 10%-15% discount from the market price (Arfah et al, 2017). In addition, the production capacity of processing cocoa beans into cocoa powder products at the Food Science and Technology Chocolate Processing Factory is still relatively low, such as in one production process it is only able to process 15 kg of cocoa beans. This affects the amount of profit obtained. Manalu et al. (2017), explained that the very low capacity of cocoa bean processing equipment into cocoa powder products causes inefficient activities and affects the number of profits obtained.

Materials and Methods

The research was carried out in the industry medium-scale (Chocolate Processing Factory, Food Science and Technology). Types and sources of research data used primary data and secondary data. Data collection techniques used a direct interview approach and literature study. The variables in this study include tradable inputs, non-tradable inputs, private prices, social prices, and production. Data analysis using the Policy Analysis Matrix model can be seen in Table 1.

Table 1. Construction Model of Policy Analysis Matrix

Description	cceptance	Cost		Profit
		Tradable Input	Non-tradable Input	
Private Price	A	B	C	D
Social Pricing	E	F	G	H
Divergence Effect	I	J	K	L

Source: (Pearson et al., 2005).

Notes:

A = Revenue at Private Price
B = Cost of Tradeable Inputs at Private Prices
C = Non-Tradable Input Cost at Private Price
D = Profit on Private Price = A-(B+C)
E = Acceptance at Social Price
F = Cost of Tradable Inputs at Social Prices
G = Cost of Non-Tradable Inputs at Social Prices
H = Profit at Social Price = E-(F+G)
I = Transfer Output = A-E
J = Transfer of Tradable Inputs = B-F
K = Non-Tradable Input Transfer = C-G
L = Net Transfer = I-(K+J)

Competitive advantage

The competitive advantage of cocoa powder in the Medium Industry was measured using the Private Cost Ratio (PCR) value, with mathematically formulated:

$$PCR = \frac{C}{A - B}$$

Notes:

PCR = Private Cost Ratio
A = Acceptance at Private rates
B = Input Tradable fees at Private Prices
C = Non-Tradable Input Fees at Private Prices

Criteria:

a. PCR <1, means that cocoa powder in the Medium Industry (Chocolate Processing Factory for Food Science and Technology) has a competitive advantage.
b. PCR >1, means that cocoa powder in the Medium Industry (Chocolate Processing Factory for Food Science and Technology) does not have a competitive advantage.

Comparative Advantage

The comparative advantage of cocoa powder in the Medium Industry was measured using the Domestic Resource Cost Ratio (DRCR) value. Mathematically it can be formulated:

$$DRCR = \frac{G}{E - F}$$

Notes:

DRCR = Domestic Resources Cost Ratio
E = Acceptance at Social Price
F = Cost of Tradable Inputs at Social Prices
G = Cost of Non-Tradable Inputs at Social Prices

Criteria:

a. DRCR <1, means that cocoa powder in the Medium Industry (Chocolate Processing Factory for Food Science and Technology) has a comparative advantage.
b. DRCR >1, means that cocoa powder in the Medium Industry (Chocolate Processing Factory for Food Science and Technology) does not have a comparative advantage.

Results and Discussion

Output Shadow Price

The shadow output price is determined using the FOB (Free on Board) value approach multiplied by the Shadow Exchange Rate (SER) because the cocoa powder product in this study is an export-oriented commodity. The FOB price of cocoa powder in the international market is 1.82 US$ per kilogram (BPS, 2020). In addition, converted to an SER value of IDR 14,701 per US$, the shadow price of cocoa powder is IDR 26,818/kg. Furthermore, this figure is reduced by the cost of trading cocoa powder from the location of the processing industry to the port of destination for export and distribution costs. As a result, the shadow price of cocoa powder output is IDR 26,498/kg.

Input Shadow Price

The price of input inputs such as scales, buckets, pans, sieves, spatulas, tissue, packaging, and hairdryer, which are used in the industrial activities of processing cocoa beans into cocoa powder products at the Food Science and Technology Chocolate Processing Factory is the same as the prices prevailing in the domestic market. This is due to the inputs used to come from within the country, while the shadow price for labor input is adjusted to the

unemployment rate in the research location. The average unemployment rate in Southeast Sulawesi Province is 3.26% (BPS, 2020). Also, the average wage for uneducated workers in the cocoa bean processing industry into cocoa powder products at the Food Science and Technology Chocolate Processing Factory is IDR 972,195.81/working people's day, so that the shadow price of labor wages is IDR 3,169,358.34/working people's day. Cocoa beans are an export commodity so the shadow price is determined based on the FOB (Free on Board) price, which is 0.36 US$/kg, then the FOB price is multiplied by the SER value which is IDR. 14,701 per US$, so that the shadow price of cocoa beans is IDR 5,290.94/kg. Meanwhile, the shadow price of the machine for processing cocoa beans into cocoa powder products used by the Food Science and Technology Chocolate Processing Factory is CIF (Cost Insurance and Freight) value because it is an imported product. The CIF price of the cocoa bean processing machine is 1,171 US$/unit and if it is converted to the SER value of IDR 14,701.13/US$, the shadow price of the cocoa bean processing machine is IDR 17,215,025.20/unit.

Policy Analysis Matrix (PAM)

The Policy Analysis Matrix (PAM) shows the individual or collective influence of price policies and domestic factor policies related to the processing of cocoa beans into cocoa powder products at the Food Science and Technology Chocolate Processing Factory, the results can be seen in Table 2.

Table 2. Policy Analysis Matrix (PAM)

Description	Acceptance (IDR/Year)	Cost (IDR/Year)		Profit (IDR/Year)
		Tradable Input	Non-tradable Input	
Private Price	168,000,000	125,500,000	110,456,696	- 67,956,696
Social Pricing	44,516,639	7,746,761	28,851,444	7,918,434
Divergence Effect	123,483,361	117,753,239	81,605,252	- 75,875,130

Source: Processed Data, 2021.

Table 1 shows that the profit obtained by producers in processing cocoa beans into cocoa powder at the Food Science and Technology Chocolate Processing Factory at private prices is negative due to the costs incurred by both tradable input costs and non-tradable input costs are higher than the output or revenue generated by producers from processing cocoa beans into cocoa powder products. This condition is certainly detrimental to cocoa powder producers because in real terms the average revenue is smaller than the costs incurred. On the other hand, there is a positive divergence in the output and input components (tradable inputs and non-tradable inputs). This is because the private price of output and input is higher than the social price. The positive value of the output and input divergence indicates that with the government's policy on industrial activities to process cocoa beans into cocoa powder products at the Food Science and Technology Chocolate Processing Factory, producers must pay a private price that is higher than the social price.

Private Benefits

The results showed that the average private income of the cocoa bean processing industry into cocoa powder products at the Food Science and Technology Chocolate Processing Factory was IDR 168,000,000/year. The private revenue figure is obtained from the multiplication of the average amount of cocoa powder production, which is 1,680 kg with the price of cocoa powder products prevailing at the producer level, which is IDR. 100,000/kg. Meanwhile, the input costs of the cocoa bean processing industry into cocoa powder products which consist of tradable inputs of IDR 125,500,000/year and non-tradable inputs (domestic input costs) of IDR 110,456,696/year are also determined based on private prices or input prices prevailing at the producer level. Therefore, the private profit obtained is negative IDR 67,956,696 which is the difference between the total private revenue and the total input cost (tradable and non-tradable). Private profit is an indicator of the financial efficiency of cocoa powder commodities in the Food Science and Technology Chocolate Processing Factory. So based on these conditions, it shows that the cocoa bean processing industry into cocoa powder products at the Food Science and Technology Chocolate Processing Factory is not financially profitable or has no competitive advantage. This is because tradable input costs and non-tradable input costs are higher than the output or revenue generated.

Social Benefits

The results showed that the acceptance of the cocoa bean processing industry into cocoa powder products at the social price level or shadow price was IDR 44,516,639/year. This price is obtained from the result of multiplying the average amount of cocoa powder production which is 1,680 kg with a shadow price of IDR 26,498/kg. The tradable input cost in the cocoa bean processing industry into cocoa powder products at the Food Science and Technology Chocolate Processing Factory is IDR 7,746,761/year. Pricing for tradable inputs is based on the value of CIF (Cost Insurance and Freight) because it is an imported commodity or traded internationally. Then the non-tradable input cost is IDR 28,851,444/year. The value of social benefits in the cocoa bean processing industry into cocoa powder products at the Food Science and Technology Chocolate Processing Factory is IDR 7,918,434/year. Social benefits are indicators of the social efficiency of commodities in the absence of policy implementation. The value of the social benefits shows the nominal that will be obtained if all cocoa powder products produced are assumed to be exported.

Competitiveness Analysis

The competitiveness of the cocoa bean processing industry into cocoa powder products at the Food Science and Technology Chocolate Processing Factory is analyzed based on two indicators, namely competitive advantage using private prices and comparative advantage using social prices. Regarding the value of the competitiveness parameter of the cocoa bean processing industry into cocoa powder products at the Food Science and Technology Chocolate Processing Factory, it can be seen in Table 3.

Table 3. Parameter Value of Competitive and Comparative Advantage of Cocoa Powder Processing Industry in Chocolate Processing Factory Food Science and Technology in 2021

No.	Parameter	Value
1.	Competitive Advantage (PCR)	2.60
2.	Comparative Advantage (DRCR)	0,78

Sumber: Processed Data, 2021.

Table 3 shows that the activities of the cocoa bean processing industry into cocoa powder products at the Food Science and Technology Chocolate Processing Factory are generally competitive at the social price level or have a comparative advantage, but are not competitive at the private price level or have no competitive advantage. This can be seen from the value of the Domestic Resources Cost Ratio (DRCR) which is less than one and the value of the Private Cost Ratio (PCR) which is greater than one.

Competitive advantage

The competitive advantage of cocoa powder products at the Food Science and Technology Chocolate Processing Factory is shown by the value of the private cost ratio (PCR) and private profit (PP). The PCR value of cocoa powder products at the Food Science and Technology Chocolate Processing Factory is 2.60. This shows that to get the added value of the output of one unit at private prices, an additional domestic factor cost of 2.60 is needed. This is supported by the opinion of Arfah (2017) which explains that policies that cause input costs to increase and output use value to decrease will cause a decrease in competitiveness. Based on the PCR value, it can be concluded that cocoa powder products at the Food Science and Technology Chocolate Processing Factory do not have a competitive advantage due to the PCR value is greater than one. In addition, it can also be interpreted that the cocoa powder product production system is unable to pay for its domestic factors. Meanwhile, the private profit value of cocoa powder products is negative IDR 67,956,696/year. Thus, cocoa powder products at the Food Science and Technology Chocolate Processing Factory are not profitable and cannot compete at private price levels. Apart from the high cost of domestic factors, another factor that affects the competitiveness of cocoa products is quality. Hasibuan (2012) explained that in general, Indonesian cocoa bean products do not yet have competitiveness due to their low quality and have not been able to adapt to market demand conditions.

Comparative Advantage

Comparative advantage is one of the indicators to assess whether cocoa powder products at the Food Science and Technology Chocolate Processing Factory are competitive, able to live without government assistance, and have great export opportunities. The results showed that the value of the domestic resource cost ratio (DRCR) of cocoa powder products at the Food Science and Technology Chocolate Processing Factory was 0.78. This indicates that to obtain an output value-added of one unit at the social price, an additional domestic resource cost of 0.78 is required. This means that producing cocoa powder at the Food Science and Technology Chocolate Processing Factory requires domestic resource costs of 78 percent of the required import costs. In other words, processing cocoa beans into cocoa powder products are economically efficient and has a comparative advantage. The value of DRCR<1 indicates that even without government policy or intervention, processing cocoa beans into cocoa powder

products is efficient to develop. This is supported by the results of research conducted by Tresliyana et al. (2015) which states that Indonesian cocoa powder has a good comparative advantage with an average Revealed Comparative Advantage (RCA) value of 3.91. This study is following the statement of Hasibuan et al. (2012) which explains that the higher the RCA value, the country has a higher comparative advantage. Barani (2010) also added that Indonesian cocoa has the highest competitiveness composite index and has future development prospects measured from export competitiveness through a comparative parameter approach.

The comparison between competitive and comparative advantage can be seen from the DRCR value which is smaller than the PCR value. This means that cocoa powder products produced by the Food Science and Technology Chocolate Processing Factory are not supported by government policies that increase production efficiency. Furthermore, the value of social benefits is smaller than private benefits. This means that the processing of cocoa beans into cocoa powder products is more profitable when there is no intervention from the government on the inputs and outputs produced.

Conclusion

Based on the results of the study, it can be concluded that cocoa powder in the Medium Industry (Chocolate Processing Factory for Food Science and Technology) has competitiveness at the social price level or has a comparative advantage with the Domestic Resource Cost Ratio (DRCR) value of 0.78 which is smaller than one. However, it does not have competitiveness at the private price level or does not have a competitive advantage with a Private Cost Ratio (PCR) value of 2.60 which is greater than one.

Suggestion

It is necessary to increase the production capacity of cocoa bean processing into cocoa powder processed products as well as efforts to develop cocoa bean fermentation activities within the scope of farmers as a source of raw material for processing cocoa beans into cocoa powder products at the Food Science and Technology Chocolate Processing Factory to increase the competitiveness of cocoa powder products.

References

Adebile, O. A., & Amusan, A. S. (2011). The non-oil sector and the Nigeria economy a case study of cocoa export since 1960. International Journal of Asian Social Science, 1(5), 142-151.

Aigbokhan, B. E. (2001, June). Resuscitating agricultural production (cocoa, cotton, groundnuts, palm oil, rubber, etc) for exports. In 10th Annual Conference of Zonal Research Unit of The Central Bank of Nigeria, held in Owerri.

Akiyama, T., & Nishio, A. (1997). Sulawesi's cocoa boom: Lessons of smallholder dynamism and a hands-off policy. Bulletin of Indonesian Economic Studies, 33(2), 97-121.

Arfah, S. Y. C., Harianto dan Suharno. (2017). Daya Saing dan Peran Pemerintah dalam Meningkatkan Daya Saing Komoditi Kakao di Sulawesi Tengah. Buletin Ilmiah Litbang Perdagangan. Vol. 11. No. 1. Hal. 69-96. DOI: https://doi.org/10.30908/bilp.v11i1.79.

Badan Pusat Statistik. (2020). Buletin Statistik Perdagangan Luar Negeri, Ekspor: Menurut Kelompok Komoditi dan Negara. Badan Pusat Statistik Republik Indonesia. Jakarta.

Badan Pusat Statistik. (2020). Sulawesi Tenggara dalam Angka. Badan Pusat Statistik Republik Indonesia. Kendari.

Badan Pusat Statistik. (2021). Buletin Statistik Perdagangan Luar Negeri, Ekspor: Menurut Kelompok Komoditi dan Negara. Badan Pusat Statistik Republik Indonesia. Jakarta.

Barani, A. M. (2010). Bukan Sebuah Mimpi: Menjadi Produsen Kakao Terbesar Dunia. PT. Ideals Agro Abrar. Jakarta.

DOI: https://doi.org/10.15408/aj.v8i1.5126.

Dompreh, E. B., Asare, R., & Gasparatos, A. (2021). Sustainable but hungry? Food security outcomes of certification for cocoa and oil palm smallholders in Ghana. Environmental Research Letters, 16(5), 055001.

Goenadi, D.H., J.B. Baon, S. Abdullah, Herman dan A. Purwoto. 2007. Prospek dan Arah Pengembangan Agribisnis Kakao, Edisi Kedua. Badan Penelitian dan Pengembangan Pertanian Departemen Pertanian. Jakarta.

Hasibuan, A. M., Nurmalina, R. dan Wahyudi, A. (2012). Analisis Kinerja dan Daya Saing Perdagangan Biji Kakao dan Produk Kakao Olahan Indonesia di Pasar Internasional. Buletin RISTRI. Vol. 3. No. 1. Hal. 57-70. DOI: http://dx.doi.org/10.21082/jtidp.v3n1.2012.p57-70.

Indah, P. N., Setiawan, R. F., Hendrarini, H., Yektingsih, E., & Sunarsono, R. J. (2021). Agriculture supply chain performance and added value of cocoa: a study in Kare Village, Indonesia. Bulgarian Journal of Agricultural Science, 27(3), 487-497.

Manalu, L. P., Djafar, M. Y., Wibawa, T. Y. dan Adinegoro, H. (2017). Proses Pintas Pengolahan Kakao Skala UKM Studi Kasus di Luwu Sulawesi Selatan. M. P. I. Vol. 11. No. 1. Hal. 51-60. DOI:10.29122/mipi.v11i1.2093.

Nauly, D., Daris, E. dan Nuhung, I. A. (2014). Daya Saing Ekspor Kakao Olahan Indonesia. Jurnal Agribisnis. Vol. 8. No. 1. Hal. 15-28.

Neilson∗, J. (2007). Global markets, farmers and the state: sustaining profits in the Indonesian cocoa sector. Bulletin of Indonesian Economic Studies, 43(2), 227-250.

Obike, K. C., Ukoha, J. C. I., & Idu, M. A. (2017). Revolutionizing Cocoa Marketing: a Strategy for Promoting Cocoa Farming in Nigeria. NIMN, 67.

Olukunle, O. T. (2013). Challenges and prospects of agriculture in Nigeria: the way forward. Journal of Economics and sustainable development, 4(16), 37-45.

Pearson, S., Gotsch, C., dan Bahri, S. (2005). Aplikasi Policy Analysis Matrix Pada Pertanian Indonesia. Yayasan Obor. Jakarta.

Peraturan Menteri Keuangan Nomor 67/PMK.011/2010 tentang Penetapan Barang Ekspor yang dikenakan Bea Keluar dan Tarif Bea Keluar. Jakarta.

Peraturan Pemerintah Republik Indonesia Nomor 21 Tahun 2020 tentang Pembatasann Sosial Berskala Besar dalam Rangka Percepatan Penanganan Corona Virus Disease 2019 (Covid-19). Jakarta.

Tresliyana, A., Fariyanti, A. dan Rifin, A. (2015). Daya Saing Kakao Indonesia di Pasar Internasional. Jurnal Manajemen & Agribisnis. Vol. 12. No. 2. Hal. 150-162. DOI: https://doi.org/10.17358/jma.12.2.150.Source: https://journal.ipb.ac.id/index.php/jmagr/article/view/11008