COMPETITIVENESS AND COMPARATIVE ADVANTAGE OF BEEF CATTLE FATTENING IN BANDUNG REGENCY

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SUMMARY

Each region in West Java is currently working hard to develop its agribusiness potential. This requires that they identify commodities in which their region has a comparative advantage.

Bandung Regency has identified fattening beef cattle as a competitive activity for farmers in the area. Consumer demand for beef is rising. Indonesian consumption of beef in 1999 and 2000 was 1.8 kg/capita/year. In 2001, it increased to 2 kg/capita/year. (This is not yet to the level before the crisis which was 2.2 kg/capita/year.) When compared to American beef consumption (44 kg/capita/year) Indonesian consumption is still very small. However, it is very likely that consumption will increase rapidly as the economy improves.

The results of a PAM analysis of beef fattening enterprises show that the beef industry is profitable at private and social prices. Fattening both local and imported animals produces profits that create positive incentives for producers and reflect an efficient use of domestic resources. Economies of scale do not appear to be important in determining enterprise profits. Locally bred animals fed by individual farmers on grass and hay is the most profitable fattening activity.

I. INTRODUCTION

1.1. Background of the Research

Each region in West Java is currently working hard to develop its agribusiness potential. This requires that they identify commodities in which their region has a comparative advantage.

Bandung Regency has identified fattening beef cattle as a competitive activity for farmers in the area. Consumer demand for beef is rising. Indonesian consumption of beef in 1999 and 2000 was 1.8 kg/capita/year. In 2001, it increased to 2 kg/capita/year. (This is not yet to the level before the crisis which was 2,2 kg/capita/year.) When compared to American beef consumption (44 kg/capita/year) Indonesian consumption is still very small. However, it is very likely that consumption will increase rapidly as the economy improves.

Indonesia's domestic production provides approximately 80% of the beef consumed. Imported meat covers the other 20 %. In 2000, for West Java, the 80% was slightly over 300,000 head.

Of the 300,000 head, approximately 60,000 were bred locally. Farmers do not like to fatten local cattle because the average increase in weight is only 0,5 kg per day. At this rate of gain, it takes a long time—up to six months-- to achieve a selling weight. Because of the length of time during which capital is tied up, farmers feel that profits feeding local cattle are reduced significantly because of large interest costs.

Some local feeder cattle are brought in from East Java. However, most of the feeder cattle in West Java are imported cattle (bakalan). The increase in weight per day of imported beef cattle is higher than that of local beef cattle, 0,8 kg up to 1,5 kg per day. By adding concentrates to the ration, these cattle are fed for only 90 days..

In 1989, in an effort to develop more beef cattle fattening operations in Indonesia, the Directorate General of Animal Husbandry issued a recommendation limiting the importation of finished beef cattle. This recommendation required imported beef cattle to weigh less than 350 kg so that they needed to be fattened before they are sold. Nevertheless, the increasing demand for beef has resulted in the emergence of businesses who import grown beef cattle ready for slaughter. These businessmen reason that importing cattle ready for slaughter ties up capital for relatively short periods of time and therefore reduces interest costs.

The government and AFPINDO, the association of beef cattle farmers, have stated that imported fat beef cattle would damage the local fattening industry. AFPINDO argues that, in order to develop a beef cattle fattening

industry, a tariff on finished cattle is needed. They propose tariffs for imported feeder cattle with a weight 350 kg above and a 10% tariff for imported beef meat. There would be no tariff for imported beef cattle weighing less than 350 kg. Currently, an import tariff is being applied to all imported cattle, regardless of their weight.

1.2. Research Objectives

The questions underlying the investigation are: (1) how competitive is the beef cattle fattening business using either local and imported feeder cattle, (2) what impact does the government's tariff have on the competitiveness of beef operations, (3) does Bandung Regency have a comparative advantage in fattening cattle, and (4), what changes would occur in the beef industry if the import tariff on feeder cattle was abolished?

Data have also been collected and budgets prepared for different size operations (small, medium, and large) to assess the economies of scale in the beef cattle industry.

II. RESEARCH METHODS

2.1. The Policy Analysis Matrix Approach

The PAM model developed by Eric A. Monke and Scott R. Petterson (1989) can be used, not only to measure comparative advantage (social profitability) of an activity, but to measure the effect of government interventions on beef fattening.

In this study, the PAM methodology is used to examine the economics of beef production. PAM can also be used to investigate the entire commodity system including handling, processing, and marketing activities.

Measures of profitability and net transfers are the most important results of the PAM analysis. However, the matrix format makes it possible to break down the end results into its various components including output transfers, tradable input transfers, and domestic resource transfers. These can be presented in ratio forms such as the DRC, the PCR, and NPCO, and the NPCI.

The elements of the PAM model are:

1. Profitability based on private costs and returns. (Private profitability uses the actual prices received by producers, inclusive of government policies.)

2. Profitability based on social costs and returns. (Social prices for tradables are derived from world markets. Social prices for domestic resources-- land, labor, and capital--are determined from the opportunity cost of resources to the domestic economy.)

3. Divergences (difference between private and social profitability) that measure the effect of government policy or market imperfections.

Table 1. The Policy Analysis Matrix

	Revenues	Costs		Profits
		Tradable Inputs	Domestic Factors	
Private Prices	A	B	C	D
Social Prices	E	F	G	H
Divergences	I	J	K	L

PAM analysis can be used for individual commodity systems in different locatioms, farming business types, and technologies. Table 1 shows the organization of the PAM matrix. The first row is based on private (financial) estimates. These financial estimates are made up of revenues and costs that use the actual market price obtained or paid by producers or others in an agribusiness system. Profits provide a measure of the competitiveness of the activity, e.g., the incentives farmers have to produce the commodity.

The second row of the matrix consists of estimates of costs and returns at social prices. These estimates are based on import parity prices for tradables and opportunity costs for domestic resources. The profitability column provides a measure of the efficiency with which resources are used and shows whether a commodity has a comparative advantage in production.

In the third row, each column is the difference between figures computed using the observed (actual market price) price and figures based on economic (efficiency) prices. If market failures are considered an insignificant factor, then the difference is caused by government policy interventions. These interventions are a major source of interest in this study.

2.2. Data Collection

To obtain the necessary estimates of private and social profitability, farm budget data were needed for all aspects of beef cattle production. Research to obtain such data were conducted in September and October, 2002. Both primary and secondary sources were used. The former were obtained from field surveys in four districts: Cileunyi, Cimenyan, Cikalong Wetan and Cikancung. Primary data were collected through interviews and structured questionnaires. The respondents were 40 farmers. A purposive sample was constructed based on the type of feeder cattle used (import and local) and the scale of beef cattle farming (small, medium, and large). Small-scale beef cattle farmers were those with less than 10 head; medium scale were farmers with 11-50 head; large farmers were those fattening more than 50 head.

In addition to farm surveys, data were compiled from the BPS, the Department of Animal Husbandry, and the association of beef cattle farmers (APFINDO).

III. DESCRIPTION OF BEEF CATTLE FATTENING IN BANDUNG REGENCY

The production of beef cattle in Bandung is centered in Cileunyi, Cimenyan, Cikalong Wetan, and Cikancung districts. Cikalong Wetan and Cikancung are the centers of beef cattle fattening using imported feeder cattle. Three large-scale companies dominate the market. In Cikancung, there are also small and medium-scale companies who use imported feeder cattle. These usually operate in partnership with a large-scale producer.

Cimenyan and Cileunyi are the centers for beef cattle fattening business using local feeder cattle. All companies are small-scale. No middle or large-scale companies were found in these districts.

Geographically, the four areas are far from each other and scattered around Bandung. There are, however, reasons for each location, based on the source of feeder cattle, the size of the operation, the length of time for fattening, the main feed, and the target market.

3.1. Economies of Scale

There are some differences between beef cattle fattening using local feeder cattle and imported feeder cattle as seen from an economies of scale aspect. All farmers using local feeder cattle conduct small-scale operations with 1 up to 9 beef cattle or 3 per farmer. This is because they have limited capital and only 27% reported livestock as their main source of income. Most of them rely on other farming activities such as growing crops or maintaining plantations.

Fattening operations using imported feeder cattle vary in size. There are a number of small-scale companies located in Cikancung and Cigereleng Desa Cijapati. This concentration exists because of partnerships with a large feedlot (PT Kadilla Lestari) that provides Brahman Cross cattle, concentrates, and a feedlot for beef cattle after fattening. The average number of imported cattle owned by a small-scale farmers is 9. Medium size businesses have 23, while large firms have an average of 1,4666. Cikalong Wetan is another area which has a large beef cattle fattening farm that uses imported feeder cattle.

The partnership mechanism used by PT Kadilla Lestari and small-scale feeders is the plasma (?) credit model. PT. Kadila Lestari acts as a nucleus company and the farmers in Cikancung act as plasma. Lestari supplies imported feeder cattle and concentrates in the form of a credit/loan with the rate of interest of 14% per year. This loan is repaid by the plasma/farmers when they sell the fat cattle to the company. Small farmers obtain credit from the Food Security Credit Program (KKP) subsidized by the government; the charge is 6%. The large company acts as a guarantor for the plasma toward the creditor/Bank.

The system used to fatten imported beef cattle is different from that used to feed local cattle. Fattening systems for imported feeder cattle use a colony

model where a number of farmers join together to carry out the business. Such a colony may consist of 40-50 beef cattle. The colony is located away from the farmers' residence, and farmers work collectively to carry out the feeding activities. This is different from local feeder cattle which are kept on the farm of the owner.

The motivation of the farmers to become a plasma (?) is because they can get credit at a subsidized rate and they have a market guarantee given by the main company. Farmers choose imported feeder cattle because they can expect faster gains compared to local feeder cattle.

3.2 The Length of Fattening

The time needed to fatten an animal to the desired weight is the main factor that distinguishes imported feeder cattle from local feeder cattle. The latter take 185 days for fattening while the former take only 90 days. Scale also affects the rate of gain. The medium-scale farms take 79 days and the large farms take 68 days. This shorter time allows faster cash flow to the farmers.

This research found that the average weight gain for local feeder cattle was 0.53 kg per day while the weight increase for imported feeder cattle was 1.15 kg per day at small producers, 1.26 kg for medium producers and 1.32 kg/day for large producers.

3.3. Main Feed

There is a significant difference in the type of feed fed to local cattle and imported cattle. Farmers who fatten local cattle feed their animals grass and hay. Because they grow the hay or use the by-product of crops, their out-of-pocket feed expenses are small. What is sometimes needed is the cost of transport and the cost of labor for harvesting. The average amount of hay fed by small producers to local cattle is 12 kg./day.

The main feed fed by farmers using imported beef cattle is imported concentrate. This is fed at the rate of 10 kg per day for animal.

3.4. Market Target

Fattening local beef cattle is targeted to meet the demand on Iedul Adha (Sacrifice Day) when beef cattle are sacrificed. This means that local cattle have a specific target market. Producers of local beef cattle in Bandung Regency start the fattening process 7 months before the Day using their own capital. Cattle buyers visit the farms to buy the finished animals.

The marketing of local cattle obtained from small producers is different than the marketing of imported animals, which are targeted to meet the demand of daily consumption. Imported beef cattle are marketed to slaughter houses located around Bandung

Table 2. Description of Beef Cattle Fattening System in Bandung Regency

	Local Feeder Cattle	Imported Feeder Cattle
Economics of Scale	Small	Small, Middle and Large
Number of head each farmer	3 head	Small: 9 head Middle: 23 head Large: 1466 head
Length of Fattening	185 days	Small: 90 days Middle: 79 days Large: 68 days
Feeder Cattle Variety	Peranakan Onggol	Brahman Cross
Pakan Utama	Jerami	Concentrate
Daily Gain (kg/day)	0.53 kg/day	Small: 1.15 kg/day Middle: 1.26 kg/day Large: 1.32 kg /day
Fattening System	Individual	Small: Colony Middle: Colony Large: Corporate
Market Target	Idhul Adha	Daily Consumption

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IV. RESULTS OF THE PAM ANALYSIS OF BEEF CATTLE FATTENING

The first step in the PAM analysis of cattle feeding was to construct an input-output table showing the physical inputs that were required to produce a unit of output, in this case one fat animal. Private and social prices were then used to construct budgets that showed private and social profits. Import parity prices of fat animals were determined using the price of live cattle from Australia at Pelabuhan Tanjung Priok Jakarta. The data were obtained from the Indonesian Association of Beef Cattle Fattening (APFINDO). The results of a PAM analysis of beef cattle fattening is shown in Table 3.

4. 1. Revenue

The private and social revenues resulting from fattening imported beef cattle show a positive divergence. This indicates that the prices received by Indonesian farmers are higher than the prices of similar cattle sold in international markets. The divergence is due to an import tariff of 10% levied by the government on all cattle imports (UU No 18 year 2000, Perpu No. 12 year 2001 and SK Menkeu RI No. 155/KMK03/2001). The policy is designed to protect farmers who feed locally bred cattle. It is expected that this tariff will be sufficient to permit the local cattle to compete with imported animals. Apart from this general tariff, outputs prices are also distorted by taxes levied by the Bandung Local Government (Bandung Regency) on the transportation of cattle (PERDA

No. 22/200) to and from markets. The levies are collected to provide income for the Bandung Regency Government.

There is a difference in output prices because consumers tend to prefer local beef to imported beef. As a result, the price of local cattle is higher than the price of import cattle. When the research took place, the live price for local beef cattle was Rp. 12,333 per kg while the price of imported beef cattle was Rp. 12, 000 per kg.

Table 3. PAM analysis for beef cattle fattening business in Bandung Regency

	Revenue	Tradable Inputs		Domestic Resources				Profit
		Bakalan	Others	Labor	Capital	Land	Others	
IMPORT								
Small								
Private	4,840,000	3,570,000	585,000	25,893	53,983	225	384	604,515
Social	4,013,167	2,985,000	585,000	25,893	106,095	225	384	310,570
Divergences	826,833	585,000	0	0	-52,112	0	0	293,945
Medium								
Private	4,778,182	3,564,591	510,545	18,571	41,934	196	1,198	641,146
Social	3,961,909	2,980,477	510,545	18,571	86,144	196	1,198	364,777
Divergences	816,273	584,114	0	0	-44,210	0	0	276,369
Large								
Private	4,530,000	3,402,000	444,821	41,525	51,001	170	639	589,844
Social	3,756,125	2,860,625	445,479	41,525	87,798	170	639	319,889
Divergences	773,875	541,375	-658	0	-36,798	0	0	269,956
LOCAL								
Small								
Private	4,027,031	3,090,880	0	61,564	84,392	464	132,392	657,341
Social	3,269,932	2,288,500	0	61,564	183,735	464	132,392	603,278
Divergences	757,100	802,380	0	0	-99,343	0	0	54,063

The per unit revenue of large-scale enterprises who fatten imported cattle is lower then medium and small-scale businesses. This is because the larger firms tend to sell animals at lower weights. Their typical fattening time is 60 days. The purchase price of feeder cattle is the same, Rp. 12,000 per kg. The motivation of shortening the fattening process is the high market demand and speeding the cash flow of the farmers.

The small business owner who uses local feeder cattle has the lowest revenue. The live weight of local feeders going into the finished market is low compared to finished imported feeder cattle.

4.2. Tradable Inputs

The biggest cost component of a fattening operation is the cost of feeder cattle (82%). The PAM shows a divergence in tradable inputs that is due to a 10% tariff on all imported animals, including feeder stock. In addition to the general tariff distortion, local government retributions as well as levies by Tanjung Priok Jakarta and Bandung Regency add to the divergence between private and social prices.

There are no divergences between private and social prices for other tradable inputs such as concentrates and medicines. The government does not impose tariffs on these commodities.

In large-scale fattening businesses, there is a negative cost divergence (private prices are lower than social prices) because the government provides a subsidy for energy. The subsidy is on solar power that can be used to substitute for electricity and diesel.

Because consumers prefer local over imported beef, local feeder cattle are more expensive than imported ones. The live local feeder cattle cost 13,633/kg while imported feeder cattle cost Rp. 11,900.

In the local fattening business, there are no tradable inputs such as concentrates and medicine because the cattle are fed on home grown hay and grass. In the PAM analyses, this type of feed is classified as a domestic non-tradable input that should be disaggregated into tradable inputs and domestic factors. The cost of hay and grass is almost entirely labor. The capital cost of harvesting tools is virtually zero.

4.3. Domestic Factors (Labor and Capital)

The labor used in fattening cattle is unskilled labor. There is no government policy that affects wages such as a minimum wage rate. Because there is an abundance of labor available in the area, it is assumed that there is no imperfection in the labor market and no divergence between its social and private price.

In the case of capital, there is a divergence between private and social prices caused by subsidized interest rate for all imported feeder cattle. The interest rate, after adjusting for an inflation level of 10%/year, is 3.64%.

There is also a 6% subsidy from the government given as an incentive to businesses that use the partnership nucleus plasma mechanism.

4.4. Profits

The private and social profits of the fattening process for both local and imported feeder cattle shows a positive divergence. In part, this divergence is due to distorted output policies implemented by the central and local governments. It also happens because of the subsidized purchased inputs and subsidized interest rates for loans, especially for small farmers.

Both the private and social profits received by farmers who use local feeder cattle are higher than those who use imported feeders. This is because the hay and grass used as the main source of feed is much less expensive than imported concentrates. (This type of domestic feed is limited because it is a by-

product of general agriculture and thus there are few opportunities of expanding local cattle feeding.)

4.5. Ratio Analysis Of PAM

Based on PAM ratio result, farmers have an incentive to engage in beef cattle fattening and it is an efficient use of domestic resources. This is indicated by the small PRC (Private Cost ratio) and low DRC (Domestic Cost ratio).

Table 4. PAM Ratios

	Imported			Local
	Small	**Medium**	**Large**	**Small**
1 NPCO [A/E]	1.21	1.21	1.21	1.23
2 NPCI [B/F]	7.10	7.98	8.64	
3 PCR [C/(A-B)]	0.12	0.09	0.14	0.48
4 DRC [G/(E-F)]	0.01	0.01	0.02	0.08
5 EPC [(A-B)/(E-F)]	0.20	0.20	0.21	0.29
6 PC [D/H]	0.18	0.19	0.18	0.16
7 SRP [L/E]	-0.69	-0.70	-0.70	-0.77

4.6. Analysis of Sensitivity

Assume that the 10% import tariff on imported feeder cattle is removed.

1. The cost of tradable inputs in the form of imported feeder cattle is decreased so that positive divergences are caused only by local government retribution for cattle transportation and other levies.

2. The level of private profit is increased because the cost of imported feeder animals has been reduced.

3. Feeders using locally bred cattle do not experience any change due to the removal of the import tariff on feeder cattle.

Table 5. Analysis of Sensitivity without the implementation of import tariff.

	Revenue	Tradable Input		Domestic Factors					Profit
		Bakalan	Others	Labor	Capital	Land	Others	Total	
IMPORT									
a. Small									
Private	4,840,000	3,259,500	585,000	25,893	51,158	225	384	77,660	917,840
Social	4,013,167	2,985,000	585,000	25,893	106,095	225	384	132,597	310,570
Divergences	826,833	274,500	0	0	-54,937	0	0	-54,937	607,271
b. Medium									
Private	4,778,182	3,254,561	510,545	18,571	39,472	196	1,198	59,437	953,638
Social	3,961,909	2,980,477	510,545	18,571	86,144	196	1,198	106,110	364,777
Divergences	816,273	274,084	0	0	-46,673	0	0	-46,673	588,861
c. Large									
Private	4,530,000	3,105,000	444,821	41,525	48,959	170	639	91,292	888,886
Social	3,756,125	2,860,625	445,479	41,525	87,798	170	639	130,132	319,889
Divergences	773,875	244,375	-658	0	-38,840	0	0	-38,840	568,998
LOCAL									
Small									
Private	4,027,031	3,090,880	0	61,564	84,392	464	132,392	278,811	657,341
Social	3,269,932	2,288,500	0	61,564	183,735	464	132,392	378,154	603,278
Divergences	757,100	802,380	0	0	-99,343	0	0	-99,343	54,063

V. CONCLUSIONS AND THE IMPACT OF POLICY

1. All beef cattle systems are privately profitable indicating that producers have positive financial incentives to continue or to expand production.

2. All beef cattle fattening enterprises using either imported or local feeder cattle are socially profitable showing that they have a high degree of comparative advantage.

3. The profits earned by different size enterprises (small, medium, and large) are not significantly different. This shows that there are no obvious economies of scale in beef fattening systems.

4. Positive divergences between private and social prices for tradable outputs and inputs are caused by policy distortions in the form of import tariffs (10% by central government (Law No. 18, 2000, Central Regulation No. 12, 2001 and Fund Ministry regulation No. 155/KMK03/2001) and retribution imposed by local government (Local Regulation No. 22/2000) and other levies.

5. Local cattle fattening is more efficient than feeding imported cattle because local feeds such as hay and grazing are virtually free while imported concentrates used to feed imported cattle are expensive.

6. If farmers were exempt from paying the import tariff of 10% on feeder cattle, their profits would increase because the effect of the current policy distortion on tradable inputs would be reduced.