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Meat and Dairy Processing Industry:
Impact of Trade Policies on Performance, Competitiveness and Structure

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PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

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Introduction

TRADITIONAL trade theory has shown that the opening up of economies to more trade has been generally beneficial, whether in terms of welfare or efficiency gains. The argument has taken many forms; most suggest that trade liberalization leads to productivity growth. Numerous studies have established this positive link. However, more recent ones have shown that the relation may be ambiguous. Furthermore, the literature on total factor productivity or technical efficiency has provided insights on the importance of other factors.

At the same time, the structure of markets has taken an increasingly prominent role in the analysis. The theory of trade in the presence of increasing returns is, instead, derived from the explanation of intra-industry trade as due to economies of scale rather than comparative advantage (Krugman 1979). This has spawned new literature which links trade theory and industrial organization. The new thinking questions the presumption that free trade is optimal; whether or not an economy gains from liberalization thus becomes an empirical question.

The Philippines embarked on a structural adjustment program which focused on trade policy reform more than a decade ago. The effects of this policy shift on the industrial sector may now be examined. Since these industries do not operate in a vacuum, but have a particular structure partly defined by the nature of the product and partly owing to the environment, such influences should also be considered. The broad question that interests us is with what market structure are efficiency and productivity gains from trade liberalization more likely.

This study aims to determine how market structure affects firms' adjustment responses to policy. Three basic tasks lie ahead:

1) establishing the market structure of the industry based on the firms' behavior;
2) describing the environment within which the industry operates; and
3) examining the performance, efficiency, and competitiveness of the industry to determine the extent of influence of policy or structural factors.

In describing the industries, we will be following the "structure-conduct-performance" paradigm, since this mode of thinking on industrial organization emphasizes empirical research. A subsequent theoretical wave, which makes use of game theory (Tirole 1988), would be more difficult to apply to the data at hand.

Food processing belongs to a distinct set of infant industries which has achieved some degree of maturity and export competitiveness. Its share in manufacturing value added has always been the highest, although this has declined from 44.7 percent in 1980 to 37.7 percent in 1992. Its share in gross domestic product (GDP) has also gradually fallen from 30.9 to 9.5 percent in the same period.

The heterogeneity of the industry renders analysis difficult, hence the selection of the meat and dairy processing sectors to present a more focused analysis. Meat processing contributes 0.8 percent and dairy processing 1.7 percent to manufacturing's value added.

Because of data constraints at the firm level, we can only compare 1983 with 1988, or a "bust" with a "boom" year, so that macroeconomic variables may account for many of the differences in the performances of the industries. In addition, 1983 is considered abnormal because of a severe drought, which affected the local supplies of agricultural raw materials. We are thus treating 1983 as a pre-reform period and 1988 as the transition, since the second major liberalization took place only from 1986 to 1988; 1991 would have been the post-reform year. The respondents, however, could not be matched through time, since the Census of Establishments does not

reveal their identities. The few firms that responded to the survey could only furnish information for 1991 because past records were no longer available. Interviews conducted with key informants also covered recent years. (Where the specific names of firms are mentioned, the sources are published reports from other institutions.) Another constraint derives from the treatment by the Census of multi-product firms as plants in their respective industry classification, making it difficult to capture the effects of concentration, for instance, on firm behavior. These are taken into account in the discussion as much as possible.

Part I: Meat Processing

1

Industry Structure

THE latest available Census of Establishments (1988) shows a total of 70 large firms in the meat slaughtering, preparing and preserving sector (PSIC 3111) with value added of P1,160 million. Four-fifths (80 percent) were in meat processing while the rest were in slaughtering (10 percent), poultry dressing and packing (7 percent), and other processing activities (3 percent). Industry size has more than doubled since 1983, when only about 22 firms were listed under the category while average value-added per firm has also grown.

In 1988, small meat processing establishments, numbering about 188 (from 119 in 1983), had a total value added of P8.4 million. Despite the increase in number, the average value added of these firms has fallen, indicating that many of the firms contributed less than they did in 1983. The government estimates the number of unregistered small scale producers at 40 percent of the total, with 3-4 percent of total rated capacity (BOI 1989). About 70 percent of poultry production also probably takes place in small entities, since commercial poultry growers only account for 20-30 percent of production.

Half of the large firms are based in metropolitan Manila, which holds 60 percent of the market. Consumer lifestyles, preferences, and incomes in the area make it a profitable location. Supplies, equipment, and other services are also readily available here. However, this could

only be from the marketing viewpoint since plants built near production centers are said to enjoy a 20 percent cost advantage compared to the Manila-based operations due to savings on freight, wages, and fuel (WB 1985). Thus, large firms that have also built slaughtering plants in the provinces are able to capture both marketing and input advantages. The rest of the large plants are mostly in Southern Tagalog, Bicol, and Eastern Visayas (Appendix 1). Many small establishments are found in Central Luzon, probably because it is a major source of raw materials or simply because traditional culinary skills, which Pampangos are known for, are put to profitable use.

There is a consensus among processing firms that two companies dominate the industry because they have established their leadership long ago, produce a wide range of goods, and are able to engage in advertising and research and development (R&D). Purefoods' share comprises 50 percent while Republic Flour Mills (RFM) captures 37 percent of processed meat industry sales; the remaining 13 percent is divided among the so-called "followers" in terms of what to produce. For canned meat, the ratio is 35:37:28. This perception is substantiated by data from the Securities and Exchange Commission (Appendix 2), but the top firms hold almost equal shares of net sales, with RFM at 31.6 percent, Purefoods at 28 percent, and Universal Robina at 23.9 percent; the remaining seven firms hold less than 2 percent each. The prominence of these leading firms is further reflected in their 1990 rated plant capacities which averaged about 13,000 metric tons (although no data was available for San Miguel Corporation [SMC]), in contrast to the medium-scale food processors which had an average of 2,785 metric tons.

The industry is actually composed of four leaders engaged in virtually the same operations but with different origins.

The largest, SMC, derives its size from the fact that it has the widest range of products, starting with beer and bottled drinks and expanding to dairy, packaging, processed meats, fruit drinks, cooking oil, feeds (from brewing by-products), livestock and poultry. SMC is the only firm with a cattle farm.

RFM started with flour milling and went on to feed milling, piggery and poultry, fruit juices, cooking oil, processed meat, and margarine. It recently acquired the Selecta ice cream line.

General Milling started with flour and feed milling, corn processing, poultry and piggery. Its other products include pasta and snack food, edible oil, and processed milk.

Purefoods, the original meat processor, was established in 1956 and diversified in the 1980s after it was purchased by the Ayala Group. It integrated its piggery and poultry operations, and engaged in tuna canning, flour and pasta making and marketing of powdered milk. It also recently acquired Coney Island ice cream. Both RFM and Purefoods have licensing agreements with US firms to manufacture their products here. Thus, the diversification into processed meat followed logically from flour or brewery products to feedmills to livestock. For Purefoods, the process was reversed, flour milling came after livestock. Even the less diversified Vitarich Company started with feedmilling and went on to poultry and processed meat.

The perennial problem of meat processors is the absence of a continuous supply of quality meat, which comprises 70 percent of total production cost. (This finding has already been discussed in previous studies on the sector [WB 1980, 1985].) Large firms have overcome this problem by establishing their own sources - backward integrating - or by contract growing. But according to one large company, "integration is a myth" since the costs of hog raising are so high and only 40 percent of the hog (i.e., primals which are the jowls, belly, and loin) is used in processed meat. This may be one reason why domestic prices of pork are sometimes double when compared to foreign prices.

Poultry meat is an exception to this problem since supply has been growing because of the entry of several integrators. Aside from the abovementioned four industry leaders, there are Universal Robina, Vitarich, and Golden Country, and the successful contract growing schemes among broiler producers. However, this scheme has been said to reinforce consolidation for large integrators and put small firms at a disadvantage (WB 1980) in terms of technology and lower price of inputs. Vertical integration from feeds to livestock means that

pricing policies and raw material control is a step in the production process which affects all other operations.

An indirect example is the supply of day-old chicks for small poultry raisers. According to the Bureau of Animal Industry (BAI), the five major commercial integrators are a constant source of supply. However, since the poultry raisers usually need less than the minimum transaction volume of 1,000 heads, they can only source these from retailers who in turn get their supply from the distributors of the commercial integrators. Both types - broilers bred for their meat, and egg-layers - are available from such integrators, but the latter is sometimes in short supply. These are further classified based on weight with greater demand for those weighing 35 to 45 grams. The BAI raises chicks of imported breeds for sale to farmers exclusively for breeding purposes.

Some 90 percent of dressed chicken undergo modern methods, since most chicken plants are highly rated in terms of layout, equipment, quality control, sanitation standards, and others. Hence, quality has improved but with little additional cost as evidenced by equal prices for both mechanically and traditionally dressed chicken. Around 84 percent of swine is traditionally raised (MKPFI 1988) and probably slaughtered similarly. The "aseptic shock" method of slaughtering (i.e., hitting the animal on the head) is slow compared to the "electric shock" method employed by modern companies, and results to lower productivity. However, consumer preferences for the red meat produced by the old method render the new methods unmarketable. In turn, integrated hog raising operations become less profitable.

In addition, because of the lack of national meat grading standards (Ibarra 1990), little or no price differentials exist between different qualities of meat. Standard cuts are obtainable from institutionalized markets, but in general, quality is not a major consideration. Only large integrated meat processors follow a set of standards for quality control purposes, which also result in higher costs and prices.

Nevertheless, the complaint usually raised about the input supply is that local slaughterhouses cannot meet the demand for specific cuts. The Philippine Association of Hog Raisers (PAHRI) has responded to

what it perceives as a marketing problem by setting up a slaughterhouse in 1992 which would eliminate middlemen by centralizing slaughtering, selling to buyers onsite and controlling pork prices.

The Philippine Association of Meat Processors (PAMPI), however, disagrees with this solution since large firms have their own slaughterhouses; what the smaller firms need is a continuous supply of certain cuts. One processing firm commented that prices are sometimes actually higher in a PAHRI slaughterhouse. Local pork prices are sometimes about 50 percent higher than foreign pork prices, partly because of subsidies given to foreign farmers. Although the country is self-sufficient in pork and choice cuts cannot be imported, PAHRI is apprehensive about the possibilities of smuggling. Small processing firms are worried that because of the sudden drop in domestic supply and due to import restrictions, prices may also suddenly rise.

Contributing to the input supply constraint is the inferior livestock marketing system and poor compliance with abattoir standards (Ibarra 1990). The methods of transporting livestock often result in reduced weight and compromise meat quality and enables unscrupulous traders to delay slaughtering in order to extract lower prices from livestock farmers. In addition, the already small population of cattle and carabao is being further depleted because of poor reproductive performances caused by poor nutrition and management, high slaughter rate, and low cow-calf production. Numerous studies have also documented other problems such as inadequate support services, absence of security of tenure in Pasture Lease Arrangements (SGV 1988), the shrinking of forage and pasture lands which were affected by agrarian reform, lack of credit, and the high cost of importing cattle and semen biologics (DA 1991). Figures on livestock inventory show that the population of cattle and carabao has declined from 1986 to 1990, but that of hogs, chicken, and duck has grown.

The more basic problem for livestock raisers is the cost of corn, which is 50 percent of the volume of feed ingredients, but reaching 70 percent of actual peso costs. There is a need to match seasonal and

locational demand and supply of corn. Infrastructure deficiencies are the main reason why locally grown corn is more expensive than the imported, e.g., P5.60/kg from Mindanao versus P5.20/kg landed cost from the US.

The bulk of fresh meat imports consists of manufacturing grade beef and offals (Appendix 3) and mutton and pork. Dressed poultry and poultry cuts and liver are also purchased from abroad. Some imports of processed meat have been recorded but these comprise a mere 0.1 percent of total food imports. These may also be attributed to import restrictions, which were first imposed in 1970, and again in 1983 and 1984, after a few years of deregulation in 1981 and 1982. Non-canned goods are not substantially imported because of their higher perishability and much lower prices here. Hence, domestic producers have taken advantage of the market. Smuggling of canned meat, especially of a particular Chinese brand, has irked local producers. Labor, raw materials, and power costs are undisputedly lower abroad, aside from their alleged use of meat extenders and therefore lower quality and poor packaging.

The country's processed food exports, which consist mainly of pork and chicken, have been minimal (Appendix 4), at 0.08 percent of total agricultural exports. Other processed meat has also been sold abroad such as ham, sausages, other preserved pork cuts, meat flour and other prepared/preserved meat and offals. The major constraint to exports is the high quality standards imposed by the importing countries in the form of sanitary and phytosanitary requirements and technological specifications. For example, a medium-scale processor's prospect of selling to Japan did not materialize because of these.

Some 80 percent of meat is sold fresh because of Filipino preferences for fresh home-cooked food. The processed meat market is probably confined to the urban high- and middle-income consumer, but there are indications that the other markets are buying more. For instance, producers are segmenting the market into the high, middle and low income (A, B, and C) groups by producing for each market. "Delicatessen" types of processed meat were introduced by the three leading firms at about the same time to cater to the A group. This may have been a response to the perception that the

upper-income market served by the hotel-delicatessen outlets may be penetrated. It is said that this is profitable because price changes here are more readily absorbed by these consumers (although one large processor views this as only an "image" strategy) and can subsidize the production of other goods which are more price-elastic. B consumers buy cold cuts and canned goods, which are priced more moderately but are of better quality than goods catering to the C market. Thus the variety of product choices decreases as one goes down the income ladder.

The main processed products are frozen meat, corned beef, and dressed frozen poultry. One particular product — the hotdog — dominates production and sales (70 percent), but margins are low and prices do not rise too much because of the leaders would rather not have their competitors eating into this market. Since medium-scale producers can only charge prices that are at most equal to that of the leaders, their objective is to increase their market shares by increasing productivity or lowering costs. Some achieve this by selling in wet markets, where turnover is faster and collection periods shorter (if somewhat riskier), translating into lower working capital requirements. These businesses are also usually family-run, which means lower labor costs, and faster decisionmaking, which enable them to survive and charge cutthroat prices.

Despite the established competition, smaller firms still view the increasing market segmentation as a growth opportunity. They do not incur as much quality control costs and C market consumers will ignore quality differences. Thus, unlike large firms who cater to all, many of the smaller firms are confined to the B and C markets. The exceptions are a few small- or medium-scale businesses which specialize in "delicatessen" products confined to the A market.

Some firms are exclusive suppliers of certain fastfood outlets or operate franchises or chain stores, which is a direct way of selling. In fact, one of the leaders established a meat-processing subsidiary for the sole reason of supplying a fastfood chain. Only one firm actually started out first in the fastfood business. Such firms are particularly meticulous about quality control, as shown by their adoption of

quality circles, or the "kaizen" productivity improvement program. In general, all of the larger firms and many of the medium-scale ones devote resources to research and development (R&D) and quality control. The importance of brand names as an indicator of quality varies directly with the size of the producer, so that the larger firms need to be strict about quality maintenance to cultivate brand loyalties and preserve market shares. This is in contrast to small firms who can simply change brand names because their losses will not be as large, although the company's reputation may also be partly affected.

Large firms have the technical capability to produce high-quality products which meet international standards (BOI 1989), although they use a mixture of manual, semi-automatic and automatic operations. Medium-scale firms use batch-type operations, given the smaller market and low volume of raw materials, even if they have automated high-volume facilities. Smaller firms use locally-fabricated equipment with "inferior technology."

A BAI study (1990) reports that there are few meat processing equipment distributors and most are in Metro Manila. However, there are several fabricators who can make sets for line operations or individual machines. These cost more than imported machines. Thus, larger firms prefer to import machines. Others buy used equipment and repair or modify them. Given the small price differences between high- and low-capacity types, many firms choose to buy the former. And since modifications are not subject to any design regulations, the materials or designs may be below safety or sanitary standards.

The rated capacity of 19 major meat processing facilities in 1983 was 59,400 metric tons (WB 1985). However, utilization was only 50-55 percent due to technological deficiencies or overcapacity (BOI 1989), and more recently, the restricted market, which forces firms into batch-type processes and short production runs. For the past three years the poor economy has kept prices down: Profit margins are usually 5-10 percent for canned goods and 10-15 percent for cold cuts (BOI 1989), but now smaller firms are only starting to break even.

Some 60 percent of processed meat is packed into polyethylene bags, the rest is canned (WB 1985). Packaging costs are a major

headache, accounting for 35 percent of the total (BOI 1989); 5 percent for frozen, 24-39 percent for canned, and 51 percent for bottled meat (WB 1980). Aside from the higher domestic price of packaging materials, the supply is inadequate and suppliers often cannot meet specifications. Locally-made open-top or sanitary cans are of inferior quality, making imports necessary for export lines. In addition, distribution costs often reach 10 percent, owing to poor infrastructure. Firms are diversifying partly to use their technical and marketing capacities more extensively since overhead costs are not easily reduced anyway.

A large processing firm believes that its so-called inefficiencies are due, not to uncompetitiveness but to limited demand. Given their high fixed costs, their large asset base would be justified by increasing volumes of production. But since demand is inadequate, they cannot move on to higher value-added aspects of production. However, this could be a short-term phenomenon related to the recession rather than a long-term condition.

2

Policy Environment

For the past 20 years, government efforts at developing the local livestock industry have focused on increasing and improving stocks for beef and milk. These efforts consisted of:

1) a national breeding program;
2) a regular dispersal program;
3) the Multi-Livestock Dispersal Loan Program, which provides seed funds to conduit banks to finance loans to farmers for the purchase of animals from the BAI;
4) an animal health program;
5) forage production and pasture development; and
6) livestock auction markets.

The BAI has also started undertaking research and product development, training, and technical assistance specifically for the meat slaughter and by-products industry through its Animal Products Development Center.

The National Meat Inspection Commission (NMIC) regulates the flow of livestock and its products through inspection services. The implementation of standards for accreditation is hampered by the lack of funds. Thus, only a small proportion of slaughterhouses are accredited e.g., 18 percent in 1991. Moreover, while the regulation demands that processing plants be accredited, these can operate legally without accreditation (Ibarra 1990), and abattoirs that do not meet the standards still operate because of the high costs of meeting such standards. The NMIC has no jurisdiction over the management of these slaughterhouses, e.g., small unaccredited ones are under

municipal governments. Thus, the condemnation of meat in the country is reported to be a mere 0.05 percent, way below the normal 1 percent rate in other countries.

The Bureau of Food and Drugs (BFAD) regulates food quality and safety. This study attempted to examine these rules but copies were unavailable. The list that was eventually put together shows that many of the standards are simply copied from the USFDA and may thus be old and inappropriate and determining which are still in effect was not easy. Nevertheless, certain basic rules have been laid down and repeated complaints or obvious large scale violations receive prompt attention, such as in the case of radioactive-contaminated powdered milk from Holland, or the aflatoxin content of peanut butter. Over 3,000 establishments are inspected and 500 samples collected annually, e.g., of milk for lead content, meat for nitrites and nitrates, refined sugar and canned sardines/mackerel for heavy metals, and others. However, considering the great number of food establishments and a limited budget, implementation is wanting.

Product testing is undertaken by the Department of Agriculture (DA), the Department of Science and Technology ITDI, and the NFA Food Development Center. The latter two accept R&D contracts with the (usually small- and medium-scale) private sector. The University of the Philippines at Los Baños (UPLB) is another research facility. Examples of food-related R&D contracts are product development, thermal processing, waste utilization, chemical and microbiological hazards, handling and storage, drying, fermentation, freezing methods, and low cost goods production.

Despite the obvious involvement of the government in the food sector, the industry has largely developed with the initiatives and ability of private business (WB 1985). Among the numerous regulations that affect the industry are:

- EO 234 of 1970, the carabao slaughter ban, which aimed to boost the food program. It was amended by EO 626 of 1980, which allowed the slaughter of seven-year old male and 11-year old female carabaos; the ban was lifted in 1990;
- EO 626a of 1980, which banned the interprovincial transport of

carabaos to preserve the carabao population used as work animals. Unfortunately, this regulation segmented the market, creating surpluses in some provinces and shortages in others;

- RA 7394 of 1992, the Consumer Act of the Philippines, which consolidated all rules relating to consumer product quality and safety;
- RA 7581 of 1992, which stabilized the prices of basic commodities; and
- Memo Circulars and Administrative Orders of the BFAD.

A particular BFAD regulation, Administrative Order No. 88-B of 25 May 1984, affects the variety of products that food manufacturers decide to produce. It banned the use of superlative such as "premium, super, special, excellent" and other descriptions on product labels which connote superiority over other products, unless the company manufactured different qualities of the same product, for which a justification to support the claim should be attached.

In 1979, the importation of beef briskets and trimmings from Australia and New Zealand was centralized through the PhilBAI, a government corporation created for the purpose, which was dismantled in 1986. Since then, meat processors have undertaken their own importations, but the NMIC has taken charge of import restrictions on meat and meat products. Only accredited meat processors and hotels certified by the Department of Tourism were allowed to import meat. The rated capacity and projected needs of processors were evaluated and only 50 percent of the requested volume was granted. In the case of hotels, size and seating capacity plus projected requirements were the bases for granting import licenses. Only frozen meat and choice cuts were allowed. Canned products are not, and processed frozen products are supposedly allowed but no requests have as of yet been forwarded.

In 1993, the DA again restricted imports of corn and corn substitutes, live swine, pork products, live poultry, chicken and other meat products, by virtue of RA 7607, the Magna Carta of Small Farmers. Only upon an actual or anticipated shortage of such products would imports be allowed, but a maximum volume would also be

specified. Accredited importers who are also end-users can import, with the following allocations: 80 percent of the volume or number of animals for large-scale livestock producers, integrators, or meat processors, and 20 percent for small-scale producers or meat processors. The NMIC still takes charge of meat and meat products; the BAI supervises live animal imports. Live cattle, beef and beef products are now freely importable.

The government has also given the industry investment incentives. However, only the production of livestock and poultry is part of the 1992 Investment Priorities Plan. So far, only about 13 meat producers and 19 projects have availed themselves of BOI incentives since 1976, of which three firms and five projects have been cancelled. They are all nonpioneers and most are large. Again the more established firms are able to consolidate their market position further with these benefits; smaller firms incur only increased transaction costs if they avail themselves of these benefits.

The value-added tax (VAT), which was implemented in 1988, is perceived as another problem by meat processors, who say that it increases their costs. Since their agricultural inputs are tax-exempt, they cannot simply pass on the VAT to the consumer because of the competition. There is thus an incentive to underreport sales. Manasan (1993) confirmed that the VAT is biased against food processors, although to a much lesser extent than previously estimated. In 1983, domestic sales taxes were 1 percent for slaughtering and 5 percent for processed meat. Advanced sales tax was 10 percent and markups were 25 percent.

Appendix 5 details the tariff rate structure for different meat products in 1983, 1988, and 1991. The tariff structure has generally been a "cascading" one, higher for the processed items and lower for the raw material, with the exception of poultry which has always had a high tariff. The range also narrowed within the period, because of increased rates on live animals in 1991 (but very low tariffs on breeding animals) and on meat in 1988 and 1991.

Import restrictions (Appendix 6) were imposed on live animals and fresh meat in 1975 and 1979, partly removed in 1986 and 1988, totally removed in 1992, but reimposed in 1993. Restrictions on

processed meat were first imposed in 1970, removed in 1981 and 1982, reinstated in 1983 and 1984, removed again in 1992, and reimposed in 1993. Today, live chicken, pork, dressed poultry, fresh meat, and meat products except beef — about 46 percent of commodity lines — are still subject to import restrictions. The short period of liberalization of salted dried and smoked meat (from 1982 to 1983), of other prepared meat (from 1981 to 1984), and of some types of fresh meat (from 1986 to 1988) together with the liberalization of live animals indicate that tariff-based effective protection rates (EPRs) may be understated for beef or pork products, since the inputs would be both relatively cheap and easy to import while the outputs have high tariff and non-tariff barriers. Hence, it is not surprising that import-penetration indices are a mere 0.05 to 0.075 percent for processed meat, 0.9 to 0.45 percent for slaughtering, and 0.02 to 0.91 percent for other poultry for 1983 and 1988.

Table 1 shows the implicit tariffs on the output (T_j) and inputs (T_i), which take domestic sales taxes and markups into account. The T_js were higher than the T_is only for meat processing in 1983. The reverse was true for slaughtering but the same for poultry dressing. In 1988, the T_js were higher than the T_is in all sectors. Again, tariffs increased rather than decreased on the meat inputs but remained the same on the output. Furthermore, the performance of each sector was affected by the presence of nontariff barriers on both inputs and output in all sectors (except for canned processed meat) in 1983, and live swine and fresh meat and all processed meat (except canned beef) in 1988, not to mention the degree of intensity of these quantitative restrictions. Such are not accounted for in the implicit tariffs although they have a bearing on domestic costs. Both the higher tariffs on meat and presence of QRs on input and output prevent us from showing the effects of trade policy changes on the industry's performance during the period, but we can still examine the relationship between the industrial structure and its efficiency in the presence of protection.

The impact of such policies may be gauged from their EPRs, also shown in Table 1. In 1983, these reflected the implicit tariffs on slaughtering and poultry dressing but the estimate for meat processing

Table 1

Protection and Performance Indicators

PSIC	Industry Description	No. of Firms		Ti		Tj		EPR		NEPR		DRC/SER[a]		TEC	
		1983	1988	1983	1988	1983	1988	1983	1988	1983	1988	1983	1988	1983	1988
31111	Slaughtering	3	3	0.11	0.10	0.06	0.20	0.03	0.49	-0.17	0.19	1.22	1.45	0.97	0.98
31113	Poultry dressing and packing	1	5	0.52	0.40	0.51	0.49	0.49	0.89	0.19	0.51	11.72	1.32	1.00	0.95
31114	Meat processing, curing, preserving, and canning	38	42	0.37	0.35	0.79	0.65	7.73	0.98	5.99	0.58	1.74	1.56	0.56	0.76
31121	Fluid fresh milk and cream	1	1	0.20	0.21	0.14	0.43	0.07	0.34	-0.15	0.07	2.04	1.48	1.00	1.00
31122	Powdered/evaporated/ condensed/filled milk	5	4			0.20	0.27	0.21	0.09	-0.03	-0.13	0.83	2.71	0.65	0.99
31131	Butter and cheese	3	2	0.31	0.25	0.30	0.43	0.38	0.47	0.11	0.18	1.19	0.94	0.99	1.00
31132	Ice cream, sherbet, ice drop, etc.	21	31	0.46	0.43	0.59	0.65	0.60	0.61	0.28	0.28	1.12	1.09	0.89	0.78
31133	Milk-based infants and invalids food	2	3	0.52	0.42	0.28	0.65	0.07	0.58	-0.15	0.26	0.47	1.01	1.00	1.00

[a]Deflating domestic raw materials by $((0.5 * 1/(1 + s\text{-}d_j)) + (0.5 * 1/(1 + t_j) * 1.25)$ and assuming interest rates of 12 percent for 1983 and 10 percent for 1988.

Source: Computed from *Census of Establishments* and the *Tariff and Customs Code*.

was extremely high, again probably due to the binding import restrictions on the output (which allows local processors to charge higher-than-world prices), combined with the relative ease of importing beef inputs. The tight domestic supply situation brought about by drought may have also affected domestic prices. The EPRs in 1988 increased substantially for slaughtering and poultry dressing but decreased, also substantially, for meat processing, although they were still on the high side. These relative magnitudes seem to be the reverse of the trend observed in the 1974 protection structure, where EPRs were very high in slaughtering and poultry dressing (128 percent), and very low in canned and uncanned meat (5 and 68 percent)(Bautista, Power et al. 1978). This trend was observed despite the treatment of most processed meat as unclassified consumer goods (i.e., luxury imports) in the 1970 commodity classification scheme, and the restriction of live animals and fresh meat imports only in 1975. Across sectors, meat processing was the most protected in both 1983 and 1988 since its T_js were always much higher than its T_is, although in 1988 the estimate for poultry dressing was close to that of meat processing.

The NEPR indicates that slaughtering was penalized by the overvaluation of the peso in 1983, while the rest of the sectors still enjoyed some amount of protection. Meat processors were still very highly protected especially in 1983.

3

Performance

TABLE 1 also shows the domestic resource costs (DRCs). DRCs at shadow prices (DRC/SER) in 1983 reflect a particularly high-cost foreign exchange saving activity in poultry dressing. But since only one firm was sampled, this figure may not be representative. The input and cornfeed supply problem bears directly on this performance as lamented by the processors themselves; the effects of the year's particularly bad drought may have also been partly felt. Poultry dressing may have been more affected because of import restrictions on live and dressed poultry up to 1986, which may have been more binding compared to those imposed on other animals or beef.

Defining the minimal inefficiency range at 1.21 to 1.50, and mild inefficiency at 1.51 to 2.0, slaughtering qualifies in the first and meat processing in the second category. In 1988, however, the situation vastly improved for poultry dressing (with more respondents), which became minimally inefficient. This is significant, considering that live poultry is the only restricted live animal import after its deregulation from 1986 to 1992. Integrators gained from protection on both ends since live poultry and dressed poultry are now restricted imports, although they were still affected by the corn supply situation. Meat processing retained its mild inefficiency. Slaughtering worsened slightly but still kept within the minimally inefficient range. Considering that protection through tariffs and nontariff restrictions were pervasive in this sector, the results are somewhat unexpected. Across sectors, meat processing turned in the relatively worst performance, although it was the most protected both in terms of tariffs and QRs.

As early as 1974, slaughtering and poultry dressing, as well as canned and uncanned meat, were estimated to be efficient foreign-exchange savers, showing DRC/SERs of 0.87, 0.90, and 1.02 respectively (Bautista, Power et al. 1978). Poultry dressing showed the most improvement in 1988, with the lowest DRC/SER ratio. Although there was a difference in the number of observations, it cannot be denied that the sector was an overall winner: For instance, an unpublished DRC/SER of a large integrator in 1988 was estimated at 0.17 and its EPR 53 percent, in contrast to a slaughterhouse's figures of 2.36 and 52.41 percent respectively (Pineda 1988). The removal of import restrictions on live poultry and dressed poultry (except chicken) in 1986 may have exerted a disciplining effect on this sector.

The technical efficiency coefficients (TEC), also in Table 1, show establishments in slaughtering and poultry dressing to be near the frontier. However, because these are averages of the technical levels of the sampled plants, unity does not necessarily mean state-of-the-art technical efficiency if their current practices are not up-to-date. Hence, the more observations, the more dispersed and the lower the TEC, as is shown by meat processing in both years. However, given that its DRC/SER is within the mildly inefficient range, we may conclude that it is not technically inefficient. This is supported by the finding that many medium- and small-scale firms, which rely on manual operations, are able to compete with the larger companies in terms of price. At the same time, inadequate specialization among firms producing similar products are said to cause deviations from "best practice" (Pack and Westphal 1986). And since many meat firms produce a wide range of product choices rather than just one type per firm, this is probably the case. However, since the production methods in meat processing are not too dissimilar between products or probably even between firms, specialization is not a profitable pursuit. Taste differences are probably the crucial determinant of specialization, and this does not necessarily entail a different production method.

The TEC of poultry dressing is very close to unity, which is consistent with the handful of observations and a minimally inefficient DRC/SER in 1988. Nevertheless, given that its DRC substantially

improved from 1983, poultry dressing seems to be the economically and technically efficient sector. This higher relative efficiency has been ascribed to either its more recent operations, the previous experience of most entrepreneurs in meat processing, or the help of foreign expertise (WB 1985).

Tables 2 and 3 give the size and productivity indicators for the industry. In 1983 and 1988, poultry dressing had the highest average value-added, output, capital, and employment per firm, although these figures rose for all sectors during the period. Three out of four productivity indicators show meat processing as the most productive in 1983 but in 1988, slaughtering and poultry dressing had the highest productivity. Moreover, these two sectors showed improved productivity for the period, based on all indicators. Capital per worker (Table 4) which was highest in poultry dressing in both years, grew as well for meat processing but figures fell for slaughtering.

Price-cost markups are shown in Table 4 and are highest in slaughtering in both years although these margins dropped for all sectors. The rise in the margins may be due to an increase in value-added, a drop in wage costs, or a decrease in the value of output, given the measure for this indicator. The degree of vertical integration, as defined by the value-added-to-sales ratio, was most pronounced in slaughtering and much less in poultry dressing, even when they involved essentially the same operations. This is probably due to the greater value-added in the former. All three sectors showed decreased vertical integration in 1988, which may be the reason why minimum efficient scale (MES), defined as the average value-added of the top 50 percent of firms in the sector, is also highest in slaughtering (excluding the single observation for poultry), although in 1988, that of poultry dressing was not too far behind. The lower MES for meat processors is a reflection of the relative ease with which such firms are established.

Herfindahl indices and concentration ratios in Table 5 are also highest in slaughtering (after ignoring the single sample for poultry dressing), although they are much lower in 1983 than in 1988. The higher levels of concentration in sales, revenue, and value added in 1988 for slaughtering indicates fewer firms which are exacting higher profit margins than other sectors, which is made possible by the

Table 2

Average Size Indicators

PSIC	Industry Description	Average Capital (P000)		Average Value Added (P000)		Actual Average Employment		Average Value of Output (P000)	
		1983	1988	1983	1988	1983	1988	1983	1988
31111	Slaughtering	11,382	26,045	983	6,232	38	72	1,573	16,642
31113	Dressing and packing of poultry	1,478,398	7,357,081	51,248	70,170	1,296	424	174,070	474,333
31114	Meat processing, curing, preserving and canning	32,688	898,155	3,182	7,840	89	112	15,374	39,658
31119	Slaughtering, preparing, n.e.s.	—	49,654	—	2,017	—	36	—	5,667
31121	Fluid fresh milk and cream	238,465	277,011	7,845	23,114	107	189	22,188	82,731
31122	Powdered milk and condensed, evaporated, filled	232,959	1,212,721	70,114	11,659	498	339	350,933	585,008
31131	Butter and cheese	89,885	118,058	17,955	66,243	163	132	90,595	288,601
31132	Ice cream and sherbet, ice drop candy other flavors	1,468	58,053	355	23,140	13	93	541	64,688
31133	Milk-based infants and invalids food	230,041	641,600	129,334	164,959	632	341	341,653	455,095
31139	Dairy products except milk, n.e.s.	-	6,320	-	572	-	31	-	2,641

Source: Computed from Census of Establishments.

Table 3

Productivity Indicators

PSIC	Industry Description	Ave. Output Per Worker 1983	Ave. Output Per Worker 1988	Ave. Output Per Capital 1983	Ave. Output Per Capital 1988	Ave. Value Added Per Worker 1983	Ave. Value Added Per Worker 1988	Ave. Value Added Per Unit Capital 1983	Ave. Value Added Per Unit Capital 1988
31111	Slaughtering	41,053	229,868	0.14	1.06	25,652	86,083	0.09	0.40
31113	Dressing and packing of poultry	134,313	1,118,185	0.12	0.64	39,543	132,335	0.03	0.08
31114	Meat processing, curing, preserving and canning	171,724	324,695	0.51	0.53	35,539	56,489	0.11	0.09
31119	Slaughtering, preparing, n.e.s.	—	155,282	—	0.11	—	55,276	—	0.04
31121	Fluid fresh milk and cream	210,789	437,733	0.09	0.30	73,325	122,297	0.03	0.08
31122	Powdered milk and condensed, evaporated, filled	704,965	1,725,690	1.51	0.48	140,792	25,796	0.30	0.01
31131	Butter and cheese	555,801	2,194,691	1.01	2.44	110,155	503,753	0.20	1.56
31132	Ice cream and sherbet, ice drop, candy other flavors	43,408	692,640	0.39	1.19	26,543	240,261	0.24	0.41
31133	Milk-based infants and invalids food	540,917	1,332,636	1.49	0.95	204,703	483,044	0.56	0.34
31139	Dairy products except milk, n.e.s.	—	85,200	—	0.42	—	18,477	—	0.09

Source: Computed from Census of Establishments.

Table 4

Pofitability and Production Indicators

PSIC	Industry Description	Price Cost Mark-up 1983	Price Cost Mark-up 1988	Capital/Labor (in thousands) 1983	Capital/Labor (in thousands) 1988	Value Added/ Sales 1983	Value Added/ Sales 1988	Average Age of Equipment 1983	Average Age of Equipment 1988	Minimum Efficient Scale 1983	Minimum Efficient Scale 1988
31111	Slaughtering	0.62	0.28	296	215	0.62	0.37	4.75	4.88	0.76	0.86
31113	Dressing and packing of poultry	0.29	0.06	1,190	1,734	0.29	0.12	12.30	12.37	1.00	0.81
31114	Meat processing, curing, preserving and canning	0.21	0.07	336	617	0.20	0.17	5.28	—[b]	0.39	0.75
31119	Slaughtering, preparing, n.e.s.	—	0.29	4	1,360	—	0.37	—	5.23	—	0.66
31121	Fluid fresh milk and cream	0.35	0.18	2,228	1,465	0.37	0.28	7.45	13.40	1.00	1.00
31122	Powdered milk and condensed, evaporated, filled	0.20	-0.03[a]	467	3,577	0.20	0.02	6.78	16.30	0.64	0.66
31131	Butter and cheese	0.20	0.18	551	897	0.20	0.23	7.18	7.25	0.78	0.94
31132	Ice cream and sherbet, ice drop candy other flavors	0.63	0.25	109	583	0.65	0.35	6.44	7.21	0.65	0.66
31133	Milk-based infants and invalids food	0.38	0.27	364	1,409	0.39	0.34	5.48	—[b]	0.74	0.76
31139	Dairy products except milk, n.e.s.	—	0.02	—	203	—	0.22	—	6.18	—	0.53

[a]Negative, probably due to a negative numerator because compensation costs could have exceeded value added.

[b]Since average age was computed as [(useful life x depreciation) - (book value)]/(depreciation), these sectors had negative results.

Source: Computed from Census of Establishments.

Table 5

Concentration Indicators

PSIC	Industry Description	Herfindahl Indices						CR4					
		Sales		Total Revenue		Value Added		Sales		Total Revenue		Value Added	
		1983	1988	1983	1988	1983	1988	1983	1988	1983	1988	1983	1988
31111	Slaughtering	0.42	0.77	0.54	0.70	0.62	0.76	1.00	0.99	1.00	0.99	1.00	1.00
31113	Dressing and packing of poultry	1.00	0.40	1.00	0.39	1.00	0.68	1.00	0.83	1.00	0.82	1.00	1.00
31114	Meat processing, curing, preserving and canning	0.36	0.29	0.39	0.20	0.26	0.57	0.86	0.71	0.84	0.56	0.83	0.88
31119	Slaughtering, preparing, n.e.s.	—	0.90	—	0.60	—	0.55	—	1.00	—	1.00	—	1.00
31121	Fluid fresh milk and cream	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
31122	Powdered milk and condensed, evaporated, filled	0.27	0.62	0.27	0.62	0.46	0.50	1.00	1.00	1.00	1.00	1.00	1.00
31131	Butter and cheese	0.42	0.60	0.41	0.60	0.64	0.89	1.00	1.00	1.00	1.00	1.00	1.00
31132	Ice cream and sherbet, ice drop candy, other flavors	0.38	0.57	0.38	0.57	0.48	0.51	0.89	0.99	0.88	0.99	0.91	0.99
31133	Milk-based infants and invalids food	0.51	0.52	0.50	0.51	0.62	0.64	1.00	1.00	1.00	1.00	1.00	1.00
31139	Dairy products except milk, n.e.s.	—	0.63	—	0.63	—	0.50	—	1.00	—	1.00	—	1.00

Source: Computed from Census of Establishments.

existence of binding QRs on live swine that prohibit imports from exerting their discipline. The opposite situation is true for processed meat, which seems logical since more competition means that prices and profit margins cannot rise as much. The ease of entry into small-scale meat processing serves to offset the existence of import restrictions, which is a major reason for industrial concentration, especially because of nonbinding import restrictions on one major import and rampant smuggling of the restricted finished product. The four-firm concentration ratios (CR4s) show all sectors to be highly concentrated.

The leading firms described earlier are multi-product establishments and although the Census includes plants and not firms, the indices are a fair indication only of the degree of plant concentration in each sector, not of firms as described earlier. It will be useful to determine the concentration of firms since these are engaged in basically the same activities which may be run independently but nevertheless influence their overall decisions, strategies, and policy responses.

Poultry dressing again is the most capital-intensive sector in the industry but it also utilizes the oldest machines. And although employment was highest for poultry dressers, their value-added was correspondingly the largest. Thus, contribution per worker was also the largest; output behaved similarly. Capital productivity, however, was not as high. Meat processors were the heaviest investors in new capital goods for large- and medium-scale firms. Per firm capital, value-added, output, and employment were also high in this sector relative to those of slaughtering, but productivities were not always higher. Capital per worker was only half that of poultry dressing.

Table 6 shows the EPRs and DRC/SERs of 11 firms, which were computed from their 1991 financial statements. In the poultry dressing sector, the firms were either penalized by the protection structure or totally unprotected. Based on their DRC/SERs, one was a high-cost foreign-exchange saver, while the other was efficient, although the former is a multi-product firm whose main activity is not easily determined and only assumed to be poultry. The latter is also in the feeds business, so the same difficulty applies. The eight

Table 6

1991 Survey Results

	Industry	DRC/SER	EPR
31113	Dressing and packing of poultry	1.98	
	Firm A	2.83	-30.68
	Firm B	1.12	1.00
31114	Meat processing, curing, preserving and canning	2.12	2.89
	Firm C	2.50	0.92
	Firm D	1.32	7.11
	Firm E	5.09	3.18
	Firm F	1.27	1.51
	Firm G	1.35	4.85
	Firm H	2.86	1.25
	Firm I	1.30	2.76
	Firm J	1.30	1.56
31131	Butter and cheese		
	Firm K	1.89	-6.15

Source: Computed from financial statements.

meat processors' average EPR was on the high side, although it fell between the 1983 and the 1988 Census-based figures for the industry. DRC/SERs averaged 1.98 and 2.12, respectively, which are higher than the CE-based computations but are on the borderline between low cost and high cost. Of course, the periods covered, sample sizes, and compositions are different. Nevertheless, the five meat processing firms which were minimally inefficient were small, although the really inefficient ones were both large and small. The large firm was again multi-product, but since it operates each activity at arm's length the parameters assumed for this exercise may be considered realistic.

The distribution of establishments according to their DRC/SER levels is tabulated in Table 7, which also shows their employment sizes. There seems to have been no drastic change in the distribution between the two years, with each DRC/SER range comprising about one-fifth to one-fourth of the number of firms. There were more

Table 7

Size Distribution of Meat Establishments by Efficiency Level

1983	Employment					
DRC/SER	< 50	50 to 99	100 to 499	500 to 999	1000 and above	All
< 0	2	0	0	0	0	2
0.01 to 1.20	8	1	2	0	0	11
1.21 to 1.50	4	4	0	0	0	8
1.51 to 2.00	4	1	1	0	1	7
> 2.00	9	0	1	0	1	11
All	**27**	**6**	**4**	**0**	**2**	**39**

1988	Employment					
DRC/SER	< 50	50 to 99	100 to 499	500 to 999	1000 and above	All
< 0	1	0	0	0	0	1
0.01 to 1.20	6	1	0	0	2	9
1.21 to 1.50	10	2	2	0	0	14
1.51 to 2.00	7	2	1	1	0	11
> 2.00	4	2	4	0	0	10
All	**28**	**7**	**7**	**1**	**2**	**45**

Source: Computed from Census of Establishments.

efficient establishments in 1983 than in 1988, both in absolute and relative terms. However, an overall improvement took place in 1988 since aside from the larger population, 75 percent of firms fell within the mildly inefficient range. A majority of the firms, whether low-cost or high-cost foreign exchange savers, employed up to 50 workers in both years. Still, an improved performance was reflected in the fact that the largest firms went from one extreme to the other in the efficiency scale.

We attempted to determine the structural characteristics that are correlated with economic and technical efficiencies of the firms in the CE, by running a regression equation for each efficiency measure,

Table 8
Size Distribution of Dairy Establishments by Efficiency Level

1983	Employment					
DRC/SER	< 50	50 to 99	100 to 499	500 to 999	1000 and above	All
< 0	3	0	0	0	0	3
0.01 to 1.20	10	2	3	3	0	18
1.21 to 1.50	0	0	0	0	0	0
1.51 to 2.00	2	0	1	0	0	3
> 2.00	3	1	2	0	0	6
All	**18**	**3**	**6**	**3**	**0**	**30**
1988	**Employment**					
DRC/SER	**< 50**	**50 to 99**	**100 to 499**	**500 to 999**	**1000 and above**	**All**
< 0	1	0	0	0	0	1
0.01 to 1.20	10	1	2	1	1	15
1.21 to 1.50	6	0	2	0	0	8
1.51 to 2.00	5	2	0	0	0	7
> 2.00	6	1	2	1	0	10
All	**28**	**4**	**6**	**2**	**1**	**41**

Source: Computed from Census of Establishments.

although unavailable data in 1983 did not permit the same variables to be included. Thus,

(1a) DRC/SER = f(GEOG, AGEK, CVAC, EMPL, CAPU, KL, PER, LEG, TEC)

where

GEOG = geographical location, a dummy variable with 1 for Metro Manila and 0 otherwise, and whose expected sign is not known;

AGEK = average age of capital equipment, expected to be positively correlated with DRC since newer equipment means more efficient technology;

CVAC = value-added per capital which should have a negative sign because a higher capital productivity should translate into lower DRC;

EMPL = employment, shows firm size, with an uncertain sign since domestic costs could be associated with either more or less employment;

CAPU = capacity utilization which is expected to be negatively correlated with DRCs because lower utilization means higher costs;

KL = the capital-labor ratio which could be negatively or positively correlated with efficiency since the latter depends on the use of such inputs, and either automation or the abundance of skilled workers raises productivity;

PER = period of operation, a dummy variable with 1 for firms established before 1983 and 0 otherwise, also with an uncertain sign;

LEG = legal organization, another dummy variable with 1 for single proprietorships and 0 for corporations, whose expected sign is also unknown; and

TEC = technical efficiency which should be inversely related with DRC/SER.

The alternative specification removed variables which were highly correlated with each other and included two others instead:

(1b) DRC/SER = f(GEOG, AGEK, PCM, CAPU, PER, LEG, FSIS)

Price-cost mark-ups (PCM) approximate market power. It is usually associated with inefficiency; market power allowed by protection encourages excessive entry and ineficient small-scale production (Eastman and Stykolt 1980, and Dixit and Norman 1980). Alternatively, protection in sectors with unutilized scale economies

erects entry barriers, which in turn allow firms to exploit market power (de Melo and Roland-Holst 1991), with product differentiation accounting for the entry barriers, because such firms face downward-sloping demand curves. In our study, however, we may find the opposite result, since lower costs are made possible when firms are efficient, yet these translate into higher margins given constant value-added and output.

Because market segmentation allows the existence of small and large producers, ease of entry-exit also differs between them, assuming that smaller firms may easily join or leave the business. Consequently, there are lower entry barriers for the small firm and the contestable markets hypothesis (Baumol, Panzar, and Willig 1982) will apply wherein a competitive price is adopted because of the threat of entry. This qualifies the importance of sunk costs as an entry barrier since potential smaller entrants face no sunk costs, yet the large firms which have high sunk costs still adopt the entry-forestalling prices because their smaller competitors are a threat to their market share.

Market share (FSIS) as a proxy for seller concentration may either be directly or inversely correlated with the inefficiency level in an industry composed of a few large firms and a competitive fringe, assuming free entry and economies of scale, because with protection, they may be operating on the high portion of their cost curves. Furthermore, oligopolistic firms under protection will forego more profits if they compete among themselves, so their strategic behavior favors higher costs, e.g., through outdated technology. A greater market share, however, also makes firms invest in productivity-raising technology.

Ideally, market size should also be considered since it influences productivity, efficiency and product diversity. A limited market contributes to low capacity utilization, or the lack of specialization due to fragmented markets results in low productivity (Pack 1984). But with increasing returns to scale, an expanded market can lead to more product differentiation. Market expansion through exports also leads to higher productivity growth through scale economies and competitive incentives, but increased import-substitution brought about by protection leads to lower productivity growth (Nishimizu

and Robinson 1984). Increased openness widens the market, resulting in increased capacity utilization and scale economies because of specialization and therefore more efficiency (Havrylyshyn 1990). Expanding the size of the market will let in a greater variety of products, which will be limited by increasing returns in production (Grossman 1992). In such an industry, imports force high-cost firms to concentrate on producing certain products and lowering costs.

The equations for technical efficiency were also tested using basically the same variables:

(2a) TEC = f(GEOG, AGEK, CVAC, EMPL, CAPU, KL, PER, LEG, EPR)

(2b) TEC = f(GEOG, AGEK, PCM, CAPU, PER, LEG, FSIS, EPR)

The relationships were expected to be the reverse of those in the DRC/SER equations since TEC measures technical efficiency. Only one more variable (EPR) was added, which has an uncertain sign given the arguments stemming from the assumption of an imperfectly competitive market structure. Protection increases a firm's market share, which encourages it to invest in newer technology. But the strategic behavior of oligopolistic firms instead lead to underinvestment and higher costs since internal competition is likely to reduce the large profits allowed by the protection.

The results in Table 10 for the first equation show capital per worker (KL) to be significantly correlated with DRC/SER in both years, with a positive sign in 1983 and a negative one in 1988. Thus, the more capital-intensive firms were first high-cost and then low-cost foreign-exchange savers, which imply higher capital productivity from one year to the next. In addition, GEOG was negatively associated with DRC/SER in 1988, confirming that locating in Metro Manila lowers costs. Single-proprietorships were likely to be high-costs, since LEG was negative. For the second equation, only GEOG came out significant in 1988.

Table 9

Price Comparisons[1]

Commodity	1985	1986	1987	1988	1989	1990	1991	1992
Meat and meat products								
Swine, liveweight	2.02	2.28	2.45	2.34	2.42	2.02	2.00	0.87
Chicken, liveweight	1.31	1.14	1.20	1.20	1.16	1.15	1.26	1.38
Beef, 2nd class	0.84	0.85	0.98	1.02	0.94	0.87	0.82	0.55
Pork, 2nd class	1.46	1.23	1.33	1.51	1.60	1.39	1.17	1.21
Bacon	1.59	1.62	1.67	1.66	1.26	1.04	1.62	2.03
Ham, cooked	2.14	2.33	2.03	1.41	1.02	1.57	2.01	1.57
Frankfurters	2.14	1.93	2.09	2.24	1.78	1.74	2.06	2.50
Vienna sausages	2.40	1.86	1.99	2.28	1.30	1.22	1.46	3.32
Liverspread	1.88	1.85	1.99	1.90	1.76	1.82	2.24	2.43
Milk and other dairy products								
Fresh milk	1.56	1.29	1.21	1.07	1.02	0.78	0.73	1.00
Powdered milk	1.30	1.30	1.37	1.36	1.31	1.22	1.76	2.06
Evaporated filled milk	1.51	1.39	1.32	1.25	1.30	1.24	1.37	1.50
Sweetened condensed filled milk	1.29	1.14	1.14	1.16	1.27	1.17	1.25	1.47
Butter	2.26	2.18	2.28	2.15	1.85	1.64	1.83	1.99
Cheddar cheese	1.19	0.98	0.98	0.96	1.02	1.01	0.85	0.97

[1]Ratios between domestic wholesale prices and Hongkong unit import values.

Source: Computed from NSO WPI raw data and Hongkong Imports for the years indicated.

Table 12 gives the results for TEC. In 1983, AGEK was inversely and KL directly correlated with TEC in the first equation, meaning newer equipment and higher capital intensity translates into technical efficiency. In the second equation, PCM and FSIS were both positively associated with TEC so that higher margins and larger market shares meant higher technical efficiency. In 1988, no variables were significant in the first equation, but in the second, PCM, FSIS and EPR were directly, and LEG inversely, associated with TEC. Thus, firms which had higher margins, market shares and protection or were organized into corporations, were likely to be technically efficient.

Table 10

Regression Results of DRC/SER for Meat Firms

1983 Independent Variables	Equation (1a) Coefficient	t-values	Equation (1b) Coefficient	t-values
intercept	0.739	0.524	-0.183	-0.122
AGEK	-0.026	-0.727	0.077	1.247
PCM	—	—	7.673	1.653
CVAC	0.477	0.471	—	—
EMPL	-0.002	-1.449	—	—
KL	0.00	6.977	—	—
LEG	1.049	0.598	3.092	1.109
FSIS	—	—	2.216	0.623
TEC	-0.785	-0.357	—	—
Adj R-square	**0.606**		**0.047**	

1988 Independent Variables	Equation (1a) Coefficient	t-values	Equation (1b) Coefficient	t-values
intercept	8.202	2.623	3.613	1.632
GEOG	-4.242	-2.240	-5.772	-2.540
AGEK	0.002	0.142	0.002	0.236
PCM	—	—	0.706	0.162
CVAC	-0.170	-0.641	—	—
EMPL	-0.0001	-0.044	—	—
CAPU	-0.078	-0.198	-0.124	-0.262
KL	-1.3E-0	-4.187	—	—
PER	-1.236	-0.907	-0.770	-0.458
LEG	-2.670	-1.943	-0.952	-0.656
FSIS	—	—	-0.873	-0.175
TEC	-3.163	-0.925	—	—
Adj R-square	**0.345**		**0.038**	

Table 11

Regression Results of DRC/SER for Dairy Firms

1983 Independent Variables	Equation (1a)		Equation (1b)	
	Coefficient	t-values	Coefficient	t-values
intercept	2.580	3.210	2.524	3.308
AGEK	-0.010	-0.164	-0.003	-0.043
PCM	—	—	-3.196	-2.194
CVAC	-1.158	-1.299	—	—
EMPL	0.00	0.231	—	—
KL	8.3E	0.898	—	—
LEG	2.245	1.176	2.026	1.069
FSIS	—	—	—	—
TEC	-1.658	-1.028	-1.012	-0.720
Adj R-square	**0.157**		**0.091**	

1988 Independent Variables	Equation (1a)		Equation (1b)	
	Coefficient	t-values	Coefficient	t-values
intercept	2.859	3.147	2.497	3.181
GEOG	-0.915	-1.661	-1.287	-2.456
AGEK	-0.015	-0.769	0.019	1.097
PCM	—	—	-4.259	-3.619
CVAC	0.002	0.224	—	—
EMPL	-0.001	-0.752	—	—
CAPU	-0.009	-0.055	-0.098	-0.632
KL	6.1E	2.393	—	—
PER	0.526	1.094	0.681	1.511
LEG	-0.180	-0.386	-0.318	-0.727
FSIS	—	—	-0.557	-0.693
TEC	-2.373	-2.812	—	—
Adj R-square	**0.205**		**0.256**	

Table 12

Regression Results of TEC for Meat Firms

1983 Independent Variables	Equation (1a)		Equation (1b)	
	Coefficient	t-values	Coefficient	t-values
intercept	0.584	10.804	0.495	6.451
AGEK	-0.005	-1.847	-0.001	-0.343
PCM	—	—	0.536	2.374
CVAC	0.107	1.376	—	—
EMPL	-6.3E-06	-0.057	—	—
KL	2.793	2.318	—	—
LEG	0.114	0.806	0.078	0.574
FSIS	—	—	0.302	1.725
EPR	-9.3E-05	-0.805	-6.5E-05	-0.678
Adj R-square	**0.142**		**0.243**	

1988 Independent Variables	Equation (1a)		Equation (1b)	
	Coefficient	t-values	Coefficient	t-values
intercept	0.731	7.487	0.726	9.904
GEOG	-0.057	-0.606	0.003	0.037
AGEK	-2.1E-04	-0.330	-4.6E-05	-0.131
PCM	—	—	0.440	3.053
CVAC	-0.011	-0.794	—	—
EMPL	2.2E-04	1.310	—	—
CAPU	-0.001	-0.038	0.001	0.090
KL	-4.5E-04	-0.286	—	—
PER	0.046	0.694	-0.017	-0.310
LEG	-0.094	-1.392	-0.133	-2.749
FSIS	—	—	0.467	2.808
EPR	4.7E-05	1.651	4.1E-05	1.861
Adj R-square	**-0.012**		**0.348**	

Table 13

Regression Results of TEC for Dairy Firms

1983 Independent Variables	Equation (1a)		Equation (1b)	
	Coefficient	t-values	Coefficient	t-values
intercept	0.845	3.959	0.697	4.966
AGEK	0.006	0.872	0.002	0.410
PCM	—	—	0.386	2.680
CVAC	0.179	1.890	—	—
EMPL	-2.7E-05	-0.143	—	—
KL	1.15E-07	1.050	—	—
LEG	0.183	0.876	0.324	1.774
FSIS	—	—	0.506	2.931
EPR	-0.007	-2.844	-0.006	-3.745
Adj R-square	**0.626**		**0.719**	

1988 Independent Variables	Equation (1a)		Equation (1b)	
	Coefficient	t-values	Coefficient	t-values
intercept	0.569	3.368	0.446	3.223
GEOG	0.071	0.642	0.087	0.973
AGEK	-0.008	-2.066	-0.010	-3.173
PCM	—	—	0.591	2.923
CVAC	0.003	1.530	—	—
EMPL	9.7E-05	0.657	—	—
CAPU	0.036	1.099	0.026	0.979
KL	1.7E-08	0.306	—	—
PER	0.091	0.938	0.059	0.753
LEG	-0.071	-0.751	0.024	0.326
FSIS	—	—	0.495	3.581
EPR	-0.001	-1.740	-0.001	-2.139
Adj R-square	**0.204**		**0.469**	

We may determine how establishments responded to policy changes only in 1988 and 1992, since only minor liberalization efforts took place in the industry from 1983 to 1988 and mainly affecting live and dressed poultry in 1986. Restrictions that were removed in 1981 and 1982 were immediately reinstated and tariffs on meat were even raised. The 1992 delisting was also revoked a few months after, aside from the difficulty of delineating these adjustments from those brought about by the recession, which occurred simultaneously. Nevertheless, their responses most likely differ according to firm size only in degree, at least based on some interviews. For instance, to be more cost-effective in the face of domestic and potential import competition, small- and medium-scale firms have cut down on labor expenses by reducing work hours, trying other formulations, or searching for cheaper raw materials. Medium and large ones are engaging in R&D, and trying to automatize partly to meet the shortage of skilled workers.

All firms are diversifying their products: smaller long-established firms which have a steady clientele are assured of a ready niche because of traditional methods that attract patronage. Many firms now use chicken increasingly because of its availability and relatively low prices; other firms plan to use turkey meat, which is acceptable to consumers and cheaper. Medium-sized firms are taking advantage of their lower overhead relative to large competitors, and increasing their product choices to include native dried or cured meat. Competition in the different product lines also seems keen for large firms, based on their aggressive marketing and advertising. Increased product differentiation lowers unit costs with increased throughput; this is one recommendation given in 1980 (WB 1980) together with more aggressive sales and better product presentation. Overall, however, it may be more a result of the marketing strategy of the establishments based on their perception of how the market is segmented, rather than on the previously described BFAD labelling regulation. Many firms produce not only different types of the same product, but complete lines for different markets.

All meat processing firms, regardless of size, seek to stabilize prices by using least-cost formulations, especially since different products

have different shelf-lives and prices. Canned pork turns rancid after several months (BOI 1989), but it is more marketable because it is cheaper. Canned beef lasts longer, but is also more expensive, so firms opt to produce a combination that will be profitable.

At least two firms have left the industry. New small firms have entered the industry in the past five years or so, based on updated lists of establishments engaged in meat processing.

Despite the opportunity for members of the association to agree on common prices for their products in wet markets, they have refused to do so. Their general attitude is to compete independently, but they take a united stand against issues that affect them as a whole. Whether to what extent the existence of QRs influence this attitude is an interesting question. The common perception is that it will be more profitable for them to be traders rather than producers if imports are liberalized or tariff protection is inadequate. (For example, all agree that a 100 percent tariff is not enough.) It is thus possible that QRs have created more domestic market power than tariffs (Bhagwati 1965), which they want to share among themselves, given their proclivity for protection in the form of QRs. At the same time, the existence of QRs did not diminish domestic competition, since they seem to be adopting competitive prices, even if the threat of imports has been eliminated. This perverse result qualifies the prescription that liberalization will result in gains through the promotion of competition (Krugman 1985).

The resistance to the removal of import restrictions is difficult ro understand in the case of noncanned processed meat, since the imported substitutes may become more expensive because of import barriers, so that a relatively low tariff would suffice.

Table 9 shows the estimated price differences, inclusive of tariff, between domestic and foreign (Hong Kong) products. It shows that bacon is priced similarly in the country, and is sometimes even cheaper. Ham, frankfurters, Vienna sausages, and liver spread were generally more expensive, but became cheaper in some years. Canned beef products are cheaper abroad. With liberalization, imports have reached the domestic market at about the same prices as domestic products. QRs, however, still cover most of the meat products. The

price ratios further show that live swine is much more expensive here, but live chicken, beef and pork are competitively priced. The ease of importing cattle and beef, the high productivity in poultry production, and the high costs of swine-raising may partly explain this result.

Given the perception that the market for their products is limited and depressed even more by the recession, competition has become so fierce that most information is kept secret by firms, given their highly similar operations and technology which makes it easy to predict their competitive plans and preempt these. Acute awareness of each others' actions is a major factor upon which decisions are based. For instance, SMC's announcement of a new line of processed meat products for the A market prompted their competitors to introduce similar "European-quality" lines which they advertised heavily. Although SMC did not pursue the line vigorously, it is an acknowledged leader in product determination. In fact, one of its competitors simply watches which of its new products sells, and simply follows suit. The current limited market may be temporary, however, considering that the population is growing and incomes will improve after the recession.

Several barriers to entry exist for a potential large meat processor. The first is the high cost of capital, which increases sunk costs and deters entrants from committing their resources. Another barrier is the high degree of product differentiation, (which reflects learning and scale economies), accompanying brand loyalties, and advertising expenses. Introducing new product lines, dispersing outlets geographically, and maintaining extensive distribution channels may fill product niches and maintain market shares. Thus, potential entrants are forced to sell in less profitable markets, or submit to an implicit limit price which prevents them from recovering costs, unless they are large enough to impose their own prices and sell at a loss first.

Advertising is important for product awareness, whether it be TV, broadcast or print media. Tie-ups of large firms with foreign companies enable them to ride on the following for these foreign brands. Still another deterrent is the extensive ditribution channels which large firms have developed. A relatively fixed livestock

population and lack of skilled labor also pose as entry barriers because major raw material inputs and competent workers are not readily available, making backward integration an advantage. Nevertheless, the common perception is that there are too many competitors in the industry, and this applies more to the smaller firms which face fewer entry barriers and have a limited market. Their ease of entry is shown by the continued addition of such firms in the business.

The many changes between July 1992 and February 1993 in the liberalization and tariff adjustments for livestock, poultry, meat and feeds and the eventual reimposition of restrictions are mainly a result of intense lobbying by industry organizations. In contrast, in the early 1980s, there was no such association that could bring the industry's problems to the attention of the government (WB 1980). The danger posed by this response is that entrepreneurial activity may be more devoted to predicting economic policy rather than production, since businesses will be encouraged to lobby instead of simply adjusting to policy when lobbying is proven effective. Of course, some flexibility is also needed, especially when changes are made during difficult periods. The government's indecisive implementation is not a good signal for the private sector and may compromise past efforts at trade reform.

Another example of adhoc implementation is allowing the importation of hatching eggs during supply shortages. This removes the pressure on local breeders to stay efficient and discourages them from improving productivity since they have to compete with cheap inputs when the government perceives that domestic prices are too high. Retail margins should also be addressed, since retail prices remain high even if wholesale prices fall. Requiring poultry integrators to maintain grandparent stocks is an expensive alternative, given the world market oversupply. Depending on the productivity of these farms, the costs are passed on to breeders.

Government intervention and frequent changes in regulations increase business risk and discourage new investment. The unintended effects of policies have often discouraged potential investors. In livestock operations, ranches that require large areas for forage and pasture were affected by agrarian reform (although the Supreme

Court subsequently upheld their exemption), hence the disincentive to such ventures, with the consequent supply effects. Moreover, liberalized feeder-cattle imports and the carabao slaughter ban, which were meant to arrest the decline of ruminants instead made it disadvantageous for local farmers who aimed for sustainable supplies of feeder cattle and were deprived of market opportunities for carabaos. Such a pattern eventually perpetuated the shortage of feeder cattle. The strong links between feedmilling and livestock and poultry and the existence of integrated firms necessitate a balanced pricing policy, just as price control over products which are seasonal by nature hurts business.

4

Conclusions and Recommendations

STRIKING a balance between the needs of the different sectors is a difficult task for the government. Part of the difficulty is the uncertainty of agricultural production which results in supply imbalances and fluctuating prices. The need to know the correct priorities and at the same time to be flexible, and to be able give the correct signals to encourage production, are all exacting demands on the government.

Although the government's efforts to achieve a balanced agro-industrial structure are laudable, the failure of certain industries after years of support may signal that perhaps no comparative advantage will ever be coaxed out of them. For instance, the private sector would rather not invest in the cattle industry because of its high costs, and conversely, private businesses can tell which industries will be profitable even with little government intervention. Other countries have resorted to subsidies since food security warrants the high priorities given to agriculture and many agricultural activities have a long gestation period. What is unfortunate is that the country seems to have lost its comparative advantage in certain activities even on indigenous breeds such as carabaos. Misdirected or inadequate government involvement, non-implementation of regulations and indecisive policy have taken their toll.

Trade policy has always been protective of the meat slaughtering and processing industry in terms of tariffs and import restrictions. This has exacted a heavier toll on inefficiencies, although the downstream industry has usually been accorded more protection than the upstream source of inputs. Liberalization has only become permanent for live animals, live and dressed poultry other than chicken, beef and mutton,

and processed beef, turkey and duck meat. The result is that an increase in effective protection are associated with lower DRCs, although EPRs are still high. Thus, although there were more efficient firms before, performance generally improved from 1983 to 1988, based on the indicators, with more firms in the mildly inefficient range. The influences of the factor-input mix, geographical location and legal organization were significant on the firms' foreign-exchange saving efficiency. For technical efficiency, the significant variables were the age of equipment, capital-labor ratio, price-cost markup, market share, EPR, and legal organization.

The meat processing industry may be characterized as an oligopoly with a competitive fringe since it consists of four large leading multi-product and several single-product establishments. However, product differentiation, whether a result of BFAD rules, unused capacity or "image" strategy, allows competition in the whole industry since competitive prices are important for the market shares of large firms, aside from the relative ease of entry into smaller-scale production. After all, commercial meat processing is a simple extension of the entrepreneur's culinary talent. The existence of import restrictions does not seem to discourage domestic competition: Producers face the same limited captive market and input constraints because of nontariff barriers. Right now, meat processors are willing to pay high tariffs on inputs as long as they are importable, but even with a high tariff rate on their product and no import restrictions, their perception is that it will be more profitable for them to become traders rather than producers because of these input constraints. Thus, although both economic and technical efficiencies have improved, the question is, would this still be possible in a freer trade situation? The prognosis looks good if the poultry dressing sector is used as the basis, since QRs were removed and DRCs dropped here, even if EPRs doubled. Ironically, the reimposed import restrictions include chicken.

It is obvious that firms are responsive to market demands. They continuously search for and implement more efficient methods to cut costs, showing continuous improvement in their use of resources over time and large potentials for even better performances. The limited

demand may only be a temporary problem due to the recession, although consumer tastes which take longer to adjust may be the constraining factor. The most immediate need is to reduce the costs of inputs that are especially due to infrastructural deficiencies, before or at the same time that we reduce protection. Considering that the industry has been on its own from the start, government policy would be more cost-effective if, instead of regulating, it provided basic support services. For example, traders who usually provide storage, trucking and credit benefit from the seasonality of corn harvests, "buying cheap and selling dear," since these facilities are otherwise unavailable. Or at the minimum, since food must be regulated for safety and health considerations, standard guidelines must be implemented properly (e.g., abattoir standards, livestock market guidelines, food quality).

It seems that the immediate removal of import restrictions on certain meat products (e.g., frozen meat) will not harm the industry because of the natural protection afforded by their perishability and lower domestic prices. For canned products, the problem of packaging must be addressed first. It will also make sense to deregulate imports of meat inputs after feed supply conditions are met, given the self-sufficiency in hog production but high domestic prices traceable to corn input costs. The difficulties of developing a livestock base should finally be resolved, if the country is to gain independence from imports of basic agricultural commodities. Before we can hope to see improvements in the quality of local meat, which in turn will translate into better processed meat that meets export standards, quantities must first be available. Tariffs should provide enough protection, especially when seasonal supply problems are the only constraint. Then, we may witness even higher efficiencies, enough to make elusive competitiveness a more concrete possibility.

Part II: Dairy Processing

Chapter 5

Industry Structure

DAIRY processing may be divided into milk processing and other dairy products. The 1988 Census of Establishments lists only five large firms in the milk-processing sector (PSIC 3112, fresh and preserved milk) with value-added of P208 million, or an average of P41.5 million per firm. Three establishments were in Metro Manila, and two in South Tagalog. One firm was foreign-owned. The sector comprising other dairy products (PSIC 3113) consisted of 49 large firms with value-added of P2,308 million or an average of P47 million per firm. Only two firms had controlling foreign equity. In addition, there were 324 small establishments with P13.7 million in value-added engaged in cheese and ice cream making, or an average of P42,300 per firm. The number of large dairy processors did not change from the figures given in the 1983 Census, but there were much fewer, i.e., fourteen, nonmilk dairy producers. Value-added per large firm was about the same, at P44 million. As for the smaller counterparts, 284 were listed in 1983 with P18,900 average value-added.

Despite the greater number of nonmilk producers, the value of industry output is dominated by milk processing, which serves a more basic consumption need. It is composed of the preserved milk sector, which reprocesses or repacks milk and provides 98 percent of total consumption, and the dairy farming sector, which actually produces raw milk and provides the remaining two percent (PDC 1991). The

former grouping corresponds to PSIC 31122 (powdered, condensed and evaporated milk). These establishments import majority of their raw material inputs. Firms engaged in the processing of fluid/fresh milk and cream (PSIC 31121) source their inputs from local dairy farms, which supply cooperatives run either by the government or privately; only one large processor maintains its own farm.

The industry is composed of a few large multi-product firms and several medium-scale and small competitors in each sector. SMC is the undisputed industry leader. It started well ahead of the others (having bought the Magnolia ice cream plant in 1925) and carries many product lines - fresh and UHT milk, yoghourt, cottage cheese, dressings, ice cream, butter, margarine and cheese. It has become the only integrated producer of milk, having the largest commercial dairy farm and the most modern processing plant in Southeast Asia, and even a joint venture in Taiwan. It serves 78.4 percent of the ice cream market (Appendix 2).

The closest contender in the fresh milk and ice cream sector is Selecta (with its 15.0 percent market share), which was acquired by RFM in 1990, although the firm has also been in the business since 1925. Using a carabao milk formulation, it managed to sustain a following, but did not expand as much until the buy-out. For the past two years, it has concentrated on ice cream and penetrated the market by differentiating its product between a cheaper and more expensive line, using its traditional carabao milk formulation for the latter.

Other fresh-milk producers are cooperatives put up by small dairy farmers. Sta. Maria Dairy Cooperative started in 1946 by selling fresh milk and then acquiring equipment in 1950 for pasteurized milk. There are, at present, four dairy federations composed of a total of 2,303 farmers, as well as 35 independent cooperatives in six regions.

There are two other large ice cream makers and some smaller ones. CFC Corporation carries the Presto brand, which has been selling for more than a decade. Coney Island, a US franchise owned by Seamark Enterprises, was purchased by Purefoods some three years ago. The small producers are old cottage-type businesses which cater to a limited market usually defined by their location.

The powdered/condensed/evaporated milk sector consists of four main producers which import dried milk and repack or reconstitute this into evaporated full cream, filled milk, or sweetened condensed filled milk. As early as the 1930s, four bottling plants were already involved in reconstituting. Nestle, which is a 55-45 percent joint venture between the Swiss parent company and SMC (MKPFI 1987), is now considered the leading producer in terms of number of brands. The others are Holland (a General Milling company), Kawsek, and CFC who produce several popular brands each. Liberty was producing milk and meat products but stopped in 1990.

Only three firms process butter and cheese: the Philippine Dairy Products Corporation (PDPC)(with a 36.6 percent market share), Kraft (48.8 percent), and New Zealand Creamery (15.0 percent). PDPC is a joint venture with the New Zealand Dairy Board. Kraft is a subsidiary of Kraft USA which introduced blended processed cheese and set up the first commercial production in the country in 1964. (Margarine is excluded from this discussion, since it is principally made up of vegetable oils and animal fats.)

Milk-based infant foods are produced only by Wyeth-Suaco, a joint venture with the US company that first introduced infant formula, and Mead-Johnson, a subsidiary of Bristol-Myers. Yakult manufactures fermented skim milk with lactic acid bacteria, and is classified under "other dairy products."

Dairy products comprise 77 percent of processed-food imports, amounting to $475 million in 1990 or $1.5 billion over the last decade, increasing at 18 percent annually. Powdered milk holds 80 percent of this proportion; butter, cheese, and curd share five percent. Appendix 3 gives the import figures in detail. The major sources of these imports are Australia, New Zealand and the Netherlands, although recently, evaporated and condensed milk imports have been recorded from Thailand, Malaysia, Hongkong, and Singapore.

Although prices abroad are low, they have been increasing in the last five years. This has become a source of concern for the government. The major producing countries have signed dairy protocols increasing the world prices for dairy exports. They now control production because of subsidy cuts. (Milk powder is highly

processed and is expensive if unsubsidized.) In the US, dairy animals are being sold for slaughter or export under their dairy termination program, while Western Europe and North America have imposed quotas on milk marketing. Another development which has forced cheese manufacturers to shift from subsidized to nonsubsidized imports, is the use of the Home Consumption Valuation (HCV) method, since it increased the value of subsidized imports.

One major local producer, however, perceives the situation differently. Apparently, despite these developments, dumping is still likely, given the increasing health consciousness and consequent declining demand in these Western supplier-countries. If subsidies continue, there will still be excess output, given that subsidies are output-based. And when trade barriers are removed, competition among subsidizing countries will even be keener. This perception is partly the reason why this producer has been selling off its excess cattle, especially since upkeep is costly, imported milk powder is P5 cheaper per liter than local raw milk, and a major market for its premium lines (the US military in the former baselands) no longer exists. The necessity of cost-effectiveness is made more urgent by the strategy of other major dairying countries, such as New Zealand, to compete in "branded" markets where value-added is higher.

Since 1964, the government has tried to establish dairy farms and milk collection schemes, but these efforts have met difficulties similar to those plaguing the cattle industry, e.g., the lack of suitable breeds and inefficient feeding practices that result in low yields, and high collection and maintenance costs because of bad roads and long distances. Dairy development also needs refrigeration facilities, a mechanism for replacement or refund if milk is rejected, and the capability to process soured milk.

The domestic supply of raw milk comes from either commercial (64 percent), or backyard and government farms (36 percent). In physical terms, production from these three sources in 1990 amounted to 12.29, 5.8, and 1.07 thousand metric tons, respectively (BAS). Magnolia and its sister company, Monterey, have the largest commercial farms, contributing more than 50 percent to the industry total in 1984 (WB 1985). Except for these farms, the DA dramatizes

the contribution of dairy farms as "3 drops per day per person" (DA-PDC 1986). Part of the reason is that backyard milk production is merely an offshoot activity of livestock-raising, which are meant for meat and draft power. Since backyard carabao and cattle population has remained constant, milk production has been kept low and stagnant.

Daily per capita consumption is only half of the recommended dietary allowance of 82 grams; in 1990, it was 51.8 grams. For self-sufficiency, the ideal number of milking cows is pegged at 600,000 (Dulay 1988). Actual numbers total only 44,000 dairy cattle (DA 1992). Children below five consume the largest amounts of milk, and given our rapid population growth, demand is expected to grow. Metro Manila shows the highest consumption in locational terms.

Altogether, the dairy market is estimated to be worth P14 billion. There is a wide market base and product range, and an established market for local products (BOI 1989), especially for powdered and evaporated filled milk. Intermediate users, such as confectioners, food processors, bakeries, and hotels are also a reliable market. For the non-institutional market, the generally low consumption level is influenced by low incomes or purchasing power, milk being highly income-elastic. This is a basic problem for local dairy cooperatives. Most consumers cannot discern or afford to pay for quality differences, and therefore buy low quality (highly-processed) import-based milk, rather than the more expensive highly nutritious (fresh) local milk.

For milk companies that compete in a single product line such as powdered milk, distribution and brand awareness are critical. Processed milk is also price-elastic, and prices are dependent on both import prices (since raw materials are 70 percent of production cost), as well as packaging (which could amount to 28 percent for canned milk). Powdered milk repackers are using retail packs, which is what lower-income buyers can afford.

Milk production requires a good infrastructure system because of its high perishability and short turnaround period. For cooperatives, this is manifested in the high costs of collecting milk from members. Thus, marketing costs are even higher than processing costs; for fresh

milk, it may reach 22 percent (BOI 1988). A major repacker of milk powder has thus invested heavily in a distribution system.

Milk accounts for 80 percent of total consumption of dairy products. Condensed and evaporated filled milk, powdered milk, processed cheese and ice cream are the most popular product forms. Shelf life is a crucial determinant in consumer choices. Processed milk is the exception to the rule that processing translates into higher prices, since technology has instead brought both longer shelf life and lower prices, hence the imported powdered raw material is cheaper. A premium is instead paid for freshness, since it is deemed more nutritious, fresh milk needs refrigeration and costs more to produce. Its high perishability, however, limits its market reach. Full cream milk is also more expensive than filled or skim milk.

Butter and cheddar cheese are not as popular as their cheaper substitutes, margarine or butter compound and filled cheese. And just like other food products which need low-cost formulation. The cheaper substitutes were most likely developed to capture lower-income consumers, who have a taste for these. Demand is generally erratic and lower during hot months.

One source of rising demand for cheese is the rapid growth of the fastfood industry in the 1980s (BOI 1989). However, this trend has also led to increased imports of curd, since locally-produced curd is not suitable for processing. The technology for curd making is not complicated but the liquid milk requirement for an economic-sized production is large i.e., ten kilograms for every kilogram of cheese. Curd prices rise along with milk prices, but the substitution effect also works, since the demand for milk then declines and cheesemaking becomes more profitable. Current health concerns have also created a demand for skim milk, which has made butterfat cheaper.

Exports usually consist of ice cream, liquid and powdered cream, processed cheese, milk powder, and condensed sweetened filled and evaporated filled milk (Appendix 4). Considering that the raw material inputs are largely imported, these are basically re-exports.

The level of technology in reconstituting or recombining is of the intermediate and final processing type, since the raw material has already been processed into its dry form. In 1957, the recombining

method, which uses imported skimmed milk powder and vegetable (coconut) oil, was first developed here to produce filled milk and then condensed sweetened filled milk in 1967. The plant and facilities of repackers are old but properly maintained, and comparable to those in other Asian countries. Equipment costs may be lowered by substituting imported types with locally fabricated ones, although a homogenizer is more complex to manufacture (BOI 1989). Basic cheesemaking equipment is also manufactured by local fabricators, although these may not be as efficient or have the same capacity as imported machinery.

The production processes are not very complicated, involving basic pasteurization and homogenization for milk (also denaturization for UHT), blending for ice cream and cheese, and ripening or incubation for cheese and yoghurt. Nonetheless, the industry is capital-intensive, being highly dependent on processing equipment and process technology and facilities. In fresh milk processing, Magnolia uses the most modern integrated automated operations even up to UHT processing, which increases the shelf life of milk and eliminates the seasonal problem of oversupply. It is estimated to produce four million liters yearly (BOI 1989), which is a little more than the combined production of the Laguna Processing Center, the Southern Tagalog Dairy Cooperative, and the Dairy Training and Research Institute. The latter three use the basic methods with semi-mechanized and manual operations. Other cooperatives plan to invest in a locally developed medium-scale spray dryer and in more pasteurizing plants.

Magnolia also utilizes modern dairy farming methods, which it locates suitably. It maintains and upgrades an economic-sized herd. It has a complete "cold chain" which reduces losses in the collection, storage, processing and distribution of milk. In fact, it can supply the dairy cattle requirements of the industry easily, i.e., the capability exists but is not efficient because imported milk powder is still cheaper to use. Quality control is crucial even in the early stages of milk production, e.g., udders that are not milked stop producing and one defective tit affects the rest. Moreover, because the quality of feeds determines the productivity and milk quality of the animal, their

availability is also important. These factors increase production costs and the need for economies of scale.

The production costs of local milk manufacturers, especially cooperatives, are higher than those of foreign producers who have attained scale economies, are subsidized, and have their own sufficient supply of raw milk. A steady supply of large amounts is crucial since it takes 11 liters of fresh milk to produce one kilogram of powdered, and a minimum of 10 tons of liquid milk to produce the powdered form economically. The underutilized capacities of dairy farm cooperatives, however, result more from marketing difficulties rather than from the lack of a continuous supply of raw milk.

6

Policy Environment

THE Dairy Act of 1961, Republic Act 4041, officially established the development of an indigenous dairy industry through the BAI. Since then, considerable efforts were undertaken to help the industry further, among which was the establishment of the Dairy Training and Research Institute at the UPLB. In 1979, the Dairy Industry Development Act or Batasang Pambansa Bilang 21, creating the Philippine Dairy Corporation (PDC), was passed. A National Dairy Development Bill was filed in 1988 and refiled in 1992. The DA's Medium Term Dairy Development Program was launched in 1990.

The DA now bases the growth of the dairy industry on the development of smallhold dairy farming and the organization of farmers into viable cooperatives. The BAI focuses on backyard producers by rendering dairy husbandry and technology training services. A milk collection scheme, for instance, was restored recently in Nueva Ecija, after a large company pledged to buy the collected milk, presumably for its ice cream line. The BAI has also launched a breed-upgrading program, under which it provides hormones for mass heat synchronization.

The dairy program, which aims "to help small farmers produce more milk and make more money from producing it," is implemented by the PDC and BAI, and consists of three levels: breeder foundation, dairy modules and integration of support. Dairy modules consist of dairy production units composed of 300 dairy animals owned by around 100 farmers, a dairy market base, a collection unit and a processing unit. The aim is to consolidate the output of each module to achieve efficiencies in collection, processing and marketing. Milkshed areas are a network of modules. Cooperatives are tapped to

collect, process and market milk. The model for this is the Alabang Milk Processing Plant run by the Southern Tagalog Dairy Cooperative. It has shown the benefits of using government-owned infrastructure in generating income for small dairy farmers. The Cebu and Davao projects under the program have so far been successful, and provide good examples for the facilitating, rather than regulating, role of government.

In 1992, a Task Force on Dairy of the Philippine Chamber of Commerce and Industry reviewed and analyzed all existing programs and policies covering the industry. It observed that the objective of supplying the country's dairy needs cannot be justified from an economic viewpoint. It then recommended the satellite farming approach for new entrants to establish the requirements of a viable project, and better entrepreneurship of milk and meat for existing dairy ventures.

Government policies relating to the meat industry also affect the dairy industry, since both depend on the existence of a livestock base. The carabao slaughter ban runs counter to the need to produce more animals, because in practice, this law is often violated with impunity. Carabao- or cattle-raising should be made a business enterprise. The BAI has proposed to "save the herd," so that the government buy all carabaos put up for sale, or provide for a mechanism which will allow farmers to borrow money against their pregnant cows. Another recommended measure is to ban the slaughter of female carabaos, because they have a 15-year productive life, aside from the superior quality of carabao milk compared to that of any other dairy animal.

The Multi-Livestock Dispersal Loan Program described earlier has also met implementation constraints: the stocks are not yet breedable, and the farmers find the 10 percent interest too high. In addition, the number of animals given to beneficiaries is limited, income-augmentation rather than economic viability has been the basis for the program, and the poor prioritization of the subsidy to this effort are some reasons why it had no significant impact.

The BFAD is in charge of implementing food safety regulations; those specific to the dairy industry have so far involved powdered milk imported from countries affected by the Chernobyl nuclear plant

accident, and the regular destruction of infant formula past their expiry date. The labeling regulation described earlier also affects milk products, particularly ice cream, since this is where differentiation has been pronounced.

Fresh and processed milk are considered basic necessities; other dairy products are prime commodities under Republic Act 7581, the Price Act of 1992, which seeks to protect consumers from unconscionable price increases during emergency situations. Prices are monitored regularly by the DA and the Department of Trade and Industry (DTI), which recommend price ceilings when necessary. Hoarding, profiteering, and cartels are also deemed illegal.

Appendix 5 shows that tariffs generally increase with processing. There were no changes except for the slight rise in raw materials duties. The rates on fresh milk and cream were 5 percent in 1983, 20 percent (for canned) and 10 percent (other) in 1988, and 10 percent in 1991. For whey and milk powder, it was 5 percent in 1983, and 10 percent (bulk) and 20 percent (other) in 1983 and 1991. For preserved concentrated sweetened cream, it was 10 percent in all years except for those in containers other than bulk, which had 20 percent rates. For butter, it was 40 percent in 1983 and 30 percent in 1988 and 1991, while other anhydrous milk fat had 10 percent throughout. Yoghourt and other fermented milk had 10, 20, or 50 percent, depending on contents in 1988 and 1991. Curd had 30 percent and cheese had 40 percent. Ice cream had 50 percent and infant formula 20 percent throughout.

Implicit tariffs on the output and input in 1983 were almost equal for milk, butter and cheese, higher on the output than on the input for ice cream, and the reverse for infant formula (Table 1). In 1988, implicit tariffs were higher on the output than on the input for all sectors.

Except for a few restricted lines in 1970 and 1975, imports of milk and cream were restricted in 1976, but deregulated shortly in 1977 (Appendix 6). Restrictions were imposed once more in 1983 and totally removed in 1985. Butter, cheese, and curd were subject to restrictions in 1970 and 1975, delisted in 1982, again restricted in 1984, and finally liberalized in 1985.

The impact of policies as measured by the EPRs and NEPRs shown in Table 1 were computed from the censuses of 1983 and 1988, which may denote the pre- and post-liberalization periods given data constraints. Fresh milk (one observation) and infant formula producers were the least protected in 1983, while powdered/evaporated milk processors had the lowest EPRs in 1988. Ice cream makers were the most protected in both years. Except for powdered/evaporated milk producers, all sectors enjoyed increased protection levels between the two years. The combination of high EPRs and low DRC/SERs suggests monopoly rents.

The 1988 results seem to be a continuation of the 1974 estimates of 5 percent for evaporated/condensed milk, and 52 percent for butter, cheese, and other dairy (Bautista, Power et al. 1978). However, the negative NEPRs in fresh milk, powdered milk, and infant milk production indicate that they were penalized by the overvalued exchange rate but the relatively high NEPR for ice cream shows that it still receives high protection. Indeed, the 1991 estimate of the only butter and cheese manufacturer in Table 6 also indicates a net penalty; its survival likewise indicates its efficiency, which follows from being the most productive and among the efficient sectors even in 1988.

7

Performance

THE shadow DRC/SERs (Table 1) in 1983 show all sectors in the industry except for fresh milk to be efficient foreign-exchange savers. The picture changed drastically in 1988 for powdered/evaporated milk processors who became high-cost and switched places with fresh milk producers who became only minimally inefficient. (The 1991 financial statement-based estimate of 1.58 for the single butter producer shows a mild level of inefficiency.) Thus, the powdered/evaporated milk processing sector seemed to have lost its comparative advantage, considering that it had a DRC/SER in 1974 of 0.18. But ice cream production, which had a ratio of 0.88 in 1974, maintained its efficiency. Butter and cheese, coming from a DRC/SER of 1.97 in 1974, also seem to be gaining efficiency (Bautista, Power et al. 1978).

The production of fresh milk necessarily involves dairy farming, since it does not merely consist of bottling milk and cream sourced abroad, an arrangement rendered infeasible by the high perishability of raw milk. And because small dairy farms have been shown to be efficient foreign exchange savers in certain areas (Cabanilla, UPLB 1983), the contention that smallholders have the potential comparative advantage finds support, considering that the sector was only minimally inefficient in 1988. If large-scale integrated milk production is not economic, then small-scale ventures should be encouraged instead.

Although TECs given in the same table show that ice cream makers are relatively far from the frontier, this should be qualified by the presence of two kinds of producers here — a few technologically advanced and several smaller, labor-intensive establishments using simpler and possibly older machines. The rest of the sectors are close

to the average technically advanced firm. Of course, more observations mean lower TECs. And if the methods currently employed are not necessarily the most modern, unity results do not mean the most advanced level.

Based on Table 2, processors of infant formula and powdered milk were the largest in terms of all indicators except for average value-added in 1988 where the latter sector was replaced by butter and cheese makers, and average capital in 1983 where three sectors had similar sizes. The lowest indicators were registered by the ice cream sector. Employment dropped in three sectors, but the rest of the size indicators rose for all sectors except again for value-added in processed milk.

Table 3 shows that butter and cheese were the most productive sectors in 1988; fresh milk and processed milk manufacturers were the least productive, depending on the indicator. In 1983, processed milk and infant milk formulators took the lead, and fresh milk and ice cream producers trailed behind. Productivity fell only for processed milk and infant formula makers.

Table 4 shows that capital per worker was highest in fresh milk production in 1983, then in processed milk, which seems to coincide with the switch in efficiency described earlier; the ratio for the former sector also dropped. These sectors also had the oldest equipment. Ice cream makers were the least capital-intensive, which is a manifestation of the small size of these ventures and the relative ease of setting one up. They were also the most vertically integrated, as approximated by the ratio of value-added to sales, although the figures do not vary too much between sectors except for the low ratio of powdered milk producers in 1988. Minimum efficient scales were also similar in 1983, but in 1988, butter and cheese differed from the rest with its high ratio. Age of equipment again was almost the same for all sectors in 1983 and went from 16 years for powdered milk to seven years for ice cream and butter and cheese; these correspond to the productivity rankings found earlier such that the sectors equipped with newer machinery seemed to be the most productive.

Price-cost margins, computed as the ratio of the difference between value-added and compensation costs to output, were higher

in 1983 than in 1988 for all sectors, reflecting decreased profitabilities, which were probably partly attributable to the removal of QRs. Ice cream processing had the highest markup in 1983 and infant formula in 1988, although its figure was not much higher than that of ice cream. This seems to have been a signal for more aggressive behavior from Magnolia's competitors, or more infant formula product differentiation. The sector with the highest output, powdered/evaporated milk processors, invested among the largest amounts of capital and had one of the lowest profit margins in 1988, while ice cream makers who were the smallest, and infant formula producers who were the largest and were highly-productive, had much higher markups. In 1988, butter and cheese, the most productive sector, ranked among the low-profit sectors both in 1983 and in 1988.

Based on comparative prices, wide price-cost margins exist in repacking (Dulay 1988). It was discovered that retail prices for evaporated milk are thrice their import cost, while that of full cream milk is double its landed cost. The differences more than account for the large shares in costs of packaging, distribution, reprocessing, or credit, and may be attributed to profits. To the extent that this is made possible by the protective structure, a possible explanation is that in sectors with unexploited economies of scale, protection erects entry barriers that allow firms to exploit market power (de Melo and Roland-Holst 1991). Otherwise, the monopoly rents generated through protection encourage excessive entry instead, which may result in inefficient small-scale production, or lower margins.

Herfindahl indices in Table 5 were surprisingly similar for ice cream and infant formula processing despite the difference in number of establishments. Thus even with 31 firms in ice cream, there tends to be some concentration. On the other hand, the indices show relatively equal market shares for the three observations in infant formula. For powdered milk and butter and cheese however, the formula indicates some concentration which became pronounced in 1988. The four-firm concentration ratios show all sectors to be monopolies instead.

Table 8 reflects the distribution of dairy establishments by efficiency level and their corresponding employment sizes. More firms were efficient in 1983 than in 1988, although about the same

proportion were high-cost foreign-exchange savers in both years. Only 10 percent were minimally to mildly inefficient in 1983 compared to 36.6 percent in 1988. Most of the firms employed less than 50 workers in both years, whatever their efficiency level.

Historically, the country has never gone into large-scale milk production because the needed pasture lands have been limited by more immediate rice growing needs. Furthermore, rice-growing unlike wheat cultivation does not allow land to lie fallow for long periods and neither is the country's general climate conducive to raising dairy cattle. Aside from this, milk-drinking is not a natural habit for Filipinos, who like other Asians are lactose-intolerant.

The country has thus manifested a general dependence on imports, and the consequent investment in processing technology geared for this form of input. With lower-priced imported inputs, processors have enjoyed high profit margins, although the recent rise in world prices has cut through these profits. Large capital requirements, breeding, feeding, and distribution costs, and the long gestation period before profit margins are realized serve as disincentives to dairy ventures.

Unutilized capacity in dairy cooperatives and large fresh milk and cheese processors is more an indication of insufficient raw milk inputs than of low demand, since imports have been rising to meet this demand. These disincentives act as barriers to entrants not only in processing but also in raw milk production.

Magnolia has all the advantages of a first-mover, having been established way ahead of the others, and having invested in integrated operations even up to packaging (e.g., Tetrabrik), which is crucial to milk production and is a major cause of high costs. Such advantages are also shown in butter and cheese, as well as in the infant formula sectors, where high capital intensities and large capacities effectively prevent the entry of new firms.

RFM's entry into ice cream production through its purchase of Selecta has fostered competition since it combined the large resources of an established company with the goodwill of an old brand name. Products have proliferated to give the consumer a wide range of flavors and prices to choose from. Even the third major ice cream

maker has started to advertise heavily; it was the first to try out other frozen forms on the market. "Buy-one-take-one" deals, which sources say were due to slow-moving sales, have also occurred. And while BFAD labeling regulations may affect the decisions of ice cream producers on the number of products to offer, their desire to maintain market shares probably plays a larger role. An interesting observation made by an industry source is that there has been an intra-firm transfer of technical personnel in the ice cream business, which accounts for an observed similarity of taste in products and even in product offerings.

The introduction of several other types of frozen ice products in the market is a way of filling all possible product niches, which also deters potential entrants. The setting up of plants in the South has, meanwhile, dispersed products geographically. Advertising to differentiate products or maintain brand awareness has also been practiced by other sectors in the industry, although to a lesser extent than ice cream. The establishment of a plant abroad by Magnolia further illustrates its rank in the business.

All large firms devote a proportion of their budgets to R&D and quality control, which some producers say is crucial to maintaining market shares. Those who have foreign equity are able to use the parent company's resources or goodwill, and often try to utilize locally-available raw materials.

Only one firm was found out to have exited from the industry, but several other repackers of powdered and evaporated milk have emerged in the past five years, based on the increased number of canned milk brands available in the market which carry the repackers' names. Their large capital expenditures, as shown by the Census, indicates a positive supply response to the liberalization of imports. Some repackers probably import finished goods, if the labels on the milk cans are to be interpreted literally. If this means that the producer is also the importer, the discipline expected to be provided by liberalized imports will not be realized. However, there seem to be no entry barriers to importing, so this is not likely to happen.

Import-penetration indices rose from 29.12 to 45.10 percent for processed milk, and declined from 18.38 to 10.87 percent for other

dairy processing from 1983 to 1988. This indicates that the domestic demand for milk was increasingly served by imports partly because of relaxed rules on importation or because domestic supply was simply lacking.

Fresh and processed milk are still subject to price control but only during emergency situations. Price data show reasonable price changes within the last three years, either because manufacturers are constrained by competition due to raising prices, or high price-elasticity. In the 1970s, price control squeezed margins and forced the three major companies then to stop operations. One firm took advantage of this situation and captured a substantial market share by advertising.

Comparing domestic prices with Hong Kong unit import values (Table 9) and assuming the same quality, domestic prices were much greater than those of imported substitutes of powdered, evaporated filled, sweetened condensed milk, and butter. (Powdered milk prices were an average of regular and infant formula milk prices.) Fresh milk was more expensive locally only in the early part of the period covered while cheddar cheese was competitively priced and even domestically cheaper in some years. Tariffs could explain the excess of the ratios over unity for all except butter, whose local prices were double the border. And except for powdered milk whose ratios were almost constant, the price differences narrowed after 1985, which shows that the liberalization was effective. For cheese, imports are not a threat because of their generally higher border prices. What they provide is a wider choice of products which only upper-income consumers can afford. And although imports of cheese as well as fresh milk have been growing, there have been substantial quality differences which are not reflected in the price ratios.

Given the efficiency of butter producers, the relatively high prices they charge indicates that entry barriers due to sunk costs are effective since there are only three of them with almost equal market shares. There is also unutilized capacity, which enables them to respond to increases in market demand. But because price-cost margins are among the lowest in the industry, these prices probably reflect production costs.

To test the importance of structural or policy influences on the economic and technical efficiencies of dairy firms, the two equations described in the meat section were run for the dairy (milk and nonmilk) industry combined. Table 11 shows that for the first equation in 1983, no variable was significant, but for the second equation, the significant variable was the price-cost markup (PCM), which is negatively correlated with DRC/SER. Thus, firms with high margins are likely to be efficient. This could be due to the way the variable was defined, so that higher PCMs are either because of higher value-added or lower wage costs, hence the negative correlation is not surprising. In 1988, the capital-labor ratio (KL) was positively and the technical efficiency level (TEC), negatively associated with DRC/SER in the first equation. For the alternative specification, location (GEOG) and price margins (PCM) were both significant with negative signs. Thus, firms which located in Metro Manila were also less inefficient, which confirms the finding mentioned earlier that such a location gives firms a cost advantage.

To explain technical efficiency in 1983 (Table 13), capital productivity (CVAC) and EPR were significant, with the expected positive and negative signs, respectively. The second specification yielded a better fit and more significant variables: PCM, LEG, and FSIS with positive signs, and EPR with the expected negative sign. Hence, technical efficiency was associated with higher margins, single proprietorships, larger market shares, and lower effective protection. In 1988, age of equipment (AGEK) and EPR again were negatively correlated with TEC in the first equation. And virtually the same variables in the second equation came out as significant: PCM and FSIS with positive and AGEK and EPR with negative signs, so that high margins, large market shares, new equipment and low effective protection characterized the technically efficient establishments. Of course, market shares especially in dairy processing, are mainly a result of historical advantage and efficiency.

The presence of economies of scale has implications other than its relationship with market power mentioned earlier. If it limits diversity, expanded markets would result in greater differentiation, but the opposite is also possible, i.e., since fragmented markets result in too

much diverse products (Pack 1984), enlarging the market would lead to economies of scale due to specialization (Havrylyshyn 1990). In the dairy processing industry, there seems to be large raw material inputs required for viability, although in one sector (ice cream making), small-scale production is possible. The large capital requirements are also defined by technology and the availability of the major inputs at low prices. The limiting factor at present is the absence of this supply, which prevents the firms from fully utilizing their capacities and realizing these scale economies. Nevertheless, the products seem to be more diverse, especially in the case of ice cream processors.

8

Conclusions

Milk processing has received low to moderate protection compared to other industries. While technically efficient, it was either mildly or highly inefficient by the end of the 1980s, the surprising result being the switch from one to the other extreme efficiency level within the five-year period. Other dairy products which received much higher effective protection were efficient foreign exchange savers, which is an improvement from their previously already very minimal inefficiencies. The unfortunate change was for the preserved milk sector, which turned around completely from foreign-exchange-saving to -using, yet it also used cheap imported raw materials. Perhaps such use of imported inputs is not, after all, crucial to efficiency since the fresh milk producer's performance improved even when it used so-called expensive, locally-sourced inputs.

Trade policy has benefited the processed milk sector more in terms of the removal of QRs (although these were not binding for milk powder which, being an essential commodity, received dollar allocations during rationing in the early 1970s) rather than tariff adjustments, which were not at all substantial. Given the cheap imported raw material and the relatively higher border prices of foreign brands of finished milk products (not to mention the perishability of these products which act as a natural barrier, aside from transport costs), it is thus surprising that not all (nonfresh-milk) sectors experienced higher efficiencies when they all use similar imported milk powder, curd, and whey, as basic inputs. Of course, there were macroeconomic reasons for this differential performance. The important point is that despite the liberalization of both inputs

and outputs, nonmilk dairy processing proved itself capable of achieving comparative advantage.

Price-cost margins declined as the ratios between domestic to border prices generally fell after the liberalization. The variables found associated with inefficiency were markups (-), factor-input mix (+), technical efficiency (-), and geographical location (-). Technical efficiency was correlated with markups (+), effective protection (-), market share (+), capital-productivity (+), legal organization (+), and age of equipment (+).

These efficiency estimates, however, must be qualified to the extent that the imported inputs and outputs are subsidized by the producer countries. This makes border prices understated if the dumping prices are much lower than world prices. Incorporating this into the computations would lower the DRCs and EPRs, even possibly resulting in efficient levels.

The disciplining effect of imports is also qualified by the phenomenon of dumping. In our case, the production of powdered milk has not been undertaken, which is most likely the result of dumping, which has gone on for a long time and is expected to continue. The consensus is to avail of cheap raw materials since no local producer is hurt. This observation may extend to the fact that the liberalization of dairy products was among the "uncontested" policy moves. The long-term effect, however, has been import-dependence, and the failure to encourage dairying. Protection may seem to be justified when dumping occurs, but industry observers seem to agree that this should take place only if predatory pricing is the reason for low border prices.

For most sectors in dairy processing, entry barriers due to sunk costs are formidable, but for the others, notably dairy farming and ice cream making, smaller-scale investment is possible. Here, contestability may be the reason for competitive prices. However, for reprocessors, butter and cheese, or infant formula producers, prices need not forestall potential entrants, although the desire to maintain market shares among existing competitors may result in competitive prices, aside from the limited market which constrains the entry of new firms.

The industry consists of a few large multi-product firms and several medium and small competitors in each sector, with milk processing dominating the whole industry. The structure, however, does not seem to influence the relative efficiencies, considering that the different concentration levels in the nonmilk dairy sector are associated with similarly efficient foreign-exchange saving ability, or the oligopolistic powdered milk sector and monopolistic fresh milk sector are both inefficient savers. The similar Herfindahls in 1988 suggest some critical market share as an efficient level. Price-cost margins are higher for some but not all efficient sectors and in 1988, they varied much less between sectors.

Although natural barriers to imports exist, the common response of these firms perhaps to decreased protection has been to differentiate their products to capture market shares, or what is known as "market positioning." There are at least five brands of evaporated filled milk produced by each processor in the sector, or powdered skimmed milk, several classes of ice cream, "filled" cheese, or butter "compounds." Of course, this may be partly in response to the recession, that is, given the broad market but low incomes, firms have to produce what the consumers can afford, especially to maintain their market shares or earn enough on their investments. However, increased product differentiation, which could also be an indication of the use of scale economies, started even before the recession and may only be more pronounced now. More repackers have entered the industry and the largest expenditures on new assets were undertaken by the preserved milk sector.

Whether imports have disciplined the industry depends on a combination of reasons. One is the sectoral differences in scale economies, which could pose as an entry barrier that renders import discipline ineffective. Another is the nature of the product, e.g., perishability, which gives domestic producers natural protection against imports. Yet, dumping enables both small and large producers to take advantage of cheap imports and lower costs.

Milk processing must be large-scale, so that local procurement by big companies may not be possible as of yet because of the large volumes their plants need (i.e., 50,000 liters of fresh milk per day for

a medium-sized plant versus current production of 11,022 liters per day [BOI 1989]). Still, we have the ironic difficulty of disposing of the milk output at the dairy farm level despite the fact that the volume of local produce is an insignificant proportion of the total requirement. While a large processor disputes the efficiency of smallholding relative to large-scale farming (although Cabanilla's result proves their efficiency), the past low supplies and low selling prices have been the result of this very difficulty, and the consequences have been low returns to the farmers. The cooperatives argue that the relative ease of setting up dairy farms and the lower costs of smallholding indicate that there exists a large potential source of raw milk, not to mention the high animal yields in certain larger farms. What is difficult is sustaining production, if there is no forward linkage in which the farmer can profitably cooperate, so that he goes beyond the "livelihood" into the "for profit" thinking. Thus, farm dairying cannot be stimulated without the support of the commercial processors.

A lesson may be learned from the Indonesian experience: Dairy companies were required by law to purchase a fixed portion of their milk inputs from local dairy farmers. Perhaps we need to hurdle a certain volume of production before local raw milk will be just as cheap as imports.

The government seems to have wisely assigned high priorities to smallhold dairy farming, since dairying is really a by-product of carabao or cattle-raising and hence takes little else to promote. Moreover, milk is a basic consumption need by vulnerable age groups, which defines the need to be less import-dependent (especially since subsidy cuts abroad are a reality) if not self-sufficient. Previous government efforts are already paying off, as small dairy farms have been shown to be efficient foreign-exchange savers, and milk-intensive breeds adaptable to our climate have already been discovered. The quandary of the small milk producers exists however, since competing raw material imports are cheap and processing costs are much higher here.

The long gestation period characterizing integrated milk processing makes repacking a more profitable venture, but the potential efficiencies for locally-sourced milk should serve as a

counter-example. For instance, the high productivities of small dairy farms may be as effectively exploited, together with the market-responsiveness of farmers. The crucial link is to the milk processor who would be the more immediate market for dairy farmers to allow them to move on to larger production volumes sooner. Allowing carabao and cattle raisers to engage in trading activity for profit would also help in this objective. Of course, infrastructure such as farm to market roads, large-scale refrigeration, an efficient transport system, and credit are just as crucial, as well as a feedgrains base. The problems build up when one important infrastructural link is absent, e.g., cornfeed is available in Davao but cargo rates are too low to be profitable for the shipper to transport it.

It is obvious that we do not lack ideas to promote the dairy sector, especially considering the multitude of recent proposals. However, the key problems faced by the industry as perceived by government agencies are that government initiatives are uncoordinated and that there is uncertainty about the direction of policy and the commitment of resources to the industry. In this context, it is not surprising that Thailand's efforts have been successful: Its government supported the industry "at all costs." The urgency for us is heightened by the need to regain what we already had in the past. It would seem that the next step for government is to facilitate the link between small-farm dairying to large-scale processing. Then perhaps the potentials for efficiencies will be realized, at relatively low cost, and so will the benefits of directing resources toward their highest potential profitabilities.

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Appendix 1

Regional Distribution of Meat and Dairy Processing Firms

PSIC	Industry Description	National Capital	Ilocos	Cagayan Valley	Central Luzon	Southern Tagalog	Bicol	Western Visayas	Central Visayas	Eastern Visayas	Western Mindanao	Northern Mindanao	Southern Mindanao	Central Mindanao
31111	Slaughtering	2				1	2		1				1	
31113	Poultry dressing and packing	2				1	3							
31114	Meat processing, etc.	28		1	1	4	3	2	3	8			3	3
31119	Slaughtering, preparing, etc.	1				1								
31121	Fluid fresh milk and cream						1							
31122	Powdered/evaporated/ condensed/filled milk	2					2							
31131	Butter and cheese	2												
31132	Ice cream, sherbet, ice drop, etc.	21		2		2	6	1		1		1	1	3
31133	Milk-based infant/ invalid food	4												
31139	Dairy products except milk, n.e.s.	1					1							

Source: Census of Establishments.

Appendix 2

Net Sales of Meat and Dairy Firms in 1991

PSIC	Firm	Net Sales (P000)	Percentage Share
31114	**Meat processing**		
	RFM Corporation	5,199,004	31.6
	Purefoods Corporation	4,618,526	28.0
	Universal Robina Corporation	3,929,385	23.9
	Barney Foods International	194,748	1.2
	Genosi, Inc.	116,862	0.7
	Delnor Foods Corporation	84,148	0.5
	Reno Foods, Inc.	83,540	0.5
	VFI Foods, Inc.	60,210	0.4
	Vitarich Corporation	1,921,119	11.7
	Leslie Corporation	264,650	1.6
31122	**Powdered/evaporated etc. milk**		
	Nestle Philippines, Inc.	11,106,902	
31131	**Butter and cheese**		
	Kraft General Foods, Inc.	1,077,789	48.8
	Philippine Dairy Products Corporation	802,552	36.3
	New Zealand Creamery	330,462	15.0
31132	**Ice cream**		
	Magnolia Corporation	774,326	78.4
	Selecta Dairy Products	147,970	15.0
	Seamark Enterprises, Inc.	64,973	6.6
31139	**Other dairy products**		
	Yakult Philippines, Inc.	129,583	

Source: 1991 SEC Top 2000 Corporations.

Appendix 3

Philippine Imports of Meat and Dairy Products: 1983, 1985, 1988 and 1991

Commodity	Imports (CIF Value in US$) 1983	1985	1988	1991
Meat of bovine animals, fresh, chilled/frozen, with bones	1,339,064	218,915	1,029,929	182,637
Meat of bovine animals, fresh, chilled/frozen, boneless	10,895,162	3,008,154	7,551,242	17,156,357
Meat of sheep and goats, fresh, chilled or frozen	249,510	71,599	99,633	182,853
Meat of swine, fresh, chilled or frozen	745,878	399,167	1,956,728	467,030
Edible offals of animals falling in subgrps 001.1, 001.2, 001.3 and 001.5 fresh, chilled or frozen	1,050,797	125,747	390,374	543,306
Edible offals	—	—	—	—
Meat, n.e.s., fresh, chilled or frozen	3,095	6,628	72,143	
Chickens, killed or dressed, fresh, chilled or frozen	178	129,190	67,321	36,974
Cuts of chicken, frozen	—	—	—	70,780
Ducks, killed or dressed, fresh, chilled or frozen	212,632	55,019	136,236	11,832
Turkeys, killed or dressed, fresh, chilled or frozen	84,755	23,596	17,018	12,677
Cuts of turkeys, frozen	—	—	—	2,466
Geese, killed or dressed, fresh, chilled or frozen	10,623	1,619	—	13,969
Pigeons, killed or dressed, fresh, chilled or frozen	—	—	—	1,877
Cuts of chickens, ducks and turkeys, fresh, chilled	—	—	—	169,665
Poultry meat, n.e.s., fresh, chilled or frozen	5,046	—	—	—
Poultry liver, fresh, chilled or frozen, salted in brine	71,255	23,387	4,462	—
Bacon	1,506	7,499	786	415
Bacon, in airtight containers	39	1780	—	7,835

Appendix 3 *continued*

Commodity	Imports (CIF Value in US$) 1983	1985	1988	1991
Ham and shoulders, dried, salted or smoked	—	4,543	121	—
Ham, in airtight containers	5,732	2,216	—	22,755
Sausages of all kinds, not in airtight containers	50,576	19,021	35,564	20,454
Sausages of all kinds, in airtight containers	5,695	1,930	4,068	—
Pork, in airtight containers	201	—	9,300	—
Pork luncheon meat, in airtight containers	1,015	—	77,464	—
Beef and veal	15,984	2,021	3,677	
Beef, in airtight containers	1,693	—		
Corned beef, in airtight containers	8,373	—	6,145	
Chicken meat, salted, dried not in airtight containers			19,048	70,043
Duck meat and goose meat, salted not in airtight containers	1,957		163	1,756
Turkey meat, in airtight containers	3,130			
Turkey meat, salted, in brine, dried/smoked				103
Meat and meat preparation, in airtight containers	245,551	856	33,456	
Edible offals of swine salted, in brine, dried, smoked	24,050			
Other prepared or preserved meat and edible offals	22,107	4,955	24,744	48,183
Other meat and edible meat offals salted, in brine, dried,smoked			138	
Duck and goose meat and offal (other than liver)prepared/preserved, n.e.s				3,388
Liver of any animal, prepared/preserved, n.e.s.				45,222
Meat extracts	16,472	7,373	39,430	60,570
Extracts and juices, of crustaceans, molluscs/other aquatic invertebrate				836

Appendix 3 *continued*

Commodity	Imports (CIF Value In US$) 1983	1985	1988	1991
Meat pastes and spreads	8,661	1,205	3,951	
Milk, fat exceeding 1%, not concentrated nor sweetened w/ preservative in cans				194,675
Milk, fat not exceeding 1%, not concentrated sweetened, other than O(NK) O1				523,934
Milk, fat exceeding 1% not 6% not sweetened/concentrated, w/ preservative/in cans				12,621
Milk, fat exceeding 1% not 6%, not sweetened/concentrated, other than O(NK)O1				311,239
Cream, fat exceeding 6%, not concentrated nor sweetened, w/ preservative/in cans				38,532
Cream fat exceeding 6%, not concentrated sweetened, other 0221301				95,105
Natural milk, in hermatically sealed cans	545,444	98,136	1,706,857	
Milk,in solid form,fat not exceeding 1.5%gmt 20k/more, concentrated/sweetened				96,502,368
Milk, in solid form, fat content by weight, exceeding 1.5% other than 022.22-01				1,070,756
Milk,in solid form,fat exceeding 1.5% not containing added sugar/other sweetening				39,198,176
Milk,in solid form,fat content,by weight exceeding 1.5% other than O(NK)O1				24,039,772
Cream,in solid form, fat exceeding 1.5% not containing added sugar/other sweetening				30,478
Cream,in solid form,fat content by weight exceeding 1.5% other than O22.22-O3				3,116
Skim milk, powdered in bulk containers	50,744,711	38,885,028	73,450,701	
Skim milk, powdered in consumer containers	550,976	2,716	264,239	
Milk in powder or granules, in bulk containers	16,801,330	11,997,635	30,727,388	
Milk in powder or granules, in consumer containers	37,849,834	12,750,294	28,567,109	
Cream in powder or granules, in consumer containers	377	—		
Evaporated full cream milk	1,687		547,541	3,350,130
Evaporated reconstituted milk				68,872

Appendix 3 *continued*

Commodity	Imports (CIF Value in US$)			
	1983	1985	1988	1991
Evaporated filled milk			2,511,967	
Condensed sweetened full cream (whole)milk	344		1,215,968	91,510
Condensed sweetened reconstituted milk			—	201,518
Condensed sweetened filled milk			1,544,217	
Products consisting of natural milk concentrated, sweetened, other than 0224901				43,391
Cream, preserved	1,472,195	508,668	462,936	
Other milk and cream, n.e.s	154,256	98,349	676,138	
Butterfat (anhydrous milk fat)	17,077,546	8,223,833	12,345,678	17,204,730
Butter, in airtight containers	50,555	10,079	319,063	
Fresh butter, not in airtight containers	18,316,540	74,487	233,103	466,556
Cheese	696,429	537,793	1,242,685	1,934,272
Grated / powdered cheese, of all kinds				119,104
Processed cheese, not grated/powdered				199,494
Blue-veined cheese				26,808
Fresh cheese (including whey cheese), not fermented				322
Other cheese				1,588,544
Curd	8,287,118	4,347,554	11,258,446	14,973,124
Ice cream, containing cocoa/not				93,900
Ice cream mixes and powders				13,295
Whey preserved, concentrated or sweetened	3,403,658	1,195,114	7,651,911	6,052,654

Appendix 3 *continued*

Commodity	Imports (CIF Value in US$) 1983	1985	1988	1991
Yogurt, containing fruits,nuts, cocoa/flavoring matter; liquid yogurt				1,035
Yogurt, concentrated, sweeetened w/ preservative/ in S,D cans				6,101
Other yogurt, wtr/not concentrated				23,906
Buttermilk, wtr/not concentrated/containing sugar/sweetening/fruits,nuts/cocoa				122,279
Buttermilk, wtr/not concentrated/containing sugar/other sweetening, other than 0223201				14,620,388
Sour milk wtr/not concentrated/containing-sugar/sweetening/fruits, nuts/cocoa				2,825
Other fermented/acidified milk/cream,concntrated, sweetened, other than 0223209 & 0223219				
8,177				

Source: *Foreign Trade Statistics* (1983, 1985, 1988, 1991).

Appendix 4

Philippine Exports of Meat and Dairy Products: 1983, 1985, 1988 and 1991

Commodity	Exports (FOB Value in US$)			
	1983	1985	1988	1991
Meat of sheep and goats, fresh, chilled or frozen	1,382			
Meat of swine, fresh, chilled or frozen	433,595	196,189	415,604	
Other meat of swine, fresh, chilled				52,508
Other meat of swine, frozen				756,990
Meat, n.e.s., fresh, chilled or frozen		267	8,046	
Other meat, n.e.s., fresh, chilled, frozen				53,726
Cuts of chicken, frozen				7,204
Offal of chickens (other than liver), frozen				67,621
Hams, shoulders and cuts w/ bone-in, of swine, frozen				157,123
Ham, in airtight containers		3,297		
Other dried meat of swine dried, salted or smoked			11,942	
Sausages of all kinds, not in airtight containers	1,268	12,027	8,619	
Sausages and similar product of meat, meat offal/blood;food preparation				13,556
Sausages of all kinds, in airtight containers	1,106		1,320	
Pork luncheon meat, in airtight containers	258			
Beef and veal salted, in brine, dried			2,404	
Corned beef, in airtight containers	1,126		156	
Chicken meat, salted, dried not in airtight containers	448			
Meat and meat preparation, in airtight containers	2,650			
Meat meal and meat flour, fit for human consumption		31,660		

Appendix 4 *continued*

Commodity	Exports (FOB Value in US$) 1983	1985	1988	1991
Other meat and edible meat offal, other than swine,salted,in brine, dried,smoked				7329
Other prepared or preserved meat and edible offals	54,390	47,307		
Pork luncheon meat				639
Other prepared/preserved meat/ meat				325
Other meat and edible meat offals salted, in brine, dried, smoked			5,416	
Liver of any animal, prepared/preserved, n.e.s.				9,077
Meat pastes and spreads	183			
Other milk, not in solid form, not containing added sugar/other sweetening matter				664
Cream, not in solid form, not containing added sugar/other sweetening matter				53,306
Milk and cream, fresh			308	
Milk, in solid form, fat content by weight, exceeding 1.5% other than 022.22-01				21,984
Milk,in solid form,fat content,by weight exceeding 1.5% other than 0(NK) 01				10,822
Milk in powder or granules, in consumer containers	30,248	28,743	111,621	
Evaporated full cream milk	18,812			
Evaporated full cream milk				295
Evaporated reconstituted milk	348,153	194,842	58,665	
Evaporated filled milk	2,058,805			
Condensed sweetened full cream milk				400

Appendix 4 *continued*

Commodity	Exports (FOB Value in US$) 1983	1985	1988	1991
Condensed sweetened reconstituted milk		174	178	
Condensed sweetened filled milk	11,566			
Other milk and cream, n.e.s			220	
Cheese	65,943	66,159	90,812	
Processed cheese, not grated/powdered				208,529
Ice cream, containing cocoa/not containing cocoa				218,284
Ice cream mixes and powders				81,977
Ice drops and other edible ice water/not containing cocoa				11,803

Source: *Foreign Trade Statistics* (1983, 1985, 1988, 1991).

Appendix 5

Tariffs on Meat and Dairy Products

Description of Articles	Rate of Duty (%) 1983	1985	1988	1991
Live horses, asses, mules and hinnies	10	10		
Horses				
Pure-bred breeding animals			10	10
Other			10	30
Asses, mules and hinnies			10	30
Live animals of bovine species				
Pure-bred breeding animal	10	10	10	3
Other	10	10	10	
Feeder cattle weighing not more than 300 kg				3
Other				30
Live swine	10	10		
Pure-bred breeding animals			10	3
Other				
Weighing less than 50 kg			10	30
Weighing 50 kg or more			10	30
Live sheep and goats				
Sheep	10	10	10	
Pure-bred breeding animals				3
Other				30
Goats	10	10	10	
Pure-bred breeding animals				3
Other				30
Live poultry: fowls, ducks, geese, turkeys and guinea fowls				
Weighing not more than 185 g	50	50		
Fowls of the species Gallus domesticus			40	
Pure bred chicks for breeding				3
Other				40
Other			40	40
Other	50	50		
Fowls of the species Gallus domesticus			40	40
Other			40	40
Animals of a kind mainly used for human food	50	50		
Other (including zoo animals, dogs and cats)	50	50		
Pure-bred breeding animals				3
Other				50

Appendix 5 *continued*

Description of Articles	Rate of Duty (%) 1983	1985	1988	1991
Other live animals			50	
Meat of horses, asses, mules or hinnies, fresh, chilled	5	5	20	30
Meat of bovine animals, fresh or chilled.	5	5		
Carcasses and half-carcasses			20	30
Other cuts with bone in			20	30
Boneless			20	30
Meat of bovine animals, frozen	5	5		
Carcasses and half-carcasses			20	30
Other cuts, boneless			20	30
Boneless			20	30
Meat of swine, fresh, chilled or frozen	5	5		
Fresh or chilled				
Carcasses and half carcasses			20	30
Hams, shoulders and cuts thereof w/ bone in			20	30
Other			20	30
Frozen				
Carcasses and half carcasses			20	30
Hams, shoulders and cuts thereof with bone in			20	30
Other			20	30
Meat of sheep or goats, fresh, chilled or frozen	5	5		
Carcasses and half carcasses of lamb, fresh or chilled			20	30
Other meat of sheep, fresh or chilled:				
Carcasses and half-carcasses			20	30
Other cuts with bone in			20	30
Boneless			20	30
Carcasses and half-carcasses of lamb, frozen			20	30
Carcasses and half-carcasses			20	30
Other cuts with bone in			20	30
Boneless			20	30
Meat of goats			20	30
Edible offal of bovine animals, swine, sheeps, goats, horses, asses, mules or hinnies, fresh, chilled or frozen	5	5		
Of bovine animals, fresh or chilled			20	30
Of bovine animals, frozen				
Tongues			20	30
Livers			20	30
Other			20	30

Appendix 5 *continued*

Description of Articles	Rate of Duty (%) 1983	1985	1988	1991
Of swine, fresh or chilled			20	30
Of swine, frozen				
Livers			20	30
Other			20	30
Other, fresh or chilled			20	30
Other, frozen			20	30
Other meat and edible meat offals, fresh, chilled,	50	50		
Other meat and edible offal, fresh, chilled or frozen				
Of rabbits or hares			50	50
Frog's legs			50	50
Other			50	50
Dead poultry (that is to say, fowls, ducks, geese, turkeys and guinea fowls) and edible offals thereof (except liver), fresh, chilled, or frozen:				
Chickens, ducks and turkeys	50	50		
Other	30	30		
Meat and edible offal, of poultry heading No.01.05, fresh,chilled,frozen				
Poultry not cut in pieces, fresh or chilled				
Chickens, ducks and turkeys			50	50
Other			30	30
Poultry not cut in pieces, frozen				
Fowls of the species Gallus Domesticus			50	50
Turkeys				50
Ducks, geese and guinea fowls				45
Ducks			50	
Geese and guinea fowls			30	
Poultry cuts and offals (including livers), fresh or chilled				
Fatty livers of geese or ducks			50	50
Other				40
Cuts of chickens, ducks or turkeys, fresh or chilled			50	
Livers of other poultry			50	
Other			30	
Poultry cuts and offals other than livers, frozen:				
Of fowls of the species Gallus Domesticus				40

Appendix 5 *continued*

Description of Articles	Rate of Duty (%) 1983	1985	1988	1991
Cuts			50	
Offal			30	
Of turkey				40
Cuts			50	
Offal			30	
Of ducks, geese, or guinea fowls				40
Cuts of ducks			50	
Offal of ducks			30	
Of geese or guinea fowls			30	
Pig fat free of lean meat and poultry fat (not rendered or solvent — extracted), fresh, chilled, frozen, salted, in brine, dried or smoked	50	50		
Pig fat free of lean meat and poultry fat(not rendered), fresh, chilled, frozen, salted, in brine, dried or smoked			50	50
Meat and edible meat offals (except poultry liver), salted, in brine, dried, or smoked:				
Bacon, ham and other meat of domestic swine	50	50		
Other	50	50		
Meat and edible meat offal, salted, in brine, dried, or smoked; edible flours and meals of meat or meat offal				
Meat of swine				
Hams, shoulders and cuts thereof, with bone in			50	50
Bellies (streaky) and cuts thereof			50	50
Other			50	50
Meat of bovine animals			50	50
Other, Including edible flours and meals of meat or meat offal			50	50
Sausages, etc. of meat, offal, or blood, other food preparation			50	50
Other prepared or preserved meat, meat offal or blood			50	50
Meat extracts			30	40
Poultry liver, fresh, chilled, frozen, salted or in brine	50	50		

Appendix 5 *continued*

Description of Articles	Rate of Duty (%) 1983	1985	1988	1991
Poultry livers, frozen				50
Milk, fresh, not concentrated or sweetened	5	5		
Milk, not concentrated nor containing added sugar or other sweetening matter				
Of a fat content, by weight, not exceeding 1%				10
Milk with preservative or in hermetically sealed cans			20	
Other			10	
Of a fat content, by weight, exceeding 1% but not exceeding 6%				10
Milk with preservative or in hermetically sealed cans			20	
Other			10	
Of a fat content, by weight, exceeding 6%				10
Milk with preservative or in hermetically sealed cans			20	
Other			10	
Malt extract; preparations of flour, meal, starch or malt extracts, for infant food or dietetic/culinary purposes, with filled milk <50% by wash of milk to which <10% of secondary ingredients to which <10% of secondary ingredients were added				
for retail			20	20
not for retail				50
Other	20	20	50	50
Milk (other than whey), in powder or granules containing not more than 1.5% by weight of fat	5	5		
In bulk containers of gross weight 25 kg or more				
Other				
Milk, concentrated or containing added sugar or other sweetening matter				
In powder, granules or other solid forms, of a fat content, by weight, not exceeding 1.5%:				

Appendix 5 *continued*

Description of Articles	Rate of Duty (%) 1983	1985	1988	1991
In bulk containers of gross weight 20 kg or more			10	10
Other			20	20
Milk (other than whey), in powder or granules containing more than 1.5% by weight of fat:				
Milk		5	5	
Other				
Milk, concentrated or containing added sugar or other sweetening matter				
In powder, granules or other solid forms, of a fat content, by weight exceeding 1.5% :				
Not containing added sugar or other sweetening matter:				
In bulk containers of gross weight 20 kg or more			20	20
Other				20
Other:				20
In bulk containers of gross weight 20 kg or more			20	20
Other				20
Other:				
Not containing added sugar or other sweetening matter				20
Milk			20	
Other				20
Milk			20	
Milk (other than whey) cream, in forms other than powder or granules				
Milk		5	5	
Cream, in powder or granules containing more than 1.5% by weight of fat	10	10		
Cream, in forms other than powder or granules	10	10		
Cream, not containing added sugar			10	
Cream			10	
Cream			10	
Cream			10	
Buttermilk				

Appendix 5 *continued*

Description of Articles	Rate of Duty (%) 1983	1985	1988	1991
Cheese and curd				
Curd	30	30		
Cheese	40	40		
Cheese and curd				
Fresh cheese (including whey cheese), unripened or uncured and curd;				
Curd			30	20
Fresh cheese (including whey cheese), unripened or uncured			40	40
Grated or powdered cheese, of all kinds			40	40
Processed cheese, not grated or powdered			40	40
Blue-veined cheese			40	40
Other cheese			40	40
Food preparation not elsewhere specified	50	50		
Flavored/colored syrups	50	50		
Ice cream, and other ice cream products			50	50
Milk and cream, preserved, concentrated or sweetened:				
Whey	5	5		
Whey, whether or not concentrated or containing added sugar or other sweetening matter; products consisting of natural milk constituents, whether or not containing added sugar or other sweetening matter, not elsewhere specified or included.				
Whey, whether or not concentrated or containing added sugar or other sweetening matter			10	10
Other:				
Concentrated, sweetened, with preservative added or in hermetically sealed cans			20	20
Other			10	10

Appendix 5 *continued*

Description of Articles	Rate of Duty (%) 1983	1985	1988	1991
Butter:				
Butter	40	30		
Butter			30	30
Butter and other fats and oils derived from milk				
Butter (anhydrous milk fat) other than butter	10	10		
Butter fat (anhydrous milk fat) other than butter			10	10
Buttermilk, curdled milk and cream, yogurt, kephir and other fermented or acidified milk and cream, whether or not concentrated or containing added sugar or other sweetening matter or flavoured or containing added fruit or cocoa.				
Yogurt:				
Containing fruits, nuts, cocoa or flavouring matter; liquid yogurt			50	50
Concentrated, sweetened, with preservative added or in hermetically sealed cans			20	
Other			20	20
Other:				
Buttermilk				
Containing fruits, nuts, cocoa, or flavouring matter			50	50
Other			10	10
Other:				
Containing fruits, nuts, cocoa or flavouring matter			50	50
Concentrated, sweetened, with preservative added or in hermetically sealed cans			20	
Other			10	20
Edible products of animal origin, not elsewhere specified or included.	50	50	50	50

Source: *Tariff and Customs Code of the Philippines*, various years.

Appendix 6

Import Restrictions and Liberalization of Meat and Dairy Inputs and Products

PSCC	Description	
001.1100	Bovine animals, pure breed, for breeding and scientific purposes	R75 R79 L88
001.1900	Bovine animals, live, other than pure breed for breeding and scientific purposes	R75 R79 L88
001.2101	Sheep, live, for breeding and scientific purposes	R75 R79 L88
001.2109	Sheep, live, other than for breeding and scientific purposes	R75 R79 L88
001.2201	Goats, live, for breeding and scientific purposes	R75 R79 L88
001.2209	Goats, live, other than for breeding and purposes	R75 L92 R93 L93
001.3100	Swine, live, for breeding and scientific purposes	R75 R79 L88
001.3900	Swine, live, other than for breeding and scientific purposes	R75 L92 R93 L93
001.4101	Chickens, live, not exceeding 185 g, for breeding	R79 R84 L86 L92 R93 L93
001.4102	Ducks and geese, live not exceeding 185 g, for breeding	R79 R83 R84 L86 L92 R93 L93
001.4103	Turkeys, live, not exceeding 185 g, for breeding	R79 R83 R84 L86 L92 R93 L93
001.4109	Other live poultry of a weight not exceeding 185 g, n.e.s.	R75 R79 R83 R84 L86 L92 R93
001.4901	Chickens, live, of a weight exceeding 185 g for breeding	R79 R83 R84 L86 L92 R93
001.4902	Chickens, live, of a weight exceeding 185 g, other than for breeding	R75 R79 R83 R84 L86 L92 R93
001.4903	Ducks and geese, live, of a weight exceeding 185 g, for breeding	R79 R83 R84 L86 L91
001.4904	Ducks and geese, live, of a weight exceeding 185 g,other than for breeding	R75 R79 R83 R84 L86 L92 R93 L93
001.4905	Turkeys, live, of a weight exceeding 185 g, for breeding	R79 R83 R84 L86 L91
001.4906	Turkeys, live, of a weight exceeding 185 g other than for breeding	R75 R79 R83 R84 L86 L92 R93 L93

Appendix 6 *continued*

PSCC	Description	
001.4907	Cocks or any male chicken belonging to any the breeds commonly known and recognized to be used principally for breeding purposes, as certified by the Department of Agriculture thru the BAI	R79 R83 R84 L86 L92 R93 L93
001.4908	Game cocks or any male chicken belonging the breeds commonly known and recognized to be used principally for cockfighting, as certified by the Department of Agriculture thru the BAI	B70 R79 L92
001.4909	Poultry, live, of a weight exceeding 185 g, n.e.s.	R75 R79 R83 R84 L86 L92 R93
001.5100	Horses, live	R79 L92 R93 L93
001.5900	Other equine animals, live	R79 L92 R93 L93
001.9100	Rabbits, live	R75 R79 R83 R84 L86 L91
001.9200	Guinea pigs, live	R75 R79 R83 R84 L86 L91
001.9300	Doves, pigeons and quails, wild ducks, wild geese and other birds not specified in sub-groups 001.4 and 941.4, live	R75 R79 R83 R84 L86 L91
001.9900	Other live animals chiefly for food, n.e.s	R75 R79 R83 R84 L86 L92 R93
011.1100	Meat of bovine animals, fresh, chilled or frozen, with bone	R75 R79 L92
011.1200	Meat of bovine animals, fresh, chilled or frozen, boneless	R75 R79 L92
011.2000	Meat of sheep and goats, fresh, chilled or frozen	R75 R79 L92 R93 L93
011.3000	Meat of swine, fresh, chilled or frozen	R75 R79 L92 R93
011.4100	Chicken killed or dressed, fresh, chilled or frozen	R75 R79 R83 R84 L88 L92 R93
011.4200	Ducks, killed or dressed, fresh, chilled or frozen	R75 R79 R83 R84 L86 L92 R93
011.4300	Turkeys, killed or dressed, fresh, chilled or frozen	R75 R79 R83 R84 L86 L92 R93
011.4400	Poultry offals other than liver, fresh, chilled or frozen	R79 L92 R93 L93
011.4500	Geese, killed or dressed, fresh, chilled or frozen	R79 L92 R93 L93
011.5000	Meat of horses, asses, mules and hinnies, chilled or frozen	R79 L92 R93 L93

Appendix 6 *continued*

PSCC	Description	
011.6000	Edible offals of the animals falling in sub-group 001.1, 001.2, 001.3 and 001.5, fresh chilled or frozen	R75 R79 L92 R93 L93
011.8100	Poultry liver, fresh, chilled or frozen, salted or in brine	R75 R79 R83 R84 L88 L92 R93 L93
011.8901	Pigeons, killed or dressed, fresh chilled or frozen	R75 R79 R83 R84 L86 L92 R93 L93
011.8902	Poultry meat, n.e.s, fresh chilled or frozen	R75 R79 R83 R84 L88 L92 R93
011.8903	Meat, fresh, chilled or frozen	R75 R79 R83 R84 L88 L92 R93
011.8904	Edible offals, n.e.s.	R75 R79 R83 R84 L88 L92 R93 L93
012.1100	Bacon	B70 R79 L82 R83 L92 R93
012.1200	Ham and shoulders, dried, salted, or smoked	B70 R79 L82 R83 L92 R93
012.1300	Pork, salted	B70 R79 L82 R83 L92 R93
012.1900	Other dried, salted or smoked meat of swine	B70 R79 L82 R83 L92 R93
012.9100	Beef and veal, salted, in brine, dried or smoked	B70 R79 L82 R83 L92
012.9201	Chicken meat, salted, in brine, dried or smoked, not in airtight containers	B70 R79 L82 R83 L92 R93
012.9202	Duck meat and goose meat, salted, in brine, dried or smoked, not in airtight containers	B70 R79 L82 R83 L92 R93 L93
012.9203	Turkey meat, salted, in brine, dried or smoked not in airtight containers	B70 R79 L82 R83 L92 R93 L93
012.9901	Meat meal and meat flour, fit for human consumption	B70 R79 L82 R83 L92 R93
012.9902	Edible offals of poultry other than liver, salted, in brine, dried or smoked	B70 R79 L82 R83 L93
012.9903	Poultry liver,salted, in brine, dried or smoked	B70 R79 L82 R83 L92 R93
012.9904	Edible offals of swine, salted, in brine, dried or smoked	B70 R79 L82 R83 L92 R93
012.9909	Other meat and edible meat offals, salted, in brine, dried or smoked, n.e.s.	B70 R79 L82 R83 L92 R93 L93
014.1101	Meat extracts	B70 R79 R80 L81 R84 L92 R93 L93
014.1102	Meat juices	B70 R79 R80 L81 R84 L92 R93 L93

Appendix 6 *continued*

PSCC	Description	
014.1200	Fish extracts	B70 R79 L81
014.2100	Sausages of all kinds, not in airtight containers	B70 R79 L81 R84 L92 R93
014.2200	Sausages of all kinds, in airtight containers	B70 R79 R80 L81 R84 L92 R93
014.9101	Bacon, in airtight containers	B70 R79 R80 L81 R84 L92 R93
014.9102	Ham, in airtight containers	B70 R79 R80 L81 R84 L92 R93
014.9103	Pork, in airtight containers	B70 R79 R80 L81 R84 L92 R93
014.9104	Pork luncheon meat, in airtight containers	R79 R83 R84 L88 L92 R93
014.9105	Beef, in airtight containers	B70 R79 R80 L81 R84 L92
014.9106	Corned beef, in airtight containers	R75 R79 R83 R84 L88 L92
014.9107	Corned beef loaf, chopped beef, minced beef loag and beef luncheon meat, in airtight containers	R75 R79 R83 R84 L88 L92
014.9109	Meat and meat preparations, in airtight containers, n.e.s.	B70 R79 R80 L81 R84 L92 R93
014.9201	Chicken meat, in airtight containers	B70 R79 R80 L81 R84 L92 R93
014.9202	Duck meat and goose meat, in airtight containers	B70 R79 R80 L81 R84 L92 R93 L93
014.9203	Turkey meat, in airtight containers	B70 R79 R80 L81 R84 L92 R93 L93
014.9209	Other poultry meat, in airtight containers	B70 R79 R80 L81 R84 L92 R93
014.9300	Meat pastes and spreads	B70 R79 R80 L81 R84 L92 R93
014.9900	Other prepared or preserved meat and edible offals, n.e.s.	B70 R79 R80 L81 R84 L92 R93
022.3000	Milk and cream, fresh	R76 L77 R83 L85
022.4100	Whey, preserved, concentraded or sweetened	R75 R83 L85 L86
022.4201	Skim milk, powdered, in bulk containers	R76 L77 R83 L85
022.4202	Skim milk, powdered in consumer containers	R76 L77 R83 L85
022.4301	Milk, in powder or granules, in bulk containers	R76 L77 R83 L85
022.4302	Milk, in powder or granules, in consumer containers	R76 L77 R83 L85

Appendix 6 *continued*

PSCC	Description	
022.4303	Cream, in powder of granules, in bulk containers	R76 L77 R83 L85
022.4304	Cream, in powder of granules, in consumer containers	R76 L77 R83 L85
022.4901	Evaporated skim milk	R76 L77 R83 L85
022.4902	Evaporated full cream milk	R76 L77 R83 L85
022.4903	Evaporated reconstituted milk	B70 L82 R84 L85
022.4904	Evaporated filled milk	R76 L77 R83 L85
022.4905	Condensed sweetened skim milk	R76 L77 R83 L85
022.4906	Condensed sweetened full cream milk	R76 L77 R83 L85
022.4907	Condensed sweetened reconstituted milk	R76 L77 R83 L85
022.4908	Condensed sweetened filled milk	R76 L77 R83 L85
022.4909	Natural milk, in hermetically sealed cans	R76 L77 R83 L85
022.4911	Cream, preserved	R76 L77 R83 L85
022.4919	Other milk and cream, n.e.s.	R75 R83 L85 L86
023.0100	Butterfat, including raw butter	R76 L77 R83 L85
023.0200	Butter in airtight containers	B70 L82 R84 L85
023.0300	Fresh butter, not in airtight containers	B70 L82 R82 L85
024.0100	Cheese	B70 L82 R84 L85
024.0200	Curd	R76 L77 R83 L85

Source: Various Central Bank Circulars.

Appendix 7

Protection and Performance Indicators Using Alternative Assumptions

PSIC	Industry Description	DRC*/SER[a] at i = 10% 1983	DRC*/SER[a] at i = 10% 1988	DRC*/SER[a] at i = 12% 1983	DRC*/SER[a] at i = 12% 1988	DRC*/SER[b] at i = 10% 1983	DRC*/SER[b] at i = 10% 1988	DRC*/SER[b] at i = 12% 1983	DRC*/SER[b] at i = 12% 1988
31111	Slaughtering	1.08	1.40	1.20	1.51	1.10	1.45	1.22	1.56
31113	Poultry dressing and packing	10.45	1.37	11.82	1.42	10.36	1.32	11.72	1.36
31114	Meat processing, curing, preserving and canning	1.67	1.59	1.75	1.66	1.66	1.56	1.74	1.63
31121	Fluid fresh milk and cream	1.81	1.47	2.02	1.60	1.83	1.48	2.04	1.61
31122	Powdered/evaporated/ condensed/filled milk	0.76	2.69	0.80	3.05	0.79	2.71	0.83	3.07
31131	Butter and cheese	1.12	0.94	1.18	0.97	1.13	0.94	1.19	0.97
31132	Ice cream, sherbet, ice drop, etc.	1.04	1.11	1.12	1.16	1.03	1.09	1.12	1.14
31133	Milk-based infants and invalids food	0.46	1.02	0.48	1.08	0.45	1.01	0.47	1.07

[a] deflates domestic raw materials by $(1 + s_i)$

[b] deflates domestic raw materials by $[(0.5 * 1/(1 + s_i)) + (0.5 * 1/(1 + t_i) * 1.25)]$

Source: Computed from Census of Establishments.

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