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ECONOMIC INCENTIVES AND COMPARATIVE ADVANTAGE IN THE LIVESTOCK INDUSTRY*

by

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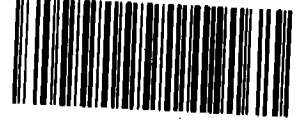

ECONOMIC INCENTIVES AND COMPARATIVE ADVANTAGE IN THE LIVESTOCK INDUSTRY*

L. S. Cabanilla[**]

Government intervention in the livestock industry has become an important part of agricultural policy making in the Philippines. The desire for self-sufficiency in livestock products in the face of demand growth resulting from increasing income and population has led to more government intervention in the industry.

As in other industries, intervention has taken several forms which can be classified broadly as tariff and non-tariff. These interventions alter relative prices of inputs and outputs in the domestic market and put a wedge between domestic and border (world) prices. Consequently, different degrees of protection are afforded to firms within and across industries, and, some consumer groups are protected while others are penalized.

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The existence of numerous and sometimes conflicting government intervention raises the question of whether or not these policies produce effects favorable to agricultural development in general. The incentive structure resulting from intervention in the livestock sector has pervasive effects on the other sectors. When private profitability is high in livestock production, additional resources will flow to this sector. Thus, it is necessary to determine whether or not the present intervention system promotes livestock production activities that are relatively efficient in the use of domestic resources.

This paper is composed of three parts. The first briefly describes the livestock industry, the second part analyzes the impact of government policies, and the third part discusses comparative advantage in livestock production in the Philippines.

The Livestock Industry

The Philippine livestock industry[1] contributes an average of 15 percent to the gross value added (GVA) in agriculture. Most of this come from four animal species namely poultry, hogs, cattle and carabaos, although carabaos are at present primarily raised as work animals rather than source of meat.

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[1] In official statistical publications (particularly NEDA's) poultry is distinguished from livestock. For this study, livestock includes poultry.

The animals, particularly the ruminants (e.g., cattle and carabaos) are raised predominantly in backyard farms. But growth of the commercial sector specially in the non-ruminants (e.g. hogs and poultry) has been significant since the early seventies. This phenomenon which seem to be true also in most Asian LDC's is due to the observation that technology in hogs and poultry raising is easily transferred across countries while technology in cattle is not. Cattle raising is highly dependent on environmental conditions favoring the temperate countries. Furthermore, the declining land-man ratio presents a barrier to higher inventories of cattle which are at present raised economically only in sparsely populated areas where the opportunity cost of land for growing pasture grass for cattle is relatively low. In contrast, hogs and poultry can generally be raised in commercial scale anywhere as long as they are provided with proper housing facilities and a steady supply of feed concentrates.

Meat production which has been growing at an average rate of 2.5 percent per year in the seventies compared to 1 percent in the previous years (see Figure 1) has been due to the growth both in the number of animals slaughtered and the weight of animals. Important in this development is the commercial sector particularly in hogs and poultry. Hogs contribute around 60 percent of the total meat supply and poultry supplies around 15 percent.

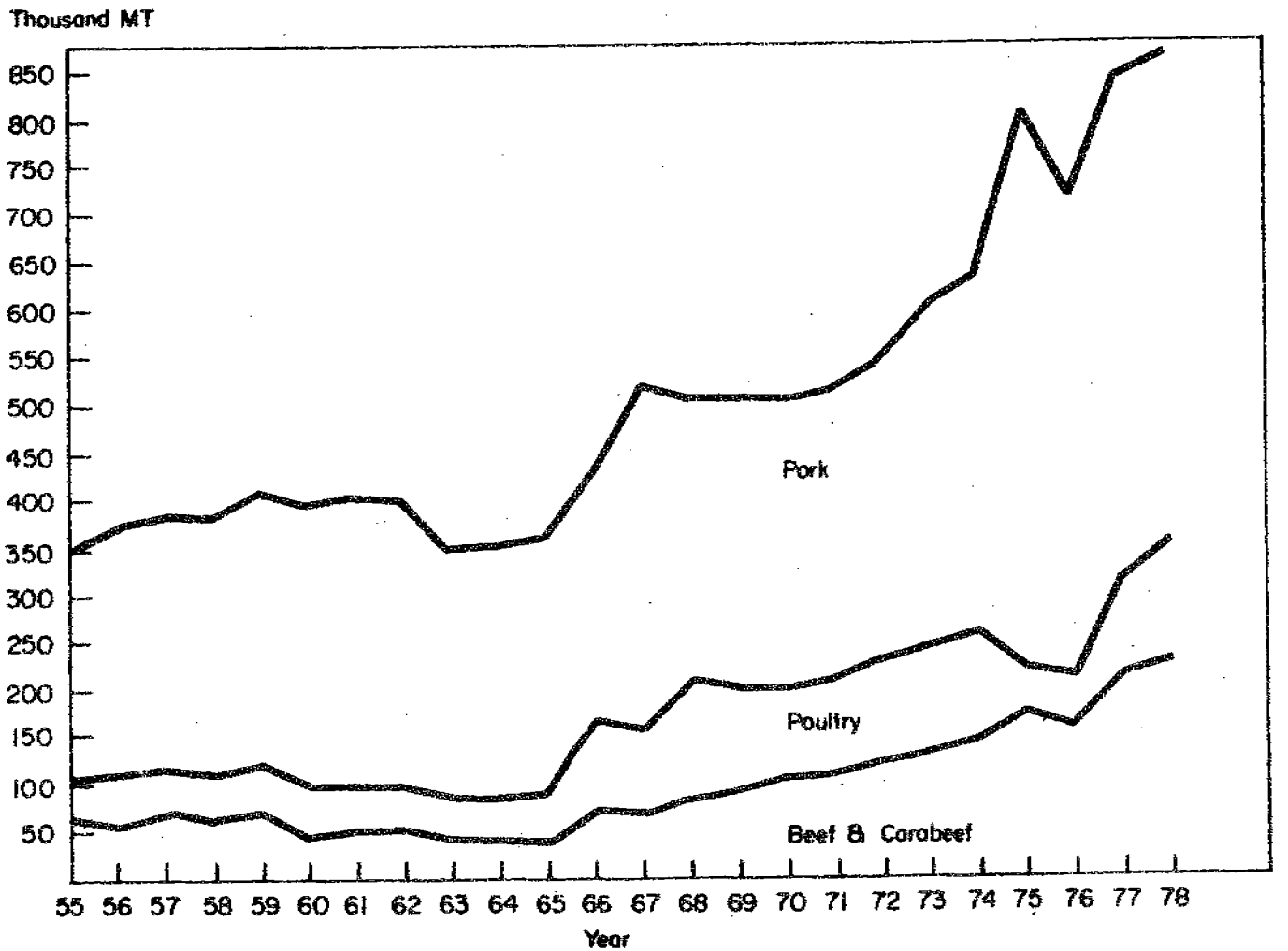

Fig. 1. Trends in meat production, 1955-80.

The ruminants are a minor source of meat and this will likely be true also in the future. Commercial hogs and broiler production in poultry, which has become predominantly a contract growing system will continue to serve as the major sources of meat. These animals are known to reproduce much faster and their feed conversion efficiency is also higher than ruminants. It is worth noting however, that since raising hogs and chickens necessitates the use of large amounts of feeds,[2] increased domestic production or increased importation of feedstuffs will be needed.

If the country wants to save foreign exchange by preventing meat imports and promoting domestic production, we have to produce the feedstuffs which are needed to produce meat. In other words resources have to be allocated to the production of more feed ingredients notably feed grains, which inevitably competes with other food crops for the use of domestic resources particularly land. Otherwise, we may end up using more foreign exchange to import these feedstuffs. This appears to be the case in the Philippines starting in the seventies when the value of the country's imports of feedstuffs notably yellow corn, soybean meal, and fish meal, have grown relatively more than meat imports,which have been kept at low levels (see Figure 2).

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[2] Feeds cost can go as high as 70 percent of the total cost of production (See Labadan, 1976).

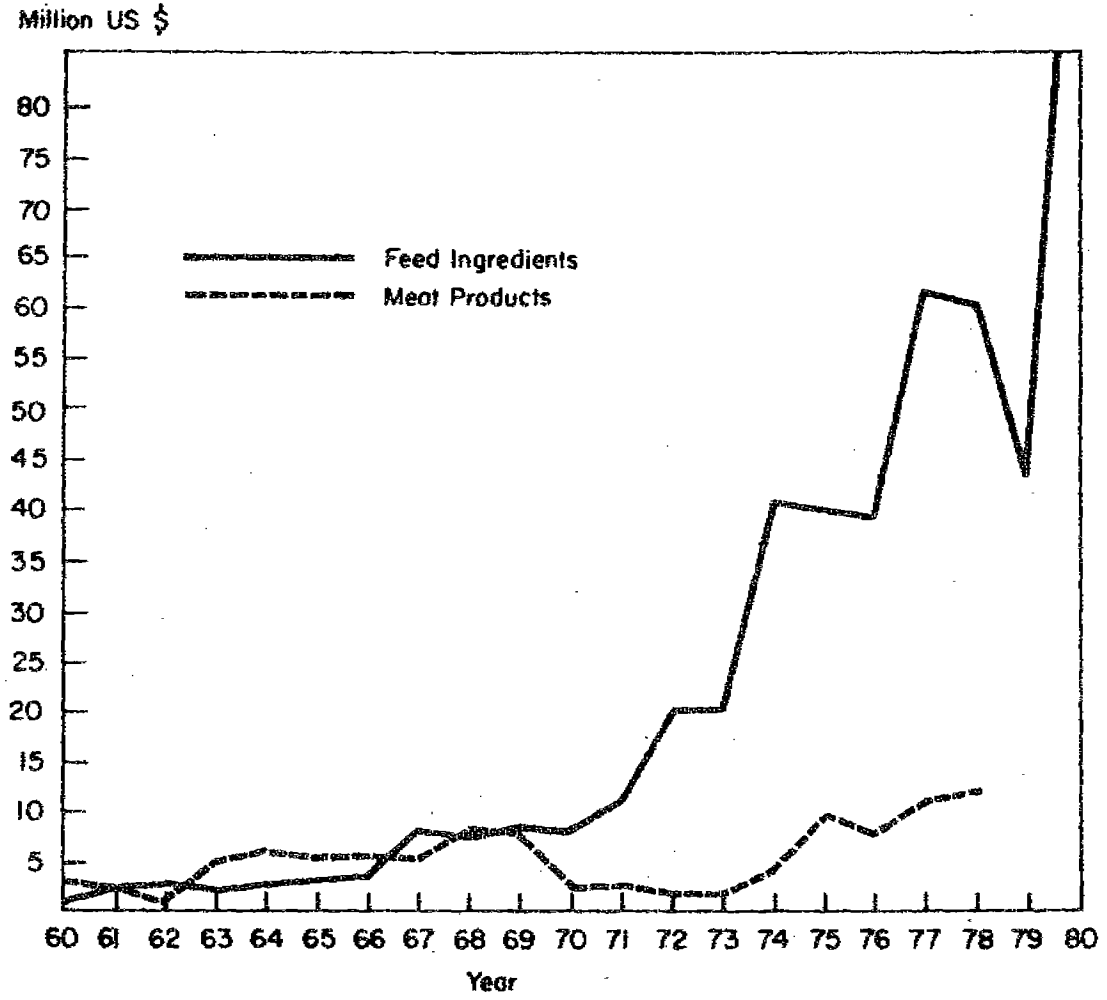

Fig. 2. Trends in value of feed ingredients and meat products imported 1960-80.

Except for the substantial imports of poultry meat and eggs during the early post-war years and again some token amounts in the mid-sixties, imports have generally been less than 10 percent of supply for beef and less than one percent for pork, chicken and eggs. Canned meat, particularly corned beef however, have been imported in significant quantities during the National Marketing Corporation (NAMARCO) days of the fifties and the sixties. Between 1955 and 1969, imports of corned beef averaged 7,000MT per year. This is equivalent to more than 90 percent of the total imports of canned meat or three times the average volume of fresh beef imports during the same period. But even this has dropped tremendously in the mid-seventies when imports of corned beef averaged only 130MT per year. It is then evident that due to the government's efforts to conserve foreign exchange, the expected increase in demand for livestock products due to population and per capita income growth will put pressure to the expansion of domestic livestock production.

Analysis of Government Policies

Since livestock products are considered essential goods, one of the major concerns of the government has been to maintain low and stable consumer prices of these products. To achieve this, the government intervened in both output and inputs markets.

Tariff policy has been used to protect domestic producers from foreign competitors and various other programs were instituted to make the price of inputs, especially feeds, low.

In this section, the effects of government policies are analyzed. Composed of two parts, the first part deals with policies that affect output price and the second deals with policies that affect the price of inputs.

Policies that Affect Output Price

a) Trade Policy

Both tariff duties and quantitative restrictions have been used in the past to regulate the flow of live animals and livestock products into and out of the country but except for the ban on the importation of eggs in 1951 and live hogs export in 1976, trade on livestock products have been regulated mostly through tariff. Tariffs not only provide government revenues but also price protection to domestic livestock producers by raising domestic price above border price. Tariff protection however, has been historically more favorable to poultry than the other animal species.

Starting in 1957 when Republic Act 1937 (the Tariff and Customs Laws of the Philippines) was approved, the tariff rate was 70 percent for poultry meat and 100 percent for eggs while

other forms of meat were subject to 15 percent duty. Live poultry was subject to a 60 percent tariff rate, while young animals of the other species (i.e., horses, bovine, pigs, sheep and goats) were tax-free.

The high tariff for poultry, served as an effective means of preventing the inflow of cheap poultry products from abroad. During the mid sixties for example, there has been a constant threat of Danish chicken meat flooding the domestic market so that in the succeeding revisions of the tariff code, tariff for poultry remained high.[3]

In the 1972 revision of the tariff code, tariff rates for poultry meat and eggs remained at 70 percent and 100 percent, respectively but tariffs on other forms of meat declined to 10 percent. Duties on live animals likewise changed. The tariff on live poultry declined to 50 percent while tariffs on other live animals increased to 10 percent. It will be noted that in this revision there was a significant change in the tariff duty on processed meat, particularly corned beef. From 15 percent, (75 percent for other canned meat) the tariff duty increased to 100 percent. Tax-free imports of corned beef, which started

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[3]People in the poultry sector in batting for the retention of high tariff rates claim that the entry of cheap Danish chicken in 1964 has caused them a lot of trouble (See Baladad, A., 1979).

upon the creation of the National Marketing Corporation (NAMARCO) in 1955 also stopped. Although this development was directly a form a protection to the local meat processing industry, commercial cattle producers will share part of this through a greater demand for beef as raw materials.

Another amendment to the tariff code was instituted in 1980. Although this time there was a general decline in tariff rates, the structure remained favorable to poultry. Imports of poultry meat (by 1981), and eggs (by 1982) will face a 50 percent tariff. Pork and beef are now subject to only 5 percent duty. The implication of this tariff structure in livestock products is that in the absence of other policies that negate its impact on prices in the domestic market, we will observe that domestic prices of poultry products relative to border price will be higher than pork and beef.

Price Control

Direct price intervention through fiat, has been used primarily to maintain a stable consumer price of livestock products. If effective, it should counteract part of the impact of tariffs on domestic prices.

Thus, in view of the concern for the benefit of the local consumer, prices of poultry meat and eggs and some cuts of pork, but not beef, are subject to price control.

Government authorized prices are announced to the public and this is enforced through periodic inspection of retail stores. Most recently, the government likewise undertook distribution of livestock products in rolling stores and other distribution centers at controlled prices. However, the smallness of the operation of these centers relative to the total market renders price control ineffective in depressing the upward pressure exerted by tariff policy on domestic price of livestock products, particularly poultry.

Periodic reports indicate that these distribution centers mostly located in Metro-Manila handle less than one percent of the meat sold in the area (the BAI Report, 1979). Studies also tend to show that farmers prefer to sell their produce to middlemen than to government procurement-distribution centers.[4]

Other Policies

There exist other policies that have long-run effects on the industry. Research and extension programs of the government for example have important effects on technology in livestock. These programs could have significant long-run repercussions on price as better technology (higher efficiency) would ultimately mean lower cost of production.

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[4]Limited capacity to absorb supply and strict grading requirements are some of the reasons cited (Zamora, G., 1982).

Unfortunately, like in most agricultural commodities, there is very little research expenditure on livestock. Improvements in domestic technology have been primarily through direct technology transfer from abroad. Nonetheless, it is important to note that research in poultry got more attention relative to other species. Research expenditures represented 0.40 percent of the value of output in poultry in 1980 compared to 0.07 for pork and 0.035 for beef and carabeef (Evenson, 1981). Genetic improvement has been an important component of research undertakings and this has made possible the improvement in the performance of the local poultry stock relative to that in the U.S. (see Arboleda, 1980).

Livestock marketing is another aspect that has caught the attention of policy makers. It is a popular idea that the marketing system is inefficient due primarily to the involvement of middlemen. Because of this, much effort in the past has been devoted to the regulation of the activities of the middlemen in the marketing system. The establishment of the Food Terminal Inc. (FTI), previously known as the Greater Manila Terminal Food Market (GMTFM) and Livestock Auction Markets (LAM's) are moves along this line. However, studies show that middlemen still play a major role in the marketing of livestock (Dagaas, C. and Garcia, M., 1981; Deomampo, N., 1973). This may be because, contrary to what most people think, the services of the middlemen are essential.

Impact of Policies on Output Price

To quantify the net impact of government policies affecting output prices, the nominal protection rates (NPRs)[5] for chicken meat, eggs, pork and beef were calculated. NPRs measure the rate by which domestic price deviates from the border price.

One commonly used measure of the border price is the country's import unit value (CIF). For livestock, however, the Philippines' import unit values cannot be used since imports comprise a very insignificant proportion of the total domestic supply. Moreover, imports do not represent the average quality of meat that is traded domestically. For these reasons, border prices used in valuing output are the import unit values of Hongkong for poultry and pork, and of the U.S. for beef.

The choice of Hongkong import price is based on the observation that it imports substantial quantities of livestock products. Its geographical location relative to international supply points

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[5] $NPR = (\frac{P^d}{P^b} - 1) \times (100)$ where: P^d = domestic price and P^b = border price.

is comparable to the Philippines, and its import unit values are found to be very similar to other countries like South Korea and Singapore. For beef, U.S. import unit values were used since its imports consist mainly of low quality beef.[6]

Estimates of NPR for the livestock industry derived using direct price comparison are shown in Table 1. Immediately apparent are the high coefficients for poultry. During the period covering 1960-80, the rate of protection to broiler production was 62 percent on average. layers received 16 percent protection but pork and beef were afforded 9 percent and zero[7] protection rates, respectively. Except for the case of beef, these are consistent with the tariff protection afforded to these enterprises across time.

Protection rates for chicken and pork were notably high in the early sixties. Government policy, particularly tariff

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[6] Despite the precautions undertaken in choosing what is thought to be the most appropriate border price, there may still be problems of comparatibility particularly in beef since traded beef comprise a wide range of different qualities.

[7] The low NPR for beef is hard to explain especially because we may have price comparability problem. Note however that recent data (1981) show high NPR for beef -- 60 percent, making its average NPR to the 6 percent,very close to the tariff rate.

Table 1. Average NPR for pork, beef, chicken and eggs, 1960-1980.

	1960-64	1965-69	1970-74	1975-80	1960-1980
Pork	16	50	20	-2	9
Beef	10	-4	-32	17	0
Chicken	50	122	50	57	62
Eggs	23	47	13	11	16

Source: Derived from Appendix Table 1.

policy, has allowed domestic price to be well above border prices. This seems to have been a necessary integrated type of the poultry sector. Lastly, it is also in the sixties that new techniques of production such as the contract growing scheme evolved.

Towards the seventies and into the eighties, protection rates declined (Figures 3 and 4). This trend was more consistent in eggs and pork. Since there has generally been no change in government policies that strongly affect domestic price of livestock products during this period, improvements in hogs and poultry technology together with domestic competition appear to have made part of the protection afforded by tariff redundant.

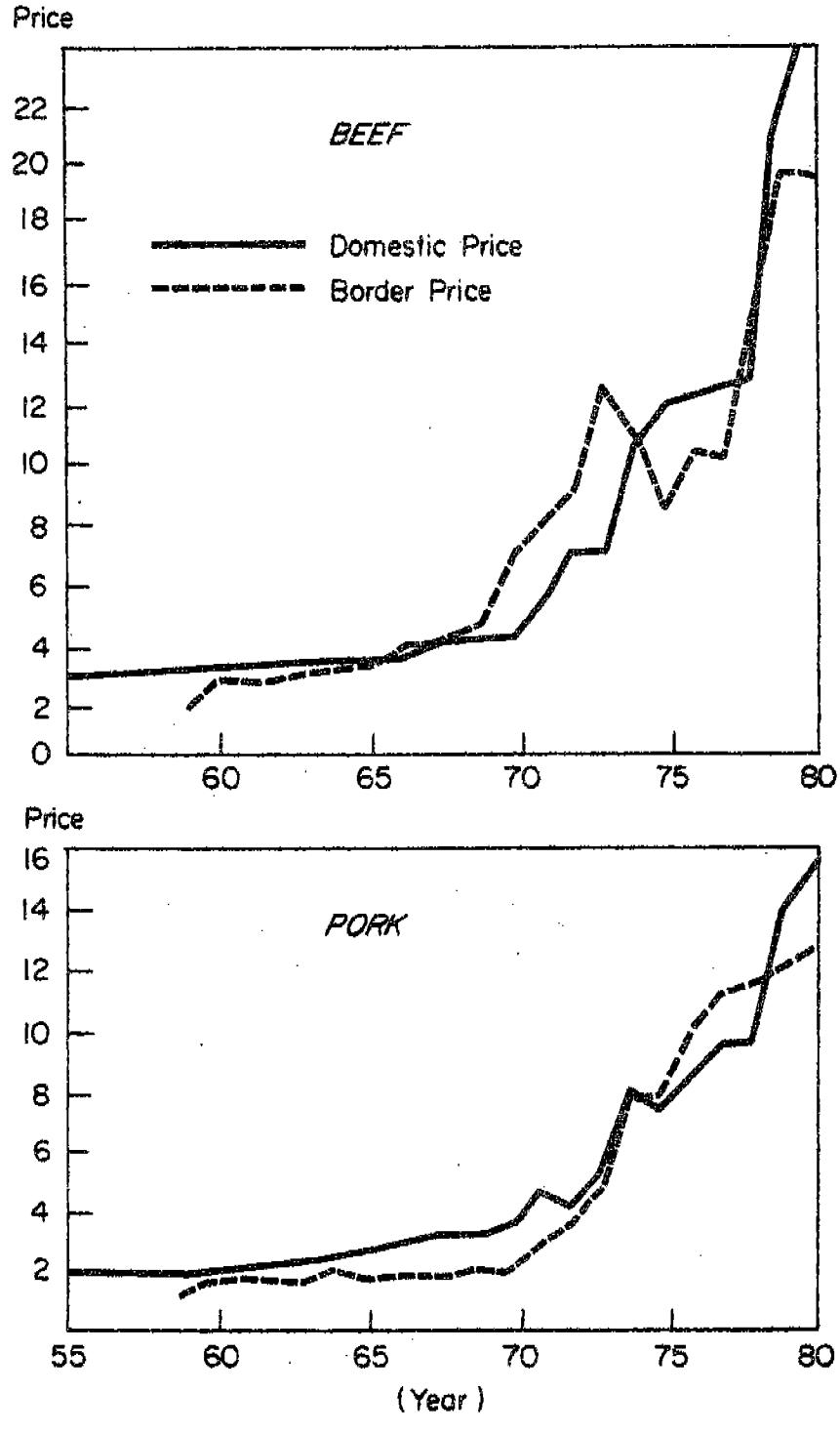

Fig. 3. Trends in domestic and border prices (₱/kg.), beef and pork, 1959-1980.

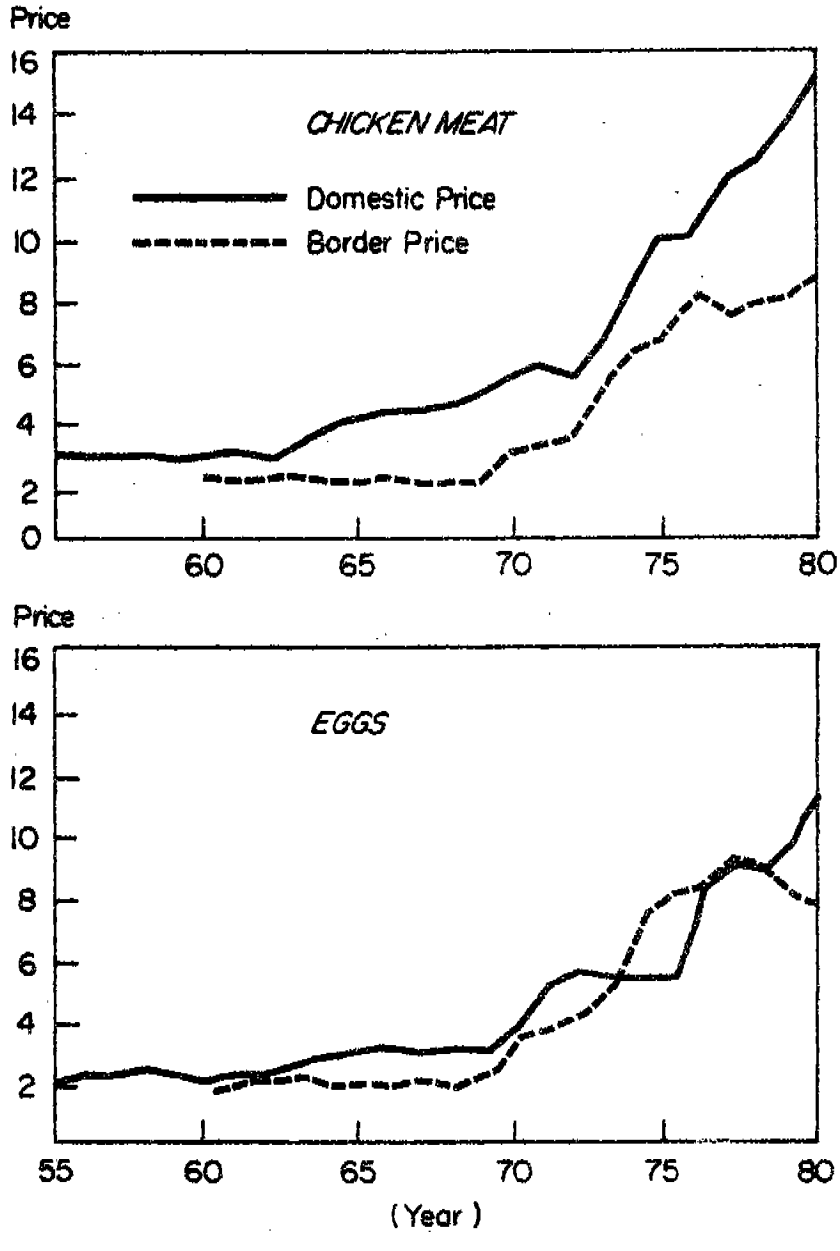

Fig. 4. Trends in domestic and border prices (₱/kg.) chicken meat and eggs, 1959-80.

Better organizational technology, e.g., contract growing, together with better breeds made higher efficiency possible. In 1975 for example, performance tests in poultry show that feed efficiency in broiler and egg production has increased. Arboleda (1980) notes that while it used to take more than 14 weeks to grow one kilo liveweight of broiler, it is now common to attain it in only six weeks. As a result, it now takes only 2 kilos of feeds to produce a kilo of chicken meat compared to 8 kilos of feeds to attain the same weight several years ago.

The same phenomenon was experienced in egg production. It now takes only 2 kilos of feeds to produce a dozen eggs compared to 8 kgs. of feeds several years back. It is interesting to note however, that generally, efficiency in domestic egg production relative to that in the US is much higher than in domestic broiler production. Efficiency in egg production is only 2 percent below that in the US while in broiler production performance is 20 percent below. Technical experts attribute this phenomenon to environmental factors.[8] This is consistent with the lower NPR, based on price comparison, for eggs than in chicken meat despite the higher tariff rates for eggs. Stronger competition among the more

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[8]Some claim that broiler grows much faster at around 75°F — lower than the yearly average temperature in the Philippines.

efficient egg producers may have also driven down domestic price of eggs relative to border price.

The same thing appears to be true for pork but we cannot be very certain about the trend in the NPR for beef. It will be noted for example, that during the early seventies, domestic price of pork moved very closely with the border price. This is an indication of the improvement in the country's competitive position on hogs making it possible the exportation of live hogs to neighboring countries like Hongkong during this period. However, in 1976, the government imposed a ban on hog exports, which, for several years has driven domestic price below the world price (Figure 3). It is not clear when the ban was lifted but latest developments show that commercial hog producers have again ventured in the export market -- evidence of the inherent potential of this sector.

Policies Affecting Input Prices

Protection on the price of livestock products is just part of the government's influence on the structure of livestock production in the country. The government also intervenes in the input markets in an effort to make domestic production profitable and at the same time maintain a stable consumer price level. Since feeds, as pointed out earlier, comprise as much as 70 percent of the total cost of livestock production particularly in

the commercial sector, intervention has mainly been in the form of altering the price of feeds in the market. The government also tries to make the cost of capital low primarily through low interest credit policy and secondarily through various other forms of incentives under the Investment Priorities Plan (IPP) of the Board of Investment (BOI).

Programs for the backyard sector are essentially in the form of supervised credit (e.g., Bakahang Barangay). But apart from the problems inherent to cheap credit programs now well recognized (see David, C., 1982) the bulk of the loans to the industry has been mainly for long term investments (e.g., investments on fixed capital) rather than for operating cost which is the major expenditure item in livestock production. The discussion in this section will focus mainly on policies affecting feeds.

Trade Policies

Under the old Tariff and Customs Code (RA No. 1937), the tariff on prepared animal feeds was 40 percent. Ingredients like flour meal, meat and bone meal, fish meal and by-products of cereals and leguminous plants were subject to 10 percent tariff.

In the 1972 revision of the tariff code, the duty on mixed feeds was increased to 50 percent but the tariffs on ingredients essentially remained unchanged. Also in the seventies impor-

tations and distribution of vital ingredients like yellow corn, soybean meal and wheat grain, from which wheat bran is derived, became a government monopoly under the National Grains Authority (now called the National Food Authority).

The tariff rates will put an upward pressure on the domestic price of feeds. And, since the NFA imports ingredients tax-free, its marketing monopoly on yelllow corn and soybean meal may dampen or further increase[9] domestic price depending on its pricing policy.

Copra meal and molasses exports as has already been noted earlier, are subject to a 4 percent tax. The export tax would make the domestic price at least 4 percent lower than the border price. This will cushion the impact of the implicit tariffs on fishmeal, meat and bone meal. It will also counteract whatever price wedge that may arise from NFA's marketing monopoly on yellow corn and soybean meal.

Price Control

In addition to the trade policies that tend to lower the price of domestically produced feed ingredients, price controls on mixed feeds and feed ingredients, particularly feed grains and their by-products were instituted. Note however, that ceiling prices for different types of mixed feeds are based on the cost

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[9] Note that in our succeeding analysis, the border price of yellow corn and soybean meal (CIF) were adjusted upwards by 5 percent to account for NFA's additional costs of handling from the boat to the pier.

analysis, we took the 33 percent as the upper limit and as an alternative (a lower limit), we simply assume that feed-millers do not enjoy any effective protection, i.e., EPR = 0, and implicit tariffs paid on feed ingredients are passed on to the livestock producers as a higher price for mixed feeds.

Table 2 shows the individual IT rates for the different feed ingredients used in estimating the average IT for mixed feeds. It is interesting to note that soybean meal and yellow corn, the ingredients under NFA's control have implicit tariff rates of 59 and 17 percent respectively. Apparently, NFA's pricing policy on these ingredients has imposed a penalty to the users of these ingredients.

Table 2 also shows a summary of our estimates of the IT for layer mash, broiler mash and hog grower mash. These feed mixtures were used to represent the feeds for layer, broiler, and piggery enterprises since they normally comprise the biggest proportion of total mixed feeds used in each type of enterprise. They also represent the bulk of the total volume of mixed feeds produced by feed millers intended for these groups of animals.

Note that the higher implicit tariff rates for broiler and layer mash is largely explained by the greater use of importable ingredients (which are subject to high IT s) in poultry feeds. On the other hand, it appears that in the hog feeds formulation, there is more reliance on indigenous materials. As an example,

Table 2. Implicit tariff rates for feed ingredients, and mixed feeds.

FEEDSTUFF	IMPLICIT TARIFF %
Feed Ingredients	
(A) Tradables	
Yellow corn	17[a]
Soybean meal	59[a]
Meat meal	24[b]
Fish meal	24[b]
Vitamins	27[b]
Copra meal	-4[c]
Molasses	-4[c]
(B) Non-Tradables	
Corn bran	0
Corn germ meal	0
Corn grits	0
Ipil-ipil leaf meal	0
Pollard	0
Rice bran	0
Salts	0
Mixed Feeds[1]	
Broiler mash	23
Layer mash	20
Cattle feeds	17
Hog grower mash	7

[a]Based on price comparison. Average of 1979-1981 prices.

[b]Based on legal rates.

[c]Export tax rate. Very close to IT using price comparison.

[1]For computational details see Cabanilla, L.S. 1983,

corn bran and rice bran combined, both by-products of the local milling industry, were utilized by PAFMI companies to around 40 percent of the total weight in hog grower feeds in 1975 compared to only 9 percent in layer and 5 percent in broiler mash. It must be pointed out however, that the lower implicit tariff rates for hogs and cattle feeds serve to offset the lower protection on the prices of pork and beef relative to poultry products.

Effective Protection Rate

To synthesize the impact of government policies affecting output and input prices, we estimated the effective protection rates (EPRs)[10] for poultry, hogs and cattle. Note first that for broiler, only the EPR for an integrated operation is presented. This is because, the total protection for broiler production is thought to be shared by the hatchery operator, feed miller and the broiler grower, particularly under the contract growing scheme.

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[10] Also known as protection on value added EPR is shown as:

$$EPR = \left(\frac{V^d}{V^b}\right) - 1) \times (100)$$

where: EPR = effective protection on the jth activity; V^d = value added in domestic price; V^b = value added in border price.

Our estimates are shown in Table 3. Because the implicit tariffs for feeds derived in this study provide a lower limit and the 33 percent derived by Medalla and Power provides the upper limits, we made two separate EPR estimates corresponding to those limits. This is an attempt to make sure that the EPRs that truely indicate the effect of price policy on feeds are reflected in our estimates. At best these would fall half-way between the high and low estimates.

It appears that there is high effective protection for poultry and negative protection for hogs and cattle. Domestic broiler production in particular, enjoys as high as an average of 200 percent effective protection. This is primarily because of the very small value added in broiler production. Cost of intermediate inputs range from 70 to 80 percent, most of which, is feeds. Moreover, there is a wider gap between the NPR for output and average IT for inputs in broiler compared to the other species. For broiler production to continue serving as the main source of chicken meat, returns to primary factors of production had to be artificially high.

Hogs and cattle on the other hand, are not as well favored. It appears that they are penalized by the protection system. Their continued existence, and in fact the sustained growth in hogs production however, is one indication that they are efficient producing units.

Table 3. Effective protection rates (percent) for poultry, hogs and cattle.

ENTERPRISE[1]	EFFECTIVE PROTECTION RATE[2]			
	Project Survey (1980)		DBP Survey (1979)	
	High	Low	High	Low
Broiler (Integrated)			261	209
Large	241	155	-	-
Small	278	228	-	-
Layer			18	(-)7
Large	19	7	-	-
Small	12	(-)9	-	-
Hogs			15	(-)29
Large	17	(-)20	-	-
Small	15	(-)29	-	-
Cattle[3]				
Feedlot (A)	(-)11	(-)16	-	-
(B)	3	(-) 3	-	-
Ranch (A)	(-) 6	(-) 7	-	-
(B)	7	6	-	-

[1] Backyard farms were not included because the use of traded feedstuffs in these farms is very small. EPs are very close to NPRs.

[2] The high estimates correspond to the conservative ITs for feeds i.e. broiler mash =23 percent; layer mash = 20 percent and hog mash = 7 percent. The low estimates correspond to the 33 percent IT for all types of feeds.

[3] There are two estimates for cattle. (A) refers to EPR when NPR for beef is assumed zero and (B), when NPR is 10 percent.

Comparative Advantage in Livestock Production

The high protection rate to poultry has created a more favorable business environment for private entrepreneurs attracting investments from various groups, notably the big feedmillers. It must be noted, however, that the divergence between private and social profitability necessitates tackling the issue of whether or not it is socially beneficial to continue protecting import substituting endeavors such as poultry production. Put another way, the question is whether or not poultry is socially efficient in saving foreign exchange relative to swine and cattle or other production activities.

In this section, analysis of private profitability is followed by domestic resource cost estimates. Data used for this purpose come from three sources. For commercial swine and poultry, the Development Bank of the Philippines (DBP) provided one set of data of 118 of their financed projects in the provinces of Laguna, Rizal, Batangas, Cavite, Bulacan, and Pampanga. The other data set on commercial farms, which from here on, shall be referred to as project survey data, involving 62 sample hogs and poultry farms, taken from Metro Manila, Bulacan, Laguna, and Batangas came from a small survey conducted personally by the author in 1980.

Farms in this data set were categorized into small and large farms in an attempt to make some distinctions in technology. This is potentially important in broiler production where the large farms are all contract growers. Data on two case studies of commercial feedlot cattle and a cattle ranch were also undertaken. For backyard farms, data gathered by the Bureau of Agricultural Economics (BAEcon) in a nationwide survey of backyard livestock farms were used.

It should be pointed out that the limited number of samples of commercial farms and the concentration of samples in provinces around Metro Manila may present problems on representativeness of our samples. However, the input-output coefficients appear to be consistent with other farm management surveys conducted in the past. Technical experts at UPLB also find no serious problems in these numbers. In this respect the limitations posed by the nature of our samples do not preclude the usefulness of the implications derived from the following analysis.

Private Profitability

The analysis of private profitability is highlighted by the differences in techniques of production within each animal category. This was done by classifying the sample farms into commercial and backyard. And, within the commercial sector, farms

were divided into small and large. Large commercial hogs and layer farms usually mix their feeds while small commercial farms buy commercially mixed feeds. In broiler production, most of the large farms are contract growers. Integrated operation where the chicks and mixed feeds are produced in the farm is also not uncommon among large broiler farms. Thus, for broiler we have separate estimates for independent and integrated operation.

Commercial Farms

Cost of intermediate inputs comprise the bulk of the total cost of production in commercial farms (Tables 4 and 5) particularly in poultry and hogs. This is mainly due to the relatively high proportion of the cost of feeds which implies that private profitability is highly dependent on the price of feeds. Consequently, government pricing policy on feeds is important to the producers of these animals.

For broiler, note the differences in the cost structure between the independent and integrated operation. Cost of intermediate inputs is on the average 80 percent of the value of output in the independent type whereas in the integrated type, it ranges from 60 to around 68 percent. This is because the value added in the production of chicks and mixing of feeds is now a part of the cost of primary inputs under the integrated operation. The proportion of cost of feeds however, is higher in the integrated system because of the added cost of feeding the parent stock that produces the chicks.

Table 4. Private costs and returns in commercial poultry production.[1]

	BROILER					
	Independent			Integrated		
	Large	Small	DBP	Large	Small	DBP
	pesos per kg.			pesos per kg.		
Costs[2]						
1. Intermediate Inputs	9.00 (.80)	9.41 (.82)	7.57 (.81)	7.47 (.67)	8.35 (.73)	6.70 (.72)
Feeds	5.97 (.53)	6.95 (.61)	4.90 (.53)	6.73 (.60)	7.80 (.68)	6.17 (.66)
MVS	.44	.30	.22	.46	.32	.24
Water & electricity	.11	.04	.05	.19	.12	.12
Others (fuel & oil, office supplies)	-	-	.05	.09	.10	.05
Chicks	2.48 (.22)	2.12 (.19)	2.32 (.25)	-	-	-
2. Primary Inputs	2.22 (.20)	2.00 (.18)	1.67 (.19)	3.71 (.33)	3.06 (.27)	2.56 (.28)
Labor	.22	.18	.13	.33	.31	.23
Depreciation	.20	.23	.18	.32	.48	.29
Interest:						
Fixed Capital	.30	.29	.55	.49	.53	.72
Operating Capital	.28	.35	.06	.34	.40	.10
3. Taxes & Other Fees	.05	-	-	.05	-	-
Total Output:						
Quantity (kgs)	28,921	2,370	19,576	28,921	2,370	19,576
Total Value (₱)	324,767	27,047	181,401	324,767	27,047	181,401
Value/Unit output	11.22	11.41	9.27	11.22	11.41	9.27
/unit output	1.17 (.10)	0.95 (.08)	.74 (.08)	2.23 (.20)	1.35 (.12)	1.21 (.13)

Notes: [1]Taken from Cabanilla, L. S., 1983.
[2]Numbers within parenthesis are proportions of costs to value of output.

Table 4. continued

ITEMS	LAYER		
	Large	Small	DBP
	pesos per egg		
Costs			
1. Intermediate Inputs	.330 (.55)	.496 (.72)	.489 (.78)
Feeds	.319 (.53)	.482 (.70)	.451 (.71)
MVS	.002	.010	.009
Water & electricity	.004	.001	.003
Others (fuel & oil office supplies)	.005	.003	.003
Chicks	-	-	.023
2. Primary Inputs	.271 (.45)	.197 (.28)	.141 (.22)
Labor	.034	.014	.010
Depreciation	.029	.039	.029 (.05)
Interest:			
Fixed Capital	.070	.079 (.11)	.066 (.10)
Operating Capital	.005	.006	.006
3. Taxes & Other Fees	-	-	-
Total Output:			
Quantity (pcs)	5,180.999	463,479	432,616
Total Value (₱)	3,054,163	324,191	272,287
Value/unit output	.60	.69	.63
/unit output	.133 (.22)	.059 (.08)	.03 (.05)

Table 5. Private costs and returns in commercial hogs and cattle production.[1]

ITEMS	HOGS			CATTLE	
	Large	Small	DBP	Feedlot	Ranch
	pesos per head				
Costs[2]					
1. Intermediate Inputs	678.57 (.77)	731.43 (.77)	468.07 (.76)	2,464.18 (.67)	634.14 (.35)
Feeds	662.24 (.75)	708.07 (.74)	438.32 (.71)	1,399.54 (.38)	124.14 (.07)
MVS	6.80	13.15	12.00	17.53	323.40 (.18)
Repairs	3.11	-	-	45.36	47.20
Water & Electricity	4.20	9.25	7.33	7.01	-
Fuel & Oil	2.08	.96	9.41	147.71 (.04)	99.57
Fertilizers	-	-	-	-	38.55
Others (e.g. Office Supplies)	.14	-	1.01	847.03 (.23)	1.28
2. Primary Inputs	203.41 (.33)	220.00 (.23)	145.66 (.24)	1,236.33 (.33)	1,184.59 (.65)
Labor	40.26	24.45	4.45	91.95	306.55 (.17)
Depreciation	12.46	18.12	15.08	149.74 (.04)	107.54 (.06)
Interest:					
Fixed Capital	80.69 (.09)	119.70 (.13)	84.57 (.14)	322.61 (.09)	403.30 (.22)
Operating Capital	12.29	12.44	5.64	103.03 (.03)	57.02
3. Taxes	3.55	-	.59	-	-
Total Output					
Quantity (heads)	3,143	195	98	3,423	2,350
Total Value (₱)	2,773,774	185,527	60,203	12,669,100	4,274,020
Value/Unit Output	882	950	614	3,701	1,819
Returns/Unit Output	54.06 (.06)	45.28 (.05)	35.92 (.06)	569 (.15)	310 (.17)

Notes: [1]Taken from Cabanilla, L.S., 1983.
[2]Nos. within parenthesis are proportions of costs to value of output.

Profit per unit output in the integrated farms is higher than the independent farms by around 60 percent, which in some ways reflect the profits that accrue to the feedmiller and the hatchery operator. It will be noted also that profit per kg. in our independent broiler enterprise is close to the fixed fee paid by the integrator to the contract grower. However, we may expect an increased shift to contract growing scheme in the future as the farmers are less exposed to risk in this system of production.[11]

Our figures for the commercial layer farms indicate that profit per unit of egg among large farms is twice as much as those among the small farms. The reason for this is the significant difference in the feed cost between the small and large farms. In the project survey, all the large sample farms mix their own feeds while majority of the small farms buy the commercially-mixed feeds. Apparently, the farms can reduce costs by mixing their own feeds. In addition, feed quality is also assured. Thus, although the price per egg is lower among large farms which is due to volume deliveries, net returns are still much higher.[12]

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[11] In 1976, some contracts specify that in case of abnormal mortality, the grower's share in the loss is only ₱1.00 per bird (up to 4 weeks of age) and ₱2.00 per bird (5-8 weeks of age).

[12] Most of the small farms cater directly to retail stores therefore price received is a little higher.

Net returns among the DBP sample farms appear to be very low -- 3 centavos per egg. It should be noted however that the survey covered only 5 months of production which happened to fall on the hot and humid months of the year when the laying flock are less productive.

Table 5 shows the private costs and returns for commercial hogs and cattle. It will be noted first that small and large hog farms represent different production systems. Large farms usually produce both finishers (marketable animals for slaughter) as well as weanlings (for sale to small operators). In most instances the number of weanlings is more than the number of finishers sold. Small farms on the other hand rarely sell weanlings. Usually they sell their animals as finishers. This is the case in our sample farms.

The large farms in our survey maintain breeding animals to produce weanlings for sale to backyard operators and also to be raised as finishers. The small farms on the other hand, rarely produce weanlings for sale to other farms. In some cases, they do not have breeding animals so that they buy weanlings from large farms and feed these animals till they reach marketable weight of around 85 kgs. Because of this, price per unit and feed cost per unit output is higher among small farms. Note however, that despite the lower price per head of output among the large farms, profit is 20 percent higher than small farms. This

profit difference can be looked at as premium for assuming the risk of maintaining a large stock of breeding animals in addition to scale economies enjoyed by the large farms.

Another difference between the small and large hog farms is on capital cost. Although in general, total capital investments among large farms is higher - - they have more sophisticated buildings and equipment, it appears that they are more efficient in using their fixed capital investment. Capital cost per unit of output is lower among the large farms.

The DBP data on hogs show a low profit per head. There is no apparent explanation to this but it is worth noting that the DBP survey as had already been pointed out, fell on a period of low production rate and slack demand.

Commercial cattle producton normally takes two forms — feedlot operation and cattle ranching. Cattle in feedlot are raised in confinement while in a ranch, the animals are allowed to graze in pasture lands. Feedlot farms raise cattle primarily for meat while ranches serve as breeding farms as well. In fact, they are the sources of yearlings for the feedlot operators. These differences explain why we observe a contrasting cost and return structure between feedlot and ranch in our figures in Table 5. Intermediate inputs, most of which is feeds, comprise around 67 percent of the total cost in feedlot compared to only 35 percent

in cattle ranch. On the other hand, the major proportion of the total cost in cattle ranch is on primary inputs.

Our case feedlot farm buys yearlings weighing around 200 kgs. from neighboring ranches and feed them in confinement till they reach marketable weight of 400 kgs. The roughage fed to the animals consist mainly of waste matter from the plantation of the agribusiness firm, while protein and energy are supplied by feeding the animals with corn and its by-products, in addition to some amounts of soybean meal.

The case ranch on the other hand sells most of its yearlings to rural bank-assisted farmers in the area who in turn feed the cattle in their backyards until they reach marketable weight. Slightly less than 50 percent of its output are sold for meat slaughter. This explains the difference in the value per unit of output between the two case farms. Note also that the profit per output is much higher in feedlot operation. This accounts for the higher risk assumed by the feedlot farmer in raising a yearling until it becomes marketable. The farmer loses more when the yearlings dies than when it dies at an earlier age.

Backyard Farms

The costs and returns for backyard farms are expressed on a per peso worth of output (Table 6). This is because of the absence of information on output quantity from the survey conducted

Table 6. Cost and returns; backyard livestock farms (peso of output).

ITEMS	Poultry	Hogs	Cattle
Costs			
1. Intermediate Inputs	.079	.251	.169
Feeds	.079	.243	.168
MVS	.002	.002	.001
2. Primary Inputs	.921	.749	.83
Labor	.192	.541	.270
Residual	.729	.208	.560

Source: Cabanilla, L. S., 1983.

by the Bureau of Agricultural Economics (BAEcon). Note however that the set of prices in the BAEcon survey is different from the project and DBP surveys since it was gathered in 1976. To make our numbers in the backyard farms comparable to the commercial farms, cost and returns are expressed per peso worth of output.

Two things are clear from Table 6. First, in contrast to the commercial farms, the cost of primary input is large among backyard farms. This is because the proportion of feeds cost which is as much as 70 percent among commercial farms, is

very small. Second, it appears that profit rate appears to be higher among backyard farms. It ranges between 20-70 percent of the value of output compared to 5-22 percent among the commercial farms.

Backyard farms in general, are subsistence production units. The system of feeding ranges from the scavenger type where the animals are allowed to fend for themselves (the case of the native chicken) to a system where kitchen refuse (in the case of hogs) is the main feeding material. Because purchased inputs are low, net returns tend to be high.

However, the higher profit rate cannot be taken as an argument in favor of promoting backyard systems of production because feed efficiency among these farms is low. Furthermore, expanding backyard production would ultimately necessitate increased use of purchased feedstuff since there is a limit to the home-produced feeding materials now being used among these farms. Marketing cost, which is not included in the analysis is also higher among the small, unorganized farms. But it is worth pointing out that backyard livestock farms will continue to be an important aspect of the farming system in the rural areas in the future. Backyard livestock (e.g., cabarao) will continue to be important sources of farm power, meat, and eggs for the rural folk. Furthermore, backyard livestock offers an opportunity for a better utilization of farm waste.

Domestic Resource Cost

The DRC [13] estimates are shown in Tables 7 and 8. Two sets of estimates are presented. One, the historical source allocation, allocates inputs to domestic and foreign sources as they actually occurred. The other, the fully traded assumption, treats all potentially tradable inputs as foreign. Conceptually, the two estimates have implications on the future expansions of the livestock industry. The historical source allocation presupposes that inputs for expanding production will come from their present sources while in the fully traded assumption, all potentially tradable inputs are assumed imported.

What is revealing from the numbers in the high DRCs for broiler compared to the other production activities. This is an indication that broiler production is less efficient than layer, hogs and cattle production. In fact, when the DRC estimates are compared to the shadow exchange rate, it becomes apparent that the country at present does not possess comparative advantage in broiler production. The social value of domestic resources used in broiler production is higher than the shadow exchange rate. Put another way, the "own-exchange" rate of

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[13] DRC measures the opportunity cost in terms of total domestic resources of producing (saving) a net marginal unit of foreign exchange.

Table 7. Domestic resource cost estimates in poultry.

PRODUCTION CATEGORY	D R C				D R C / S E R			
	Historical		Fully Traded		Historical		Fully Traded	
	Project Survey	DBP/BAEcon Survey [1]	Project Survey	DBP/BAEcon Survey [1]	Project Survey	DBP/BAEcon Survey [1]	Project Survey	DBP/BAEcon Survey [1]
Commercial Broiler								
A. Independent	12[a]	12	18[a]	17	1.35	1.35	2	1.9
Large	12		17		1.35		1.9	
Small	13		20		1.46		2.2	
B. Integrated	11[a]	11	16[a]	16	1.24	1.24	1.8	1.24
Large	11		15		1.24		1.7	
Small	11		17		1.24		1.9	
Commercial Layer	7[a]	7	7[a]	7	.79	.79	.79	.79
Large	8		8		.90		.90	
Small	7		7		.79		.79	
Backyard Poultry		10		10		1.13		1.13

[1] Data on backyard farms are from BAEcon.

[a] Mean DRC coefficient of large and small farms.

Source: Cabanilla, L. S., 1983.

Table 8. Domestic resource estimates in hogs and cattle.

PRODUCTION CATEGORY	D R C				D R C / S E R			
	Historical		Fully Traded		Historical		Fully Traded	
	Project Survey	DBP/BAEcon Survey	Project Survey	DBP/BAEcon Survey	Project Survy	DBP/BAEcon Survey	Project Survey	DBP/BAEcon Survey
Commercial Hogs	7[a]	6	6[a]	6	.79	.67	.73	.67
Large	7	-	6	-	.79	-	.67	-
Small	7	-	7	-	.79	-	.79	-
Backyard Hogs		8		8		.9	.9	
Commercial Cattle								
A. Feedlot								
High	7	-	b	-	.79	-	b	-
Low	6	-	b	-	.67	-	b	-
B. Ranch								
High	7	-	b	-	.79	-	b	-
Low	6	-	b	-	.67	-	b	-
Backyard Cattle								
High	-	8	-	b	-	.9	-	b
Low	-	7	-	b	-	.79	-	b

[1]Data on backyard farms are from BAEcon.

[a]Mean DRC coefficient of large and small farms.

[b]The DRC coefficients are the same as under the historical source allocation.

Source: Cabanilla, L. S., 1983.

broiler is higher than the shadow price of foreign exchange. Thus, broiler is not efficient in saving foreign exchange. The same is true with backyard poultry which produces both meat and eggs.

Apparently, the state of the arts in broiler production had not yet reached the level that is comparable to those abroad at the time our data was collected --1979-1981 for commercial farms. Our evidence tends to confirm the observation of technical experts as noted earlier, that the technical efficiency of broiler in the country is still far below that in the U.S. Egg production, in contrast, presents an interesting case. The DRC coefficients for layer indicate that it possesses a comparative advantage. The high protection rates afforded by tariff in the early fifties to egg production has enabled this sector to attain its present competitive position. Given enough time however, the same thing may happen to broiler production.

On the other hand, it will be noted that hogs and cattle, which are fed with a significant amount of indigeneous feedstuff with low opportunity costs, are more efficient than broilers. Their DRC coefficients when compared to the SER indicate that they are efficient in saving foreign exchange.

Summary and Concluding Comments

As income and population increase, demand for livestock products will continue to rise. To meet this growing demand, the country could expand production or increase importation -- each having important repercussions to the whole economy. Increased importation would entail use of more foreign exchange which may mean a sacrifice in other importable commodities. Expansion of domestic production would entail increased use of domestic resources thus heightening the competition for the use of these resources. This is more particularly so because expansion of animal production would require more feedstuffs which at present already have a high import content.

Because of the chronic foreign exchange problem that the country has had to tackle, expansion of domestic production of both feedstuffs and livestock products is the more likely choice in the future. In fact, past government policies have been geared along these lines. However, since the country possesses an extremely limited resource base, it would be necessary to determine whether or not these policies are moves towards a more efficient utilization of domestic resources.

Our analysis shows that the NPRs for poultry were higher than hogs and cattle during the post-ward years — domestic prices of poultry products were much higher than prices at the border compared

to hogs and cattle. This is consistent with the tariff structure for these products which indicates the importance of tariff policy in promoting domestic production.

Likewise, government policy in the input market, has resulted in poultry, particularly broiler, enjoying high effective protection rate. On the other hand, cattle and hogs were suffering from negative EPRs. This is because in broiler, NPR for output was much higher than the implicit tariff rate for inputs, while the opposite is true in cattle and hogs.

The high protection given in poultry production and particularly broilers, has created a favorable investment opportunity for the private sector. This has attracted investments in hatchery and other related enterprises. In fact this has resulted in the rapid development of commercial broiler production in the last decade. The results of the DRC analysis however, show that broiler production is still inefficient in the use of domestic resources.

On the other hand, the DRC estimates for hogs and cattle, the enterprises that are penalized by the protection system, show that they are efficient in saving foreign exchange. One important policy issue that inevitably arises from this observation is whether or not to allow the present protection structure in livestock to continue in the future.

It appears that the high tariff walls meant to protect the infant poultry industry has produced better results in eggs than

in broiler production. The protection afforded by policy has enabled the egg producing sector reach its present competitive position. This seem not yet true in broiler. Therefore, there is need for more vigorous efforts to improve efficiency in broiler production. This could be achieved through further genetic improvement to develop strains more adaptable to local conditions and better feed quality, not to mention the need to develop indigenous feeding materials. Through these efforts together with further improvements in organizational technology, the efficiency in egg production can very well be duplicated in broiler production.

Furthermore it is worth noting that the disadvantage in broiler could very well be explained by the fact that it uses feed ingredients that must be imported. Here, the disadvantage lies in the added transport cost between the source and the Philippines which, Thailand, for example does not have to pay (e.g., yellow corn). This may change however, if the government succeeds in its present corn production program.

The low DRC estimates for hogs and cattle show that they are efficient in the use of domestic resources. This is especially true with hog production which, despite the negative effective protection rate afforded it, continues to grow. Latest developments likewise indicate that domestic hog producers can compete in the world market.

In general therefore, the livestock industry possesses a comparative advantage. Its linkage to the manufacturing sector through the feed milling and drug/chemical industries implies that it should not be left out in the process of economic development. The industry can effectively serve as an important income generating endeavor in the rural areas, and at the same time provide protein-rich foods for the growing population particularly in the urban areas.

BIBLIOGRAPHY

Arboleda, C. (1980). Genetic Improvement of the Chicken and the Development of the Philippine Poultry Industry. Paper presented at the PSAS-UPLB-NRCP Lecture Series: A Tribute to Dr. Francisco Fronda.

Aviquetero, E. et. al. (1976). Income and Food Consumption (Summary of 17 Economic Surveys), Special Studies Division, Ministry of Agriculture.

Baladad, A. (1979). News and views, Better Poultry and Livestock, Vol. 20, No. 12.

Balassa, B. (1955). Tariff Protection in Industrialized Countries: An Evaluation, JPE, Vol. 23, p. 573-94.

Bautista, R., J. H. Power and Associates (1979). Industrial Promotion: Policies in the Philippines. Philippine Institute of Development Studies (PIDS).

Bruno, M. (1972). Domestic Resource Cost and Effective Protection: Clarification and Synthesis, JPE, 80 (1).

Cabanilla, L. S. (1983). Economic Incentives and Comparative Advantage in the Livestock Industry, Ph.D. dissertation, UPLB College, Laguna.

David, C. (1982). Economic Policies and Agricultural Incentives. Paper presented at the first session of the Leonides S. Virata round table on development policies, Manila, October 6, 1982.

Deomampo, N. and T. B. Punzalan (1973). Marketing Practices Costs and Margins of Hog Farms. Journal of Agricultural Economics and Development, Vol. III, No. 2.

Evenson, R. E., P. Waggeoner, and P. Bloom, (1981). "Agricultural Research Progress in the Philippines," Unpublished paper, Economic Growth Center, Yale University.

Gapuz, R. (1977). Poultry Management in the Philippines. Revised edition, Philippine Education Co., Manila.

Integrated Agricultural Production and Marketing Project (IAPMP), 1980. The corn-feed livestock industry: A framework for policy analysis, Ministry of Agriculture, Quezon City.

Labadan, M. (1976). "The Feed Processing Industry", in Livestock Production in Asian Context of Agricultural Diversification, Asian Productivity Organization (APO).

Lopez, P. (1980). Production, Utilization and Trade of Feed Stuffs in the Philippine, Unpublished paper, Department of Animal Science, University of the Philippines, Los Baños.

Medalla, E. and J. Power (1979). Estimating Implicit Tariffs and Nominal Rates of Protection, Special Paper No. 2, in Bautista R. and J. Power, Industrial Promotion. Policies in the Philippines.

NEDA, The Philippine Food Balance Sheet (various issues).

Appendix Table 1. Domestic wholesale price, border price and nominal protection rates (NPR) of pork beef, poultry and eggs, 1960-1981.

	PORK			BEEF			POULTRY			EGGS		
	Domestic Price ₱/kg.	Border Price ₱/kg.	NPR %	Domestic Price ₱/kg.	Border Price ₱/kg.	NPR %	Domestic Price ₱/kg.	Border Price ₱/kg.	NPR %	Domestic Price ₱/kg.	Border Price ₱/kg.	NPR %
1960	1.97	1.79	10	2.81	2.66	6	2.85*	2.17	31	2.14	1.61	33
1961	2.02	1.82	11	2.83	2.56	11	2.93*	2.03	44	2.25	1.93	16
1962	2.11	1.86	13	2.83	2.55	11	2.83*	2.09	35	2.20	2.09	5
1963	2.31	1.72	34	2.93	2.66	10	3.25*	2.19	48	2.51	2.16	16
1964	2.46	2.11	17	3.01	2.73	10	3.75*	1.91	96	2.66	1.76	51
1965	2.54	1.83	39	3.01	2.89	4	4.07	1.99	104	2.83	1.87	51
1966	2.81	1.87	50	3.00	3.28	-8	4.27	2.07	106	2.90	1.87	55
1967	3.04	1.95	56	3.51	3.51	0	4.32	1.99	117	2.87	1.91	50
1968	3.20	1.95	64	3.51	3.63	-3	4.46	1.83	144	2.90	1.83	58
1969	3.24	2.26	43	3.51	4.02	-13	4.85	2.03	139	2.86	2.30	24
1970	3.72	2.07	21	3.66	6.55	-44	5.38	3.07	75	3.75	3.36	12
1971	4.69	3.39	38	4.69	7.49	-37	5.64	3.14	80	5.12	3.58	43
1972	4.27	3.62	18	6.34	8.44	-25	5.52	3.62	52	5.28	4.02	31
1973	5.34	4.69	14	6.35	11.63	-45	6.74	5.17	30	5.15	4.96	4
1974	8.04	7.89	2	9.46	10.34	-8	8.49	6.19	37	7.02	7.28	-4
1975	7.61	7.99	-5	11.02	7.63	44	9.70	6.48	50	7.06	7.85	-10
1976	8.48	10.21	-17	11.31	9.62	18	9.55	7.77	23	8.02	8.10	-1
1977	9.62	11.40	-16	11.47	9.32	23	11.41	7.25	57	8.84	8.95	-2
1978	9.73	11.62	-16	11.79	12.65	-7	12.06	7.55	60	8.55	8.58	0
1979	14.20	12.21	16	19.85	18.28	9	13.51	7.77	74	9.54	7.62	25
1980	15.50	12.80	21	22.66	18.04	25	14.94	8.44	77	11.33	7.33	55
1981	17.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Notes: Sources of data: Border Price: FAO Trade Yearbook
Border price of pork, poultry and eggs are imports unit values of Hongkong, and U.S. import unit values for beef. In converting border values to pesos, the official exchange rates were used.
Domestic Price: Central Bank of the Philippines. *Converted from price of chicken liveweight.