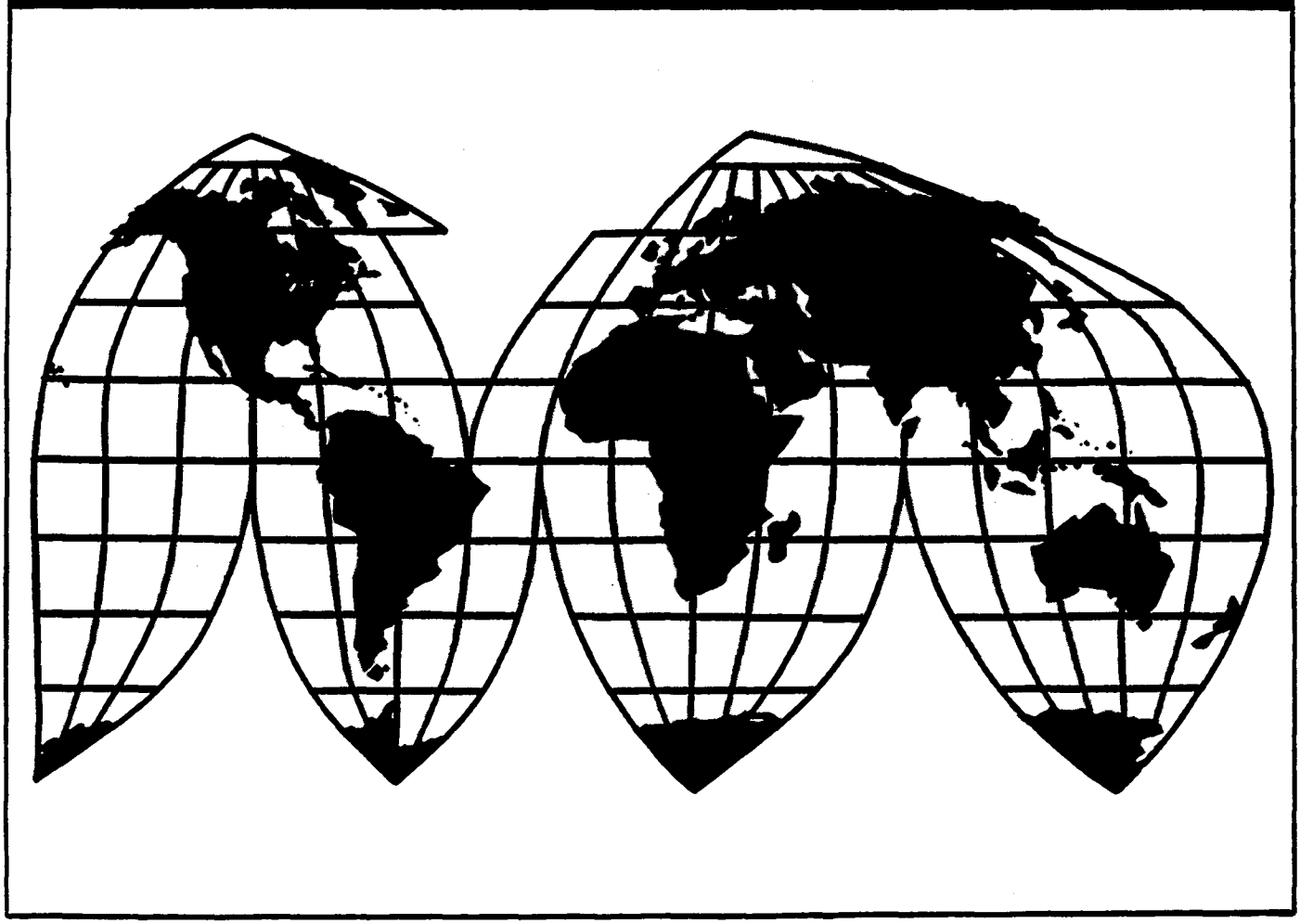
# The U.S. Automobile Industry Monthly Report on Selected Economic Indicators

Investigation No. 332-207

**Publication 2914** **July 1995**

U.S. International Trade Commission



Washington, DC 20436

# U.S. International Trade Commission

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# PREFACE

In November 1980, the U.S. International Trade Commission, under section 201 of the Trade Act of 1974, determined that certain motor vehicles and certain chassis and bodies therefor were not being imported into the United States in such increased quantities as to be a substantial cause of serious injury, or threat thereof, to the domestic industry producing articles like or directly competitive with the imported articles (inv. No. TA-201-44). In December 1980, the Subcommittee on Trade, Committee on Ways and Means of the U.S. House of Representatives, requested that the Commission provide it with monthly data on U.S. automobile imports, sales, production, and prices. In late December 1980, the Commission instituted inv. No. 332-121, U.S. Automobile Industry Monthly Report on Selected Economic Indicators. The request by the Subcommittee on Trade of the House Committee on Ways and Means for monthly data on the automobile industry was renewed four times between 1981-85, with the final request in 1985 (inv. No. 332-207) having no fixed date for termination.

The report uses trade data compiled from official statistics of the U.S. Department of Commerce. Sales, production, and certain price data are derived from *Automotive News*. The U.S. Department of Labor provides employment and consumer and producer price data, while quarterly financial results for U.S.-owned automakers are from various public sources.

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Table 1
New passenger automobiles: U.S. retail sales of domestic production, production, inventory, days' supply, and employment, by specified periods, July 1993-June 1995

*(In thousands of units; thousands of employees)*

| Item | 1994-95 | | | 1993-94 | |
|---|---|---|---|---|---|
| | May 1995 | June 1995 | July 1994-June 1995 | June 1994 | July 1993-June 1994 |
| Retail sales of domestic production | 660 | 687 | 7,129 | 695 | 6,757 |
| Production | 581 | 557 | 6,604 | 598 | 6,056 |
| Inventory | 1,764 | 1,747 | ([1]) | 1,453 | ([1]) |
| Days' supply[2] | 69 | 66 | ([1]) | 54 | ([1]) |
| Employment:[3] | | | | | |
| Total employees | [4]940 | [5]944 | ([1]) | [6]885 | ([1]) |
| Production workers | [4]739 | [5]742 | ([1]) | [6]686 | ([1]) |

[1] Not applicable.
[2] Days' supply is an average for each class size which is determined by the previous month's retail sales.
[3] Employment data are for SIC 371 (motor vehicles and motor vehicle equipment).
[4] Data are for April 1995, revised.
[5] Data are for May 1995.
[6] Data are for May 1994.

Source: Production, retail sales, days' supply, and inventory, *Automotive News*; and employment, U.S. Department of Labor.

Note.--Because of rounding, figures may not add to the totals shown.

Table 3
Lightweight automobile trucks[1] and bodies and cab/chassis for lightweight automobile trucks: U.S. imports, by principal sources and by specified periods, June 1993-May 1995[2]

| Source | 1994-95 | | | 1993-94 | |
|---|---|---|---|---|---|
| | Apr. 1995 | May 1995 | June 1994-May 1995 | May 1994 | June 1993-May 1994 |
| | Quantity *(units)*[3] | | | | |
| Japan | 6,171 | 5,821 | 134,407 | 10,189 | 116,455 |
| Canada | 34,600 | 32,941 | 443,360 | 36,557 | 444,853 |
| Mexico | 7,433 | 8,089 | 54,439 | 3,876 | 34,623 |
| All other | 28 | 19 | 2,044 | 219 | 3,152 |
| Total | 48,232 | 46,870 | 634,251 | 50,837 | 598,972 |
| | Value *(1,000 dollars)* | | | | |
| Japan | 66,278 | 63,885 | 1,186,992 | 81,989 | 940,489 |
| Canada | 535,520 | 504,514 | 6,527,021 | 513,371 | 6,127,315 |
| Mexico | 129,171 | 135,941 | 963,015 | 55,130 | 524,849 |
| All other | 5,414 | 5,865 | 88,229 | 7,392 | 102,901 |
| Total | 736,383 | 710,204 | 8,765,257 | 657,882 | 7,695,554 |

[1] Defined as not over 10,000 pounds gvw.
[2] Partially estimated, all data include imports into Puerto Rico.
[3] Quantity data include complete trucks and cab/chassis, but exclude bodies.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Note.--Because of rounding, figures may not add to the totals shown.

Table 5
Lightweight automobile trucks[1] and bodies and cab/chassis for lightweight automobile trucks: U.S. exports of domestic merchandise, by principal markets and by specified periods, June 1993-May 1995[2]

| Market | 1994-95 Apr. 1995 | 1994-95 May 1995 | 1994-95 June 1994-May 1995 | 1993-94 May 1994 | 1993-94 June 1993-May 1994 |
|---|---|---|---|---|---|
| | Quantity *(units)*[3] | | | | |
| Canada | 15,039 | 13,567 | 159,385 | 16,709 | 150,311 |
| All other | 3,683 | 5,082 | 59,022 | 3,104 | 36,074 |
| Total | 18,722 | 18,650 | 218,407 | 19,813 | 186,440 |
| | Value *(1,000 dollars)* | | | | |
| Canada | 213,866 | 199,939 | 2,156,965 | 212,763 | 1,921,497 |
| All other | 68,552 | 92,311 | 748,899 | 56,242 | 697,976 |
| Total | 282,418 | 292,250 | 2,905,865 | 269,005 | 2,620,433 |

[1] Defined as not over 10,000 pounds gvw.
[2] Partially estimated.
[3] Quantity data include complete trucks and cab/chassis, but exclude bodies.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Note.--Because of rounding, figures may not add to the totals shown.

Table 8
New passenger automobiles: Retail price changes in the U.S. market during June 1995[1]

| Country source/make | Retail price changes June 1995 (+ or -) |
|---|---|
| U.S. producers: | |
| General Motors | No change. |
| Ford | No change. |
| Chrysler | No change. |
| Japanese producers: | |
| Toyota Motors | No change. |
| Mazda | No change. |
| Honda | No change. |
| Nissan | +1.2 percent |
| European producers: | |
| Volkswagen | No change. |
| BMW | No change. |
| Mercedes-Benz | No change. |
| Korean producer: | |
| Hyundai | No change. |

[1] Average retail price change for all models.

Source: *Automotive News*, June 1995.

Table 9
Sales and profits (loss) on major U.S. automobile manufacturers' operations, by specified periods, 1995 and 1994[1]

*(In millions of dollars)*

| Item and firm | 1995 January-June | 1995 April-June | 1994 January-June | 1994 April-June |
|---|---|---|---|---|
| Sales: | | | | |
| General Motors | 79,620 | 40,170 | 77,890 | 40,390 |
| Ford | 58,462 | 29,861 | 64,200 | 33,800 |
| Chrysler | 26,100 | 12,500 | 26,300 | 13,100 |
| Total | 164,182 | 82,531 | 168,390 | 87,290 |
| Profits: | | | | |
| General Motors | 4,424 | 2,270 | 2,774 | 1,920 |
| Ford | 3,122 | 1,572 | 2,614 | 1,710 |
| Chrysler | 727 | 135 | 1,894 | 956 |
| Total | 8,273 | 3,977 | 7,282 | 4,586 |

[1] Data are for world operations.

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## EXECUTIVE SUMMARY

### Background

The Commission instituted the subject investigation on November 1, 1994, following receipt of a request on October 12, 1994, from the United States Trade Representative. The investigation is being conducted under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) and under the authority delegated by Executive Order 12661 for the purpose of investigating the competitive conditions affecting the U.S. lamb industry.[1]

Lamb meat is derived from young sheep, usually under one year in age. For purposes of this study, the U.S. sheep and lamb industry may be described as consisting of lamb growers and feeders, packers, and processors. U.S. sheep and lamb growers may be divided into categories including (1) purebred breeders (that is, those who keep purebred sheep and sell rams for breeding purposes), (2) commercial market lamb producers (those who maintain flocks of sheep for the production of lambs that are sent directly to slaughter or feedlots), and (3) commercial feedlot operators (those who maintain feedlots where lambs are fed concentrates until they reach slaughter weight). Lamb packers are companies that slaughter lambs, regardless of whether they process lamb meat. Lamb meat processors fabricate carcasses into primal, subprimal, or retail cuts. Lamb meat is distributed to the ultimate consumer through hotel, restaurant, and institutional (HRI) outlets and through retail grocery chains and butcher shops.

Some domestic interests have expressed concern about lamb meat imports that increased from 6.7 percent of domestic consumption in 1990, to 11.5 percent in 1994. Also, some domestic sheep and lamb growers contend that their sector has been adversely affected by recent U.S. government actions. For example, payments to growers under the National Wool Act of 1954 are estimated to have accounted for between 18 and 23 percent of annual gross returns to growers between 1990 and 1993; these payments are to end with the 1995 production season. Other U.S. Government actions have included restrictions on predator controls, including the termination of the U.S. Department of Agriculture (USDA), Animal Damage Control (ADC) program on lands administered by the U.S. Department of the Interior (USDI), Bureau of Land Management (BLM) effective on April 6, 1993. Growers have also noted other restrictions related to grazing on public lands administered by the BLM and the USDA Forest Service (FS). They further contend that regulations administered by the Immigration and Naturalization Service (INS) under authority of the Immigration Reform and Control Act of 1986 have made it difficult to employ shepherds from other countries.

Increasing concentration in the lamb slaughtering and processing sector, concomitant with a decline in the number of packing plants, has increased concerns on the part of growers. Indeed, growers have expressed a concern about a general decline in the infrastructure of the U.S. sheep sector, citing declining market outlets and shortages of specialized labor. They have also noted that the relatively small size of the U.S. lamb sector impedes investment and research by such supporting industries as the animal medicine industry.

### Findings

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[1] The information and analysis provided in this report are for the purpose of this report only. Nothing in this report should be construed to indicate how the Commission would find in an investigation concluded under statutory authority covering the same or similar subject matter.

## *United States*

- *In the United States, most sheep and lambs are meat-type animals kept mainly for the production of lambs for meat or dual purpose breeds kept both for the production of lambs for meat and wool. The U.S. sheep sector, located primarily in the Western States and in the Corn Belt, has been in a long-term decline as measured by the number of animals or growers and by lamb meat production. However, prices for lambs generally rose during 1990-94.*

- *The U.S. sheep and lamb population declined by 22 percent, from 11.4 million animals in January 1, 1990, to 8.9 million animals in January 1, 1995. The number of sheep-raising operations in the United States declined by 20 percent, from 108,940 in 1990 to 87,350 in 1994. The Western States accounted for 79 percent of the total U.S. sheep and lamb population as of January 1, 1995; the Corn Belt accounted for 15 percent.*

- *During 1990-94 the annual average price for live lambs rose irregularly from $55.42 per 100 pounds (cwt) to $66.77, or by 20 percent. The rise in price corresponded with a general decline in lamb meat production, which fell by 13 percent, from 346 million pounds in 1990 and 1991 to 300 million pounds in 1994. The price pattern for lamb carcasses was similar to that for live lambs. During 1990-94, the annual average price for lamb carcasses rose by 22 percent, from $121.47 per cwt to $147.62. Some domestic sheep and lamb growers have expressed concern about the farm-retail price spread between live lamb and lamb meat. This spread may reflect to some extent a less efficient U.S. lamb meat processing and distribution sector in comparison with other meat sectors, such as beef and poultry.*

- *U.S. imports of fresh, chilled, or frozen lamb meat are subject to several health and sanitary measures. Virtually all U.S. imports of lamb meat are from Australia and New Zealand. Frozen bone-in cuts of lamb meat represent the bulk of lamb meat imports and reflect transportation cost considerations. The share of imports accounted for by frozen products rose from 69 percent in 1990 to 80 percent in 1994; fresh or chilled lamb meat made up the remaining 20 percent. During 1990-94, annual U.S. imports of fresh, chilled, or frozen lamb meat increased irregularly from 24.9 million pounds, valued at $31.3 million, to 38.7 million pounds, valued at $48.7 million.*

- *Imports from Australia rose 70 percent in terms of volume during this period. U.S. imports of Australian lamb amounted to 13.4 million pounds, valued at nearly US$14 million, in 1990, compared with 22.8 million pounds, valued at US$26.5 million, in 1994. Imports from New Zealand rose 38 percent in terms of volume from 1990 to 1994. More than 11.5 million pounds, valued at US$17.3 million, were imported in 1990, compared with the more than 15.9 million pounds, valued at US$22.2 million, imported in 1994.*

- *During the 1980s, the domestic lamb sector filed three petitions with the United States International Trade Commission (USITC) alleging that imports of lamb meat from New Zealand were being subsidized and/or were being sold in the United States at less than fair value (LTFV). One petition was withdrawn and the investigations associated with the other petitions resulted in*

*USITC determinations of no injury or threat of injury to a domestic industry. A fourth petition alleging that imports of lamb meat were being subsidized by the Government of New Zealand was filed with the U.S. Department of Commerce (DOC) in 1985. This petition resulted in a countervailing duty order (CVD) on imports of lamb meat from New Zealand entering on and after June 25, 1985.*

- *Eight final administrative reviews of the CVD order on lamb meat from New Zealand have been completed by the DOC. The CVD (subsidy) amounts decreased for each annual review, and the total bounty or grant was found to be **de minimis** for all firms for the review period April 1, 1990, through March 31, 1991. A subsequent final review for the period April 1, 1991, through March 31, 1992, also determined **de minimis** CVD amounts for all firms.*

- *On May 22, 1995, the DOC published a notice of its final determination that the subsidy for the period April 1, 1992, through March 31, 1993, was **de minimis** for all firms. In the same notice, the DOC reported its final determination that the Government of New Zealand had met the requirements for revocation of the CVD order. Accordingly, on May 22, 1995 (60 F.R. 27082), the DOC announced a revocation of the CVD order.*

### *Australia*

- *In Australia, about 75 percent of the sheep are wool-type (animals kept mainly for the production of wool), unsuited to produce lambs for meat. During 1990-94 (as of March 31), the number of sheep and lambs in Australia fell from 170 million animals to 134 million. The decline in Australian sheep numbers reflects declining profitability of wool production in Australia during the early 1990s and adverse production conditions resulting from drought.*

- *Exports of lamb meat have become increasingly important to the Australian sheep sector in recent years, and the United States is an important market. During FY 1990-94 (year ended June 30), Australian exports of lamb meat rose irregularly from 87.6 million pounds (shipped weight), valued at US$84 million, in 1990, to 127.4 million pounds, valued at US$134 million, in 1994. Exports also rose irregularly as a share of Australian lamb meat production from 14 percent in 1990 to 23 percent in 1994, reflecting decreased production as well as irregularly rising exports.*

- *The United States was the largest single market for Australian exports of lamb meat in terms of quantity during 1990-94. In terms of value the United States was the largest single market for Australian lamb meat exports in all years except 1991 and 1992, when the value of exports to the European Union and Japan both exceeded those of the United States. The United States accounted for 19 percent of the quantity and value of Australia's exports of lamb meat in 1994.*

- *Australian Federal Government involvement in the sheep sector appears to be largely through wool-related programs or general agriculture programs rather than through programs that are specifically limited to live lambs or lamb meat. Most Australian Federal Government programs related to sheep production are*

*administered by the Department of Primary Industries and Energy by subdivisions, or "Sub-programs," which appear to be similar to agencies of the USDA. The Wool Industry Supplementary Payment Scheme was established by the Australian Federal Government in March 1991 after the abolition of the Reserve Price Scheme, a program to provide price stability for Australian wool. The announced purpose of this program was to compensate wool growers for the difference between the market price for wool and the Reserve Price for wool sold between February and June 1991. The total payment to sheep growers from the Wool Industry Supplementary Payment Scheme was AUS$311 million, including AUS$300 million of Australian Federal Government funds. This program was terminated in 1992.*

### *New Zealand*

- *In New Zealand, most sheep are dual-purpose animals. Although New Zealand sheep growers benefit from nearly ideal climatic and grazing conditions, the sheep inventory declined from 57.9 million animals in 1990 to 50.1 million animals in 1994, continuing a long-term decline from 70.3 million in 1982. The decline in sheep numbers reflects in part lower wool prices and the continued movement, especially in northern regions from sheep to dairy cattle, beef cattle, and forestry.*

- *Meat processing is handled mainly by a number of private-sector companies, some of which are owned by producer cooperatives. Reportedly, inefficient plants have been closed in recent years; others have been modernized, and new efficient plants have opened. Significant gains reportedly have been made in productivity in recent years, and per head processing costs have been declining. During 1994, two large meat-processing companies went into receivership.*

- *Between 95 and 97 percent of New Zealand's annual lamb meat production during 1990-94 was exported. New Zealand lamb meat exports increased from 732 million pounds in 1990 (year ending September 30) to 838 million pounds in 1992, then dropped to 747 million pounds in 1993, and rose to 827 million pounds in 1994. The largest market for New Zealand lamb meat exports is the European Union (EU), which accounted for 52 percent (by quantity) of New Zealand's exports in 1994. New Zealand sheepmeat (mutton and lamb) exports into the EU are subject to import quotas under various voluntary restraint agreements. Other major markets include the Middle East, Papua New Guinea, Fiji, North America, and Asia. U.S. imports of New Zealand lamb meat were equivalent to 2.5 percent of total New Zealand lamb meat exports and to about 5 percent of U.S. consumption in 1994.*

- *Government assistance to New Zealand agriculture has fallen significantly since the 1980s. Government funded research, primarily related to animal and plant health concerns, and disaster relief are the major areas in which the Government provides assistance. The New Zealand Government made a commitment in 1991 to maintain a minimum level of funding (NZ$255 million per year) for its investment in research through the Public Good Science Fund. Approximately NZ$13 million of this funding is allocated to sheep production.*

## *Comparative Analysis*

- *Available data suggest that live lamb raising, and thus, lamb meat production are generally lower in cost in New Zealand and Australia than in the United States, and likely reflect, at least in part, different management practices of live lamb growers.*

- *Mature sheep typically are fed on pasture in the United States, but, in addition, they receive some concentrates (usually grains) and protein supplements. In New Zealand and Australia sheep and lambs are fed almost exclusively on pasture and limited amounts of hay. In the United States, grains and protein concentrates accounted for about 20 percent of estimated total variable cash expenses annually during 1989-94. Hay accounted for an additional 10 percent of estimated total variable cash expenses. Total hay costs are believed to be lower in New Zealand and Australia, reflecting the longer pasture seasons in those countries.*

- *U.S. lamb packers also pay a higher price for lambs than do their counterparts in New Zealand and Australia. Lower prices for live animals in Australia and New Zealand provide a cost advantage to packers in those countries relative to their counterparts in the United States.*

- *The U.S. sheep and lamb packing sector is rather concentrated and has become increasingly profitable in recent years. The Australian meatpacking sector is relatively inefficient. The competitive position of New Zealand's meatpacking sector, especially lamb, has suffered from overcapacity and high debt levels, and, in recent years some plants have closed.*

- *The number of large U.S. lamb packing plants has declined from 11 in 1991 to 7 in 1995. Eight large plants accounted for 83 percent of U.S. lamb slaughter in 1994. Packers responding to the Commission's questionnaire (accounting for over 86 percent of domestic production) reported their operating income as a share of net sales ranged from 1.4 percent in 1993 to 3.5 percent in 1994. Operating income was 2 cents per-pound in 1992 and 1993 and 6 cents in 1994.*

- *In a private study commissioned by the Australian Meat and Live-stock Corporation, the Australian meat packing sector, while marginally profitable, was found to be less efficient than counterparts in a number of other countries, including New Zealand and the United States. Although, Australian packers obtain low-cost animals, they have relatively high wage rates, restrictive labor practices, and strikes.*

- *The New Zealand lamb packing sector benefits from relatively low-cost animals for packing, economies of scale, and a relatively concentrated geographic area which limits transportation costs. In August 1994, several lamb packing plants, representing about 30 percent of the capacity of the North Island of New Zealand, closed, sharply reducing an overcapacity problem. In the South Island one plant was closed because of a bankruptcy.*

- *Domestic lamb carcasses and the cuts derived from them are typically larger than imported carcasses and cuts. The average U.S. carcass weighed 63 pounds; New Zealand carcasses averaged 33 pounds; and Australian averaged 40 pounds in 1994. Commission questionnaires sent to lamb meat purchasers requested comparisons*

*between imported and domestic lamb meat relating to such factors as product quality, palatability, fat content, consistency of product specifications, shelf life, availability, packaging, and servicing. The most common response to the aforementioned factors was that the imported and domestic products are comparable.*

- *Domestic lamb meat, especially at retail outlets is typically sold fresh or chilled, whereas imported meat is often sold frozen. Some consumers prefer fresh meat because it is perceived to be higher in quality. The shelf life of frozen lamb meat is obviously an important consideration for Australian and New Zealand lamb meat in the U.S. market since three weeks transit time must be allowed for surface transportation.*

- *In the United States lambs are typically fed concentrates in addition to pasture and milk from their mothers. Such lambs are referred to as "fed lambs." In New Zealand, lambs are fed only on pasture and milk from their mothers, and in Australia concentrate feeding is minimal. Some consumers contend that meat derived from grass-fed lamb is "gamier" and has a stronger flavor and aroma than meat derived from grain-fed lambs. According to hearing testimony, responses to the Commission's questionnaires, and fieldwork, the preference of individual consumers in the U.S. market between large or small-sized cuts, fresh or frozen form, and grain-fed or grass-fed lamb appears to vary considerably.*

- *Price appears to be an important factor influencing purchase decisions for U.S., Australian, and New Zealand lamb. The Commission's questionnaire asked purchasers to rank the importance of various factors in their decision to purchase U.S., Australian, and New Zealand lamb meat. Quality was reported to be very important in 16 of 18 responses, availability was ranked as very important in 15 responses, and price and price consistency each were ranked as very important in 10 responses. No respondent purchasers of U.S., Australian, or New Zealand lamb meat ranked quality, availability, price, and price consistency as somewhat important or unimportant.*

- *The relative prices of domestic and imported lamb meat fluctuated significantly during 1990-94 according to information obtained from the Commission's questionnaires to purchasers and importers. The relative prices of domestic and imported lamb meat vary depending on the cut and form (fresh or frozen) under consideration. Also, the price of imported lamb meat is influenced by transportation cost. The fresh or chilled imported meat is flown to the United States at a cost of US$0.85 per pound. Frozen lamb is typically sent to the United States by ship at a cost of US$0.17 per pound.*

- *During 1994 Australian and New Zealand fresh racks and fresh legs, and New Zealand fresh carcasses were higher priced per pound than their domestic counterparts according to information obtained from the Commission's questionnaires to purchasers and importers. During May-December, fresh Australian and New Zealand shoulders*

*were reported to be lower priced per pound than domestic fresh shoulders.*

- *During 1994 New Zealand frozen racks were reported to be higher priced than domestic fresh or frozen racks. However, for all other frozen imported lamb meat (where price comparisons were available) both Australian and New Zealand were reported to be lower priced than their domestic fresh or frozen counterparts.*

- *An econometric model was developed to illustrate the competitive conditions affecting the U.S. sheep-related markets. Model results suggest that increased imports displaced U.S.-produced lamb quantities to an extent that apparently falls between the range of opinions expressed by U.S. and foreign producer representatives. Results suggest that imports displaced some U.S.-produced lamb quantities, but such displacement typically has not significantly influenced price.*

- *Simulation results from the econometric model suggest that increasing U.S.-produced quantities displace imports to a greater extent than increasing imports displace U.S.-produced lamb. According to model results, expanding U.S. quantities of lamb produced and consumed appear to displace lamb meat imports; historically, increases in U.S. quantity result on average, in a fall in U.S. lamb price, a rise in U.S. wool production, a decrease in the price of U.S.-produced wool, and a large drop in lamb meat imports. Model results also suggest that elimination of Wool Act benefits will likely result in some contraction of the U.S. industry.*

# CHAPTER 1: INTRODUCTION

## Background

This investigation is concerned with the competitiveness of U.S. and imported lamb in the U.S. market. The domestic industry has been in a long-term decline since the 1940s but still supplies almost 90 percent of the U.S. market. In recent years, competitive pressures from the scheduled termination of the National Wool Act of 1954 (payments under which have accounted for about one-fifth of total grower returns), a declining consumption and competition from beef and poultry, and a declining industry infrastructure have challenged the U.S. industry. More restrictive environmental regulations relating to predator controls, restrictive rules concerning grazing stock on public lands, and labor laws affecting the use of shepherds from other countries have forced producers to make decisions about new operating practices. In addition, U.S. imports of lamb meat increased from 25 million to 39 million pounds during 1990-94 and increased their share of domestic consumption from about 7 percent to 11 percent.

International trade in the sheep and lamb sector consists primarily of meat; live animals are relatively expensive and impractical to ship. Together, Australia and New Zealand account for about 75 percent of the world's estimated exports of lamb meat, and these two countries supply virtually all U.S. imports of lamb meat, which amounted to about $49 million in 1994. In 1994, the U.S. market absorbed about one-sixth of total Australian lamb meat exports and less than 3 percent of New Zealand exports.

Domestic sheep and lamb producers have for many years expressed concerns about imports of lamb meat. As a result of petitions filed by the domestic industry, the U.S. International Trade Commission (USITC) conducted a countervailing duty investigation on lamb meat imports from New Zealand in 1981,[1] and antidumping and countervailing duty investigations concerning such imports from New Zealand in 1984.[2] A fourth petition, in which the USITC did not participate,[3] alleged that imports of lamb meat were being subsidized by the Government of New Zealand and was filed with the U.S. Department of Commerce (DOC) in 1985. This petition and subsequent investigation resulted in countervailing duties being collected on U.S. lamb meat imports from New Zealand during June 25, 1985-March 31, 1990. Pursuant to Section 1937 of the Omnibus Trade and Competitiveness Act of 1988,[4] the USITC conducted a 2-year monitoring and an investigation on U.S. lamb meat imports during 1988-89.[5]

## Purpose of the Report

On October 12, 1994, the United States Trade Representative (USTR)

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[1] U.S. International Trade Commission (USITC), *Lamb Meat From New Zealand*, investigation No. 701-TA-80(P), publication 1191, Nov. 1981.

[2] USITC, *Lamb Meat From New Zealand*, investigation Nos. 701-TA-214(P) and 731-TA-188(P), publication 1534, June 1984.

[3] The investigation was conducted under section 303 of the Tariff Act and no injury determination was required prior to the issuing of a countervailing duty order because New Zealand was not a "country under the Agreement" within the meaning of section 701(b) of the Tariff Act and because the merchandise the subject of the investigation was dutiable.

[4] Section 1937 was a conference agreement resolving U.S. House of Representative and U.S. Senate differences concerning lamb meat imports. A Senate amendment authorized import quotas for lamb meat, but the House bill had no such provision.

[5] USITC, *U.S. Imports of Lamb Meat: Final Monitoring Report*, investigation No. 332-264, publication 2345, Dec. 1990.

requested that the Commission investigate the competitive conditions affecting the U.S. lamb industry and provide a report setting forth the results of the investigation.[6] The USTR requested that the report focus on the period 1991-94 and be similar in structure to the previous Commission 332 report on the lamb industry: *U.S. Imports of Lamb Meat: Final Monitoring Report*.[7] Specifically, the Commission was asked, to the extent practical, to include in its report:

(1) U.S. and foreign industry profiles; and, with respect to Australia and New Zealand, such information as the Commission develops concerning whether there is government assistance to the industries in these countries;

(2) information concerning U.S. and foreign markets;

(3) U.S. imports and exports;

(4) U.S. market penetration;

(5) price comparisons of domestic and imported lamb meat; and

(6) a discussion of other factors bearing on competitive conditions and trade that affect the U.S. lamb industry.

The Commission instituted its investigation on November 1, 1994. Public notices of the investigation, hearing, and rescheduling of the public hearing were given by posting copies of the notices at the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notices in the *Federal Register* of November 9, 1994, (59 F.R. 55854) and February 17, 1995 (60 F.R. 9396).[8] A public hearing in connection with this investigation was held on April 6, 1995, in Washington, DC.[9]

## Scope of Study

Lamb meat is the primary focus of this investigation and is derived from a young male or female sheep generally less than a year in age.[10] Lamb meat is pinkish red in color whereas the meat of an older sheep (mutton) is dark red. The lamb carcass is typically divided (broken) into so-called prime (or primal) or wholesale cuts. These cuts are then generally further divided into so-called actual or retail cuts. The prime cuts of lamb and retail cuts are shown in appendix D. Domestic lamb carcasses and the cuts derived from them are generally larger than imported carcasses and cuts. Domestic lamb meat is often sold fresh or chilled, whereas imported meat is often sold frozen.

Live lambs and sheep are included in this study because they are the only source for lamb meat and in the United States, the primary purpose for

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[6] A copy of the request from the USTR is included in appendix A.

[7] USITC, *Final Monitoring Report*, publication 2345, Dec. 1990. This report covered the period 1985-89 and reviewed the industries in the United States, Australia, and New Zealand.

[8] A copy of the notices of the Commission's investigation and hearing and the rescheduling of the hearing are included in appendix B.

[9] Appendix C contains a witness list for the public hearing.

[10] The lamb meat included in this study is classifiable under HTS subheadings 0204.10.00, 0204.22.20, 0204.23.20, 0204.30.00, 0204.42.20, and 0204.43.20.

which these animals are produced. Sheep and lambs produce both wool and meat, and growers must decide whether to produce meat-type or wool-type sheep. In the United States, wool is a secondary product to the production of lamb meat.[11] U.S. sheep and lamb growers received wool incentive payments (under the National Wool Act of 1954), which accounted for between 18 and 23 percent of annual gross returns during 1990-93. The wool incentive program will be eliminated after the 1995 marketing season, thus affecting growers' revenue. In Australia, live sheep and lambs are kept primarily for wool production, and, in New Zealand, live sheep and lambs are kept for both wool and meat production. Thus, data on wool production and trade of wool are used in the analysis of the overall viability of the entities that produce sheep.

## Industries

The U.S. sheep and lamb industry consists of lamb growers and feeders and lamb meat packers and processors. The New Zealand and Australian industries consist primarily of growers, packers, and processors (but not feeders).[12] The Australian and New Zealand lamb industries are both significantly larger than the U.S. industry. U.S. lamb meat production is about half the volume of Australia's and about one-third of New Zealand's. In addition, the Australian and New Zealand lamb industry infrastructure is generally more extensive and developed than the U.S. industry's and partially reflects much larger sheep flocks (the Australian flock is about 15 times larger than the U.S. flock, and New Zealand's is about 5 times larger).

### *United States*

The U.S. sheep and lamb inventory totaled about 9 million animals as of January 1, 1995. Sheep and lambs are raised throughout the United States but are concentrated in the West, where in many areas they are the only suitable agricultural crop. There were eight meatpacking plants in the United States that slaughtered the majority of U.S. sheep and lambs in 1994. U.S. lamb meat production totaled 300 million pounds in 1994, and accounted for less than 1 percent of U.S. red meat consumption. U.S. exports of lamb meat are negligible. U.S. wool production was valued at about $52 million in 1994. The U.S. sheep population is estimated to account for about 1 percent of the world's total, and U.S. production of lamb meat is estimated to account for about 2 percent of world production. The U.S. sheep and lamb sector is relatively small when compared with the U.S. cattle and swine sectors. In 1994, the sheep and lamb sector's output was valued at $567 million and made up about 1 percent of total U.S. meat animal sales.

### *Australia*

The Australian sheep inventory totaled 134 million in 1994. Major sheep-raising states include New South Wales, Western Australia, Victoria, and South Australia. In Australia, about three-quarters of the sheep industry is maintained for the production of wool. Australia is the world's leading producer of wool, with production totaling nearly US$2 billion in the 1993/94 marketing year. Lamb meat production totaled 584 million pounds in 1994 with over 75 percent consumed domestically. Lamb meat consumption accounted for 16 percent of red meat consumption in 1993. Exports accounted for 23 percent of Australian lamb meat production in 1994, with the United States being the

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[11] The value of wool shorn declined from the equivalent of 14 percent of growers' sales in 1990, to 9 percent in 1994.

[12] These industry terms are discussed in greater detail in chapter 2.

leading market.

### *New Zealand*

The sheep inventory in New Zealand totaled 50 million animals in 1994. Sheep are raised throughout New Zealand, and most are dual-purpose breeds producing both wool and meat. In recent years, the New Zealand lamb packing sector has undergone restructuring, with the closing of several plants and modernization of others. It is estimated that in early 1995 there were 33 large lamb packing plants. Lamb meat production totaled 849 million pounds in 1994, and over 95 percent was exported. The European Union (EU) is the largest market for New Zealand lamb meat accounting for 52 percent, by quantity, of total exports in 1994. Lamb meat accounted for about 9 percent of red meat and poultry consumption in 1994. New Zealand is the world's second largest wool producer, with production totaling US$508 million in the marketing year 1993/94.

## Market

There are two market segments in the United States in which domestic and imported lamb meat compete, namely, in the retail segment and in the hotel, restaurant, and institutional or food service segment (identified as HRI). Because imports of live lambs are negligible, no additional competition exists. Domestic lamb meat is generally marketed fresh, whereas imports are generally marketed frozen. In 1994, frozen lamb meat accounted for 80 percent of U.S. lamb meat imports and fresh or chilled lamb meat accounted for the remainder.

Lamb meat is distributed to the retail consumer by supermarkets, grocery stores, and butcher shops. Retail sales generally include a wide range of cuts, such as whole or semi-boneless legs, loin chops, shanks, shoulder chops, and rib racks. It is estimated that approximately 70 percent of domestic lamb meat is marketed through U.S. retail outlets, compared with 25 percent of New Zealand lamb. Industry sources report that significant quantities of Australian lamb are marketed also through retail outlets, however, the actual percentage is not known.[13] The HRI market segment generally demands lamb meat that has been further processed (e.g., "chef ready") and usually consists of higher priced items, such as racks and loins. About 25 percent of domestic lamb is marketed through the HRI trade compared with nearly 75 percent of New Zealand lamb meat. It is estimated that about 35 percent of Australian frozen lamb meat is suitable for the HRI market.[14]

## Approach of the Report

This report analyzes the competitive conditions of the lamb industry through an examination of the supply and demand conditions for live lambs and lamb meat in the United States, Australia, and New Zealand during 1990-94. Information on changes in sheep inventories, lamb meat production and consumption, lamb meat imports and exports, the cost of major production inputs, lamb meat marketing and quality characteristics, and governmental policies is examined. The information in the report is from submissions and testimony presented at the Commission's public hearing, domestic and foreign fieldwork, responses to the Commission's questionnaires, literature searches, U.S. Department of Agriculture (USDA) and State Department telegrams,

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[13] Council for AMLC, telephone conversation with USITC staff, June 7, 1994.
[14] Posthearing brief of the AMLC, p. 10.

telephone interviews, previous Commission studies, and other sources. Domestic fieldwork was centered in Colorado, Wyoming, Texas, and New York. Foreign fieldwork included trips to Australia and New Zealand.

### Time Period of Study

The USTR letter asked that the Commission focus its data collection and analysis on the period 1991-94 and that the report be similar in structure to the last Commission's report on lamb covering the 1985-89 period.[15] Whenever practicable, this report provides general information for the 1990-94 period so as to provide a continuum of data for both of the reports.

### Organization

Chapter 2 describes the structure of the U.S. lamb industry, the U.S. grading system, production, consumption, markets for domestic and imported meat, regulatory measures, wool, industry concerns and information on U.S. trade. Chapters 3 and 4 describe the structures of the Australian and the New Zealand industries, respectively. Chapter 5 compares and analyzes the factors that affect the competitive position of the domestic lamb meat industry with respect to the Australian and New Zealand industries; including a comparison of lamb meat prices, cost structures, and factors affecting U.S. and foreign lamb supply and demand. In addition, this chapter discusses the results of the application of a data-oriented econometric model (vector autoregression) which was used to gauge the significance of imports in the U.S. market. Statistical tables are presented upon their first reference.

[15] USITC, *Final Monitoring Report*, publication 2345, Dec. 1990.

## CHAPTER 2: U.S. INDUSTRY AND MARKET

### Structure and Operation of the U.S. Industry

As defined for the purpose of this study, the U.S. lamb industry consists of lamb growers and feeders and lamb meat packers and processors. Figure 2-1 illustrates the channels of distribution for lamb from breeding to final consumption. Lamb growers include sheepherders who maintain flocks of sheep for the production of lambs, including purebred and commercial flocks. Feedlot operators maintain feedlots where lambs are fed on grain or other concentrates until they reach slaughter weight. Lamb packers are companies that slaughter lambs, regardless of whether or not they process lamb meat.[1] Lamb meat processors fabricate carcasses into primal, subprimal, or retail cuts.

Consumers of lamb meat include retailers (mostly grocery stores) and hotels, restaurants, and institutions (HRI) that prepare food for consumption. These establishments generally purchase lamb meat from wholesalers, breakers,[2] or distributors. However, processors or packers may also sell directly to retailers.

#### *Live Sheep Inventory*

The location of the U.S. sheep inventory is shown in figure 2-2. Although sheep are found throughout the United States, sheep and lamb production is concentrated in the Western United States. Western States[3] accounted for 79 percent of the total U.S. sheep population as of January 1, 1995. In contrast, the Corn Belt[4] accounted for only 15 percent of the total U.S. sheep population as of January 1, 1995. The U.S. sheep population declined by 22 percent from January 1, 1990, to January 1, 1995, as shown in the following tabulation (in 1,000):[5]

U.S. sheep and lamb population

| | | | |
|---|---|---|---|
| 1990 | 11,363 | 1993 | 10,906 |
| 1991 | 11,200 | 1994 | 9,742 |
| 1992 | 11,507 | 1995 | 8,895 |

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[1] American Meat Institute (AMI), *Financial Review of the Meat Packing Industry, 1982*, Sept. 1983, p. 1.

[2] Breakers cut carcasses into cuts for resale to retail stores and food service outlets. Sheep Industry Development Program, Inc., *Sheep Production Handbook, 1988*, p. MKT-8.

[3] For purposes of this report, the Western rangelands are considered to be located in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

[4] The Corn Belt consists of the States of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.

[5] This decline is a continuation of a long-term trend beginning in 1942.

FIGURE 2-1
Sheep and meat of sheep: Structure of the U.S. industry

FIGURE 2-2
Regional location of U.S. sheep inventory as of January 1, 1995

Most growers have small flocks of sheep (50 or fewer animals referred to as farm-flocks) and raise sheep as a secondary enterprise.[6] However, about one-third of the growers in the rangelands of the Western States have relatively large flocks (50 or more animals referred to as range-flocks) and specialize in sheep.[7] Officials of the National Lamb Feeders Association report that there are probably only about 100 large-volume lamb feedlots in the United States, although there are many small-volume feedlots. Sheep and lamb feeding tends to be concentrated in a few States as shown in the following tabulation[8] (1,000 animals):

| State | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| California | 225 | 280 | 285 | 305 | 320 |
| Texas | 200 | 180 | 210 | 180 | 210 |
| Colorado | 385 | 250 | 310 | 315 | 325 |
| Wyoming | 100 | 110 | 150 | 190 | 190 |
| South Dakota | 55 | 85 | 85 | 91 | 103 |
| Iowa | 90 | 85 | 95 | 85 | 85 |
| Oregon | 110 | 106 | 81 | 95 | 90 |
| Kansas | 102 | 63 | 48 | 82 | 60 |
| All other | 495 | 571 | 566 | 534 | 456 |
| Total | 1,762 | 1,730 | 1,830 | 1,877 | 1,839 |

### *Growers*

U.S. sheep and lamb growers may be divided into categories including:[9] (1) purebred breeders (that is, those who keep purebred sheep and sell rams for breeding purposes;[10] (2) commercial market lamb producers (those who maintain flocks of sheep for the production of lambs that are sent directly to slaughter; or to (3) commercial feedlot operators (those who maintain feedlots where lambs are fed concentrates until they reach slaughter weight). Some growers engage in more than one sheep-raising activity. Some market lamb producers retain title to their lambs that are placed in feed lots by having them fed for a fee or having them fed in some type of partnership with the commercial feedlot operator.

The number of sheep-raising operations[11] in the United States declined steadily from 108,940 in 1990 to 87,350 in 1994, or by 20 percent. Many operations consist of only a few sheep and belong to part-time or hobby farmers. The live sheep and lamb sector is thought to be relatively unconcentrated, with even the largest volume operations accounting for only a small share of total production. The Western States and the Corn Belt account for 40 and 39 percent, respectively, of U.S. sheep operations. The remaining operations located primarily in the Northeastern United States and border

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[6] Robert E. Taylor, *Scientific Farm Animal Production: An Introduction to Animal Science*, 4th ed., (New York: Macmillan Publishing Co., 1992), p. 47.

[7] Ibid.

[8] Animals in feedlots as of January 1. USDA, National Agricultural Statistics Service (NASS), *Sheep and Goats*, various issues, 1991-95.

[9] The following description of grower categories was adapted from Taylor's *Scientific Farm Animal Production*, pp. 48-49.

[10] Growers often expand the number of animals in their flocks or replace ewes no longer suitable for breeding purposes by retaining the best ewe lambs from each year's crop. Since the productive life of a ewe is typically 4 to 5 years, about 20 to 25 percent of the ewe lambs from each year's crop must be retained to maintain breeding herd numbers.

[11] According to USDA, an operation is any place that has one or more sheep on hand at any time during the year.

regions of the Southeastern United States.[12] In many areas of the Southwest and West, forage is the only suitable agricultural crop because of topography, rainfall, and soils, and the only practical use for the forage is as a feed for ruminant animals. Domestic industry officials report that, because of the types of forage and ground cover and forage availability, some areas that do not lend themselves well to cattle production raise sheep as one of the few production alternatives.[13]

### *Lamb Packers*

**Number of plants**

Federally inspected (FI) packing plants accounted for about 96 percent of sheep and lamb slaughter annually in the United States during 1990-94. The total number of FI sheep and lamb slaughtering plants declined from 815 in 1990 to 652 in 1994, or by 20 percent.[14]

FI plants with a capacity to slaughter 100,000 or more sheep and lambs annually accounted for 80 percent or more of sheep and lamb slaughter during 1991-94 as shown in the following tabulation:

| Year | Number of large volume plants | Percent of slaughter |
|---|---|---|
| 1991 | 11 | 85 |
| 1992 | 10 | 80 |
| 1993 | 9 | 83 |
| 1994 | 8 | 83 |

Although the number of large-volume plants declined from 11 to 8 during 1991-94, the percent of slaughter remained fairly constant. In addition, the percent of commercial slaughter accounted for by the 4 largest lamb packing companies increased from 70 percent in 1990 to 78 percent in 1992.[15]

Some vertical integration exists in the lamb sector since some packers operate lamb feedlots. The Packers and Stockyards' Administration of the USDA reports statistics that include "sheep and lambs fed by or for meat packers and transferred from feedlots for slaughter during the reporting year." Packer feeding of sheep and lambs includes separate feeding activities by owners, officers, and employees of meat packers, and by nonreporting subsidiaries and affiliates.[16] During 1986-90, the most recent 5-year period for which statistics are available, packer feeding of sheep and lambs ranged from 28 to 30 percent of the equivalent of FI slaughter as shown in the following tabulation:[17]

| Year | Number fed | Share of slaughter |
|---|---|---|
| | *-(1,000)-* | *-----(Percent)----* |

[12] USDA, NASS, *Sheep and Goats*, Jan. 27, 1995, p. 7.
[13] Miller, transcript of the hearing, pp. 52-53.
[14] USDA, NASS, *Livestock Slaughter*, 1994 Summary, Mt An 1-2-1 (95), Mar. 1995, p. 85.
[15] AMI, *1994 Meat & Poultry Facts*, p. 28.
[16] USDA, *Packers & Stockyards Statistical Report 1990 Reporting Year*, p. 29.
[17] Ibid.

| | | |
|---|---|---|
| 1986 | 1,434 | 27.8 |
| 1987 | 1,339 | 28.0 |
| 1988 | 1,452 | 30.1 |
| 1989 | 1,425 | 28.7 |
| 1990 | 1,454 | 28.3 |

**Large-volume plants**

Figure 2-3 shows the approximate location of the largest volume lamb-slaughtering plants operating in the United States as of July 1995 and the large-volume plants that closed since the publication of the Commission's *Final Monitoring Report* (December 1990). These large-volume plants are primarily located in the Midwest and Western States and accounted for more than 75 percent of total U.S. lamb slaughter annually during 1990-94.[18]

Since December 1990, no new large-volume lamb-slaughtering plants have opened in the United States.[19] However, testimony at the Commission's hearing indicated that a new lamb-slaughtering plant was being planned by Aussie Meats of North America (AMONA Foods) in conjunction with certain U.S. lamb producers and would be located in Wyoming.[20] Testimony indicated that AMONA's Australian joint venture partner has and will continue to provide technical

[18] For a more detailed discussion of packer operations, see USITC *Final Monitoring Report*, publication 2345, Dec. 1990, pp. 5-4 through 5-6.

[19] The following information on changes in operations of lamb packing plants was confirmed with an official of the USDA, Packers and Stockyard Administration (PSA), in a telephone conversation on April 20, 1995.

[20] Transcript of the hearing, p. 95.

FIGURE 2-3
Operating plants with a slaughtering capacity over 100,000 lambs in 1995 and plant closures since 1990

assistance to this project, including providing a full time engineer to assist in the facility's construction.[21]

Four large-volume plants have closed or ceased slaughtering lambs since the Commission published its *Final Monitoring Report* in December 1990. The Kansas plant, owned and operated by Monfort, Inc., closed effective March 19, 1992. The plant in Ellensburg, Washington, owned and operated by Superior Packing Co. ceased slaughtering lambs effective February 7, 1993, but still processes lamb meat. The plant in Albert Lea, Minnesota, known as Seaboard Farms, was owned and operated by Farmstead Foods, closed in May 1990 and reopened in October 1990. The plant was multi-species, slaughtering lambs, but operated primarily as a swine slaughtering plant. The plant closed effective March 22, 1994. On March 31, 1995,[22] Monfort announced the closing of its San Angelo, Texas, plant effective May 31, 1995,[23] citing the reduction of sheep and lamb numbers and the decreasing demand for lamb meat in the United States.[24] In June 1995, Monfort announced its Greeley, Colorado lamb plant will continue to slaughter lambs, but no longer fabricate them stating "they don't have the operations we need to compete."[25]

**Financial experience of U.S. packers**

Packers accounting for over 86 percent of U.S. production of lamb meat in 1994 provided income-and-loss data to the Commission on their operations producing lamb meat.

***Operations on lamb meat***

Net sales values and the average per-pound sales values followed the same trend, as shown in table 2-1, decreasing from 1990 to 1991, and then increasing each year through 1994. The reporting packers realized operating income in each period with the operating income share of net sales ranging from 1.4 percent in 1993 to 3.5 percent in 1994. The operating income was 3 cents per-pound in 1990 and 1991, 2 cents in 1992 and 1993, and 6 cents in 1994.

***Capital expenditures***

U.S. packers provided data on their capital expenditures for lamb meat operations, as shown in table 2-2. Capital expenditures fluctuated throughout the 5-year period, reaching a low of US$908,000 in 1991 and a high of US$2,894,000 in 1992 expressing the lowest and highest levels over the 1990-94 period.

Table 2-1
Income-and-loss experience of U.S. packers on their operations producing lamb meat, 1990-94 fiscal years

| Item | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| | Quantity (*1,000 pounds*) | | | | |

[21] Ibid.
[22] Monfort, Inc. is a subsidiary of Con Agra Red Meat Companies.
[23] USITC confirmed that the plant closed as scheduled; telephone conversation with Monfort officials, June 6, 1995.
[24] ConAgra Red Meat Companies, press release, Mar. 31, 1995.
[25] ASI, *Marketing News*, ed. Laura Gerhard, vol. 6, No. 223, June 16, 1995.

| | | | | | |
|---|---|---|---|---|---|
| Net sales | 232,689 | 253,007 | 267,797 | 252,831 | 258,318 |
| | Value (*1,000 dollars*) | | | | |
| Net sales | 338,631 | 328,383 | 385,766 | 407,148 | 426,904 |
| Cost of goods sold | 317,335 | 303,122 | 361,812 | 383,936 | 393,207 |
| Gross profit | 21,296 | 25,261 | 23,954 | 23,212 | 33,697 |
| Selling, general, and administrative expenses | 14,951 | 16,473 | 17,725 | 17,518 | 18,586 |
| Operating income | 6,345 | 8,788 | 6,229 | 5,694 | 15,111 |
| | Ratio to net sales (*Percent*) | | | | |
| Cost of goods sold | 93.7 | 92.3 | 93.8 | 94.3 | 92.1 |
| Gross profit | 6.3 | 7.7 | 6.2 | 5.7 | 7.9 |
| Selling, general, and administrative expenses | 4.4 | 5.0 | 4.6 | 4.3 | 4.4 |
| Operating income | 1.9 | 2.7 | 1.6 | 1.4 | 3.5 |
| | Value (*US dollars per pound*) | | | | |
| Net sales | $1.46 | $1.30 | $1.44 | $1.61 | $1.65 |
| Cost of goods sold | 1.36 | 1.20 | 1.35 | 1.52 | 1.52 |
| Gross profit | 0.09 | 0.10 | 0.09 | 0.09 | 0.13 |
| Selling, general, and administrative expenses | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 |
| Operating income | 0.03 | 0.03 | 0.02 | 0.02 | 0.06 |

Source: Compiled from data submitted in response to Commission questionnaires.

Table 2-2
Capital expenditures by U.S. packers of lamb meat, 1990-94 fiscal years

| | (*1,000 dollars*) | | | | |
|---|---|---|---|---|---|
| Item | 1990 | 1991 | 1992 | 1993 | 1994 |
| Lamb meat | 1,778 | 908 | 2,894 | 1,055 | 1,482 |

Source: Compiled from data submitted in response to Commission questionnaires.

**Packer operations**

***Employment and wages***

U.S. lamb meat packers reported data on employment and wages during 1990-94, as shown in the following tabulation:[26]

| Item | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Average number of production and related workers | 716 | 835 | 842 | 801 | 807 |
| Total hours worked by such workers *(1,000)* | 1,513 | 1,759 | 1,672 | 1,599 | 1,663 |
| Total compensation to such workers *(1,000 dollars)* | 14,447 | 16,717 | 16,584 | 16,126 | 17,544 |
| Annual compensation per worker *(1,000 dollars)* | 20 | 20 | 20 | 20 | 22 |
| Average hourly compensation to such workers *(dollars per hour)* | 9.55 | 9.50 | 9.92 | 10.09 | 10.55 |

The number of workers peaked in 1992 before falling and leveling in subsequent years. Total hours worked peaked in 1991, fell during 1992 and 1993, and rose again in 1994. Total compensation and average hourly compensation increased irregularly, while annual compensation per worker was practically constant during the period under review.

***Productivity***

Productivity in the U.S. lamb packing industry, as measured by the number of man-hours required to process a lamb, the annual number of lambs slaughtered per worker, and worker compensation per lamb slaughtered, is shown in the following tabulation for 1990-94:[27]

| Item | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Total hours worked by production and related workers *(1,000)* | 1,513 | 1,759 | 1,672 | 1,599 | 1,663 |
| Number of lambs slaughtered *(1,000)* | 3,429 | 3,701 | 3,997 | 3,756 | 3,821 |
| **Hours *(per lamb)*** | **.44** | **.48** | **.42** | **.43** | **.44** |
| Average number of production and related workers | 716 | 835 | 842 | 801 | 807 |
| **Lambs slaughtered *(per worker hour)*** | **2.27** | **2.10** | **2.39** | **2.35** | **2.30** |
| Total compensation to such workers *($1,000)* | 14,447 | 16,717 | 16,584 | 16,126 | 17,544 |
| **Worker compensation *(dollars per lamb)*** | **4.21** | **4.52** | **4.15** | **4.29** | **4.59** |

[26] Data submitted in response to questionnaires of the USITC.
[27] Data submitted in response to questionnaires of the USITC.

The various measures of productivity fluctuated during the period under review and showed no discernable trend.

***Costs to process lamb meat***

Data collected from questionnaire responses indicate that in 1994 the cost of live lambs accounted for about 74 percent of the packers' cost to process lamb meat. Direct labor costs accounted for about 10 percent, and other factors made up the remainder.

## Domestic Production, Consumption, and Prices

### *Live Lamb Production*

Decisions made by growers largely determine the supply of domestic lamb meat in the U.S. market. Each year producers must decide if ewe (female) lambs will be sold for slaughter or retained for breeding purposes. The decision to retain ewe lambs for breeding suggests producer optimism and plans for increased production of lambs in the future. The decision to sell the lambs for slaughter suggests a declining capacity utilization. Most ewes are bred when they are 18 to 19 months of age and have their first lambs when they are about 2 years old.[28]

It is a common practice in the United States to provide lambs on pasture with supplemental feed. The feed is typically provided in structures, called creeps, that allow entry of the lambs but prevent entry of the larger ewes. A typical ration, referred to as concentrate, for lambs in the Corn Belt consists of corn with soybean meal as a protein supplement and alfalfa hay, whereas typical concentrates for lambs in the Western States consist of grain sorghum with cottonseed meal as a protein supplement and alfalfa hay. Many U.S. lambs, at about 6 months of age and about 55 to 90 pounds in weight, (such lambs are referred to as "feeders" or "feeder lambs") are weaned and shipped to feedlots for about 2 to 3 months of intensive feeding and finishing to weights of about 130 pounds, (such lambs are referred to as fed-lambs or slaughter lambs). In feedlots, the lambs are fed to optimal size to maximize meat production and to assure an appropriate fat content for the meat. When lambs have reached appropriate slaughter weights, they are referred to as "grain-fed." Lambs that are primarily pasture-fed are referred to as "grass-fed." Some consumers contend that meat derived from grass-fed lamb is "gamier" and has a stronger flavor and aroma than meat derived from grain-fed lambs.

The number of lambs born during the year, or the lamb crop,[29] declined by 23 percent between 1990 and 1994 as may be determined from table 2-3. The

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[28] The quantity of lambs sold for slaughter may decline in response to an increase in lamb price in the short run if producers decide to retain lambs to build up the breeding stock. However, Whipple and Menkhaus found the price elasticity of lamb supply in the short run to be highly inelastic, but positive (0.01). Longer run elasticities, applicable for 3 to 30 years, were found by Whipple and Menkhaus to range from 0.68 to 11.38. Glen D. Whipple and Dale J. Menkhaus, "Supply Response in the U.S. Sheep Industry," *American Journal of Agricultural Economics (AJAE)*, vol. 71, No. 1, (1989), pp. 126-135.

[29] In some States, especially the Western States, the lamb crop is estimated when the young lambs (about two weeks of age) are "worked", i.e. when the lambs have their tails removed (docked) and when the ram lambs are castrated. Adverse weather can kill many lambs before they are "worked," thus they are not included in the lamb crop.

lamb crop depends on the number of ewes that are 1 year old or older and kept for breeding purposes and on the number of lambs born per ewe (lambing rate). The number of ewes, 1 year old or older, kept for breeding purposes declined over this period.[30] The decline in the January 1 inventory indicates declining capacity utilization among lamb growers and a reduction in the capital stock available for future lamb production.

Table 2-3
Sheep and lambs: U.S. ewes kept, lambing rate, and lamb crop, 1990-94

| Year | Ewes kept | Lambing rate[1] | U.S. lamb crop |
|---|---|---|---|
| | *(1,000 animals)* | *(Per 100 ewes)* | *(1,000 animals)* |
| January 1, | | | |
| 1990 | 7,609 | 102 | 7,704 |
| 1991 | 7,425 | 103 | 7,644 |
| 1992 | 7,090 | 102 | 7,216 |
| 1993 | 6,536 | 98 | 6,379 |
| 1994 | 5,804 | 102 | 5,902 |

[1] Number of lambs born.

Source: USDA, ERS, *Livestock and Meat Statistics, 1970-92* (Statistical Bulletin No. 874), Jan. 1994, p. 92, and USDA, NASS, *Sheep and Goats*, Jan. 27, 1995, p. 3.

### *Lamb Meat Production*

Total U.S. lamb meat production declined from 346 million pounds in 1990 to 300 million pounds in 1994, or by 13 percent (table 2-4). U.S. lamb meat production reflects both the number of lambs slaughtered and the average

[30] Adverse weather, either during the breeding season or during the lambs' birth, contributes to reduced lambing rates. If a large share of the January 1 inventory consists of ewes kept for breeding purposes that are more than 1 year but less than 2 years old and not bred, the lambing rate during the year will be lower than if the January 1 inventory consists of a larger share of bred ewes.

Table 2-4
Lamb: U.S. commercial lamb slaughter, average carcass weight, and total lamb meat production, 1990-94

| Year | Commercial slaughter | Average carcass weight | Lamb meat production |
|---|---|---|---|
| | *(1,000 animals)* | *(Pounds)* | *(1,000 pounds)* |
| 1990 | 5,312 | 64 | 346,244 |
| 1991 | 5,377 | 64 | 346,454 |
| 1992 | 5,176 | 64 | 335,337 |
| 1993 | 4,885 | 65 | 326,682 |
| 1994 | 4,635 | 63 | 299,929 |

Note: Lamb meat production includes farm production.

Source: U.S. lamb slaughter and average carcass weight compiled from official statistics of USDA, ERS, *Livestock and Meat Statistics, 1970-92*, and *Livestock Slaughter*, annual issues; U.S. lamb meat production estimated by the U.S. International Trade Commission.

carcass weight. Monthly production data are shown in table 2-5 and reflect the seasonality of lamb production.[31]

### *Domestic Consumption*

During 1990-94, U.S. lamb meat consumption,[32] declined from 370 million pounds to 339 million pounds (figure 2-4). Tables 2-6 and 2-7 show U.S. annual and monthly consumption of lamb meat. Monthly consumption is generally higher during holiday periods, such as Easter. The decline in the annual amount of lamb meat consumed in the United States during 1990-94 reflects a decline in U.S. production, inasmuch as inventories were small and imports rose during the period.

### *Lamb Meat as a Share of Total Meat Consumption*

Table 2-8 shows that consumption of lamb meat declined irregularly during 1990-94, whereas apparent consumption of beef, pork, and poultry all increased. The sharpest change was in poultry consumption, which increased from 22 billion pounds in 1990 to 29 billion pounds in 1994, or by 32 percent.

[31] The lamb carcass is divided into primal cuts. USDA reports that the shares of carcass weight accounted for by these cuts are as follows: hind legs (31 percent), shoulder (27 percent), loin (18 percent), breast (16 percent), and rack (8 percent).

[32] Estimated by the staff of the U.S. International Trade Commission from domestic lamb meat production, plus imports, and adjusted for changes in inventories.

Table 2-5
Sheep and lamb slaughter: Share of federally inspected slaughter consisting of lambs and yearlings and dressed weight of same, estimated commercial lamb slaughter, meat production, farm lamb meat production, and total, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990: | | | | | | | | | | | | | |
| Commercial sheep and lamb slaughter *(1,000 animals)* . . . . . | 489.6 | 441.1 | 492.9 | 487.2 | 478.7 | 440.3 | 447.9 | 482.4 | 439.6 | 508.4 | 480.8 | 464.8 | 5,653.7 |
| Federally inspected dressed weight of lambs and yearlings *(average pounds)* . . . . . | 67.0 | 66.0 | 66.0 | 64.0 | 66.0 | 63.0 | 62.0 | 62.0 | 63.0 | 63.0 | 64.0 | 65.0 | 64.3 |
| Share of federally inspected slaughter consisting of lambs and yearlings *(percent)* . . . . | 95.3 | 95.3 | 95.2 | 94.1 | 93.2 | 93.1 | 93.2 | 93.5 | 93.6 | 93.8 | 94.5 | 94.2 | 93.9 |
| Estimated commercial: | | | | | | | | | | | | | |
| Lamb slaughter *(1,000 animals)* . . . . . | 467.6 | 420.4 | 472.2 | 456.5 | 447.1 | 410.4 | 417.9 | 451.0 | 409.3 | 472.8 | 449.1 | 437.8 | 5,312.0 |
| Lamb meat production *(1,000 pounds)* . . . . . | 31,327.1 | 27,744.3 | 31,165.1 | 29,216.4 | 29,509.0 | 25,852.7 | 25,909.2 | 27,964.7 | 25,783.9 | 29,787.2 | 28,740.3 | 28,459.7 | 341,459.5 |
| Estimated– | | | | | | | | | | | | | |
| Farm lamb meat production *(1,000 pounds)* . . . . . | 646.9 | 646.9 | 646.9 | 316.8 | 316.8 | 316.8 | 316.1 | 316.1 | 316.1 | 315.2 | 315.2 | 315.2 | 4,784.7 |
| Total lamb meat production *(1,000 pounds)* . . . . . | 31,973.9 | 28,391.2 | 31,811.9 | 29,533.2 | 28,825.8 | 26,169.4 | 26,225.3 | 28,280.8 | 26,100.0 | 30,102.3 | 29,055.5 | 28,774.9 | 346,244.2 |

Table continues next page.

Table 2-5–Continued
Sheep and lamb slaughter: Share of federally inspected slaughter consisting of lambs and yearlings and dressed weight of same, estimated commercial lamb slaughter, meat production, farm lamb meat production, and total, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1991: | | | | | | | | | | | | | |
| Commercial sheep and lamb slaughter *(1,000 animals)* . . . . . | 507.9 | 461.6 | 565.2 | 456.6 | 461.2 | 406.5 | 449.7 | 458.0 | 477.0 | 522.3 | 466.6 | 488.3 | 5,720.9 |
| Federally inspected dressed weight of lambs and yearlings *(average pounds)* . . . . . | 65.0 | 66.0 | 65.0 | 64.0 | 66.0 | 63.0 | 62.0 | 61.0 | 61.0 | 62.0 | 63.0 | 64.0 | 63.5 |
| Share of federally inspected slaughter consisting of lambs and yearlings *(percent)* . . . . | 95.5 | 95.3 | 95.8 | 93.7 | 93.4 | 93.2 | 93.3 | 93.5 | 93.1 | 93.0 | 93.4 | 94.2 | 94.1 |
| Estimated commercial: | | | | | | | | | | | | | |
| Lamb slaughter *(1,000 animals)* . . . . . | 485.0 | 439.9 | 541.5 | 427.8 | 430.8 | 378.9 | 419.6 | 428.2 | 444.1 | 485.7 | 435.8 | 460.0 | 5,377.3 |
| Lamb meat production *(1,000 pounds)* . . . . . | 31,527.9 | 29,033.7 | 35,195.0 | 27,381.4 | 28,430.2 | 23,868.1 | 26,013.3 | 26,122.0 | 27,089.3 | 30,115.8 | 27,455.7 | 29,438.6 | 341,671.1 |
| Estimated– | | | | | | | | | | | | | |
| Farm lamb meat production *(1,000 pounds)* . . . . . | 644.8 | 644.8 | 644.8 | 316.2 | 316.2 | 316.2 | 318.2 | 318.2 | 318.2 | 315.3 | 315.3 | 315.3 | 4,783.3 |
| Total lamb meat production *(1,000 pounds)* . . . . . | 32,172.7 | 29,678.5 | 35,839.8 | 27,697.6 | 28,746.4 | 24,184.2 | 26,331.5 | 26,440.2 | 27,407.5 | 30,431.1 | 27,770.9 | 29,753.9 | 346,454.4 |

Table continues next page.

Table 2-5--Continued
Sheep and lamb slaughter: Share of federally inspected slaughter consisting of lambs and yearlings and dressed weight of same, estimated commercial lamb slaughter, meat production, farm lamb meat production, and total, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1992: | | | | | | | | | | | | | |
| Commercial sheep and lamb slaughter *(1,000 animals)* . . . . . | 483.7 | 437.0 | 496.3 | 526.1 | 388.2 | 436.1 | 443.4 | 418.6 | 489.6 | 469.8 | 430.1 | 477.5 | 5,496.4 |
| Federally inspected dressed weight of lambs and yearlings *(average pounds)* . . . . . | 66.0 | 66.0 | 66.0 | 64.0 | 65.0 | 64.0 | 63.0 | 61.0 | 62.0 | 63.0 | 63.0 | 63.0 | 63.8 |
| Share of federally inspected slaughter consisting of lambs and yearlings *(percent)* . . . . | 94.9 | 95.0 | 94.8 | 94.2 | 93.4 | 93.0 | 93.7 | 94.0 | 93.9 | 93.9 | 94.1 | 94.9 | 94.2 |
| Estimated commercial: | | | | | | | | | | | | | |
| Lamb slaughter *(1,000 animals)* . . . . . | 459.0 | 415.2 | 470.5 | 495.6 | 362.6 | 405.6 | 415.5 | 393.5 | 459.7 | 441.1 | 404.7 | 453.1 | 5,176.1 |
| Lamb meat production *(1,000 pounds)* . . . . . | 30,296.1 | 27,399.9 | 31,052.5 | 31,717.5 | 23,567.6 | 25,956.7 | 26,174.3 | 24,002.5 | 28,503.5 | 27,792.0 | 25,497.6 | 28,548.3 | 330,508.5 |

Estimated--

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Farm lamb meat production *(1,000 pounds)* . . . . . | 650.2 | 650.2 | 650.2 | 318.6 | 318.6 | 318.6 | 319.8 | 319.8 | 319.8 | 320.9 | 320.9 | 320.9 | 4,828.6 |
| Total lamb meat production *(1,000 pounds)* . . . . . | 30,946.2 | 28,050.1 | 31,702.7 | 32,036.1 | 23,886.2 | 26,275.3 | 26,494.2 | 24,322.4 | 28,823.4 | 28,112.9 | 25,818.6 | 28,869.2 | 335,337.2 |

Table continues next page.

Table 2-5–Continued
Sheep and lamb slaughter: Share of federally inspected slaughter consisting of lambs and yearlings and dressed weight of same, estimated commercial lamb slaughter, meat production, farm lamb meat production, and total, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1993: | | | | | | | | | | | | | |
| Commercial sheep and lamb slaughter *(1,000 animals)* . . . . . | 392.7 | 394.7 | 488.8 | 482.0 | 410.9 | 478.5 | 408.9 | 432.6 | 425.9 | 406.3 | 418.3 | 442.6 | 5,182.2 |
| Federally inspected dressed weight of lambs and yearlings *(average pounds)* . . . . . | 64.0 | 65.0 | 66.0 | 64.0 | 67.0 | 67.0 | 65.0 | 64.0 | 64.0 | 63.0 | 63.0 | 64.0 | 64.7 |
| Share of federally inspected slaughter consisting of lambs and yearlings *(percent)* . . . . | 94.8 | 95.1 | 95.7 | 94.6 | 93.9 | 94.3 | 94.1 | 93.5 | 93.2 | 93.3 | 93.6 | 94.9 | 94.3 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Estimated commercial: | | | | | | | | | | | | | |
| Lamb slaughter *(1,000 animals)* . . . . . | 372.3 | 375.4 | 467.8 | 456.0 | 385.8 | 451.2 | 384.8 | 404.5 | 396.9 | 379.1 | 391.5 | 420.0 | 4,885.3 |
| Lamb meat production *(1,000 pounds)* . . . . . | 23,825.9 | 24,398.4 | 30,873.6 | 29,182.2 | 25,851.0 | 30,232.1 | 25,010.4 | 25,886.8 | 25,404.1 | 23,881.9 | 24,666.3 | 26,881.8 | 316,094.3 |
| Estimated-- | | | | | | | | | | | | | |
| Farm lamb meat production *(1,000 pounds)* . . . . . | 964.6 | 964.6 | 964.6 | 1,291.9 | 1,291.9 | 1,291.9 | 317.9 | 317.9 | 317.9 | 954.8 | 954.8 | 954.8 | 10,587.7 |
| Total lamb meat production *(1,000 pounds)* . . . . . | 24,790.5 | 25,363.0 | 31,838.2 | 30,474.1 | 27,142.8 | 31,524.0 | 25,328.3 | 26,204.7 | 25,722.0 | 24,836.7 | 25,621.1 | 27,836.6 | 326,682.1 |

Table continues next page.

Table 2-5--Continued
Sheep and lamb slaughter: Share of federally inspected slaughter consisting of lambs and yearlings and dressed weight of same, estimated commercial lamb slaughter, meat production, farm lamb meat production, and total, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994: | | | | | | | | | | | | | |
| Commercial sheep and lamb slaughter *(1,000 animals)* . . . . . | 394.3 | 418.7 | 530.2 | 419.6 | 435.2 | 392.0 | 317.8 | 400.4 | 400.2 | 397.9 | 406.5 | 425.6 | 4,938.4 |
| Federally inspected dressed weight of lambs and yearlings *(average* | | | | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *pounds)* . . . . . | 64.0 | 65.0 | 66.0 | 66.0 | 66.0 | 64.0 | 61.0 | 60.0 | 60.0 | 60.0 | 61.0 | 62.0 | 62.9 |
| Share of federally inspected slaughter consisting of lambs and yearlings *(percent)* . . . . | 94.9 | 95.5 | 95.4 | 94.2 | 93.4 | 93.1 | 92.6 | 92.9 | 93.1 | 93.3 | 93.6 | 93.5 | 93.8 |
| Estimated commercial: | | | | | | | | | | | | | |
| Lamb slaughter *(1,000 animals)* . . . . . | 374.2 | 399.9 | 505.8 | 395.3 | 406.5 | 365.0 | 294.3 | 372.0 | 372.6 | 371.2 | 380.5 | 397.9 | 4,635.1 |
| Lamb meat production *(1,000 pounds)* . . . . . | 23,948.2 | 25,990.8 | 33,383.5 | 26,087.4 | 26,827.5 | 23,356.9 | 17,951.3 | 22,318.3 | 22,355.2 | 22,274.4 | 23,209.5 | 24,672.0 | 292,375.0 |
| Estimated-- | | | | | | | | | | | | | |
| Farm lamb meat production *(1,000 pounds)* . . . . . | 968.9 | 968.9 | 968.9 | 321.8 | 321.8 | 321.8 | 316.3 | 316.3 | 316.3 | 911.1 | 911.1 | 911.1 | 7,554.3 |
| Total lamb meat production *(1,000 pounds)* . . . . . | 24,917.1 | 26,959.7 | 34,352.4 | 26,409.2 | 27,149.3 | 23,678.7 | 18,267.5 | 22,634.6 | 22,671.5 | 23,185.6 | 24,120.6 | 25,583.1 | 299,929.3 |

Source: Compiled from official statistics of the U.S. Department of Agriculture.

FIGURE 2-4
Lamb meat: U.S. production, imports, and apparent consumption, 1990-94

Table 2-6
Lamb meat, fresh, chilled, or frozen: U.S. production, imports for consumption, and apparent U.S. consumption, 1990-94

| Year | Carcass-weight equivalent | | | |
|---|---|---|---|---|
| | U.S. production | U.S. imports | Apparent U.S. consumption | Ratio of imports to consumption |
| | *(Million pounds)* | | | *(Percent)* |
| 1990 | 346 | 25 | 370 | 6.8 |
| 1991 | 346 | 26 | 375 | 6.9 |
| 1992 | 335 | 27 | 361 | 7.5 |
| 1993 | 327 | 41 | 365 | 11.2 |
| 1994 | 300 | 39 | 339 | 11.5 |

Source: Production and consumption estimated by the staff of the U.S. International Trade Commission; imports compiled from official statistics of U.S. Department of Commerce (converted to carcass-weight equivalent on the basis of factors used by USDA).

Lamb meat's share of U.S. red meat (beef, pork, veal, lamb and mutton) consumption declined very slightly during 1990-94 from 0.9 percent of red meat total to 0.8 percent. U.S. per capita lamb and mutton consumption declined from 1.6 pounds carcass-weight equivalent (1.4 pounds retail weight) in 1990 to 1.5 pounds (1.3 pounds retail weight) in 1994.[33] The decline in lamb meat consumption during 1990-94 reflects a long-term pattern.

An economic study suggest that lamb meat competes with beef, pork, and poultry in the U.S. market.[34] It was also reported that U.S. lamb meat consumption has been adversely affected by a long-term growing preference for beef over lamb, by the extraordinary development of the poultry industry, and by the lack of branded, specialty markets and outlets for lamb meat in the fast-food market.[35]

### *Costs and Returns for Sheep Operations*

The USDA has published data on the cash and economic costs and on the returns associated with U.S. sheep production. These data, shown in table 2-9, are estimated based on a survey sent to a sample of producers in the past and are presented in terms of dollars per ewe. The focus of the following

[33] *Red Meats Yearbook, 1994*, p. 99.
[34] Lamb Study Team, Texas Agricultural Market Research Center (TAMRC), *Assessment of Marketing Strategies to Enhance Returns to Lamb Producers*, TAMRC Commodity Market Research Report No. CM-1-91, Dec. 1991, pp. 193-196.
[35] Prehearing submission of the New Zealand Meat Producers Board (NZMPB), pp. 3-4.

Table 2-7
Lamb meat: Estimated total production, beginning stocks, imports, ending stocks, apparent consumption, imports as a share of consumption, and the ratio of imports to production, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990: | | | | | | | | | | | | | |
| Estimated total lamb meat production *(1,000 pounds)* | 31,973.9 | 28,391.2 | 31,811.9 | 29,533.2 | 29,825.8 | 26,169.4 | 26,225.3 | 28,280.8 | 26,100.0 | 30,102.3 | 29,055.5 | 28,774.9 | 346,244.2 |
| Estimated beginning stocks *(1,000 pounds)* | 7,281.9 | 7,475.3 | 8,112.3 | 7,407.0 | 7,836.3 | 7,504.5 | 9,036.1 | 9,450.0 | 8,513.1 | 8,304.0 | 7,899.8 | 7,629.3 | 7,281.9[1] |
| Imports *(1,000 pounds)* | 2,296.5 | 2,156.1 | 2,423.0 | 2,054.5 | 1,481.1 | 2,328.9 | 1,572.9 | 1,396.2 | 2,046.4 | 2,300.2 | 2,299.8 | 2,572.0 | 24,927.6 |
| Estimated ending stocks *(1,000 pounds)* | 7,475.3 | 8,112.3 | 7,407.0 | 7,836.3 | 7,504.5 | 9,036.1 | 9,450.0 | 8,513.1 | 8,304.0 | 7,899.8 | 7,629.3 | 8,035.4 | 8,035.4[2] |
| Apparent consumption *(1,000 pounds)* | 34,076.9 | 29,910.2 | 34,940.3 | 31,158.4 | 31,638.7 | 26,966.7 | 27,384.2 | 30,614.0 | 28,355.4 | 32,806.7 | 31,625.8 | 30,940.8 | 370,418.2 |
| Imports as a share of consumption *(percent)* | 6.7 | 7.2 | 6.9 | 6.6 | 4.7 | 8.6 | 5.7 | 4.6 | 7.2 | 7.0 | 7.3 | 8.3 | 6.7 |
| Ratio of imports to production *(percent)* | 7.2 | 7.6 | 7.6 | 7.0 | 5.0 | 8.9 | 6.0 | 4.9 | 7.8 | 7.6 | 7.9 | 8.9 | 7.2 |

Table continues next page.

Table 2-7--Continued
Lamb meat: Estimated total production, beginning stocks, imports, ending stocks, apparent consumption, imports as a share of consumption, and the ratio of imports to production, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1991: | | | | | | | | | | | | | |
| Estimated total lamb meat production *(1,000 pounds)* | 32,172.7 | 29,678.5 | 35,839.8 | 27,697.6 | 28,746.4 | 24,184.2 | 26,331.5 | 26,440.2 | 27,407.5 | 30,431.1 | 27,770.9 | 29,753.9 | 346,454.4 |
| Estimated beginning stocks *(1,000 pounds)* | 8,035.4 | 8,994.4 | 9,416.2 | 7,561.6 | 6,796.7 | 7,862.4 | 7,465.9 | 6,467.4 | 5,707.0 | 4,916.9 | 5,360.2 | 6,272.8 | 8,035.4[1] |
| Imports *(1,000 pounds)* | 2,492.1 | 2,039.7 | 2,478.0 | 2,584.6 | 1,685.2 | 2,141.7 | 1,596.1 | 2,111.0 | 1,637.3 | 2,395.7 | 2,401.2 | 2,459.3 | 26,022.0 |
| Estimated ending stocks *(1,000 pounds)* | 8,994.4 | 9,416.2 | 7,561.6 | 6,796.7 | 7,862.4 | 7,465.9 | 6,467.4 | 5,707.0 | 4,916.9 | 5,360.2 | 6,272.8 | 5,974.9 | 5,974.9[2] |
| Apparent consumption *(1,000 pounds)* | 33,705.7 | 31,296.5 | 40,172.4 | 31,047.1 | 29,366.0 | 26,722.4 | 28,926.1 | 29,311.6 | 29,834.9 | 32,383.5 | 29,259.6 | 32,511.1 | 374,536.9 |
| Imports as a share of consumption *(percent)* | 7.4 | 6.5 | 6.2 | 8.3 | 5.7 | 8.0 | 5.5 | 7.2 | 5.5 | 7.4 | 8.2 | 7.8 | 6.9 |
| Ratio of imports to production *(percent)* | 7.7 | 6.9 | 6.9 | 9.3 | 5.9 | 8.9 | 6.1 | 8.0 | 6.0 | 7.9 | 8.6 | 8.3 | 7.5 |

Table continues next page.

Table 2-7--Continued
Lamb meat: Estimated total production, beginning stocks, imports, ending stocks, apparent consumption, imports as a share of consumption, and the ratio of imports to production, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1992: | | | | | | | | | | | | | |
| Estimated total lamb meat production *(1,000 pounds)* | 30,946.2 | 28,050.1 | 31,702.7 | 32,036.1 | 23,886.2 | 26,275.3 | 26,494.2 | 24,322.4 | 28,823.4 | 28,112.9 | 25,818.6 | 28,869.2 | 335,337.2 |
| Estimated beginning stocks *(1,000 pounds)* | 5,974.9 | 6,892.3 | 6,323.2 | 7,964.6 | 8,013.7 | 9,179.1 | 10,277.0 | 11,008.3 | 8,745.8 | 8,217.2 | 8,017.3 | 7,977.3 | 5,974.9[1] |
| Imports *(1,000 pounds)* | 1,703.7 | 1,573.3 | 2,872.3 | 3,115.3 | 2,276.2 | 2,769.2 | 2,329.8 | 2,512.4 | 2,089.0 | 1,566.0 | 2,183.1 | 2,497.7 | 27,488.1 |
| Estimated ending stocks *(1,000 pounds)* | 6,892.3 | 6,323.2 | 7,964.6 | 8,013.7 | 9,179.1 | 10,277.0 | 11,008.3 | 8,745.8 | 8,217.2 | 8,017.3 | 7,977.3 | 7,455.1 | 7,455.1[2] |
| Apparent consumption *(1,000 pounds)* | 31,732.6 | 30,192.4 | 32,933.5 | 35,102.3 | 24,997.1 | 27,946.6 | 28,092.7 | 29,097.2 | 31,441.0 | 29,878.7 | 28,041.7 | 31,889.1 | 361,345.1 |
| Imports as a share of consumption *(percent)* | 5.4 | 5.2 | 8.7 | 8.9 | 9.1 | 9.9 | 8.3 | 8.6 | 6.6 | 5.2 | 7.8 | 7.8 | 7.6 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ratio of imports to production *(percent)* . . . . . | 5.5 | 5.6 | 9.1 | 9.7 | 9.5 | 10.5 | 8.8 | 10.3 | 7.2 | 5.6 | 8.5 | 8.7 | 8.2 |

Table continues next page.

Table 2-7--Continued
Lamb meat: Estimated total production, beginning stocks, imports, ending stocks, apparent consumption, imports as a share of consumption, and the ratio of imports to production, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1993: | | | | | | | | | | | | | |
| Estimated total lamb meat production *(1,000 pounds)* . . . . . | 24,790.5 | 25,363.0 | 31,838.2 | 30,474.1 | 27,142.8 | 31,524.0 | 25,328.3 | 26,204.7 | 25,722.0 | 24,836.7 | 25,621.1 | 27,836.6 | 326,682.1 |
| Estimated beginning stocks *(1,000 pounds)* . . . . . | 7,455.1 | 6,032.2 | 6,335.3 | 6,301.3 | 10,389.1 | 10,543.7 | 12,376.0 | 12,617.8 | 11,408.6 | 11,769.8 | 11,085.0 | 9,642.8 | 7,455.1[1] |
| Imports *(1,000 pounds)* . . . . . | 2,614.4 | 2,295.5 | 3,923.0 | 3,745.0 | 3,373.4 | 4,572.5 | 3,857.2 | 3,524.7 | 3,598.9 | 3,205.0 | 2,952.5 | 3,316.2 | 40,978.3 |
| Estimated ending stocks *(1,000 pounds)* . . . . . | 6,032.2 | 6,335.3 | 6,301.3 | 10,389.1 | 10,543.7 | 12,376.0 | 12,617.8 | 11,408.6 | 11,769.8 | 11,085.0 | 9,642.8 | 10,000.0 | 10,000.0[2] |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apparent consumption *(1,000 pounds)* . . . . . | 28,827.8 | 27,355.3 | 35,795.2 | 30,131.4 | 30,361.6 | 34,264.1 | 28,943.7 | 30,938.6 | 28,959.7 | 28,726.5 | 30,015.8 | 30,795.6 | 365,115.4 |
| Imports as a share of consumption *(percent)* . . . . . | 9.1 | 8.4 | 11.0 | 12.4 | 11.1 | 13.3 | 13.3 | 11.4 | 12.4 | 11.2 | 9.8 | 10.8 | 11.2 |
| Ratio of imports to production *(percent)* . . . . . | 10.5 | 9.1 | 12.3 | 12.3 | 12.4 | 14.5 | 15.2 | 13.5 | 14.0 | 12.9 | 11.5 | 11.9 | 12.5 |

Table continues next page.

Table 2-7--Continued
Lamb meat: Estimated total production, beginning stocks, imports, ending stocks, apparent consumption, imports as a share of consumption, and the ratio of imports to production, by months, Jan. 1990-Dec. 1994

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994: | | | | | | | | | | | | | |
| Estimated total lamb meat production *(1,000 pounds)* . . . . . | 24,917.1 | 26,959.7 | 34,352.4 | 26,409.2 | 27,149.3 | 23,678.7 | 18,267.5 | 22,634.6 | 22,671.5 | 23,185.6 | 24,120.6 | 25,583.1 | 299,929.3 |
| Estimated beginning stocks *(1,000 pounds)* . . . . . | 10,000.0 | 8,786.0 | 10,684.8 | 8,949.0 | 10,741.0 | 10,613.4 | 11,204.6 | 11,148.0 | 10,241.0 | 8,770.2 | 9,360.0 | 9,350.0 | 10,000.0[1] |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Imports *(1,000 pounds)* . . . . . | 3,170.4 | 2,498.3 | 3,359.4 | 3,492.4 | 3,223.9 | 3,932.1 | 3,074.7 | 3,156.3 | 2,542.6 | 3,441.2 | 3,981.6 | 2,810.0 | 38,682.8 |
| Estimated ending stocks *(1,000 pounds)* . . . . . | 8,786.0 | 10,684.8 | 8,949.0 | 10,741.0 | 10,613.4 | 11,204.6 | 11,148.0 | 10,241.0 | 8,770.2 | 9,360.0 | 9,350.0 | 9.750.0 | 9,750.0[2] |
| Apparent consumption *(1,000 pounds)* . . . . . | 29,301.4 | 27,559.1 | 39,447.6 | 28,109.5 | 30,500.8 | 27,019.6 | 21,398.8 | 26,697.9 | 26,684.8 | 26,036.9 | 28,112.2 | 27,993.2 | 338,862.1 |
| Imports as a share of consumption *(percent)* . . . . . | 10.8 | 9.1 | 8.5 | 12.4 | 10.6 | 14.6 | 14.4 | 11.8 | 9.5 | 13.2 | 14.2 | 10.0 | 11.4 |
| Ratio of imports to production *(percent)* . . . . . | 12.7 | 9.3 | 9.8 | 13.2 | 11.9 | 16.6 | 16.8 | 13.9 | 11.2 | 14.8 | 16.5 | 11.0 | 12.9 |

[1] Represents the beginning stocks as of January 1.
[2] Represents the ending stocks as of December 31.

Source: Lamb meat production estimated by the U.S. International Trade Commission; beginning stocks and ending stocks compiled from official statistics of the U.S. Department of Agriculture; imports compiled from official statistics of the U.S. Department of Commerce.

Table 2-8
Beef, veal, pork, lamb, mutton, and poultry meat: Apparent consumption, by years, 1990-94

*(Million pounds, carcass-weight equivalent)*

| Year | Beef | Veal | Pork | Lamb[1] | Mutton[1] | Total red meat | Poultry meat | Total |
|---|---|---|---|---|---|---|---|---|
| 1990 | 24,030 | 325 | 16,030 | 370 | 27 | 40,782 | 22,152 | 62,934 |
| 1991 | 24,114 | 305 | 16,399 | 375 | 22 | 41,215 | 23,291 | 64,506 |
| 1992 | 24,261 | 311 | 17,476 | 361 | 27 | 42,436 | 24,425 | 66,861 |
| 1993 | 24,006 | 286 | 17,419 | 365 | 16 | 42,092 | 25,128 | 67,220 |
| 1994[2] | 25,172 | 294 | 17,852 | 339 | 12 | 43,669 | 29,337 | 73,006 |

[1] Estimated by staff of U.S. International Trade Commission.
[2] Preliminary.

Note.--Because of rounding, figures may not add to the totals shown.

Source: USDA, ERS, *Red Meats Yearbook 1994* (Statistical Bulletin No. 885), Aug. 1994, except as noted.

discussion is on trends in and the relationships among elements of the data rather than on the absolute values, owing to their estimated nature.[36]

The gross value of production includes the value of lambs raised, wool sold, and income produced from the Federal wool incentive program, payment for unshorn lamb, and payment for cull animals. Slaughter lambs accounted for about 29 percent of cash returns, and feeder lambs for about 26 percent annually. The share of cash returns accounted for by wool, generally declined from 20 percent in 1989 to 11 percent in 1994, whereas the share from payments made under the National Wool Act of 1954 (the wool incentive and unshorn lamb payment) increased from 11 percent in 1989 to 22 percent in 1994.

[36] Table 2-9, which provides data regarding the costs and returns associated with U.S. sheep production, is taken from the USDA publication *Economic Indicators of the Farm Sector, Costs of Production--Livestock and Dairy, 1990*. Data for 1989 and 1990 are reported in this publication. Data for 1991-94 are calculated by the USITC staff based either on methodology employed by the USDA, as described either in the publication or by USDA officials contacted by telephone, or on estimates using appropriate indices to update individual data items. In general, the data are based on USDA Farm Costs and Returns Surveys administered under the authority of the Agriculture and Consumer Protection Act of 1973. Because surveys are not sent annually, many data items are estimated by applying indices or formulae to individual data elements reported in survey responses in prior years. The USDA did not publish data on costs and returns in the sheep industry after 1990.

Table 2-9
U.S. sheep production costs and returns, 1989-94

*(In dollars per ewe)*

| Item | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|---|
| Cash receipts: | | | | | | |
| Slaughter lambs | 19.56 | 16.67 | 16.97 | 19.46 | 21.01 | 21.30 |
| Feeder lambs | 19.56 | 14.92 | 14.28 | 16.67 | 18.58 | 18.68 |
| Cull ewes | 6.76 | 6.24 | 5.73 | 7.51 | 8.32 | 8.99 |
| Wool | 13.46 | 9.50 | 5.50 | 7.40 | 5.10 | 7.80 |
| Wool incentive payment | 6.08 | 12.77 | 13.30 | 12.30 | 15.30 | 13.10 |
| Unshorn lamb payment | 1.21 | 2.17 | 3.12 | 2.89 | 3.57 | 3.08 |
| Total, cash receipts | 66.63 | 62.27 | 58.91 | 66.23 | 71.88 | 72.95 |
| Cash expenses: | | | | | | |
| Feed: | | | | | | |
| Grain | 2.18 | 2.04 | 2.12 | 1.85 | 2.24 | 2.20 |
| Protein supplements | 4.49 | 4.29 | 4.19 | 4.26 | 4.49 | 4.55 |
| Salt and minerals | .42 | .43 | .44 | .44 | .44 | .46 |
| Hay | 3.58 | 3.68 | 3.25 | 3.39 | 3.87 | 3.93 |
| Pasture | 3.37 | 3.23 | 3.29 | 3.31 | 3.38 | 3.60 |
| Public grazing | .94 | .93 | 1.01 | .99 | .96 | 1.02 |
| Crop residue | .06 | .06 | .06 | .06 | .06 | .07 |
| Total, feed costs | 15.04 | 14.66 | 14.37 | 14.30 | 15.43 | 15.82 |
| Other: | | | | | | |
| Veterinary and medicine | 1.22 | 1.28 | 1.36 | 1.42 | 1.47 | 1.52 |
| Livestock hauling | 1.36 | 1.45 | 1.47 | 1.48 | 1.48 | 1.47 |
| Marketing | .34 | .35 | .36 | .37 | .38 | .39 |
| Ram death loss | .28 | .21 | .18 | .24 | .26 | .28 |
| Shearing and tagging | 1.30 | 1.36 | 1.43 | 1.50 | 1.55 | 1.50 |
| Fuel, lube, and electricity | 1.38 | 1.54 | 1.60 | 1.48 | 1.42 | 1.29 |
| Machinery and building repairs | 2.54 | 2.62 | 2.73 | 2.84 | 2.89 | 3.00 |
| Hired labor | 6.99 | 7.31 | 7.61 | 8.00 | 8.22 | 8.45 |
| Miscellaneous | 1.32 | 1.39 | 1.42 | 1.49 | 1.56 | 1.61 |
| Total, other | 16.73 | 17.51 | 18.17 | 18.81 | 19.23 | 19.52 |
| Total, variable cash expenses | 31.77 | 32.17 | 32.54 | 33.11 | 34.66 | 35.34 |
| Fixed cash expenses: | | | | | | |
| General farm overhead | 3.67 | 3.80 | 3.84 | 3.88 | 3.95 | 4.07 |
| Taxes and insurance | 3.00 | 3.02 | 3.21 | 3.31 | 3.40 | 3.56 |
| Interest | 5.90 | 5.84 | 5.46 | 5.08 | 4.80 | 5.02 |
| Total, fixed cash expenses | 12.57 | 12.66 | 12.51 | 12.26 | 12.16 | 12.65 |
| Total, cash expenses | 44.34 | 44.83 | 45.05 | 45.37 | 46.82 | 47.99 |
| Capital replacement | 8.13 | 8.19 | 8.53 | 8.87 | 9.04 | 9.38 |
| Total, cash expenses and capital replacement | 52.47 | 53.02 | 53.58 | 54.24 | 55.86 | 57.38 |
| Cash receipts less cash expenses | 22.29 | 17.44 | 13.87 | 20.85 | 25.06 | 24.95 |
| Net cash receipts | 14.16 | 9.25 | 5.33 | 11.98 | 16.01 | 15.57 |
| Economic costs and returns: | | | | | | |
| Total cash receipts | 66.63 | 62.27 | 58.91 | 66.23 | 71.88 | 72.95 |
| Economic (full ownership) costs: | | | | | | |
| Variable cash expenses | 31.77 | 32.17 | 32.54 | 33.11 | 34.66 | 35.34 |
| General farm overhead | 3.67 | 3.80 | 3.84 | 3.88 | 3.95 | 4.07 |
| Taxes and insurance | 3.00 | 3.02 | 3.21 | 3.31 | 3.40 | 3.56 |
| Capital replacement | 8.13 | 8.19 | 8.53 | 8.87 | 9.04 | 9.38 |
| Operating capital | 1.28 | 1.20 | .89 | .59 | .54 | .82 |
| Other nonland capital | 3.74 | 3.88 | 4.04 | 4.20 | 4.28 | 4.45 |
| Land | 7.87 | 8.90 | 8.69 | 8.55 | 8.64 | 8.67 |
| Unpaid labor | 8.22 | 8.64 | 9.00 | 9.45 | 9.72 | 9.99 |
| Total, economic costs | 67.68 | 69.80 | 70.74 | 71.97 | 74.25 | 76.28 |
| Residual returns to management and | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| risk | -1.05 | -7.53 | -11.83 | -5.74 | -2.37 | -3.34 |

Note.--Because of rounding figures may not add to totals shown.

Source: Data for 1989-90 from USDA, ERS, *Economic Indicators of the Farm Sector, Costs of Production--Livestock and Dairy, 1990*. Data for 1991-94 are calculated by USITC staff based either on methodology employed by the USDA, as described either in the aforementioned publication or by USDA officials contacted by telephone, or on estimates using appropriate indices to update individual data items. In general, the data are based on USDA Farm Costs and Returns Surveys administered under the authority of the Agriculture and Consumer Protection Act of 1973. Surveys are not sent annually, however, and many data items are estimated by applying indices or formulae to individual data elements reported in survey responses in previous years. The USDA did not publish data on costs and returns in the sheep industry after 1990.

The costs of production include expenses assumed to be cash costs. Feed (grains, protein supplements, hay, pasture, etc.) accounted for about 45 percent of total variable cash expenses annually during 1989-94. Grains and protein supplements accounted for about 20 percent, and hay accounted for an additional 10 percent of variable cash expenses. Of other total variable cash expenses (labor, buildings, hauling, etc.), labor accounted for about 23 percent and buildings for 8 percent.

The value of production less cash costs and capital replacement costs during 1989-94 is shown in the following tabulation (U.S. dollars per ewe):

| Year | Unit value |
|---|---|
| 1989 | 14.16 |
| 1990 | 9.25 |
| 1991[1] | 5.33 |
| 1992[1] | 11.98 |
| 1993[1] | 16.01 |
| 1994[1] | 15.57 |

[1] Estimated by USITC staff.

The estimated decline in cash receipts by lamb producers during 1990-91 primarily reflects lower returns for live animals. Cash receipts for live animals rose significantly during 1992-93, and this rise contributed mainly to the increased total cash receipts. Cash receipts for live animals were stable in 1994; however, cash receipts from wool sales increased.

The cost of raising a lamb to slaughter weight under range (grass-fed) management has been shown in one study to be more than that of raising a lamb under feedlot (grain-fed) management in the United States, given the prices[37] used in the study.[38] However, profits were greater under range management than they were under feedlot management.[39]

Notwithstanding that range management is more profitable, only about 20 percent of the lambs in the United States can be grown to slaughter weight under range management. Also, it should be noted that feed costs were the largest cost under range management. The feed costs include concentrate and protein supplement costs for the maintenance of the ewes through the weaning of lambs. The largest components of the feed costs were grains, dehydrated alfalfa pellets, and alfalfa hay.[40] The feed costs also included a grazing component.[41]

### *Domestic prices*

Prices for livestock and meat (including live lambs and lamb meat) tend to be volatile partly because supply responses are lagged on account of biological constraints. For example, the gestation period for sheep is about

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[37] However, it should be noted that the cost of feed and the cost of feeder lambs typically fluctuate significantly.

[38] The data were taken from articles in the *National Lamb & Wool Grower*, published monthly by the ASI. USITC staff reviewed the original articles, published in the December 1993 and February 1994 issues, respectively, and conducted a telephone interview with the author, Steve Meyers, on April 28, 1995.

[39] Under feed lot management, lambs may be shorn before they are marketed and thus become ineligible for the unshorn lamb payment.

[40] Officials of the ASI, telephone conversation with USITC staff, May 1, 1995.

[41] Ibid.

148 days and can be modified on very slightly by grower actions.[42] Also, the growth rate for live lambs, while more subject to grower manipulation than the gestation period, is still limited by factors such as the amount of feed that lambs can physically consume. During 1990-94, the annual average price for live slaughter lambs[43] rose irregularly from US$55.42 per 100 pounds (cwt) to US$66.77 in 1994 as shown in table 2-10. The rise in price corresponded with a general decline in lamb meat production, which fell from 346 million pounds in 1990 and 1991 to 300 million pounds in 1994. The trends in price for lamb carcasses[44] were similar to those for live lambs. During 1990-94, the annual average price for lamb carcasses rose from US$121.47 per cwt to US$147.62 in 1994 as shown in table 2-11.

Prices for both live lambs and lamb carcasses are often higher in the spring than before or after spring, apparently reflecting the traditional demand for lamb meat for holiday meals. The prices for both live lambs and lamb carcasses generally rose during 1990-94, notwithstanding an irregular rise in the quantity of U.S. imports of lamb meat from 25 million pounds (carcass-weight equivalent) in 1990 to 39 million pounds in 1994.

### *U.S. Grading System*

The official USDA quality grades of lamb (both live lambs and lamb carcasses) are Prime, Choice, Good, and Utility. Most purchasers prefer cuts from carcasses that are Choice, and most of the lamb carcasses are so graded. Expense associated with feeding lambs for the Prime grade is generally not recoverable in the marketplace. Lambs are also graded by yield, determined by the amount of external fat, the amount of kidney and pelvic fat, and the confirmation grade of the leg. The yield grades are 1 through 5, with 1 representing the leanest carcasses and 5 the fattest.

USDA grading is voluntary and entirely different from health and sanitary regulations, which are mandatory and described in the "U.S. Trade and Regulatory Measures" section of this report. During the 1994 fiscal year, processors requested the voluntary grading of 88 percent of the Federally Inspected (FI) lamb slaughter; of this, 90 percent yielded a quality grade of

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[42] *Sheep Production Handbook*, 1988, ch. REPRO.

[43] Choice slaughter lambs in San Angelo, Texas, as reported by the USDA.

[44] Carcasses graded Choice-Prime, East Coast, 55 to 65 pounds, as reported by the USDA.

Table 2-10
Choice slaughter lambs: Average price in San Angelo, by months, Jan. 1990-Dec. 1994

*(US dollars per 100 pounds (cwt))*

| Month | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Jan. | 54.80 | 47.63 | 58.56 | 69.88 | 56.67 |
| Feb. | 60.38 | 45.81 | 57.69 | 73.38 | 62.31 |
| Mar. | 63.69 | 54.88 | 66.55 | 75.50 | 61.19 |
| Apr. | 63.13 | 55.50 | 74.63 | 71.25 | 51.25 |
| May | 62.25 | 57.70 | 68.88 | 62.50 | 60.94 |
| June | 53.56 | 55.75 | 64.50 | 57.75 | 66.92 |
| July | 53.25 | 55.50 | 58.17 | 57.00 | 75.33 |
| Aug. | 51.20 | 54.31 | 52.38 | 58.97 | 79.50 |
| Sept. | 51.75 | 53.25 | 53.61 | 66.08 | 76.08 |
| Oct. | 52.50 | 51.20 | 52.81 | 63.75 | 69.96 |
| Nov. | 50.42 | 52.08 | 56.93 | 65.69 | 73.60 |
| Dec. | 48.08 | 54.92 | 67.25 | 68.44 | 67.50 |
| Annual average | 55.42 | 53.21 | 61.00 | 65.85 | 66.77 |

Source: Data for 1990-93 compiled from USDA, ERS, *Red Meat Yearbook*, (Statistical Bulletin No. 885), Aug. 1994, table 78, p. 80; data for 1994 compiled from USDA, ERS, *Cattle and Sheep Outlook* (LDP-CS-5), Feb. 14, 1995.

Table 2-11
Choice-Prime lamb carcasses: Average price, East Coast, 55-65 lb., by months, Jan. 1990-Dec. 1994

*(U.S. dollars per cwt)*

| Month | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Jan. | 112.25 | 109.05 | 114.83 | 145.72 | 131.19 |
| Feb. | 127.81 | 106.50 | 122.75 | 157.75 | 134.00 |
| Mar. | 135.25 | 118.97 | 137.38 | 168.25 | 137.05 |
| Apr. | 123.38 | 122.00 | 143.72 | 154.00 | 131.19 |
| May | 125.25 | 125.25 | 143.13 | 142.75 | 130.25 |
| June | 120.25 | 124.25 | 140.00 | 133.00 | 146.25 |
| July | 124.88 | 124.55 | 136.08 | 124.63 | 164.06 |
| Aug. | 120.25 | 121.25 | 125.47 | 135.88 | 173.05 |
| Sept. | 120.00 | 118.25 | 126.40 | 140.25 | 165.25 |
| Oct. | 119.85 | 113.38 | 120.75 | 140.25 | 154.25 |
| Nov. | 114.75 | 111.31 | 129.14 | 140.75 | 153.65 |
| Dec. | 113.75 | 113.25 | 140.25 | 144.35 | 151.25 |
| Annual average | 121.47 | 117.33 | 131.66 | 143.97 | 147.62 |

Source: Data for 1990-93 compiled from USDA, ERS, *Red Meat Yearbook*, (Statistical Bulletin No. 885), Aug. 1994, table 86, p. 88; data for 1994 compiled from USDA, ERS, *Cattle and Sheep Outlook* (LDP-CS-5), Feb. 14, 1995.

Choice or Prime.[45] In addition to the voluntary USDA grading system, some packers have their own private grades often used in conjunction with USDA grades.[46]

## Channels of Distribution

### *Grower Sales of Live Lambs*[47]

The U.S. market for slaughter lambs generally consists of many sellers (growers) and few buyers (packer/processors), usually operating independently. Live lamb price statistics are reported to the public by the ASI, the USDA, and by local news-reporting organizations.

Live lambs in the United States, whether feeders or slaughter lambs, may be sold at auction markets, terminal markets, or nonpublic markets. Nonpublic markets include direct sales to packers negotiated by growers, by order buyers, or by other middlemen. In recent years, slightly more than 80 percent of lambs sold for slaughter have been sold through nonpublic markets. Also, in recent years, some lambs have been sold through electronic marketing systems.

A number of methods are used to determine a price for feeder or slaughter lambs. Most lambs are purchased on a live weight basis with the grower being paid a market price per pound based on the weight of the animal when sold. There are, however, several variations of the live weight purchase method currently in practice.[48] As with other species of livestock, some lambs are purchased on the basis of the carcass they yield.

Growers have for many years expressed concern about packer feeding of lambs in that packers can time the slaughtering of the lambs they feed to exert maximum price influence. Thus, when market prices for live lambs rise, packers who feed lambs can temporally withdraw from the market but continue to operate their slaughter plants using lambs they have fed. Growers, with no viable alternative, are subsequently forced to sell their animals to the packers at reduced prices.

### *Domestic Lamb Meat*

Almost all firms that slaughter lambs process at least some of their carcasses into primal and subprimal cuts, and some firms produce retail cuts as well. About 65 percent of lamb received by retailers is in carcass form.[49] Some carcasses move to a type of wholesaler called a breaker. Breakers divide carcasses into primal, subprimal, or retail cuts for resale to nonbreaker wholesalers or retail outlets. Some lamb meat is processed into portion controlled cuts for food service outlets.

An increasing share of lamb, including lamb carcasses, has apparently been sold as boxed lamb. Boxed lamb is lamb meat that has been divided into primal or subprimal cuts and sealed in air-tight plastic material. This packaging increases the shelf life of the lamb and its shipping reduces freight cost because less fat and bone are shipped. Further, retailers and

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[45] Evan Stachowicz, USDA, Agricultural Marketing Service, telephone conversation with USITC staff, Jan. 24, 1995.

[46] *Scientific Farm Animal Production*, p. 140.

[47] The following description of the channels of distribution was adapted from the *Sheep Production Handbook*, 1988, ch. MKT.

[48] For a more detailed discussion of pricing methods, see USITC, *Final Monitoring Report*, publication 2435, Dec. 1990.

[49] *Sheep Production Handbook*, 1988, ch. MKT.

food service buyers can order specific cuts, thereby eliminating their need to sell or discard slower moving cuts, further reducing waste.[50]

Lamb meat consumption in the United States is concentrated on the East and West coasts. According to ASI, the Northeast and mid-Atlantic States account for more than 50 percent of lamb meat consumption in the United States with New York alone accounting for 30 percent. California is estimated to account for 17 percent of U.S. consumption. Chicago, Illinois and Miami, Florida are also reported to be good markets for lamb.[51]

### *Imported Lamb Meat*

The channels of distribution for Australian lamb meat vary in part with the type of lamb under consideration.[52] Fresh Australian lamb is shipped by air to the United States under the "Fresh Australian Range Lamb" (FARL) program.[53] Fresh Australian lamb is sold to both the retail and food service sectors. An importer and marketer of FARL testified that his company sells this product to over 1,000 supermarkets and to large-volume food service suppliers.[54] He also stated that 85 percent of his company's sales were to the retail supermarket industry.[55]

In the retail sector, the transaction among exporter, importer, and retailer is direct, although importers often choose to use brokers to develop business and deal with customer requirements on a day-to-day basis. At the food service level, fresh lamb is sold through a distributor that services regional units of rather expensive restaurant chains or individual "white table cloth" restaurants.[56] A U.S. meat distributor reported that his company purchased most of his imported lamb meat from FoodComm International (FoodComm) and supplied U.S., Australian, and New Zealand lamb meat to top white table cloth restaurants.[57] The distributor also reported that some restaurants that normally couldn't afford a large domestic lamb rack could offer the smaller and less costly imported rack or lamb sirloins.[58]

The president of FoodComm reported that he believed FoodComm was the largest importer of sheepmeat products and that the company procured such products from Australia and New Zealand to supply both food service and retail accounts.[59] He also indicated that most of FoodComm's US$30 million in sales were of sheepmeat. He reported that the majority of food service companies, wholesale jobbers, and retail operators handle a combination of domestic and imported Australian and New Zealand lamb. He supported the AMLC contention that, in the last 2 years, frozen lamb carcass imports have increased because the ethnic retail trade substituted frozen lamb for frozen mutton that was in limited supply because of the U.S. Meat Import Act.[60]

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[50] Ibid, p. MKT-8.
[51] Ibid, ch. MKT.
[52] Prehearing brief of the AMLC, pp. 9-11. The AMLC is described in the chapter entitled "Australian Industry."
[53] The FARL program is described in the chapter entitled "Australian Industry."
[54] Ken Bowman, AMONA Foods, transcript of the hearing, pp. 87-96.
[55] Ibid., p. 113.
[56] Prehearing brief of the AMLC, p. 9.
[57] Robert Furter, sales manager, Luce-Carmel Meat Company, transcript of the hearing, pp. 84-87.
[58] Ibid., p. 115.
[59] Joel Weinstein, president, FoodComm Intl., transcript of the hearing, pp. 97-104.
[60] Public Law 96-177, approved Dec. 31, 1979 (19 U.S.C.1202).

Reportedly 75 percent of New Zealand lamb sales in the United States are to the food service sector.[61] The New Zealand Meat Producers Board (NZMPB) reported that it expended much effort in developing the food service market apparently as the result of problems associated with the retail market. The NZMPB reported that at retail the frozen New Zealand lamb meat most often appears in the frozen food section not in the fresh meat case where consumers make meat purchasing decisions. The NZMPB also reported that store personnel pay less attention to the maintenance of the frozen meat section and consequently it is frequently understocked or contains packages in poor condition. Chilled New Zealand lamb is sold to particular market segments, such as specialty retail outlets and white table cloth restaurants. Exporting of lamb from New Zealand is carried out by private companies.[62] Commercial operators reportedly emphasize two marketing aspects: contractual relationships and relative returns received from different customers.[63]

**Lamb Meat Importer Questionnaire Responses**

Most U.S. importers of lamb meat who responded to USITC questionnaires reported that they made sales of fresh, chilled, or frozen lamb meat on a daily basis and that their sales pattern did not change significantly during 1990-94. For fresh or chilled lamb meat, the average lead time between placing an order and receiving product ranged from 1 to 2 weeks from New Zealand and 1 to 6 weeks from Australia; for frozen lamb meat, 1 to 2 months from New Zealand and 1 to 4 months from Australia. For fresh or chilled lamb meat, the minimum quantity required for purchases of imported lamb meat ranged from 300 to 3,000 pounds from Australia and from 2,000 to 3,500 pounds from New Zealand, and, for frozen lamb meat, 20,000 to 32,000 pounds from Australia and 20,000 to 25,000 pounds from New Zealand. Sales terms (prices, payments, contracts) between importers and their customers are generally negotiated.

**Lamb Meat Purchaser Questionnaire Responses**

Most U.S. purchasers of lamb meat who responded to questionnaires reported making purchases of fresh or chilled lamb meat on a daily and weekly basis and of frozen lamb meat on a weekly and monthly basis. This sales pattern did not change significantly during 1990-94. The purchasers reported that they changed suppliers infrequently and that they generally contacted one to three suppliers for fresh or chilled lamb meat and two to four for frozen lamb meat. For fresh or chilled lamb meat, the average lead time between placing an order and receiving the product ranged from 3 to 7 days from the United States, 14 days from Australia, and 14 to 21 days from New Zealand; and, for frozen lamb meat, 7 days from the United States, 7 to 21 days from Australia, and 10 to 21 days from New Zealand. The minimum quantity required for purchases of fresh or chilled lamb meat from the United States was from none to 1,000 pounds; no minimum purchase requirement was reported for frozen lamb meat from the United States. The minimum purchase reported for imported fresh or chilled lamb meat from Australia was from none to 3,300 pounds and from none to 40,000 pounds for frozen lamb meat. No minimum purchase requirements were reported for imports from New Zealand.

## U.S. Trade and Regulatory Measures

U.S. imports of fresh, chilled, or frozen lamb meat are subject to import duties (tariffs) as provided for under the *U.S. Harmonized Tariff Schedule* (HTS). All imports are subject to health and sanitary regulations

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[61] Prehearing submission of the New Zealand Meat Producers Board, p. 6. The NZMPB is described in the chapter entitled "New Zealand Industry."

[62] Ibid.

[63] Laurie Bryant, North American director of the NZMPB, transcript of the hearing, pp. 126-127.

administered by the USDA. In addition, imports from New Zealand were subject to countervailing duties.

## U.S. Tariff Treatment

Since January 1, 1989, fresh, chilled, or frozen lamb meat has been provided for in chapter 2 of the *HTS*. Appendix E contains a copy of pertinent portions of the *HTS*, including the rates of duty. For a discussion of relevant legal notes, an explanation of the rates of duty, and for other elements of the *HTS*, see appendix E.

Under the *HTS*, the subject imports (HTS subheadings 0204.10.00, 0204.22.20, 0204.23.20, 0204.30.00, 0204.42.20, and 0204.43.20) are dutiable at 1 cent/kilogram. The ad valorem equivalent of the 1994 rate of duty for imports of fresh, chilled, or frozen lamb meat from Australia and New Zealand was 0.3 percent and averaged 0.3 percent for all suppliers. The rates of duty are subject to staged reductions, to 0.7 cents per kilogram, as a result of the Uruguay Round negotiations.

## Health and Sanitary Regulations

### *Rinderpest and Foot-and-Mouth Disease*

U.S. imports of certain live animals, including sheep and lambs and certain fresh, chilled, or frozen meats, including lamb, are generally limited to countries that have been declared free from rinderpest and foot-and-mouth diseases[64] by the U.S. Secretary of Agriculture.[65] Australia and New Zealand have been declared free from the diseases.[66]

### *The Federal Meat Inspection Act*

The USDA administers section 20 of the Federal Meat Inspection Act (21 U.S.C. 620), which provides, in subsection (a), that meat and meat products prepared or produced in foreign countries may not be imported into the United States ". . . unless they comply with all the inspection, building construction standards, and all other provisions of this chapter [ch. 12, Meat Inspection] and regulations issued thereunder applicable to such articles in commerce in the United States."[67]

One of the results of the USDA inspection program was that, during 1993, 309,000 pounds of fresh, chilled, or frozen mutton and lamb meat (266,000 pounds from Australia and 43,000 pounds from New Zealand) were refused entry for various reasons.[68] These amounts constituted less than 1.4 percent of the fresh, chilled, or frozen mutton and lamb meat offered for entry to the United States.

### *Import Investigations*

During the 1980s, the domestic lamb industry filed three petitions with the USITC and the Department of Commerce (DOC) alleging that imports of lamb meat from New Zealand were being subsidized and/or were being sold in the United States at less than fair value (LTFV). A fourth petition alleging that imports of lamb meat were being subsidized by the Government of New Zealand was filed with the DOC in 1985.

A countervailing duty (CVD) petition filed by the National Wool Growers Association, Inc., and by the National Lamb Feeders Association, Inc., before Commerce on April 23, 1981, and before the Commission on September 21, 1981,[69] alleged that imports of lamb meat were being subsidized.[70] The Commission made an affirmative determination on November 8, 1981.[71] On November 30, 1981, Commerce announced its preliminary affirmative countervailing duty

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[64] Rinderpest and foot-and-mouth diseases are highly contagious, infectious diseases that can afflict cloven-footed animals (such as cattle, sheep, swine, and deer). Because the diseases are easily transmitted and are debilitating, they are an ever-present threat to the U.S. livestock industry. The diseases do not present a direct threat to human health.

[65] Sec. 306 of the Tariff Act of 1930 (19 U.S.C. 1306).

[66] For a more detailed discussion of this issue, see USITC *Final Monitoring Report*, publication 2345, Dec. 1990.

[67] For a more detailed discussion of health and sanitary regulations, see USITC *Final Monitoring Report*, publication 2345, Dec. 1990.

[68] USDA, *Meat and Poultry Inspection, 1993*, Report of the Secretary of Agriculture to the U.S. Congress, Sept. 1994, p. 61.

[69] USITC, *Lamb Meat From New Zealand*, investigation No. 701-TA-80 (preliminary), USITC publication 1191, 1981.

[70] On September 17, 1981, the USTR announced that New Zealand had become "a country under the Agreement." Hence, the USITC instituted a preliminary CVD investigation on September 21, 1981.

[71] See USITC publication 1191 and 46 F.R. 222, Nov. 18, 1981.

determination, estimating a net subsidy of 6.19 percent of the f.o.b. value of lamb meat exports to the United States.[72] However, shortly thereafter the petitioners requested that the petition be withdrawn.[73]

On April 18, 1984, CVD and antidumping petitions were filed with the Commission[74] and Commerce by the American Lamb Co., the Denver Lamb Co., and the Iowa Lamb Corp. on behalf of sheep ranchers, lamb feedlot operators, and lamb meat packing and processing companies. The petitions alleged that imports of lamb meat from New Zealand were being subsidized and were being sold in the United States at LTFV. On June 4, 1984, the Commission found no reasonable indication of injury to the domestic industry as a whole.[75]

On March 26, 1985, Commerce received a petition alleging that producers, processors, or exporters of lamb meat in New Zealand receive benefits that constitute[76] bounties or grants within the meaning of section 303 of the Tariff Act of 1930; Commerce initiated its investigation on April 15, 1985.[77] On September 17, 1985, Commerce published a final determination that certain benefits, determined to be about US$0.18/lb, were provided to producers, processors, or exporters of lamb meat in New Zealand.[78]

Eight final administrative reviews of the CVD order on lamb meat from New Zealand were completed by Commerce. Remedies decreased from NZ$0.31/lb for shipments during the first review period (June 25, 1985-March 31, 1986) to NZ$0.21/lb for April 1, 1986-March 31, 1987. Remedies (which shifted from a specific rate to an ad valorem rate) decreased for each annual review.[79] The total bounty or grant was found to be *de minimis* for all firms for the review period April 1, 1990, through March 31, 1991. A subsequent final review for the period April 1, 1991, through March 31, 1992 also determined *de minimis* CVD amounts for all firms. On May 22, 1995, the DOC published a notice of its final determination that the subsidy for the period April 1, 1992 through March 31, 1993 was *de minimis* for all firms. In the same notice, the DOC reported its final determination that New Zealand had met the requirements for revocation of the CVD order and reported that the CVD order would be revoked.[80]

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[72] 46 F.R. 229, Nov. 30, 1981.

[73] On December 23, 1981, the USITC was notified by the petitioners by letter that they desired to withdraw the petition. On January 4, 1982, the USITC terminated the final investigation.

[74] USITC, *Lamb Meat From New Zealand*, investigation Nos. 701-TA-214 (preliminary) and 731-TA-188 (preliminary), USITC publication 1534, June 1984.

[75] Ibid.

[76] The petitioners on behalf of the U.S. lamb meat industry were the American Lamb Co., the Denver Lamb Co., and the Iowa Lamb Corp.

[77] No injury determination by the Commission was required in this investigation because it was conducted under section 303 of the Tariff Act of 1930. Under this section of U.S. law, imports were not entitled to an injury test in a CVD investigation unless the imports are from countries that are signatories to the GATT Subsidies Code (or they have assumed substantially equivalent obligations to those under the code), except in cases where the imports enter duty free. In this case, New Zealand was not a "country under the Agreement" within the meaning of section 701(b) of the Tariff Act as it then existed, and the merchandise subject to investigation was dutiable.

[78] "Final Affirmative Countervailing Duty Determination and Countervailing Duty Order; Lamb Meat From New Zealand," 50 F.R. 37708, Sept. 17, 1985.

[79] The bounty increased for one firm during review period April 1, 1988, through March 31, 1989.

[80] See 60 F.R. 27082, May 22, 1995, Notice of Final Results of Countervailing Duty Administrative Review and Revocation of Countervailing Duty Order.

Pursuant to section 1937[81] of the Omnibus Trade and Competitiveness Act of 1988, the USITC conducted a 2-year monitoring and investigation[82] of U.S. lamb meat imports during 1988-89 under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)). Lamb meat is also one of the eight case studies included in Commission investigation No. 332-344 on the economic effects of antidumping and countervailing duty orders and suspension agreements.[83]

## Industry Concerns

In recent years, U.S. sheep and lamb growers have expressed concern about a number of issues. The issues cited include: termination of the National Wool Act of 1954, lamb and sheep losses to predators, restrictions on the use of Compound 1080 (a chemical toxicant), general decline in the infrastructure of the U.S. sheep industry, grazing issues, and a shortage of qualified shepherds in the United States.

### *National Wool Act*

The National Wool Act of 1954 (Wool Act), as amended, provides for wool incentive payments to growers. However, the Omnibus Budget Reconciliation Act of 1993, Public Law 103-130,[84] provided for a phaseout of the incentive payments over the marketing years 1993/94 and repealed the Wool Act effective December 31, 1995. For the marketing year 1994 (payments made April 1995), producers are to receive only 75 percent of their calculated payment, and, for the marketing year 1995 (payments made April 1996) they are to receive only 50 percent.

The USITC estimated the share of growers' income accounted for by incentive payments under the Wool Act.[85] Growers receive income from both marketing shorn wool and from Federal incentive payments. Gross income from sheep and lambs received by growers,[86] the value of shorn wool grown,[87] wool incentive payments,[88] total income, and the shares of total income from wool and from incentive payments as reported by USDA or derived from USDA data are shown in the following tabulation:

| Year | Gross income from Federal sheep and lambs[1] | Value of shorn wool grown | U.S. Federal Government payments | Total | Share of gross income from-- Wool | Share of gross income from-- U.S. Government payments |
|---|---|---|---|---|---|---|

[81] Section 1937 was a conference agreement resolving U.S. House of Representative and U.S. Senate differences concerning lamb meat imports. A Senate amendment authorized import quotas for lamb meat, but the House bill had no such provision.

[82] USITC, *Final Monitoring Report*, investigation No. 332-264, publication 2345, Dec. 1990.

[83] USITC, *The Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements*, investigation No. 332-344, publication 2900, June 1995.

[84] Enacted on November 1, 1993.

[85] The USITC estimates were made in consultation with officials of the ASI in a telephone conversation on April 20, 1995.

[86] As reported in the USDA's annual publication *Meat Animals Production, Disposition and Income*.

[87] USDA, Consolidated Farm Service Agency, *History of Budgetary Expenditures of the Commodity Credit Corporation* (Book 3), Feb. 6, 1995.

[88] Ibid.

| | (Million dollars) | | | | (Percent) | |
|---|---|---|---|---|---|---|
| 1990 . . . . | 421.1 | 69.5 | 105.4 | 596.0 | 12 | 18 |
| 1991 . . . . | 407.8 | 47.1 | 134.4 | 589.4 | 8 | 23 |
| 1992 . . . . | 471.5 | 60.2 | 116.0 | 647.6 | 9 | 18 |
| 1993 . . . . | 551.6 | 39.1 | 133.9 | 724.6 | 5 | 18 |
| 1994 . . . . | 514.7 | 52.4 | [2] | [2] | [2] | [2] |

[1] Marketings of animals and value of home consumption.
[2] Not available.

### *Predators*

Predation by wildlife has always been a problem for U.S. sheepgrowers.[89] Domestic interests contend that livestock losses to predators have increased in recent years and have cited a number of reasons including: more predators; fewer and less efficient methods of controlling predators; increased

[89] USDA, APHIS, *Animal Damage Control Program Final Environmental Impact Statement*, Apr. 1994, pp. 8-10.

government resistance against the management not only of predators but of all wildlife; and increased use of USDA's limited resources.[90]

A total of 368,050 sheep and lambs, valued at US$17.7 million, were lost to predators during 1994.[91] Losses to predators accounted for 39 percent of total losses from all causes in that year. Coyotes accounted for 66 percent of the losses, or 243,800 animals valued at US$11.5 million. Nearly all states reported losses to coyotes, but most losses (92 percent) to coyotes were in the Western States and Mountain States. Dogs accounted for 11 percent of the losses, or 40,325 animals valued at US$2.2 million. Other predators include mountain lions, bears, foxes, eagles, and bobcats.

In a 1994 survey conducted by the Wyoming Wool Growers Association,[92] over 80 percent of Wyoming sheep producers listed predators as their most serious problem. Many sheep growers and other agricultural interests express strong opposition to the release of wolves.

**Animal Damage Control**[93]

The U.S. Government's primary involvement with sheep predators is through the USDA, Animal and Plant Health Inspection Service (APHIS), Animal Damage Control (ADC) Program. The primary statutory authority for the ADC program is the Animal Damage Control Act of March 2, 1931, as amended (7 U.S.C. 426-426c). The mission of the ADC program is "to provide leadership in wildlife damage control to protect America's agricultural, industrial, and natural resources and to safeguard public health and safety."[94] This mission is accomplished through cooperative wildlife damage management programs; collection, evaluation, and dissemination of information; training of wildlife managers; and the provision of data and sources for limited-use pesticides. The ADC operates research facilities and manufactures and sells specialized wildlife damage control materials not readily available from commercial sources. ADC is also responsible for nonagricultural matters, for example control of wildlife hazards to aircraft. A number of ADC programs are conducted in this area. ADC was transferred from the U.S. Department of Interior, Fish and Wildlife Service to the USDA, APHIS, in 1986.

ADC program services are provided after specific requests and are delivered through a collection of cooperative programs with other Federal, State, and local agencies and private entities. Services vary widely from state to state. ADC efforts are largely directed toward cost-shared activities. ADC program service is delivered to the public by two basic means: technical assistance and direct control. Direct control is typically provided when funding is available and technical assistance alone is inadequate. In April 1994, the ADC published the *Animal Damage Control Program Final Environmental Impact Statement* that, among other things, established the guidelines that are to direct the basic activities of the ADC program.

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[90] Jw Nuckolls' testimony, representing the ASI, before the U.S. House of Representatives, Government Operations Subcommittee on Information, Justice, Transportation and Agriculture, Apr. 22, 1994.

[91] USDA, NASS, *Sheep and Goat Predator Loss*, Apr. 27, 1995.

[92] Bryce Reece, executive director, Wyoming Wool Growers Association, interview by USITC staff, Oct. 12, 1994.

[93] The following description of the ADC was taken largely from USDA, APHIS, *Animal Damage Control Program Final Environmental Impact Statement*, vol. 2, Apr. 1994.

[94] *Animal Damage Control Program Final Environmental Impact Statement*, vol. 2, Apr. 1994, p. 7.

The ADC program employs or recommends a number of techniques to control predators. Wildlife capturing or killing techniques recommended or used for direct control by the ADC program include: leghold traps; cage traps; snares; quick-kill traps; denning; shooting; and the use of chemical toxicants. ADC program technical advice to livestock producers may include advice on management practices, such as the management of guard animals or suggestions for raising alternative livestock species. The ADC program may recommend habitat management, such as elimination of wildlife feeding stations, or may provide technical advice on the physical exclusion of predators, such as fencing.

The ADC is negotiating Memoranda of Understanding with the USDA Forest Service (FS) and the Bureau of Land Management (BLM) whereby the ADC will be the lead agency for predator control on lands administered by the FS and BLM.[95] The budget for the ADC program for 1993, the most recent year for which data are available, was US$36.3 million. Expenditures for livestock were reported to be US$20 million.[96] Data on the share of the ADC budget directly applicable to the sheep and lamb sector are not available.

**Compound 1080**

Many growers contend that government restrictions effectively prohibit the use of a popular chemical toxicant, Compound 1080, to control predators.

Compound 1080 (sodium fluoroacetate), referred to in the industry as "ten-eighty," was used by the ADC program in baiting to control livestock predators before 1972. Compound 1080 was previously used as a rodenticide, but, because it had significant nontarget effects from primary and secondary toxicity, authority for the use was cancelled by the EPA.

Executive Order 11643, February 8, 1972,[97] banned the use of toxicants for predator control by Federal agencies or for use on Federal lands. Subsequent to Executive Order 11643, the EPA cancelled the registration of Compound 1080, as well as a number of other chemicals.[98] In 1986, the EPA again registered Compound 1080, although it must also be approved for use by State officials in any State where it is to be used.[99]

As of July 1995, Compound 1080 is used for coyote control only in the livestock protection collar (LPC). The LPC, attached to the neck of a sheep or goat, dispenses the toxicant when the LPC is punctured by an attacking coyote. The LPC was designed specifically for coyotes, which attack the throat of a sheep or goat; however, domestic dogs and bobcats have attacked collared sheep and goats and succumbed to the toxicant. LPCs were used by the APHIS, ADC program in Texas between FY 1988 and FY 1991 and have been used independently by growers.

### *Infrastructure*

Many domestic interests, citing declining market outlets and shortages of specialized labor, have expressed concern about a general decline in the

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[95] ADC official, telephone conversation with USITC staff, Washington, DC, Mar. 7, 1995.

[96] Ibid.

[97] 3 CFR, 1971-75 Comp., p. 664.

[98] APHIS, *Animal Damage Control Program Final Environmental Impact Statement*, Apr. 1994, ch. 1, p. 11.

[99] Bobby Acord, deputy director, APHIS, ADC, telephone conversation with USITC staff, Mar. 6, 1995.

infrastructure available to live lamb and sheep growers.[100] For example, a relatively few large-volume slaughter plants tend to be located in different regions of the country, limiting growers' opportunity to market their lambs. In addition, as the number of producers and sheep flock declined, producers report a corresponding decline in infrastructure, such as, the number of shepherds and shearers, specialized trucks used to haul lambs to feed lots, and veterinarians that specialize in the care of sheep.

Some domestic interests contend that the relative small size of the U.S. live lamb and sheep sector in relation to that of the U.S. cattle or swine sectors puts U.S. growers at a disadvantage. They argue that companies that produce livestock machinery and equipment are less inclined to target research or investments toward the live lamb and sheep sector because the potential market is relatively small. They frequently cite the large investment in time and money required of pharmaceutical companies as a deterrent to research and development of medicines for the sheep sector. Some observers note the small size of the U.S. lamb industry as a comparative disadvantage to the lamb industry in Australia and New Zealand.

### *Grazing Sheep and Lambs on Federal Lands*

The USDA, FS and the U.S. Department of Interior, BLM, administer programs that allow livestock grazing on approximately 307 out of 329 million acres of public rangelands.[101] Only 10 percent of total forage consumption by domestic livestock is provided by public rangelands.[102] An estimated 25 percent of the U.S. sheep population spends a portion of the year on Federal lands, and depends on it for forage.[103] Sheep are reported to be more efficient than cattle for using winter grazing on public lands because they can generally thrive on available vegetation, whereas cattle must be supplied with supplemental hay.[104] The requirement for supplemental hay equates to US$200 per cow/calf unit, assuming the cost of hay at US$75 per ton.[105]

Forest plans provide management direction and resource objectives for National Forest System rangelands. Since forest plans are generally long and complex documents, livestock grazing permittees often find it difficult to understand how the forest plan applies to their grazing permits and livestock grazing practices. It is also difficult for the Forest Service to achieve forest plan objectives if forest plan direction is not clearly tied to the grazing permit. To eliminate uncertainty and to ensure that forest plan direction is clearly linked to terms and conditions of a grazing permit, the Forest Service is considering amending the grazing regulations to specifically require that forest plan management direction and resource objectives applicable to livestock grazing be added to the terms and conditions of the livestock grazing permit.

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[100] Sheep and lamb growers, Cheyenne, Wyoming, interview by USITC staff, Oct. 1994.

[101] Public Land Council, *The Western Rancher, A Tradition of Economic and Environmental Success*, 1991.

[102] USDA, Forest Service, *RPA Assessment of the Forest and Rangeland Situation in the United States-1993 Update*, Forest Resource Report No. 27, p. 11.

[103] Peter Orwick, director of Government Affairs and National Resources, ASI, transcript of the hearing, p. 31.

[104] Hudson Glimp, Department of Veterinary Medicine, Fleischman Agriculture University of Nevada, Reno, NV, telephone conversation with USITC staff, June 19, 1995.

[105] Ibid.

In order for ranchers to use public lands for grazing livestock, they are required to obtain a permit from the FS, BLM, or both. Since western FS- and BLM-controlled and privately-owned lands are often intermingled or adjacent, many livestock operators hold permits from both agencies. Under terms of the Granger-Thye Act of 1950, permits are issued to livestock operators for a period not to exceed 10 years.[106] The Federal Land Policy and Management Act of 1976 authorizes the FS and BLM to issue permits, in the interest of sound land management practices, with a term shorter than 10 years. However, neither agency has fully exercised the option of issuing grazing permits shorter than a 10-year maturity. The FS is reviewing a proposed rule that would base tenure permits on a permittee's record of compliance.[107] A permit renewal would be issued for a full 10-year period if the permittee has been in compliance with the terms and conditions of the previous grazing permit. If a permittee has been found to be in poor compliance, the permit may not be reissued.

Grazing fees have always been a contentious issue.[108] On one hand, livestock producers argue that the fees reflect fair market value because public lands are significantly less productive than private rangelands and require additional operating costs. On the other hand, conservation groups assert that the fees charged accurately reflect the deteriorating conditions of the rangeland. The conservation groups also contend that the fees do not cover the costs of management by the FS and BLM and, therefore, benefit the livestock producer. These groups finally contend that higher fees could optimize the potential of the rangeland.[109] Current Federal management policies are a reflection of earlier policies that used Federal Government resources to encourage settlement of the West.[110]

Grazing sheep on Federal lands in the United States amounted to 2.7 million animal unit months (AUM)[111] in 1994.[112] The fees paid for grazing on Federal land by AUM as reported by the FS for 1990-94 follows:

| Year | Fee |
|---|---|
| 1990 | $1.81/AUM |
| 1991 | 1.97/AUM |
| 1992 | 1.92/AUM |
| 1993 | 1.86/AUM |
| 1994 | 1.98/AUM |

The January 1, 1994, appraised market value of grazing mature sheep on public rangelands in the United States ranged from $3.51 to $11.08 per head per month. The level of authorized nonuse of FS and BLM lands for grazing was about 18 percent. Permittees are allowed to let land authorized for grazing go unused up to 3 years. In some instances, permittees may be allowed to extend the 3-year period of nonuse. There are some views that the reason that the nonuse rate is high is that the FS and BLM grazing fees are not perceived

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[106] Granger-Thye Act of 1950 (16 U.S.C. 5801).

[107] *Range Management; Grazing and Livestock Use and Grazing Fees*, 58 F.R. 43202.

[108] *Grazing Fees: A Fact Sheet*. Congressional Research Service (CRS) Report for Congress, Mar. 22, 1991, 91-265 ERN, p. 1.

[109] Ibid, p. 1.

[110] *Economic Report of the President*, Feb. 1994, p. 183.

[111] An AUM is the forage required to sustain one animal unit (five mature sheep or equivalent) for 1 month.

[112] Officials of the USDA FS, telephone conversation with USITC staff, June 21, 1995.

as economical advantageous. In a paper written by Pepperdine University, the authors contend that the reason for the level of nonuse among the available supply of AUM capacity is in effect that these potential AUMs have been *rationed out of use* (emphasis included) by high grazing fees on the public lands.[113] However, the authors point out that the grazing lands may very well be marginal and inaccessible BLM lands.[114] In 1992, the latest year for which data are available, Federal receipts from grazing fees totaled $11.5 million.[115]

### *Labor*[116]

Industry sources assert that the Immigration Reform and Control Act of 1986 (Public Law 99-603, 100 Stat. 3359, Nov. 6, 1986) has resulted in a shortage of qualified shepherds in the United States. That Act, among other things, permits the entry of seasonal agricultural workers only if qualified U.S. citizens and permanent-resident aliens are not available. Regulations issued by the Secretary of Labor concerning the labor certification process for temporary agricultural employment, commonly referred to as the H-2A program, authorize special procedures in the case of rangeland workers in view of the year-round nature of livestock management in the rangelands (see 20 CFR 655.93(b)). The workers under the rangeland provision come mostly from Mexico, Peru, Chile, Spain, France, and Mongolia. Industry sources report that the total cost of employees under the H2-A visa program averages about US$1,500 to US$1,800 per month.[117]

Under the mechanics of the program, the employer may notify the U.S. Department of Labor (DOL) of the need for the agricultural worker 60 days before the need. The employer must advertise for the position for 40 days and, if no suitable employee is found, the DOL will certify to allow a foreign employee during the next 20 days. In general, growers are required to advertise positions in newspapers and on the radio, while the DOL, the U.S. Immigration and Naturalization Service (INS), and state employment agencies search for qualified U.S. citizens and permanent resident aliens.

Regulations also require that workers under the H-2A visa program receive the same benefits that a domestic laborer would receive.[118] The employer must demonstrate that suitable housing is available for the foreign worker and that the worker is covered by the Workmans' Compensation program. The visa must be obtained for the worker from the INS.

The great bulk of workers under the rangeland provision are reported to be shepherds. In recent years there have been approximately 1,100 applications per year under the rangeland provision. The number of jobs is more than the number of applications because the application may be for more than one worker, although the application is frequently for only one worker. Virtually all of the applications are in the Western Rangeland States. An

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[113] Gerhard N. Postvold and Thomas J. Dudley, *New Perspectives on Grazing Fees and Public Land Management in the 1990's*, June 1992, p. 13.

[114] Ibid.

[115] USDA, National Agricultural Statistical Service, *Agricultural Statistics*, 1993, p. 448.

[116] The following description of the Act was developed from a USITC staff telephone conversation with an official of the U.S. Department of Labor, on March 6, 1995, in Washington, DC, except where noted.

[117] *Going Into Labor, National Lamb and Wool Grower*, vol. 84, No. 4 (May 1994), pp. 12-13.

[118] 20 CFR 655.107(a).

example of the number of applications and jobs (for 1991) is shown in the following tabulation:

| | Number of applications | Number of jobs |
|---|---|---|
| California | 360 | 457 |
| Idaho | 200 | 264 |
| Wyoming | 100 | 230 |
| Colorado | 100 | 164 |

### *Price Concerns*

Some domestic growers have also expressed concern about the farm-retail price spread for live lambs and lamb meat. The farm-retail price spread is the difference between the price growers receive for the lambs they sell and the retail price of lamb meat. According to one industry source, the farm-retail price spread between live lambs and lamb meat is more than the spread between live cattle and beef and between live poultry and poultry meat partly because the U.S. lamb meat processing and distribution sector is less efficient than other sectors.[119]

The domestic industry expressed concern about an unusual development that occurred during the 1994 Easter/Passover lamb marketing season. The USDA described the situation in the following terms: "... This year's slaughter lamb prices have been a disappointment for producers hoping for a repeat of last year's record highs. Supply fundamentals were not significantly different within the lamb complex between years, yet prices this year were sharply lower through the Easter/Passover holidays. A potential cross-over effect from larger beef supplies and lower prices this year may have kept lamb prices under pressure. Other causes of the price weakness include a series of storms in January and February that disrupted East Coast distribution and kept consumers away from restaurants. An earthquake in southern California in January probably had a similar impact on away-from-home consumption. However, none of these factors adequately explains the wide difference in prices."[120] In 1995, prices returned to more usual trends.

### Imports

During 1990-94, annual U.S. imports of fresh, chilled, or frozen lamb meat increased from 25 million pounds, valued at US$31 million, to 39 million pounds, valued at US$49 million (tables 2-12 and 2-13 and figure 2-5). Australia and New Zealand supplied virtually all U.S. lamb meat imports over this period.

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[119] Glimp, Department of Veterinary Medicine, Fleischman Agriculture University of Nevada, Reno, NV, telephone conversation with USITC staff, June 19, 1995.

[120] USDA, ERS, *Cattle and Sheep Outlook* (LDP-CS-2), May 11, 1994.

Table 2-12
Lamb meat, fresh, chilled, or frozen: U.S. imports for consumption from Australia, New Zealand, and from all other sources, by months, Jan. 1990-Dec. 1994

| Country | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *(1,000 pounds, carcass weight equivalent)* | | | | | | | | | | | | |
| 1990: | | | | | | | | | | | | | |
| Australia | 1,367 | 1,021 | 1,409 | 1,157 | 641 | 897 | 612 | 630 | 1,003 | 1,226 | 1,646 | 1,807 | 13,415 |
| New Zealand | 930 | 1,135 | 1,014 | 898 | 840 | 1,432 | 961 | 766 | 1,043 | 1,071 | 653 | 765 | 11,508 |
| All other sources | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 5 |
| Total | 2,296 | 2,156 | 2,423 | 2,055 | 1,481 | 2,329 | 1,573 | 1,396 | 2,046 | 2,300 | 2,300 | 2,572 | 24,928 |
| 1991: | | | | | | | | | | | | | |
| Australia | 1,630 | 1,138 | 1,385 | 1,218 | 943 | 1,244 | 779 | 1,318 | 971 | 1,198 | 1,420 | 1,479 | 14,723 |
| New Zealand | 862 | 902 | 1,093 | 1,267 | 742 | 897 | 817 | 793 | 666 | 1,198 | 981 | 942 | 11,161 |
| All other sources | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 138 |
| Total | 2,492 | 2,040 | 2,478 | 2,585 | 1,685 | 2,142 | 1,596 | 2,111 | 1,637 | 2,396 | 2,401 | 2,459 | 26,022 |
| 1992: | | | | | | | | | | | | | |
| Australia | 1,042 | 837 | 1,764 | 1,765 | 1,205 | 1,393 | 1,313 | 1,369 | 1,049 | 820 | 1,129 | 1,276 | 14,960 |
| New Zealand | 662 | 737 | 1,109 | 1,350 | 1,072 | 1,376 | 1,017 | 1,143 | 1,040 | 746 | 1,054 | 1,221 | 12,526 |
| All other sources | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| Total | 1,704 | 1,573 | 2,872 | 3,115 | 2,276 | 2,769 | 2,330 | 2,512 | 2,089 | 1,566 | 2,183 | 2,498 | 27,488 |
| 1993: | | | | | | | | | | | | | |
| Australia | 1,720 | 1,535 | 1,969 | 1,713 | 1,642 | 2,754 | 2,239 | 2,315 | 2,218 | 1,650 | 1,698 | 2,178 | 23,632 |
| New Zealand | 895 | 760 | 1,954 | 2,029 | 1,731 | 1,819 | 1,617 | 1,209 | 1,381 | 1,554 | 1,252 | 1,138 | 17,339 |
| All other sources | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 7 |
| Total | 2,614 | 2,295 | 3,923 | 3,745 | 3,373 | 4,572 | 3,857 | 3,525 | 3,599 | 3,205 | 2,952 | 3,316 | 40,978 |
| 1994: | | | | | | | | | | | | | |
| Australia | 2,322 | 1,757 | 2,053 | 1,997 | 2,047 | 2,214 | 1,806 | 1,976 | 1,332 | 1,567 | 2,191 | 1,499 | 22,762 |
| New Zealand | 848 | 739 | 1,306 | 1,496 | 1,175 | 1,718 | 1,268 | 1,180 | 1,211 | 1,868 | 1,790 | 1,311 | 15,911 |
| All other sources | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 10 |
| Total | 3,170 | 2,498 | 3,359 | 3,492 | 3,224 | 3,932 | 3,075 | 3,156 | 2,543 | 3,441 | 3,982 | 2,810 | 38,683 |

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-13
Lamb meat, fresh, chilled, or frozen: U.S. imports for consumption from Australia, New Zealand, and from all other sources, by months, Jan. 1990-Dec. 1994

| Country | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1,000 dollars) | | | | | | | | | | | | |
| 1990: | | | | | | | | | | | | | |
| Australia | 1,431 | 1,102 | 1,699 | 1,160 | 854 | 1,044 | 732 | 779 | 1,041 | 1,168 | 1,328 | 1,615 | 13,953 |
| New Zealand | 1,366 | 1,566 | 1,592 | 1,412 | 1,441 | 1,863 | 1,453 | 1,103 | 1,486 | 1,796 | 1,110 | 1,147 | 17,335 |
| All other sources | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 3 | 2 | 15 |
| Total | 2,797 | 2,668 | 3,291 | 2,572 | 2,295 | 2,907 | 2,185 | 1,882 | 2,527 | 2,974 | 2,441 | 2,764 | 31,303 |
| 1991: | | | | | | | | | | | | | |
| Australia | 1,445 | 1,229 | 1,498 | 1,291 | 1,070 | 1,230 | 724 | 1,112 | 867 | 1,162 | 1,185 | 1,361 | 14,174 |
| New Zealand | 1,293 | 1,310 | 1,189 | 1,882 | 1,245 | 1,164 | 1,123 | 947 | 916 | 1,733 | 1,795 | 1,381 | 15,978 |
| All other sources | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 103 |
| Total | 2,738 | 2,539 | 2,687 | 3,215 | 2,315 | 2,394 | 1,847 | 2,059 | 1,783 | 2,895 | 2,980 | 2,803 | 30,255 |
| 1992: | | | | | | | | | | | | | |
| Australia | 1,021 | 768 | 1,617 | 1,792 | 1,057 | 1,494 | 1,312 | 1,492 | 1,078 | 1,040 | 1,302 | 1,654 | 15,627 |
| New Zealand | 960 | 943 | 1,359 | 1,975 | 1,688 | 1,874 | 1,466 | 1,334 | 1,552 | 1,053 | 1,476 | 1,805 | 17,485 |
| All other sources | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| Total | 1,981 | 1,711 | 2,976 | 3,767 | 2,745 | 3,368 | 2,778 | 2,827 | 2,630 | 2,093 | 2,778 | 3,460 | 33,115 |
| 1993: | | | | | | | | | | | | | |
| Australia | 1,923 | 1,968 | 2,433 | 1,934 | 1,935 | 3,052 | 2,166 | 2,128 | 2,181 | 1,844 | 1,836 | 2,368 | 25,768 |
| New Zealand | 1,300 | 1,131 | 2,804 | 2,869 | 2,590 | 2,815 | 2,333 | 1,822 | 1,724 | 3,245 | 2,150 | 1,846 | 26,629 |
| All other sources | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 7 | 0 | 13 |
| Total | 3,223 | 3,099 | 5,237 | 4,806 | 4,525 | 5,867 | 4,501 | 3,950 | 3,905 | 5,090 | 3,993 | 4,214 | 52,410 |
| 1994: | | | | | | | | | | | | | |
| Australia | 2,291 | 2,120 | 2,403 | 2,275 | 2,206 | 2,394 | 1,805 | 2,274 | 1,916 | 2,206 | 2,584 | 2,016 | 26,490 |
| New Zealand | 1,214 | 1,111 | 1,941 | 1,885 | 1,568 | 2,336 | 1,507 | 1,726 | 1,540 | 2,455 | 3,048 | 1,902 | 22,233 |
| All other sources | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 17 |
| Total | 3,505 | 3,236 | 4,344 | 4,160 | 3,779 | 4,730 | 3,312 | 4,000 | 3,456 | 4,668 | 5,632 | 3,918 | 48,740 |

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

FIGURE 2-5
Lamb meat, fresh, chilled, or frozen: U.S. imports from Australia and New Zealand, 1990-94

During 1990-94, monthly imports ranged from a low of 1.4 million pounds, valued at US$1.9 million during August 1990, to a high of 4.6 million pounds, valued at US$5.9 million in June 1993. The share of imports to consumption has trended upward, as shown in figure 2-6. Lamb meat imports are typically more just before holidays, such as Easter. The majority of U.S. imports are frozen lamb meat, as shown in table 2-14.

### Imports From Australia

U.S. imports of fresh, chilled, or frozen lamb meat from Australia increased from 13 million pounds in 1990, valued at nearly US$14 million, to 23 million pounds, valued at US$26.5 million in 1994 (tables 2-12 and 2-13). In 1994, Australia supplied 59 percent (by quantity) of total U.S. lamb meat imports. U.S. imports from Australia by HTS subheading are shown in table 2-15. Frozen bone-in cuts accounted for 56 percent (12.7 million pounds) of the subject imports during 1994, up considerably from 44 percent (5.9 million pounds) in 1990. Fresh or chilled bone-in cuts accounted for an additional 20 percent (4.5 million pounds) in 1994. Of the remainder, 14 percent (3.3 million pounds) consisted of frozen boneless lamb; 4 percent (0.9 million pounds), of fresh or chilled boneless lamb; 4 percent (0.9 million pounds), of frozen carcasses and half-carcasses; and 2 percent (0.5 million pounds), of fresh or chilled carcasses and half-carcasses.

Fresh lamb meat from Australia is flown to the United States in shipments of 50,000 to 60,000 pounds. The fresh lamb is typically available to the consumer within 3 to 4 days after the lamb is slaughtered in Australia. Frozen lamb meat is transported to the United States on refrigerated ships and is typically available to the retail consumer between 6 weeks to 4 months after the animal is slaughtered in Australia. Freight costs from Australia to the United States amounted to US$0.85/lb for air freight and US$0.17/lb for sea freight.[121] The shares of fresh, chilled, or frozen lamb imported from Australia during 1990-94 are shown in table 2-14.

### Imports From New Zealand

U.S. imports of fresh, chilled, or frozen lamb meat from New Zealand increased from 12 million pounds, valued at US$17 million, in 1990 to 16 million pounds, valued at US$22 million in 1994. New Zealand supplied 41 percent of total U.S. lamb meat imports in 1994. Table 2-16 shows that frozen bone-in cuts accounted for 72 percent (11.4 million pounds) of U.S. imports of lamb meat from New Zealand during 1994, up from 65 percent (7.5 million pounds) in 1990. Frozen boneless lamb accounted for 14 percent (2.3 million pounds), and fresh or chilled bone-in cuts accounted for an additional 9 percent (1.5 million pounds) in 1994. Of the remainder, 3 percent (0.5 million pounds) consisted of frozen carcasses and half-carcasses, and 2 percent (0.3 million pounds) consisted of fresh or chilled

[121] Weinstein, president, FoodComm Intl., transcript of the hearing, p. 101.

FIGURE 2-6
Lamb meat, fresh, chilled, or frozen: U.S. imports and imports as a share of consumption, by months, 1990-94

Table 2-14
Lamb meat, fresh, chilled or frozen: U.S. imports from Australia, New Zealand, and total, by types, by quantity, 1990-94

*(Percent)*

| Type | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Australia | | | | | |
| Fresh or chilled | 43 | 26 | 30 | 25 | 26 |
| Frozen | 57 | 74 | 70 | 75 | 74 |
| New Zealand | | | | | |
| Fresh or chilled | 17 | 11 | 16 | 15 | 11 |
| Frozen | 83 | 89 | 84 | 85 | 89 |
| Total | | | | | |
| Fresh or chilled | 31 | 20 | 24 | 21 | 20 |
| Frozen | 69 | 80 | 76 | 79 | 80 |

Source: Derived from official statistics of the U.S. Department of Commerce.

Table 2-15
Lamb meat, fresh, chilled, or frozen: U.S. imports from Australia, by HTS subheading, by months, Jan. 1990-Dec. 1994

| Item | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *(1,000 pounds, carcass weight equivalent)* | | | | | | | | | | | | |
| 1990: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] | 61 | 40 | 55 | 71 | 58 | 52 | 29 | 66 | 36 | 52 | 29 | 39 | 587 |
| Bone-in cuts, fresh or chilled[2] | 466 | 400 | 609 | 467 | 343 | 313 | 142 | 250 | 312 | 227 | 397 | 511 | 4,436 |
| Boneless, fresh or chilled[3] | 25 | 36 | 148 | 97 | 76 | 52 | 32 | 56 | 61 | 47 | 59 | 101 | 792 |
| Carcasses and half carcasses, frozen[4] | 17 | 0 | 17 | 0 | 17 | 0 | 0 | 16 | 16 | 130 | 142 | 59 | 414 |
| Bone-in cuts, frozen[5] | 676 | 424 | 546 | 415 | 128 | 455 | 353 | 157 | 437 | 630 | 819 | 881 | 5,922 |
| Boneless, frozen[6] | 123 | 120 | 32 | 106 | 20 | 25 | 57 | 84 | 142 | 141 | 199 | 214 | 1,263 |
| Total | 1,367 | 1,021 | 1,409 | 1,157 | 641 | 897 | 612 | 630 | 1,003 | 1,226 | 1,646 | 1,807 | 13,415 |
| 1991: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] | 31 | 27 | 50 | 45 | 39 | 29 | 43 | 32 | 22 | 39 | 34 | 40 | 430 |
| Bone-in cuts, fresh or chilled[2] | 210 | 252 | 558 | 238 | 162 | 187 | 132 | 256 | 223 | 287 | 196 | 236 | 2,937 |
| Boneless, fresh or chilled[3] | 42 | 48 | 72 | 26 | 34 | 37 | 26 | 43 | 32 | 39 | 33 | 60 | 492 |
| Carcasses and half carcasses, frozen[4] | 110 | 66 | 16 | 0 | 0 | 0 | 0 | 16 | 17 | 8 | 0 | 17 | 249 |
| Bone-in cuts, frozen[5] | 905 | 530 | 460 | 668 | 398 | 552 | 423 | 775 | 574 | 688 | 937 | 869 | 7,777 |
| Boneless, frozen[6] | 334 | 215 | 229 | 241 | 311 | 440 | 155 | 196 | 104 | 137 | 220 | 256 | 2,837 |
| Total | 1,630 | 1,138 | 1,385 | 1,218 | 943 | 1,244 | 779 | 1,318 | 971 | 1,198 | 1,420 | 1,479 | 14,723 |
| 1992: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] | 37 | 55 | 46 | 52 | 37 | 40 | 31 | 31 | 36 | 33 | 36 | 54 | 487 |
| Bone-in cuts, fresh or chilled[2] | 228 | 156 | 360 | 324 | 146 | 326 | 266 | 371 | 258 | 273 | 387 | 270 | 3,368 |
| Boneless, fresh or chilled[3] | 46 | 42 | 63 | 51 | 36 | 51 | 25 | 111 | 78 | 54 | 53 | 62 | 671 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carcasses and half carcasses, frozen[4] | 18 | 32 | 19 | 18 | 0 | 0 | 0 | 0 | 17 | 69 | 19 | 54 | 246 |
| Bone-in cuts, frozen[5] | 527 | 330 | 894 | 1,041 | 568 | 646 | 724 | 676 | 526 | 249 | 428 | 644 | 7,254 |
| Boneless, frozen[6] | 185 | 221 | 381 | 279 | 418 | 330 | 267 | 179 | 134 | 142 | 206 | 192 | 2,934 |
| Total | 1,042 | 837 | 1,764 | 1,765 | 1,205 | 1,393 | 1,313 | 1,369 | 1,049 | 820 | 1,129 | 1,276 | 14,960 |

See footnotes at end of table.

Table 2-15--Continued

Lamb meat, fresh, chilled, or frozen: U.S. imports from Australia, by HTS subheading, by months, Jan. 1990-Dec. 1994

| Item | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *(1,000 pounds, carcass weight equivalent)* | | | | | | | | | | | | |
| 1993: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] | 42 | 44 | 65 | 40 | 102 | 44 | 35 | 44 | 26 | 34 | 37 | 47 | 559 |
| Bone-in cuts, fresh or chilled[2] | 369 | 437 | 410 | 336 | 344 | 395 | 324 | 269 | 464 | 536 | 300 | 434 | 4,619 |
| Boneless, fresh or chilled[3] | 39 | 35 | 79 | 66 | 65 | 71 | 40 | 29 | 58 | 70 | 59 | 63 | 674 |
| Carcasses and half carcasses, frozen[4] | 0 | 0 | 0 | 8 | 0 | 378 | 424 | 602 | 736 | 418 | 228 | 161 | 2,955 |
| Bone-in cuts, frozen[5] | 902 | 709 | 1,219 | 869 | 900 | 1,449 | 994 | 1,196 | 705 | 482 | 859 | 1,103 | 11,387 |
| Boneless, frozen[6] | 368 | 310 | 195 | 394 | 232 | 417 | 423 | 175 | 229 | 110 | 215 | 371 | 3,437 |
| Total | 1,720 | 1,535 | 1,969 | 1,713 | 1,642 | 2,754 | 2,239 | 2,315 | 2,218 | 1,650 | 1,698 | 2,178 | 23,632 |
| 1994: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] | 34 | 54 | 59 | 38 | 34 | 36 | 35 | 41 | 26 | 26 | 41 | 36 | 460 |
| Bone-in cuts, fresh or chilled[2] | 252 | 346 | 588 | 283 | 292 | 285 | 342 | 552 | 477 | 255 | 473 | 372 | 4,516 |
| Boneless, fresh or chilled[3] | 55 | 54 | 123 | 55 | 59 | 59 | 74 | 80 | 89 | 73 | 97 | 113 | 929 |
| Carcasses and half carcasses, frozen[4] | 0 | 0 | 3 | 39 | 162 | 166 | 320 | 163 | 0 | 0 | 4 | 0 | 858 |
| Bone-in cuts, frozen[5] | 1,527 | 1,156 | 978 | 1,191 | 1,262 | 1,237 | 812 | 920 | 583 | 915 | 1,290 | 866 | 12,738 |
| Boneless, frozen[6] | 456 | 148 | 302 | 390 | 237 | 431 | 224 | 219 | 157 | 299 | 285 | 112 | 3,261 |
| Total | 2,322 | 1,757 | 2,053 | 1,997 | 2,047 | 2,214 | 1,806 | 1,976 | 1,332 | 1,567 | 2,191 | 1,499 | 22,762 |

[1] HTS subheading 0204.10.00.

[2] HTS subheading 0204.22.20.
[3] HTS subheading 0204.23.20.
[4] HTS subheading 0204.30.00.
[5] HTS subheading 0204.42.20.
[6] HTS subheading 0204.43.20.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-16
Lamb meat, fresh, chilled, or frozen: U.S. imports from New Zealand, by HTS subheading, by months, Jan. 1990-Dec. 1994

| Item | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *(1,000 pounds, carcass weight equivalent)* | | | | | | | | | | | | |
| 1990: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] | 0 | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 28 | 0 | 0 | 0 | 63 |
| Bone-in cuts, fresh or chilled[2] | 100 | 126 | 173 | 70 | 69 | 110 | 137 | 97 | 217 | 97 | 99 | 160 | 1,456 |
| Boneless, fresh or chilled[3] | 43 | 47 | 75 | 30 | 33 | 57 | 36 | 37 | 0 | 25 | 27 | 41 | 453 |
| Carcasses and half carcasses, frozen[4] | 0 | 21 | 32 | 0 | 6 | 38 | 29 | 38 | 8 | 7 | 4 | 33 | 215 |
| Bone-in cuts, frozen[5] | 603 | 657 | 678 | 617 | 518 | 988 | 516 | 482 | 588 | 895 | 439 | 498 | 7,478 |
| Boneless, frozen[6] | 184 | 285 | 56 | 180 | 214 | 223 | 224 | 112 | 202 | 47 | 84 | 32 | 1,843 |
| Total | 930 | 1,135 | 1,014 | 898 | 840 | 1,432 | 961 | 766 | 1,043 | 1,071 | 653 | 765 | 11,508 |
| 1991: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bone-in cuts, fresh or chilled[2] | 66 | 91 | 121 | 65 | 63 | 55 | 44 | 53 | 67 | 119 | 63 | 86 | 893 |
| Boneless, fresh or chilled[3] | 63 | 42 | 10 | 14 | 14 | 45 | 12 | 15 | 29 | 17 | 12 | 29 | 302 |
| Carcasses and half carcasses, frozen[4] | 33 | 95 | 21 | 8 | 0 | 0 | 0 | 0 | 0 | 15 | 7 | 20 | 200 |
| Bone-in cuts, frozen[5] | 376 | 573 | 482 | 992 | 533 | 600 | 498 | 453 | 499 | 767 | 711 | 682 | 7,166 |
| Boneless, frozen[6] | 324 | 100 | 459 | 188 | 132 | 197 | 263 | 272 | 72 | 279 | 188 | 125 | 2,600 |
| Total | 862 | 902 | 1,093 | 1,267 | 742 | 897 | 817 | 793 | 666 | 1,198 | 981 | 942 | 11,161 |
| 1992: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] | 0 | 0 | 0 | 14 | 8 | 15 | 7 | 5 | 17 | 2 | 3 | 5 | 77 |
| Bone-in cuts, fresh or chilled[2] | 49 | 76 | 140 | 151 | 80 | 143 | 115 | 161 | 139 | 90 | 128 | 175 | 1,448 |
| Boneless, fresh or chilled[3] | 4 | 15 | 110 | 59 | 16 | 18 | 45 | 14 | 14 | 22 | 31 | 74 | 422 |
| Carcasses and half carcasses, frozen[4] | 16 | 0 | 20 | 45 | 22 | 32 | 26 | 31 | 42 | 39 | 0 | 39 | 310 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bone-in cuts, frozen[5] . . . | 407 | 407 | 540 | 799 | 866 | 709 | 607 | 693 | 635 | 483 | 625 | 671 | 7,442 |
| Boneless, frozen[6] . . . . . | 186 | 239 | 299 | 282 | 79 | 459 | 216 | 239 | 194 | 110 | 267 | 257 | 2,826 |
| Total . . . . . | 662 | 737 | 1,109 | 1,350 | 1,072 | 1,376 | 1,017 | 1,143 | 1,040 | 746 | 1,054 | 1,221 | 12,526 |

See footnotes at end of table.

Table 2-16--Continued
Lamb meat, fresh, chilled, or frozen: U.S. imports from New Zealand, by HTS subheading, by months, Jan. 1990-Dec. 1994

| Item | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *(1,000 pounds, carcass weight equivalent)* | | | | | | | | | | | | |
| 1993: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] . . . . . | 5 | 14 | 29 | 2 | 6 | 4 | 6 | 2 | 2 | 0 | 0 | 0 | 70 |
| Bone-in cuts, fresh or chilled[2] . . . . . | 114 | 181 | 226 | 100 | 151 | 137 | 157 | 128 | 111 | 164 | 165 | 134 | 1,767 |
| Boneless, fresh or chilled[3] . . . . . | 48 | 95 | 135 | 32 | 56 | 46 | 52 | 43 | 31 | 65 | 85 | 95 | 784 |
| Carcasses and half carcasses, frozen[4] . . . . | 21 | 8 | 104 | 60 | 59 | 103 | 97 | 22 | 16 | 15 | 21 | 0 | 525 |
| Bone-in cuts, frozen[5] . . . | 406 | 353 | 1,098 | 1,281 | 1,172 | 1,172 | 1,010 | 822 | 864 | 1,182 | 874 | 653 | 10,887 |
| Boneless, frozen[6] . . . . . | 301 | 110 | 362 | 554 | 287 | 357 | 295 | 193 | 356 | 128 | 108 | 256 | 3,306 |
| Total . . . . . | 895 | 760 | 1,954 | 2,029 | 1,731 | 1,819 | 1,617 | 1,209 | 1,381 | 1,554 | 1,252 | 1,138 | 17,339 |
| 1994: | | | | | | | | | | | | | |
| Carcass and half carcasses, fresh or chilled[1] . . . . . | 3 | 8 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| Bone-in cuts, fresh or chilled[2] . . . . . | 94 | 73 | 139 | 77 | 97 | 75 | 127 | 70 | 101 | 140 | 221 | 238 | 1,453 |
| Boneless, fresh or chilled[3] . . . . . | 15 | 11 | 39 | 15 | 14 | 17 | 13 | 16 | 18 | 30 | 61 | 24 | 273 |
| Carcasses and half carcasses, frozen[4] . . . . | 26 | 24 | 0 | 54 | 83 | 4 | 0 | 56 | 41 | 89 | 33 | 41 | 452 |
| Bone-in cuts, frozen[5] . . . | 628 | 505 | 739 | 875 | 790 | 1,489 | 893 | 996 | 945 | 1,556 | 1,327 | 700 | 11,441 |
| Boneless, frozen[6] . . . . . | 81 | 117 | 381 | 475 | 191 | 133 | 235 | 42 | 106 | 53 | 149 | 308 | 2,272 |
| Total . . . . . | 848 | 739 | 1,306 | 1,496 | 1,175 | 1,718 | 1,268 | 1,180 | 1,211 | 1,868 | 1,790 | 1,311 | 15,911 |

[1] HTS subheading 0204.10.00.

[2] HTS subheading 0204.22.20.
[3] HTS subheading 0204.23.20.
[4] HTS subheading 0204.30.00.
[5] HTS subheading 0204.42.20.
[6] HTS subheading 0204.43.20.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

boneless lamb. The shares of fresh, chilled, or frozen lamb imported from New Zealand during 1990-94 are shown in table 2-14.

New Zealand export interests report that, before 1986, nearly all lamb exports to the United States were frozen. New Zealand exports of frozen lamb meat to the United States typically come in shipments that weigh about 500,000 pounds, although 1-million-pound shipments may also occur. In past years, individual shipments of as much as 2.5 million pounds have occurred. There are eight New Zealand packer/processors authorized by USDA to ship lamb meat to the United States.[122] The New Zealand Lamb Company, 50 percent of which is owned by three packers, is by far the largest importer of New Zealand lamb into the U.S. market.[123]

### U.S. Exports of Lamb Meat

Separate data are not available for U.S. exports of fresh, chilled, or frozen lamb meat because they are reported under a residual provision of *Schedule B*, which include mutton. However, U.S. exports of lamb meat apparently amount to less than 1 percent of U.S. production. U.S. exports of fresh, chilled, or frozen lamb meat and mutton totaled 8.3 million pounds, valued at US$9.8 million in 1994. Major U.S. lamb and mutton export markets include Mexico and Canada. Mexico accounted for 50 percent of the quantity, but only 36 percent of the value.[124]

### U.S. Exports of Live Sheep and Lambs

During 1990-94, U.S. exports of live sheep and lambs increased from 473,000, valued at US$15.7 million, to 788,000 animals, valued at US$26.9 million (table 2-17). Mexico was the primary market. It is estimated that U.S. exports of live lambs to Mexico ranged between 71,000 animals in 1990 to about 136,000 in 1993 and amounted to 127,000 animals in 1994 (table 2-18).

Table 2-18 shows U.S. exports of live sheep and lambs to Mexico, estimated live lamb exports to Mexico, and the estimated quantity of meat derived from the lambs.

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[122] Richard Lawrence, vice president, New Zealand Lamb Co., interview by USITC staff, Dec. 15, 1994.

[123] Officials of New Zealand Lamb Co., Wellington, New Zealand, interview by USITC staff, Apr. 1995.

[124] USDA, FAS, *Dairy, Livestock, and Poultry: U.S. Trade and Prospects*, FDLP 3-95, Mar. 1995, p. 10.

Table 2-17
Live sheep and lambs: U.S. exports by quantity and value, 1990-94

| Countries | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| | | | Quantity | | |
| Mexico . . . . | 430,032 | 777,097 | 814,883 | 827,041 | 767,872 |
| Canada . . . . | 35,702 | 28,136 | 13,350 | 12,196 | 18,909 |
| All other . . . | 7,172 | 5,032 | 6,631 | 4,726 | 1,205 |
| World . . . . . | 472,906 | 810,265 | 834,864 | 843,963 | 787,986 |
| | | | Value *(1,000 U.S. dollars)* | | |
| Mexico . . . . | 12,868 | 22,644 | 24,869 | 27,736 | 25,519 |
| Canada . . . . | 2,242 | 1,632 | 902 | 802 | 1,326 |
| All other . . . | 596 | 267 | 384 | 799 | 48 |
| World . . . . . | 15,705 | 24,543 | 26,154 | 29,338 | 26,892 |

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2-18
Live sheep and lambs: U.S. exports to Mexico, estimated live lamb exports to Mexico, and estimated lamb meat exports to Mexico, 1990-94

| Year | Live sheep | Estimated live lamb[1] | Estimated lamb meat (carcass weight equivalent)[2] |
|---|---|---|---|
| | -(*Animals*)- | -----(*Animals*)------ | --(*1,000 pounds*)-- |
| 1990 . . . . . | 430,032 | 70,955 | 4,541 |
| 1991 . . . . . | 777,097 | 128,221 | 8,206 |
| 1992 . . . . . | 814,883 | 134,456 | 8,605 |
| 1993 . . . . . | 827,041 | 136,462 | 8,870 |
| 1994 . . . . . | 767,872 | 126,699 | 7,982 |

[1] Estimated from official statistics of the U.S. Department of Commerce and from statistics used by the American Sheep Industry Association, Lamb and Wool Market News.
[2] Estimated number of animals exported multiplied by average carcass weight in each year.

Source: Compiled from official statistics of the U.S. Department of Commerce and from statistics used by the American Sheep Industry Association's Lamb and Wool Market News.

## CHAPTER 3: AUSTRALIAN INDUSTRY

### Structure and Operation of the Australian Industry

#### *Live Sheep Inventory*

Australia has the second largest sheep and goat inventory in the world[1] accounting for about 16 percent of the world's total (table 3-1).[2] According to the Australian Meat and Live-stock Corporation (AMLC), the number of sheep and lambs in Australia declined from 170 million animals in 1990 (fiscal year July 1-June 30) to 134 million in 1994 (table 3-2).[3] In addition, the AMLC forecasts that the inventory of sheep in Australia as of January 1, 1995, was 127 million animals, down about 5 percent from the previous year.[4] The AMLC reports that the decline in Australian sheep numbers reflects the declining profitability of wool production during the early 1990s and adverse production conditions resulting from drought.[5] Consequently, many producers are changing to more profitable products, such as beef.[6]

Table 3-1
Sheep and goats: Inventories in Australia, the world, and the share of world inventories accounted for by Australia, 1990-95[1]

| Location | 1990 | 1991 | 1992 | 1993 | 1994[2] | 1995[3] |
|---|---|---|---|---|---|---|
| | | | *(1,000 animals)* | | | |
| Australia | 177,841 | 173,982 | 161,073 | 147,121 | 142,441 | 139,846 |
| World | 974,784 | 960,982 | 930,019 | 906,290 | 896,006 | 889,102 |
| | | | Share accounted for *(Percent)* | | | |
| Australia | 18 | 18 | 17 | 16 | 16 | 16 |

[1] Jan. 1.
[2] Preliminary.
[3] Forecast.

Source: USDA, FAS, *Livestock and Poultry: World Markets and Trade* (FL&P 2-94), Oct. 1994, p. 75.

Table 3-2
Sheep: Annual inventory in Australia, by states and territories, as of March 31, 1990-94

*(Million animals)*

| Year | NSW | VIC | QLD | SA | WA | TAS | NT | Australia |
|---|---|---|---|---|---|---|---|---|

[1] China has the largest sheep and goat inventory.
[2] USDA data on sheep numbers in Australia also include goats. However, Australian goat numbers are negligible in comparison with sheep.
[3] Australian sheep numbers have generally declined annually since their peak of 180 million animals in 1970.
[4] AMLC, "Australian Cattle and Sheep Projections," p. 22.
[5] Sandy Troup, president of the Sheepmeat Council of Australia, reported that over 45 percent of the Australian sheep flock were in areas of the country that had officially been declared to be under drought conditions. Transcript of hearing, Apr. 6, 1995, p. 147.
[6] AMLC, "Australian Cattle and Sheep Projections," p. 22.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1990 . . . . | 62.1 | 29.3 | 16.7 | 18.4 | 38.4 | 5.3 | ([1]) | 170.3 |
| 1991 . . . . | 59.8 | 27.5 | 17.4 | 17.2 | 36.5 | 4.8 | ([1]) | 163.2 |
| 1992 . . . . | 53.6 | 24.8 | 15.3 | 16.1 | 34.1 | 4.3 | ([1]) | 148.2 |
| 1993 . . . . | 48.2 | 23.6 | 13.4 | 15.7 | 33.0 | 4.3 | ([1]) | 138.1 |
| 1994 . . . . | 46.9 | 23.4 | 11.4 | 15.0 | 32.7 | 4.2 | ([1]) | 133.7 |

[1] Fewer than 50,000 animals.

Note.--NSW represents New South Wales; VIC, Victoria; QLD, Queensland; SA, South Australia; WA, Western Australia; TAS, Tasmania; and NT, Northern Territory.

Note.--Because of rounding, figures may not add to the totals shown.

Source: *Australian Meat and Live-stock Corporation, Statistical Review,* July 93-June 94, p. 4.

The Australian inventory of sheep and lambs by state and territory as of March 31, 1990-94, is shown in table 3-2. New South Wales accounted for about 35 percent of Australia's sheep inventory during 1994; Western Australia, for about 24 percent; Victoria, for 18 percent; South Australia, for 11 percent; Queensland, for 9 percent; and Tasmania about 3 percent (figure 3-1). The inventory in the Northern Territory showed fewer than 50,000 animals; the climate of the Northern Territory is generally not suitable for efficient sheep production. Indeed, neither the climate of most of northern Australia is suited to efficient sheep production nor that of most of south central Australia, which consists largely of the Great Victoria Desert.

In Australia, about 75 percent of the sheep are maintained for the production of wool.[7] The Australian Merino breed accounts for virtually all of Australia's wool-type sheep. It is generally recognized as efficient in the production of very high-quality wool. As a result of breeding programs designed to adapt animals to various climatic conditions, four types of Australian Merinos have been developed: Superfine Wool Merino, Fine Wool Merino, Medium Wool Merino, and Strong Wool Merino. Although the Merino is efficient in the production of wool, it is generally recognized as relatively inefficient in the production of lamb meat. Merinos are usually sold for

[7] The following discussion on breeds and types of sheep in Australia and the discussion on crossbreeding were adapted, for the most part, from AMLC, *Meat and Livestock in Australia,* Dec. 1990, pp. 22-23.

FIGURE 3-1
Regional location of Australian sheep inventory as of March 31, 1994

mutton after they reach 5 to 7 years of age and are no longer suitable for the production of wool.[8]

A large share of the lamb meat for the Australian market is derived from lambs that are the offspring of crossbred ewes. To derive ewes that produce lambs for the meat market, the most common cross is Merino ewes bred to long-wool rams, usually the Border Leicester breed. The Border Leicester breed contributes the genetic potential for high-volume milk production, and fast-growing maturing lambs. The aforementioned crossbred ewes, the so-called "first cross ewes," account for about 12 percent of the Australian inventory.

To produce high-quality lambs, so-called Australian prime lambs, for lamb meat, a common practice is to mate first cross ewes with short-wool, meat-type breeds, such as the Suffolk or Dorset. Short-wool, meat-type breeds account for about 4 percent of the Australian inventory. The remaining Australian sheep inventory, about 10 percent, consists of Merino-derived dual-purpose breeds kept for both wool and meat.

### *Growing Operations*

The number of operations with sheep declined by 10 percent during 1991-93 as indicated in the following tabulation:[9]

| Year | Number of Operations |
|---|---|
| 1991 | 62,342 |
| 1992 | 59,589 |
| 1993 | 56,026 |

New South Wales accounted for 35 percent of the sheep operations in 1993, Victoria 24 percent, Western Australia 17 percent, and South Australia 16 percent. The amount of moisture available for pasture or for other crops is a primary factor influencing sheep operations in Australia.[10] Other factors that influence management decisions are the relative profitability of wool and lamb meat, profitability of sheep raising in relation to such other agricultural alternatives as beef and grain, and weather.

The moister sheep-raising regions of Australia receive 28 inches or so of rain annually and may have access to irrigation. Typically, such regions have mild Mediterranean-like climates that allow for outside lambing. These regions are often near urban areas, and land costs are relatively high. A typical operator in this region would produce meat-type lambs, have 500 to 1,000 ewes, and occupy about 500 acres. This farm would also likely produce a few beef cattle, small grains (barley and oats), and potatoes.

In parts of Australia with slightly less rainfall, a typical operation

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[8] Officials from the Australian Department of Primary Industries and Energy (DPIE) and officials of the Australian Bureau of Agricultural and Resource Economics (ABARE), interviewed by USITC staff, Canberra, Australia, Mar. 23, 1995.

[9] Also referred to as establishments, Australian Bureau of Statistics, *Livestock and Livestock Products Australia*, 1992-93, Cat. No. 7221.0, Apr. 24, 1994, p. 10.

[10] The following information on sheep management practices, grazing on government lands, costs of production, predator problems, lamb losses, and seasonality of lamb production in Australia was taken from a USITC staff interview with Sandy Troup, president, Sheepmeat Council of Australia, in Washington, DC, Feb. 7, 1995.

would maintain 3,000 to 9,000 sheep (consisting mostly of wool-type, but including some meat-type sheep) and occupy 1,500 to 3,000 acres. This farm would also raise some grain, but no cattle.

In dry regions of Australia, a typical operation would likely grow small grains and raise high-quality, meat-type lambs on the grain stubble and other grain by-products. A farm operated under this management style would have about 500 sheep and occupy 2,000 to 8,000 acres.

In very dry regions of Australia, sheep raising is limited to wool-type animals, with the meat production limited primarily to the slaughter of animals for mutton when they are too old to be suitable for the production of wool. A typical operation would have about 10,000 to 20,000 sheep and occupy 30,000 to 60,000 acres.

Australian predators of lambs and sheep include dingoes (wild dogs) and, in moister areas, red foxes that kill young lambs; however, detailed statistics are not available concerning losses to such predators. In Australia growers attempt to control dingoes and foxes through the use of Compound 1080 (sodium fluoroacetate), whereas in the United States the use of 1080 is restricted. Kangaroos are also serious competitors for pasture in dryer areas although shooting permits may be issued to control their numbers. Lamb losses may also occur because of unseasonable weather, that is, wet, cold weather that causes diseases in new-born lambs and/or hot/dry weather that results in poor pastures causing malnourished ewes that are unable to produce adequate milk for the lambs.

As in the United States, there are peak periods of lamb births and lamb slaughter in Australia. Seasonality reflects, among other things, the advantage of having lambs born and grown in the spring, when pastures are productive, and the seasonally polyestrous nature of the ewe. Estrus and ovulation in ewes occurs as days become shorter (seasonally). If the ewe is not impregnated she will continue to ovulate but the ovulation period in common domestic sheep breeds is limited to five to seven months.[11] Notwithstanding the seasonality of lamb production, lamb meat production occurs throughout the year, reflecting regional differences and producer attempts to have animals ready for slaughter throughout the year to avoid burdensome supplies and associated low prices.

### *Meat Packing and Processing Sector*

There are about 350 meat-packing establishments in Australia.[12] Most are older facilities, although certain establishments have been recently renovated. Most lamb-slaughtering plants in Australia are single species.[13] There is typically little further processing of lamb at meatpacking plants for the domestic market--carcasses are shipped to butchers or retail outlets for fabrication into retail cuts. However, plants processing for the export market generally further process the carcasses into various cuts.[14]

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[11] Sheep Production Handbook, 1988, ch. REPRO.

[12] Includes beef and veal, pigmeat, and sheepmeat establishments; separate data on the number of sheep and lamb packing establishments are unavailable.

[13] Jack Erichsen, plant manager, Tatiara Meat Co., interviewed by USITC staff, Bordertown, Australia, Mar. 22, 1995.

[14] Commissioner Rohr, fieldwork, Australia, Feb. 1995.

**Number of establishments, employment, and wage rates**[15]

The number of meat-packing establishments[16] in Australia declined from 390 in 1990 to 352 in 1992, or by 10 percent. Factors that contributed to the decline include a reduction in the beef herd and stricter government and industry hygiene and slaughter requirements. Meat packing establishments are located throughout Australia; however, major processing regions include Victoria, New South Wales, and southern Queensland. Australian officials report that there are numerous small establishments and that the top 20 firms account for about 48 percent of slaughter.[17]

Employment in the meat processing sector declined from 31,900 in FY90[18] to 27,364 in FY92, or by 15 percent. Closure of plants and improved productivity contributed to the decline in employment. Wages and salaries in this sector declined from US$599 million[19] (AUS$778 million) to US$579 million (AUS$753 million), or by 3 percent during the same period.[20] Average weekly wages in the meat packing sector by state ranged from US$324 (AUS$464) to US$398 (AUS$570) in May 1993, with Queensland having the highest wage rates and the Northwest Territory the lowest.[21] Wages were generally higher in medium-size establishments, particularly in New South Wales, Queensland, and South Australia, and in export-licensed establishments in New South Wales and Victoria.[22]

**Local and foreign ownership**

Most of Australia's meat-processing plants are privately owned. Only 10 plants are owned by State and local governments.[23] In FY92, the latter accounted for 8.5 percent of the total Australian processing output.[24]

Japan, the United Kingdom, and the United States are among the largest investors in the Australian meat-processing sector. Foreign owned establishments accounted for 10 percent of sheep and lambs slaughtered in 1988. Establishments with more than 50 percent Japanese ownership accounted for 5.4 percent of sheep and lambs slaughtered by foreign interest during this period.[25] The R.J. Gilbertson Proprietary Ltd is the largest foreign-owned (British) sheep and lamb slaughtering establishment in Melbourne.[26]

Monfort, Inc. has an investment in the Australian meat sector through its ownership of Australian Meat Holdings (AMH). AMH is the largest meat company in Australia, with sales of US$676.8 million (AUS$880 million) in 1992.[27] According to ABARE officials, AMH has a plant in Victoria that

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[15] The following discussion on meat packing establishments, employment, and wages was adapted from Australian Industry Commission, *Meat Processing*, vol. I & II, Apr. 20, 1994, except as noted.

[16] Includes beef and veal, pigmeat, and sheepmeat establishments.

[17] Officials of ABARE and DPIE, interviewed by USITC staff, Canberra, Australia, Mar. 23, 1995.

[18] The Australian fiscal year is from July 1-June 30.

[19] See appendix F for average monthly exchange rates of Australia; rates reflect U.S. dollars per Australian dollar.

[20] Ibid., p. 18.

[21] *Meat Processing*, vol. II, appendices, Apr. 20, 1994, p. 117.

[22] Ibid.

[23] Ibid., vol. I, p. 220.

[24] Ibid.

[25] Ibid., 226.

[26] Russell Reynolds, Livestock section manager, ABARE, interviewed by USITC staff, Canberra, Australia, Mar. 23, 1995.

[27] *Meat Processing*, vol. I, Apr. 20, 1994, p. 229.

slaughters mutton.[28] Beef accounts for most of the meat processed by AMH.

## Lamb Meat Production, Consumption, and Prices

### *Production*

Australian lambs slaughtered declined steadily from 16.8 million animals in 1990 to 15.0 million animals in 1994 (table 3-3). The decline apparently reflects the drop in the total sheep inventory and especially the fall in the number of ewes--from 80.8 million as of March 31, 1990, to 67.0 million as of March 31, 1994. Lamb meat production similarly declined steadily from 650 million pounds in 1990 to 584 million pounds in 1994 as shown in table 3-4. Australian lamb meat production by State and Territory is shown in table 3-5.

Table 3-3
Sheep and lambs: Australian total sheep inventory, of ewes and lambs, and number of lambs slaughtered, 1990-94

*(1,000 animals)*

| Year | Total sheep inventory | Number of Ewes | Number of Lambs | Lambs slaughtered |
|---|---|---|---|---|
| 1990 | 170,297 | 80,772 | 40,065 | 16,797 |
| 1991 | 163,238 | 76,773 | 36,085 | 16,520 |
| 1992 | 148,203 | 73,331 | 27,835 | 15,761 |
| 1993 | 138,102 | 67,992 | 28,397 | 15,409 |
| 1994 | 133,747 | 67,014 | 30,475 | 14,957 |

Note.--Total sheep inventory, of ewes and lambs is for yearend March 31, whereas the number of lambs slaughtered is for yearend June 30.

Source: Compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 93-June 94, pp. 4 and 6.

Table 3-4
Lamb meat: Australian production, exports, apparent consumption, ratio of exports to production, and ratio of exports to consumption, 1990-94[1]

| | | | Ratio of exports to | |
|---|---|---|---|---|
| | | | Apparent | |

[28] Reynolds, Livestock section manager, ABARE, interviewed by USITC staff, Canberra, Australia, Mar. 23, 1995.

| Year | Production | Exports | consumption | Production | consumption |
|---|---|---|---|---|---|
| | --(Million pounds, carcass weight)-- | | | -------(Percent)------- | |
| 1990 . . . . | 650 | 90 | 553 | 14 | 16 |
| 1991 . . . . | 636 | 101 | 536 | 16 | 19 |
| 1992 . . . . | 606 | 91 | 514 | 14 | 18 |
| 1993 . . . . | 602 | 114 | 485 | 19 | 24 |
| 1994 . . . . | 584 | 136 | 448[2] | 23 | 30 |

[1] Data are for fiscal year July 1-June 30.
[2] Estimated by the USITC.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Data compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 93-June 94, pp. 20 and 26.

Table 3-5
Lamb meat: Annual production, by States and Territories, 1990-94[1]

*(Million pounds, carcass weight)*

| Year | NSW | VIC | QLD | SA | WA | TAS | NT | Australia |
|---|---|---|---|---|---|---|---|---|
| 1990 . . . . . | 216 | 244 | 35 | 84 | 49 | 21 | (2) | 650 |
| 1991 . . . . . | 204 | 252 | 37 | 70 | 53 | 20 | (2) | 636 |
| 1992 . . . . . | 197 | 246 | 37 | 66 | 43 | 18 | (2) | 606 |
| 1993 . . . . . | 175 | 248 | 23 | 87 | 52 | 17 | (2) | 602 |
| 1994 . . . . . | 166 | 223 | 24 | 100 | 55 | 18 | (2) | 584 |

[1] Fiscal year July 1-June 30.
[2] Negligible or nil.

Note.--NSW represents New South Wales; VIC, Victoria; QLD, Queensland; SA South Australia; WA, Western Australia; TAS, Tasmania; and NT, Northern Territory.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 93-June 94, p. 9.

During 1994 production of sheepmeat (mutton and lamb) accounted for 22 percent of Australian meat production. Mutton production accounted for 13 percent, and lamb accounted for 9 percent (table 3-6).[29] However, as shown in the following tabulation, in FY 1994, the combined share of meat production accounted for by mutton and lamb and individual shares varied among States and Territories[30] within Australia (in percent):

[29] Mutton and lamb combined accounted for only about 1 percent of 1994 meat production in the United States.
[30] Mutton and lamb production in the Northern Territory is negligible.

| | Mutton | Lamb | Total |
|---|---|---|---|
| Australia | 13 | 9 | 22 |
| States and territories: | | | |
| South Australia | 29 | 18 | 47 |
| Western Australia | 29 | 11 | 40 |
| Victoria | 14 | 17 | 31 |
| New South Wales | 17 | 9 | 26 |
| Tasmania | 14 | 11 | 25 |
| Queensland | 2 | 1 | 3 |

Table 3-6
Meat,[1] mutton and lamb: Production in Australia and lamb and mutton as a share of meat production, by years, 1990-94[2]

| Year | Production of | | | Share of production | |
|---|---|---|---|---|---|
| | Meat | Mutton | Lamb | Mutton | Lamb |
| | *(Million pounds)* | | | *(Percent)* | |
| 1990 | 5,780 | 734 | 650 | 13 | 11 |
| 1991 | 6,012 | 834 | 636 | 14 | 11 |
| 1992 | 6,120 | 852 | 606 | 14 | 10 |
| 1993 | 6,168 | 818 | 602 | 13 | 10 |
| 1994 | 6,208 | 837 | 584 | 13 | 9 |

[1] Beef, veal (including buffalo), mutton, lamb, and pork.
[2] Fiscal year July 1-June 30.
Source: Compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 93-June 94, pp. 8-9.

The percentage differences largely reflect State and Territorial climatic conditions. The relatively high share of mutton production in South Australia and Western Australia reflects the high share of wool-type sheep, which are generally more economical to raise in the dryer regions of Australia. Much of Queensland is too tropical to be efficient in the production of sheep but does have a competitive advantage in the production of cattle, especially Zebu (humped back) cattle. The relatively high proportion of mutton to lamb meat production (59 percent compared with 41 percent FY94) in Australia reflects the large share of the sheep population, including wethers[31] that are kept solely for the production of wool.[32]

Average lamb carcass weights in Australia during 1990-94 are shown in the following tabulation (in pounds):

| | |
|---|---|
| 1990 | 40 |
| 1991 | 37 |
| 1992 | 37 |
| 1993 | 40 |
| 1994 | 40 |

Lamb carcass weights in Australia average significantly less than those in the United States and generally reflect a genetically smaller animal that is usually finished on grass, not grain.[33]

### *Consumption*

Lamb meat consumption in Australia declined by 12 percent during FY90-93 (table 3-7). The decline in consumption reflects both the previously discussed drop in production as well as an increase in exports, although an irregular increase. Consumption of lamb in Australia accounted for about

[31] A wether is a male sheep that has been castrated before the development of secondary sex characteristics.
[32] Lamb meat accounts for about 95 percent of combined lamb and mutton production in the United States.
[33] Gary Griffin, Senior Research Scientist, Lincoln University, interviewed by USITC staff, Armidale, New South Wales, Australia, Mar. 24, 1995.

77 percent of total production in 1994.[34] Approximately 75 percent of lamb meat production (from the Australian sheep flock raised principally for the production of lamb meat) is consumed domestically.[35]

Table 3-7
Red meat and poultry: Consumption in Australia, by types, 1990-93[1]

| Year | Red meat | | | | Total red meat | Poultry | Total |
|---|---|---|---|---|---|---|---|
| | Beef and veal | Mutton | Lamb | Pork | | | |
| | *(Million pounds, carcass-weight equivalent)*[2] | | | | | | |
| 1990 | 1,523 | 306 | 553 | 688 | 3,070 | 919 | 3,989 |
| 1991 | 1,541 | 291 | 535 | 681 | 3,048 | 933 | 3,981 |
| 1992 | 1,435 | 293 | 514 | 739 | 2,981 | 994 | 3,975 |
| 1993 | 1,440 | 328 | 485 | 734 | 2,987 | 1,014 | 4,001 |

[1] Data are for fiscal year July 1-June 30.
[2] Data for poultry are dressed weight.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Data on red meat compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 93-June 94, p. 20. Data on poultry meat compiled from USDA, Foreign Agricultural Service, *Livestock and Poultry: World Markets and Trade* (FL&P 2-94), Oct. 1994, p. 99.

Lamb meat consumption in Australia accounts for a much larger, although declining, share of red meat consumption and of combined poultry and red meat consumption than it does in the United States. The share of such consumption is shown in the following tabulation (in percent):[36]

| Year | Red meat consumption | Red meat and poultry consumption |
|---|---|---|
| 1990 | 18 | 14 |
| 1991 | 18 | 13 |
| 1992 | 17 | 13 |
| 1993 | 16 | 12 |

The declining shares accounted for by lamb meat reflects both a drop in lamb meat consumption and an increase in consumption of alternative meats, principally chicken.[37]

[34] AMLC, *Statistical Review*, July 93-June 94, p. 20.
[35] AMLC prehearing brief, p. 7.
[36] AMLC, *Statistical Review*, July 93-June 94, p. 20.
[37] Outlook 95, National Outlook Conference, *Outlook for Beef and Sheep Meat*, Speaker Russell Reynolds, ABARE, p. 97.

### *Prices*

Table 3-8 shows the price received by growers for lambs marketed in New South Wales, Victoria, and South Australia during January 1990 through the first half of 1994. South Australia and Victoria account for most of the lamb meat exported to the United States. New South Wales, the location of a large share of Australia's human population, is considered representative of the Australian domestic market.[38] The prices are for lambs that are estimated to yield carcasses that weigh between 40 to 44 pounds, the size typically used for exports to the United States.

The prices of such live lambs in Australia are, on average, below prices in the United States. However, it should be noted that there are important differences between animals in the two countries, specifically, lambs in the United States are typically larger and hence yield larger carcasses.

Lamb carcass prices in Australia are reported by the New South Wales Meat Industry Authority. These data represent prices received by Australian growers who sell directly to packers on a dressed-weight basis (carcass basis). Prices are reported weekly and are classified by weight and by fat score. Table 3-9 shows average monthly carcass prices received by growers for weight class 18-20 kg (40-44 pounds), with a fat score of 3 for the period February 1994 through April 1995.[39] Prices received by growers ranged from a low of US$.44 a pound (AUS$1.33 per kg) in June 1994 to a high of US$.61 a pound (AUS$1.90 kg) in February and March 1994. The prices growers receive for lamb carcasses in Australia are lower than prices received by U.S. farmers, reflecting in part, the smaller size carcasses derived from Australian lambs.

Retail lamb prices in Australia by selected cities are shown in table 3-10. These prices include cuts from lambs that are estimated to yield carcasses that weigh between 18 to 35 pounds. Retail prices for Australian leg and loin chops generally declined during 1991-93, reflecting a decline in total supply, as well as a decline in demand. Such prices increased in 1994, reflecting shortages of good quality lambs as a result of long-term drought and a stronger demand for lamb since beef prices increased.[40]

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[38] USITC staff fieldwork, Australia, Mar. 1995.

[39] App. G shows Australian lamb carcass prices for additional weight breaks and fat scores derived from official statistics of the New South Wales Meat Industry Authority.

[40] Anthony Gray and Jill Clark, Agricultural Economics Branch, Australian Commodities, *Sheep Meat*, paper, vol. 2, No. 1 (Mar. 1995), p. 20.

Table 3-8
Live lambs: Average monthly prices, selected Australian States, by months, Jan. 1990-June 1994

| Year/States | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *(U.S. dollars per 100 pounds)* | | | | | | | | | | | | |
| 1990: | | | | | | | | | | | | | |
| New South Wales | 47.94 | 53.83 | 48.19 | 57.36 | 57.06 | 54.56 | 49.96 | 54.44 | 42.40 | 37.59 | 33.02 | 32.49 | 47.40 |
| Victoria | 60.59 | 64.17 | 58.88 | 61.83 | 61.62 | 65.02 | 64.56 | 56.49 | 47.72 | 40.49 | 38.98 | 36.33 | 54.72 |
| South Australia | 51.20 | 58.55 | 55.28 | 59.23 | 61.45 | 65.87 | 71.49 | 57.59 | 38.85 | 30.87 | 31.13 | 35.11 | 51.38 |
| 1991: | | | | | | | | | | | | | |
| New South Wales | 50.09 | 49.00 | 47.01 | 41.90 | 39.33 | 48.94 | 48.47 | 52.27 | 40.32 | 24.62 | 32.47 | 35.79 | 42.52 |
| Victoria | 48.18 | 52.95 | 49.52 | 46.56 | 42.00 | 45.94 | 55.40 | 49.97 | 45.72 | 35.70 | 31.90 | 34.39 | 44.85 |
| South Australia | 42.06 | 46.38 | 47.22 | 43.06 | 41.37 | 49.28 | 52.15 | 40.21 | 41.76 | 31.27 | 33.54 | 33.48 | 41.82 |
| 1992: | | | | | | | | | | | | | |
| New South Wales | 39.33 | 39.73 | 37.44 | 38.49 | 40.59 | 42.94 | 51.71 | 43.72 | 40.74 | 42.02 | 43.18 | 46.83 | 42.23 |
| Victoria | 48.05 | 43.75 | 42.67 | 45.30 | 43.06 | 50.38 | 53.94 | 47.34 | 43.26 | 41.08 | 46.56 | 51.31 | 46.39 |
| South Australia | 45.44 | 40.58 | 41.64 | 41.26 | 40.11 | 40.89 | 43.53 | 48.33 | 43.36 | 39.88 | 41.87 | 51.93 | 43.23 |
| 1993: | | | | | | | | | | | | | |
| New South Wales | 52.35 | 55.85 | 54.19 | 52.41 | 48.32 | 54.65 | 69.80 | 71.28 | 64.00 | 48.63 | 49.68 | 49.71 | 55.91 |
| Victoria | 58.46 | 63.13 | 63.56 | 62.36 | 61.95 | 63.16 | 70.35 | 78.29 | 74.58 | 53.37 | 52.25 | 52.34 | 62.82 |
| South Australia | 59.01 | 59.17 | 57.24 | 56.26 | 54.50 | 57.16 | 67.95 | 73.59 | 66.15 | 45.81 | 44.71 | 48.89 | 57.54 |
| 1994: | | | | | | | | | | | | | |
| New South Wales | 55.41 | 57.10 | 56.36 | 51.42 | 52.08 | 52.69 | | | | | | | |
| Victoria | 62.36 | 64.64 | 60.94 | 55.70 | 51.35 | 49.97 | | | | | | | |
| South Australia | 59.04 | 55.06 | 56.85 | 54.66 | 53.00 | 54.52 | | | | | | | |

Source: Compiled from official statistics of the AMLC, *Statistical Review*, July 93-June 94, p. 15.

Table 3-9
Lamb carcasses:[1] Average prices received by growers, by months, Feb. 1994-Apr. 1995

*(U.S. dollars per pound)*

| Date | Fat Score[2] 3 (11-15 mm) |
|---|---|
| **1994:** | |
| Feb. | 0.61 |
| Mar. | 0.61 |
| Apr. | 0.58 |
| May | 0.48 |
| June | 0.44 |
| July | 0.49 |
| Aug. | 0.50 |
| Sept. | 0.56 |
| Oct. | 0.58 |
| Nov. | 0.59 |
| Dec. | 0.60 |
| **1995:** | |
| Jan. | ([3]) |
| Feb. | 0.59 |
| Mar. | 0.54 |
| Apr. | 0.54 |

[1] 40-44 pounds (18-20 kg).
[2] Australian lamb product specification defines fatness of carcasses on a 1 to 5 scale. The score is based on the depth of tissue at the "GR" position. This position is 110 mm from the midline of the carcass over the 12th rib.
[3] Not available.

Source: Derived from official statistics of the N.S.W. Meat Industry Authority.

Table 3-10
Lamb meat: Retail prices for selected meats in selected cities in Australia, 1991-94

*(U.S. dollars per pound)*

| Item/Year | Sydney | Melbourne | Brisbane | Adelaide | Perth | Hobart | Canberra |
|---|---|---|---|---|---|---|---|
| Year ending June 30 | | | | | | | |
| Leg: | | | | | | | |
| 1991 | 1.84 | 1.84 | 1.99 | 1.62 | 2.00 | 1.76 | 1.89 |
| 1992 | 1.75 | 1.80 | 1.89 | 1.51 | 1.81 | 1.73 | 1.75 |
| 1993 | 1.72 | 1.69 | 1.74 | 1.49 | 1.72 | 1.54 | 1.65 |
| 1994 | 1.93 | 2.04 | 1.86 | 1.63 | 1.78 | 1.72 | 1.72 |
| Loin Chops: | | | | | | | |
| 1991 | 2.13 | 2.77 | 2.43 | 2.17 | 2.56 | 2.27 | 2.36 |
| 1992 | 1.95 | 2.62 | 2.33 | 1.95 | 2.57 | 2.26 | 2.13 |
| 1993 | 1.99 | 2.40 | 2.17 | 1.94 | 2.41 | 2.05 | 2.05 |
| 1994 | 2.23 | 2.53 | 2.44 | 2.13 | 2.45 | 2.18 | 2.21 |

Source: Compiled from official statistics of the AMLC, *Statistical Review*, July 93-June 94, p. 19.

## Production Costs and Profitability[41]

### *Live Lamb Sector*

Appendix H shows average per farm cost of production and profits for the Australian sheep industry. During FY91 through FY93, major cost components per sheep farm included marketing, interest, wages, salaries and supplements, livestock purchases, payments to contractors, repairs and maintenance, fuel, fertilizer, and veterinarian services. Marketing costs and interest paid were the largest costs incurred per farm. Marketing costs include such costs as commissions, packaging, and freight. Marketing costs declined during the period from US$21,184 (AUS$27,000) to US$10,123 (AUS$14,400) per farm. Interest paid declined from US$14,515 (AUS$18,500) to US$10,123 (AUS$14,400). Costs per farm for wages and salaries ranged from a low of US$8,383 (AUS$10,900) in FY92 to a high of US$11,848 (AUS$15,100) in FY91. Purchases of livestock, another major cost, ranged from US$5,384 (AUS$7,000) in FY92 to US$6,960 (AUS$9,900) in FY93. Payments to contractors declined from US$9,152 (AUS$11,900) to US$6,749 (AUS$9,600) and include payments for wool shearing, classing, and also for contract work for nonagricultural activity. Repairs and maintenance declined by 15 percent, totaling US$5,905 (AUS$8,400) per farm in FY93. Fuel expenses also declined from US$5,335 (AUS$6,800) to US$4,359 (AUS$6,200) during the period. Per farm fertilizer cost totaled US$2,882 (AUS$4,100), and veterinarian cost per farm totaled US$2,671 (AUS$3,800) in FY93.

Data on profitability per sheep farm during FY91 through FY93 are also shown in appendix H. The average cash-operating surplus[42] per sheep farm declined from US$13,731 (AUS$17,500) in FY91 to US$1,769 (AUS$2,300) in FY92, then rose to US$8,928 (AUS$12,700) in FY93. Sales of livestock products declined from US$79,794 (AUS$101,700) to US$43,375 (AUS$61,700) and accounted for 54 percent of receipts (turnover) in FY93. Sales of livestock increased from US$14,998 (AUS$19,500) per farm in FY92 to US$24,043 (AUS$34,200) in FY93 and accounted for 30 percent of receipts in the latter year.

During FY92, sheep farms had a rate of return on farm-operating costs of 2.3 percent, or, for every $100 of farm-operating costs, $2.25 of cash-operating surplus was generated. For FY93, the rate of return on farm operating costs was 12.1 percent reflecting a 13 percent increase in returns from sales.

### Meat Packing and Processing Sector

An official of the Tatiara Meat Company Pty. Ltd., the largest Australian lamb meat exporter to the United States, reported that major cost incurred by the Australian meat packing and processing sector include cost of livestock, labor, slaughter levies, transportation cost, and fees for the Department of Primary Industries and Energy's (DPIE) Australian Quarantine and Inspection Service's (AQIS) health inspectors and veterinary officers.[43] In Australia, transportation costs from Bordertown, to Melbourne (chiller plant location) are US$519 (AUS$750) in 1994 per semi-truck, and from Bordertown to Sydney US$1,245 (AUS$1,800) per semi-truck. Costs incurred from freezing and storage of lamb meat are US$0.09 (AUS$0.13) per kilogram and US$0.10 (AUS$0.15) per carton (a carton equals 20 kilograms), respectively. Normal storage of frozen product is 4 weeks. The same official also reported that Tatiara currently employs 15 inspectors at a cost of US$55,344 (AUS$80,000) per inspector.

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[41] The following information on cost and profitability was adapted from Australian Bureau of Statistics, *Agricultural Industries Financial Statistics Australia, 1992-93*, Catalogue No. 7507.0, July 25, 1994.

[42] Cash-operating surplus is the estimate of gross-operating surplus, minus an estimate of the value of increase in livestock, and estimates of interest and land rent paid, plus estimates of interest and land rent received. Depreciation and income tax have not been deducted from cash-operating surplus. See 1992-93 *Agricultural Industries Financial Statistics Australia*, p. 50.

[43] Jack Erichsen, plant manager, Tatiara Meat Co., interviewed by USITC staff, Bordertown, Australia, Mar. 22, 1995.

The use of AQIS health inspectors and veterinarians is mandatory for all meat export establishments. As of January 1, 1991, the meat industry has been responsible for AQIS charges on a fee-for-service basis for each inspector and veterinary officer employed. During FY93, the industry paid an average of US$48,626 (AUS$69,169) for each full time meat inspector and of US$69,115 (AUS$98,314) for each veterinary officer. Total AQIS inspection cost to the meat industry exceeded US$56 million (AUS$80 million) in FY93 and amounted to between 2 and 5 percent of the meat processing industry's cost.[44]

The following tabulation shows the major cost components, by share of total cost, for sheep lamb packing and processing establishments operating in the domestic and export markets in FY93 (in percent):[45]

| Costs | Domestic | Export |
|---|---|---|
| Livestock costs: | | |
| Purchases | 72 | |
| 68 | | |
| Procurement cost | 3 | |
| 3 | | |
| Subtotal | 75 | |
| 71 | | |
| Processing costs: | | |
| Labor | 10 | |
| 11 | | |
| Materials and services | 8 | 8 |
| Fixed costs | 2 | |
| 2 | | |
| Subtotal | 20 | |
| 20 | | |
| Delivery costs | 5 | |
| 9 | | |
| Total costs | 100 | |
| 100 | | |

The price of livestock is the major input cost for the lamb meat-packing and processing sector. Labor is the next highest cost accounting for 10 to 11 percent of total costs. Delivery, which accounted for 5 percent of the domestic cost, accounted for 9 percent of costs for export. Because of the level of processing required to produce products of different quality levels, the various cost components differ considerably as a proportion of total processing cost between establishments. However, labor costs accounted for the largest proportion (excluding livestock) of total costs.[46]

One measure of profitability in the meat-packing industry is the gross profit margin (GPM) (sales revenue after all expenses have been paid). Based on a survey conducted by the Australian Bureau of Statistics, about a quarter of the sample[47] reported gross losses, half reported gross profit margins between 4.5 and 15 percent, while many slaughter plants reported much higher gross profit levels.[48]

### *Wool Production*

Australia is by far the world's leading producer of wool, accounting for between

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[44] *Meat Processing*, vol. II, Apr. 20, 1994, pp. 99-100.
[45] Ibid., vol. I, pp. 32-33.
[46] Ibid., p. 35.
[47] An overall data base of establishments surveyed was created by merging data on establishments from the Australian Bureau of Statistics and a survey conducted by the Australian Industry Commission on meat processing. The final data base consisted of 101 establishments.
[48] *Meat Processing*, vol. II, Apr. 20, 1994, p. 37.

32 percent (1994) and 37 percent (1990) of reported world production in marketing years[49] 1990/94 (table 3-11). The estimated value of such production declined by 62 percent during the period, totaling about US$2 billion in 1994.[50]

## Exports

### *Lamb Meat and Mutton*

During FY 1990-94, Australian exports of lamb meat rose irregularly from 87.6 million pounds (shipped weight),[51] valued at US$84 million (AUS$109 million), in FY90 to 127 million pounds, valued at US$134 million (AUS$194 million), in FY94, or by 45 percent in quantity and 60 percent in value (table 3-12). Exports also rose irregularly as a share of Australian lamb meat production from 14 percent in FY90 to 23 percent in FY94, reflecting decreased production as well as irregularly rising exports (table 3-4). Lamb meat's share of the value of Australia's exports of all meats increased

Table 3-11
Wool: Australian, New Zealand, and world, production and exports,[1] 1990-94[2]

| Item | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| Australia: | | | | | |
| Production *(million pounds, clean)* | 1,596 | 1,541 | 1,254 | 1,248 | 1,149 |
| Exports *(million pounds, clean)* | 948 | 861 | 1,170 | 1,070 | 1,083 |
| Exports to production *(percent)* | 59 | 56 | 93 | 86 | 94 |
| New Zealand: | | | | | |
| Production *(million pounds, clean)* | 514 | 500 | 487 | 425 | 472 |
| Exports *(million pounds, clean)* | 406 | 402 | 478 | 383 | 481 |
| Exports to production *(percent)* | 79 | 80 | 98 | 90 | 102 |
| World: | | | | | |
| Production *(million pounds, clean)* | 4,348 | 4,273 | 3,851 | 3,708 | 3,602 |
| Exports[1] *(million pounds, clean)* | 1,566 | 1,450 | 1,814 | 1,600 | 1,761 |
| Exports to production *(percent)* | 36 | 34 | 47 | 43 | 49 |

[1] May reflect inventories as well as production.
[2] July/June marketing year.

Source: International Wool Textile Organization in Succession to the Commonwealth Secretariat as reported in USDA, ERS, *Cotton and Wool Situation and Outlook Report* (CWS-78), Nov. 1994, app. table 19, p. 28.

[49] July/June marketing year.
[50] Value estimated by USITC staff from data reported by USDA, *Cotton and Wool Situation and Outlook*, Nov. 1994, p. 28.
[51] Export data are for net shipped weight; certain other data in this report are for carcass-equivalent weight and are not directly comparable.

Table 3-12
Lamb meat: Australian exports, by principal markets, 1990-94[1]

| Item | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| | *(1,000 pounds, net shipped weight)* | | | | |
| US | 14,506 | 12,831 | 16,074 | 18,607 | 23,671 |
| Japan | 6,521 | 11,925 | 14,487 | 17,549 | 18,631 |
| EU | 8,849 | 11,045 | 10,256 | 12,328 | 17,172 |
| Saudi Arabia | 3,239 | 7,286 | 4,537 | 9,989 | 7,831 |
| Canada | 3,964 | 3,477 | 3,684 | 4,356 | 5,073 |
| S. Korea | 1,199 | 653 | 165 | 417 | 789 |
| Taiwan | 304 | 560 | 315 | 692 | 794 |
| Other | 49,002 | 51,183 | 46,828 | 50,982 | 53,425 |
| Total | 87,585 | 98,959 | 96,346 | 114,920 | 127,386 |
| | *(1,000 U.S. dollars)* | | | | |
| US | 16,925 | 13,703 | 14,998 | 21,388 | 26,075 |
| Japan | 11,941 | 17,322 | 17,564 | 20,540 | 24,691 |
| EU | 12,211 | 19,949 | 15,727 | 18,315 | 24,372 |
| Saudi Arabia | 3,070 | 6,964 | 4,569 | 8,458 | 7,881 |
| Canada | 4,672 | 5,009 | 5,231 | 6,685 | 7,570 |
| S. Korea | 636 | 428 | 132 | 506 | 600 |
| Taiwan | 252 | 374 | 178 | 301 | 337 |
| Other | 34,109 | 40,494 | 34,761 | 40,759 | 42,700 |
| Total | 83,816 | 104,243 | 93,161 | 116,952 | 134,226 |

[1] Year ended June 30.

Note.--Because of rounding, figures may not add to totals shown.

Source: Data for 1990 compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 91-June 92, p. 24; data for 1991 compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 92-June 93, p. 24; and data for 1992-94 compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 93-June 94, p. 24.

irregularly from 4 percent in FY90 to 5 percent in FY94 (table 3-13).[52] Australia's share of reported world exports of lamb, mutton, and goat meat (combined) ranged from a low of 34 percent in 1994 to a high of 38 in 1993 and is projected to amount to 35 percent in 1995 (table 3-14).

The leading Australian export States have been South Australia, Victoria, and Western Australia (table 3-15). Their prominence as exporters

[52] Beef and veal accounted for the bulk of the value of Australia's meat exports during 1990-94.

Table 3-13
Meat,[1] mutton, and lamb: Australian exports and lamb and mutton as a share of meat exports, by years, 1990-94[2]

| Year | Exports | | | Share of exports | |
|---|---|---|---|---|---|
| | Meat | Mutton | Lamb | Mutton | Lamb |
| | *(Million U.S. dollars)* | | | *(Percent)* | |
| 1990 | 2,159 | 147 | 84 | 6.8 | 3.9 |
| 1991 | 2,457 | 180 | 104 | 7.3 | 4.2 |
| 1992 | 2,581 | 211 | 93 | 8.2 | 3.6 |
| 1993 | 2,584 | 197 | 117 | 7.6 | 4.5 |
| 1994 | 2,743 | 219 | 134 | 8.0 | 4.9 |

[1] Beef, veal (including buffalo), mutton, lamb, and pork.
[2] Year ended June 30.

Note.--Because of rounding, figures may not add to totals shown.

Source: Data were compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, for 1990, July 91-June 92, p. 24; for 1991, July 92-June 93, p. 24; and for 1992 to 1994, July 93-June 94, p. 24.

Table 3-14
Lamb, mutton, and goat meat: Exports from Australia and the world, and the share of world exports accounted for by Australia, 1991-95

| Location | 1991 | 1992 | 1993 | 1994[1] | 1995[2] |
|---|---|---|---|---|---|
| | Quantity *(million pounds)* | | | | |
| Australia | 675 | 690 | 714 | 677 | 648 |
| World | 1,896 | 1,949 | 1,876 | 1,975 | 1,863 |
| | Share accounted for *(percent)* | | | | |
| Australia | 36 | 35 | 38 | 34 | 35 |

[1] Preliminary.
[2] Forecast.

Source: Compiled from USDA, FAS, *Livestock and Poultry: World Markets and Trade* (FL&P 2-94), Oct. 1994, p. 58.

Table 3-15
Lamb meat, chilled or frozen: Australian exports and share of production that is exported by State and Territory, 1990-94[1]

| Year | NSW | VIC | QLD | SA | WA | TAS | NT | Australia |
|---|---|---|---|---|---|---|---|---|
| | Quantity *(Million pounds, shipped weight)* | | | | | | | |
| 1990 | 14.6 | 30.2 | 2.9 | 16.8 | 17.6 | 1.5 | (2) | 83.8 |
| 1991 | 14.3 | 30.2 | 3.5 | 15.0 | 27.6 | 2.2 | (2) | 92.6 |
| 1992 | 15.7 | 15.7 | 3.5 | 26.4 | 20.1 | 1.5 | (2) | 82.9 |
| 1993 | 16.3 | 24.9 | .9 | 40.7 | 21.6 | .9 | (2) | 104.7 |
| 1994 | 15.2 | 28.4 | 1.1 | 52.2 | 26.0 | .7 | (2) | 123.7 |
| | Percent | | | | | | | |
| 1990 | 7.3 | 13.4 | 9.9 | 22.3 | 35.9 | 7.8 | (2) | 13.8 |
| 1991 | 7.7 | 13.0 | 11.2 | 23.9 | 54.8 | 12.5 | (2) | 15.9 |
| 1992 | 8.8 | 7.0 | 11.4 | 45.4 | 48.2 | 11.2 | (2) | 15.1 |
| 1993 | 10.1 | 11.2 | 4.5 | 52.1 | 46.1 | 6.0 | (2) | 19.2 |
| 1994 | 9.8 | 1.4 | 5.5 | 58.2 | 48.0 | 3.8 | (2) | 23.2 |

[1] Fiscal year July 1-June 30.
[2] Negligible or nil.

Note.--NSW represents New South Wales; VIC, Victoria; QLD, Queensland; SA, South Australia; WA, Western Australia; TAS, Tasmania; and NT, Northern Territory.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from Australian Meat and Live-stock Corporation, *Statistical Review*, July 93-June 94, p. 22.

is thought to reflect their relatively large share of meat-type sheep and their relatively small share of the Australian human population (especially, Western Australia and South Australia). The share of lamb meat production that is exported by the Australian States and Territories is also shown in table 3-15.

Australian exports of mutton increased irregularly from US$147 million (AUS$191 million) in FY90 to US$219 million (AUS$316 million) in FY94 (table 3-13). Mutton's share of the value of Australia's exports of all meats increased irregularly from 7 percent in FY90 to 8 percent in FY94. The Middle East, Japan, the European Union (EU), and Papua New Guinea have been major markets for Australia's exports of mutton; the United States has been a relatively small market.

**Exports to the United States**

Australian exports of lamb meat to the United States increased from 15 million pounds, valued at US$17 million (AUS$22 million), in FY90 to 24 million pounds, valued at US$26 million (AUS$38 million), in FY94 (table 3-12). During FY90-94, the United States was the largest single market (in terms of value) for the Australian exports of lamb meat in FY90, FY93, and FY94 (table 3-12). The annual share of Australian lamb meat exports to the United States is shown in the following tabulation (in percent):

| Year | Quantity | Value |
|---|---|---|
| 1990 | 17 | 20 |
| 1991 | 13 | 13 |
| 1992 | 17 | |

16

1993 . . . . . 16

18

1994 . . . . . 19

19

**Other markets**

Other important markets for Australian lamb meat include Japan, the EU and Canada. Australian exports of lamb meat to Japan increased from 7 million pounds, valued at US$12 million (AUS$16 million), in FY90 to 19 million pounds, valued at US$25 million (AUS$36 million), in FY94 (table 3-12). The AMLC cited the devaluation of the Australian dollar against the yen and promotion programs as causes for the increasing demand for Australian meat in Japan in FY94.[53]

The EU has been the other leading market for Australian exports of lamb meat with total exports increasing from 9 million pounds, valued at US$12 million (AUS$16 million), in FY90 to 17 million pounds (13 percent), valued at US$24 million (AUS$35 million), in FY94 (table 3-12). Exports of sheep meat and/or goat meat to the EU have been subject to a voluntary restraint agreement of 17,500 metric tons (38.6 million pounds) carcass-weight equivalent, with no duties or levies payable. After 1995, access arrangements are to be changed from a voluntary restraint agreement to a quota system, meaning that Australia would be allowed to supply products in excess of any quantitative limit but at, what the AMLC describes, a prohibitive rate of duty.[54] Within the 17,500 metric ton quota, a subquota of 4,000 metric tons (8.8 million pounds) on chilled lamb meat exports was negotiated to be removed; but the AMLC contends that there will be little effect since Australia has rarely filled the subquota.[55]

Australian exports of lamb meat to Canada increased from 4 million pounds, valued at US$5 million (AUS$6 million), in FY90 to 5 million pounds, valued at US$8 million (AUS$11 million), in FY94 (table 3-12). The AMLC cited the FARL promotion program as increasing demand for Australian meat in FY93-94.[56]

### *Live Sheep Exports*

Australian exports of live sheep increased irregularly from 4.5 million animals, valued at US$89 million (AUS$116 million), in FY90 to 5.3 million animals, valued at US$98 million (AUS$141 million) in FY94 (table 3-16). Australian exports of live sheep include those for slaughter, mostly to the Middle East (Kuwait, the United Arab Emirates, Oman, and others), and sheep for breeding purposes to many countries throughout the world. Moslem (halal) religious slaughter requirements and Arab social customs account for this demand for exports of sheep and lambs for slaughter.

Australian exports of sheep for slaughter declined from 5 million animals in FY90 to 3 million in FY91 but increased to 4 million in FY92 as shown in table 3-16. The increase in FY92 reportedly reflected, in part, the return to normal on markets in Kuwait and in other Arab countries following the end of the Gulf War.[57] No exports of sheep for slaughter to the United States apparently existed during FY90-94. A shipment of 47,602 sheep for breeding purposes was made to Mexico during the 1991/92 marketing year.[58] Australian exports of live sheep to Saudi Arabia, once a major market, ceased

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[53] AMLC, *Annual Report 1993-1994*, pp. 21-22.
[54] Ibid., p. 31.
[55] Ibid., p. 31.
[56] Ibid., pp. 20-21.
[57] AMLC, *Annual Report*, for the period 1 July 1991-30 June 1992, Aug. 1992, p. 7.
[58] Ibid.

during 1989 because of problems with "health" and protocol.[59] Consequently, Australian live sheep were exported to neighboring countries (primarily to the United Arab Emirates and Kuwait). These sheep were slaughtered and the chilled product was exported to Saudi Arabia.[60] Exports of live sheep to Saudi Arabia resumed in March 1995.[61]

### *Wool Exports*

Australian exports of wool decreased from 948 million pounds (clean basis) in the 1990 marketing year[62] to 861 million pounds in 1991 but then increased irregularly to 1,083 million pounds in 1994 (table 3-11). The Commission's estimate of the value of Australia's exports of wool during the

[59] USDA, FAS, "1992 Livestock Annual," American Embassy, Canberra, Australia, report code 52, Aug. 1, 1992, p. 23.
[60] USDA, FAS, "1994 Livestock Annual Report," code 52, June 29, 1994, p. 24.
[61] Kevin Shiell, executive director, Sheepmeat Council of Australia, interviewed by USITC staff, Canberra, Australia, Mar. 23, 1995.
[62] July/June marketing year.

Table 3-16
Live sheep and lambs: Australian exports for slaughter and for breeding purposes to all markets, 1990-94

| Item | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| | *(1,000 animals)* | | | | |
| Sheep for slaughter | 4,490 | 3,189 | 4,299 | 5,007 | 5,315 |
| Sheep for breeding purposes | 8 | 3 | 53 | 18 | 4 |
| Total | 4,498 | 3,192 | 4,352 | 5,025 | 5,319 |
| | *(Million US dollars)* | | | | |
| Sheep for slaughter | 86 | 90 | 65 | 81 | 97 |
| Sheep for breeding purposes | 2 | 1 | 2 | 1 | 1 |
| Total | 89 | 91 | 68 | 82 | 98 |

Note--Because of rounding, figures may not add to the totals shown.

Source: Data were compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, for 1990, July 91-June 92, p. 24; for 1991, July 92-June 93, p. 24; and for 1992 to 1994, July 93-June 94, p. 32.

marketing years 1990/1994 are shown in the following tabulation (in millions of U.S. dollars):

| Marketing year | Value |
|---|---|
| 1990 | 3,065 |
| 1991 | 2,047 |
| 1992 | 2,421 |
| 1993 | 1,768 |
| 1994 | 1,858 |

Most of the wool produced in Australia is exported. As shown in table 3-11, exports were equivalent to between 56 percent and 94 percent of production during 1990-94 and averaged 76 percent. The years of relatively low exports appear to be years in which inventories increased. Australia was by far the world's largest exporter of wool during 1990-94, accounting for between 59 percent (1991) and 67 percent (1993) of reported world wool exports (table 3-11).

### Australian Meat Identification System

Australia does not have a comparable "grading" system to that used in the United States;[63] its system describes the product based upon the weight and fat range measurements of the lamb carcass.[64] Although export establishments must be accredited by AUS-MEAT,[65] accreditation by domestic establishments is voluntary. The Australian carcass description system is reported in AUS-MEAT *Sheepmeat/Goat Language*, September

[63] AMLC prehearing brief, Mar. 29, 1995, p. 7.
[64] Ibid.
[65] AUS-MEAT is part of the AMLC, described in the section of this report entitled "Australian Federal Government Programs."

1994, and specifies certain objective carcass parameters.

The Australian system describes "sheep basic categories" and "sheep alternative categories" based primarily on dentition, that is, the maximum number of permanent teeth, and on sex. The Australian "sheep alternative category" description for "young lamb" (no permanent teeth), appears to be essentially the same as what is referred to as "lamb" in the United States. The Australian "sheep alternative category" description for "hogget" (1 or 2 permanent incisors, castrate male and female, no secondary sex characteristics) appears to be similar to what is referred to as "yearling mutton" in the United States. The Australian "sheep alternative categories" described for "ewe mutton" and "wether mutton" (1 to 8 permanent incisors, female, and castrate male with no secondary sex characteristics) appears to be similar to what is referred to as "mutton" in the United States.

*Sheepmeat/Goat Language* also provides for 11 "weight classes" beginning with "weight class 8" (carcasses up to 8 kilograms) and continuing at 2 kilogram intervals until "weight class 28" (carcasses of 28 kilograms). The USDA grading system does not generally make distinctions for carcass weights, although some price reporting is done based on carcass weight distinctions. In addition, "Sheepmeat/Goat Language" describes limits to carcass trimming.

The publication also describes "sheepmeat fat classes." Fatness of a carcass is described by class on a 1 to 5 scale, "class 5" being the fattest. The Australian "sheepmeat fat classes" appears to be similar in concept to the USDA "yield grades."[66]

## Australian Government Assistance[67]

### *Australian Federal Government Programs*

A number of programs affecting the Australian agricultural industry are operated by the Australian Department of Primary Industries and Energy (DPIE).[68] These programs are operated through "Sub-programs," and those that appear to directly affect sheep and lamb producers are described below.[69]

#### Rural Adjustment and Services Sub-program

The purpose of the Rural Adjustment and Services Sub-program is to encourage the economic potential of the rural sector; and redress barriers to rural people's access to the full range of Government and of other social, economic, and rural services.

The Rural Adjustment and Services Sub-program for FY94 reoriented the Rural Adjustment Scheme (RAS) and further developed and implemented new measures announced by the Australian Federal Government in September 1992. RAS, established in 1977, is an Australian Federal Government financial assistance program for farmers administered by

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[66] In addition to *Sheepmeat/Goat Language*, AUS-MEAT has published the *Handbook of Australian Meat*, 5th ed. 1993, which was designed to facilitate Australia's meat trade domestically and overseas. It provides names, item numbers, detailed specifications, and colored pictures for wholesale and retail cuts of the following meats: sheep (lamb, hogget, and mutton); beef; buffalo; goat; and offals.

[67] Wool programs are included in this review because these programs are applicable to the wool derived from all sheep, including "meat types."

[68] Tom Grealy, First Secretary (Commercial), Embassy of Australia, USITC staff interview, Washington, DC, February 1995.

[69] The information in this section on the Department of Primary Industries and Energy (DPIE) and its sub-programs is principally from *Department Of Primary Industries and Energy, Annual Report, 1993-94*, except as noted.

States or Territories.[70] This program is generally authorized for a 4-year period. The current RAS 1992, which became effective on January 1, 1993, replaced the RAS 1988.

The new objective is toward improved farm productivity, profitability, and sustainability or toward farm exit. Previously, the objective had been to assist farmers in trouble. However, the RAS also provides for additional assistance to eligible farmers in cases of exceptional circumstances that could not reasonably be expected to be accommodated within a farmer's normal risk-planning and management activities.

Financial assistance is available for both "normal" and "exceptional circumstances." The following tabulation shows the number of applications received, as well as the number approved for assistance under normal RAS and under exceptional circumstances for FY94:[71]

| Type | Total applications | Approved applications |
|---|---|---|
| Normal RAS | 8,898 | 6,299 |
| Exc. circumstances | 7,724 | 5,583 |
| Total | 16,622 | 11,882 |

"Normal" assistance includes support to improve farm productivity, enhance skills, and to re-establishment grants. A re-establishment[72] grant of up to US$31,131 (AUS$45,000) is available per farmer if it is determined that the farming enterprise has no longer prospects of long-term viability. "Exceptional circumstance" assistance includes support to farmers for severe and prolonged drought, rain, and "low" wool prices. The Australian Federal Government provides 90 percent of the funding for normal expenditures, and the States and Territories provide the remaining 10 percent. Funding for exceptional circumstances is provided on a 90:10 basis for interest "subsidies" of up to 50 percent of interest payable and on a 50:50 basis for "subsidies" exceeding 50 percent of interest payable.

Table 3-17 shows details of RAS expenditure by the Australian Federal Government and the States for July 1, 1993, to June 30, 1994. RAS expenditure for FY94 totaled US$119.2 million (AUS$172.3 million). The Federal Government provided US$104.0 million (AUS$150.3 million) in total RAS expenditures (US$74.9 million in normal and other, including administration expenses, and US$29.1 million in exceptional circumstance expenditures), or 87 percent of total RAS expenditures. Expenditures provided by the States totaled US$15.2 million (AUS$22.0 million), or 13 percent of total expenditures.

Exceptional circumstance expenditures accounted for US$40.8 million (AUS$59.0 million), or 35 percent of RAS assistance during FY94. Assistance to wool growers accounted for 43 percent, drought assistance to cattle and grain producers (primarily in Queensland and, to a lesser extent, New South Wales) for 32 percent, and rain assistance primarily in Southern Australia for 25 percent.

Normal expenditures (not including other or administrative expenditures) totaled US$24.2 million (AUS$35.0 million), or 20 percent of total RAS 1992 expenditures. Farm productivity accounted for 47 percent, and grants to re-establishment accounted for 46 percent of such assistance. Expenditures in FY94 under RAS 1988 (funding commitments) and administration totaled US$54.2 million (AUS$78.3 million), or 45 percent.

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[70] The information on the RAS is from *Rural Adjustment Scheme Advisory Council*, Annual Report 1993-94 (Canberra: Australian Government Publishing Service), and from *Department of Primary Industries and Energy, Annual Report*, 1993-94.

[71] July 1, 1993, to June 30, 1994.

[72] Re-establishment means that a farmer exits farming and that the grant is payable only after the farmer has exited the farm.

Under the new RAS, export levies for promotion, marketing, and research and development were collected and disbursed. Under the levies management program, US$146 million (AUS$211 million) in wool tax was collected by the Australian Tax Office and distributed by the DPIE Levies Management Unit to the wool corporations.

TABLE 3-17
Total rural adjustment scheme (RAS 92) expenditure during 1993-94
(See end of document)

Expenditures for the Rural Adjustment and Services Sub-program for FY94 were US$340 million (AUS$492 million). These expenditures represent assistance to various farm sectors, but data are not available to isolate assistance to live lamb and sheep growers, except for the management of the wool tax, which is paid by growers.[73]

**The Livestock and Pastoral Sub-program**

The purpose of the Livestock and Pastoral Sub-program is to promote increased market access and improved competitiveness for livestock and pastoral industries; to provide for efficient production and marketing systems; and to enhance industry's preparedness to deal with exotic diseases; and to improve animal welfare.

Expenditures for the Livestock and Pastoral Sub-program for FY94 were US$428 million (AUS$618 million).[74] These expenditures represent assistance to various farm sectors, the amount of assistance to live lamb and sheep growers cannot be isolated.[75]

**Quarantine and Inspection Sub-program**

The purpose of the Quarantine and Inspection Sub-program, which is administered by AQIS is to deliver effective and efficient quarantine and food inspection services that meet and are responsive to the needs of industry, consumers and the Australian Government and that fulfill Australia's international obligations and treaty requirements.[76]

Expenditures for the Quarantine and Inspection Sub-program for FY94 were US$117 million (AUS$169 million). As with other subprograms, the expenditures represent assistance to various farm sectors.[77]

**The Agricultural and Resource Economic Analysis Sub-program**

The purpose of the Agricultural and Resource Economic Analysis Sub-program, which is the responsibility of the Australian Bureau of Agricultural and Resource Economics (ABARE), is to provide economic information to Australia's primary and energy industries.

Expenditures for the Agriculture and Resource Economic Analysis Sub-program for FY94 were US$11 million (AUS$16 million). As with other sub-programs, the expenditures represent assistance to various farm sectors.[78]

**Public grazing lands**

According to the ABARE, there is some stock grazing on Government-owned lands (Crown Lands).[79] Such lands are generally leased by state governments to stock growers. Leases are good for 99 years and made available on a commercial basis, that is, market rate. Frequently, a farmer who grazes livestock on Crown lands owns adjacent lands (freehold). Sheep operations in such lands may occupy 12,000 to 100,000 acres and may raise almost exclusively wool-type sheep. The leased regions are estimated to sustain

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[73] Facsimile transmission from counsel for AMLC, Feb. 13, 1995.
[74] Ibid., p. 38.
[75] Counsel for AMLC, conversation with USITC staff, May 2, 1995.
[76] *Department of Primary Industries and Energy, Annual Report, 1993-94*, p. 81.
[77] Reynolds, ABARE, interviewed by USITC staff, Canberra, Australia, Mar. 23, 1995.
[78] Ibid.
[79] Reynolds, ABARE, interviewed by USITC staff, Canberra, Australia, Mar. 23, 1995.

10 to 15 percent of the total Australian sheep population at some time during the year. Leased lands have a reputation of being too dry for grain growing.[80]

**Measures of assistance**

Nominal and effective rates of assistance are calculated by the Bureau of Agricultural Economics (BAE). The nominal rate is the percentage by which government assistance allows the average gross returns per unit of output to increase, relative to the supposed situation in which no assistance is provided.

The effective rate measures the percentage increase in returns to an industry resulting from government assistance, as a proportion of the returns to that industry if there were no government assistance.[81] Table 3-18 shows the nominal and effective rate of assistance to the Australian beef, wool, and sheepmeat industries, for FY91 through FY93.

Assistance to wool increased growers' average gross returns by 18 percent in FY93; however, assistance was expected to decline after the last grant for wool promotion at the end of FY94. The effective rate of assistance for sheepmeat declined from 9 to 5 percent over the period.

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[80] Troup, president, Sheepmeat Council of Australia, interviewed by USITC staff, Washington, DC, Feb. 7. 1995.

[81] "Assistance to Agriculture and Marketing," *Meat Processing*, app. L, Apr. 20, 1994, pp. 317-318.

Table 3-18
Average nominal and effective rates of assistance to the Australian beef, wool, and sheepmeat industries, 1990-91 through 1992-93[1]

(Percent)

| Industry | Nominal rate of assistance on outputs | | | Effective rate of assistance | | |
|---|---|---|---|---|---|---|
| | 1990-91 | 1991-92 | 1992-93 | 1990-91 | 1991-92 | 1992-93 |
| Beef | 1 | (2) | (2) | 4 | 3 | 3 |
| Wool | 10 | 6 | 6 | 26 | 16 | 18 |
| Sheepmeat | 3 | (2) | (2) | 9 | 4 | 5 |

[1] Fiscal year July 1-June 30.
[2] Between -0.5 and 0.5 percent.

Source: Compiled from Industry Commission, *Meat Processing*, Apr. 20 1994, app. L, p. 318.

### *Australian Federal Government Statutory Authorities*

**The Australian Meat and Live-stock Corporation**[82]

The Australian Meat and Live-Stock Corporation (AMLC) is a statutory authority with the prime responsibility of facilitating the marketing of Australian meat and livestock both domestically and in foreign markets. The AMLC is funded primarily through industry levies.

The AMLC's overriding objective is to enhance the profitability of all sectors of the meat and livestock industry by maximizing the opportunities in Australia and overseas. The AMLC has four specific strategies to accomplish its overriding objective: to secure and protect the best possible access to international and domestic markets to advertize and promote AMLC's members' products, to assure quality and customer satisfaction throughout the marketing chain, and to provide market intelligence. The AMLC is constituted under the authority of the Australian Meat and Live-Stock Act, 1977.

Formal committees of the AMLC include, but are not limited, to the (1) AUS-MEAT Committee, (2) the Computer Assisted Livestock Marketing Committee, and (3) the Lamb and Sheepmeat Promotion Committee.

***AUS-MEAT Committee***[83]

AUS-MEAT is the AMLC committee responsible for industry-trading language, standards, and plant accreditation.[84] Under government regulations, all export establishments in Australia have to be accredited by AUS-MEAT. Domestic operations may be accredited voluntarily. Accreditation requires plants to achieve a score from 1 to 5 (with 1 being the highest) for a number of procedures on the slaughter floor, in the boning room, offal room, load out and cold store, and in portion-cutting process. During fiscal year 1994, 23 new plants were accredited, and, as of June 30, 1994, there were 200 accredited plants for all species of livestock, including for, but not limited to, lambs.

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[82] The description of the AMLC in this section is principally from the *Australian Meat and Live-stock Corporation 1993-1994* Annual Report, except as noted.
[83] Publications of AUS-MEAT include *The Handbook of Australian Meat* and *Sheepmeat/Goat Language*.
[84] AMLC, *1993-1994 Annual Report*, p. 35.

*Computer Assisted Livestock Marketing*

The Marketing Services Division (Division) of the AMLC services the information needs of the AMLC and of the industry in general. The Division produces a number of price and market publications including Computer Assisted Livestock Marketing (CALM). This system is an Australia-wide marketing network that is auction based and uses sales by description for trading cattle, sheep, lambs, and pigs. When marketing under the CALM system, livestock remain on the producers' property or in the feedlot. A CALM representative (assessor) visits the property or feedlot, examines the livestock and estimates the carcass weight and fat cover. The assessor then describes the animals according to breed, weight, and fat score in the network, and the livestock are entered in an auction lot.[85]

During FY94, lambs listed with CALM reached 429,721, and sheep listings reached 1.1 million.[86] Virtually all processors in Australia purchased sheep through the CALM at some point during the year, and some firms were able to greatly expand their range of buying areas. During the last part of FY94, the CALM was able to facilitate the sale of live sheep for export. Under the CALM, an increasing number of lambs are sold on a dressed weight basis, and CALM plans to expand its market to include wool. Beginning in June 1994, the CALM established an electronic market for sheep and lamb skins. Also, during FY94, CALM established an electronic bulletin board operated by the CALM Market Intelligence Unit to provide market information electronically, with users being charged for the time they are connected to the system. Information on the system includes market commentary, exchange rate movements, and wool market reports and information supplied by the Marketing Services Division of the AMLC.[87]

The Division also administers export quota systems and licenses livestock and meat exporters.[88] The licensing of exporters is a legislative authority. Applicants for licenses must meet certain standards of integrity, competence, and financial standing. An export license is subject to the condition that the holder shall comply with orders and directions of the AMLC. As of June 30, 1994, there were 379 meat exporters and 135 livestock exporters with licenses.[89] During FY94, 44 meat and 14 livestock export licenses were issued; 46 meat and 12 livestock export licenses were surrendered or expired.[90]

*Lamb and Sheep Meat Promotion Committee*

Since 1988, the AMLC has fostered the Fresh Australian Range Lamb (FARL)[91] program, which involves the promotion and sale of specified lamb meat directly to the North American consumer. All lamb meat marketed under the FARL program must carry the FARL logo and can be sold only through authorized importers and retailers as agreed to by the AMLC. Participants in the FARL program, which include Australian exporters and U.S. importers and retailers, are required to sign letters of agreement with the AMLC governing the use of the logo. The FARL program specifications call for chilled primal and subprimal cuts only, packaged and cut to previously agreed specifications and derived from carcasses that have met program specifications.[92] Any new or different specifications must be approved by AUS-MEAT.

The FARL program requires, among other things, that the meat be derived from animals that have been grown primarily on pasture conditions but does not exclude lambs

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[85] Dr. Peter Barnard, divisional manager of AMLC, USITC staff interview, Sydney, Australia, Mar. 20, 1995.

[86] AMLC, *1993-1994 Annual Report*, pp. 39-41.

[87] Ibid.

[88] Ibid., p. 44-45.

[89] Ibid.

[90] Ibid.

[91] The information in this section on the Fresh Australian Range Lamb Program is from the AMLC's *Fresh Australian Range Lamb Product Specification and Code of Conduct*, rev. ed. Jan. 1991, and *Fresh Australian Range Lamb Product Guide*, rev. ed., Mar. 1991, except as noted.

[92] The FARL program is not applicable to frozen lamb meat.

that have been finished on grain, improved pasture conditions, or on any other form of supplementary feeding. The FARL program also requires participants to conform to a code of practice during the preparation of the product, which starts out with the handling of the animals before slaughter and includes special attention to the temperature of the product at all stages of production and during transport. Under the FARL program, the product must be vacuum packed in packaging that meets specifications. Lamb marketed under the FARL program is flown directly from Australia to North America to ensure the delivery time remains around 72 hours from Australian producer to the American retailer.

### *AMLC expenses and revenues*[93]

Total operating expenses for the AMLC for the fiscal year ending June 30, 1994, were US$67.2 million (AUS$97.2 million), down from US$69.7 million (AUS$99.1 million) in the previous year. Expenses for export marketing, which include expenses for beef, as well as lamb, in North and South America for the fiscal year ending June 30, 1994, were US$6.8 million (AUS$9.8 million), down from US$10.1 million (AUS$14.4 million) in the previous corresponding year.[94] Expenses for export marketing in North Asia averaged US$17.0 million (AUS$24.0 million) in the 2 years, and export marketing expenses for all markets averaged US$32 million (AUS$46 million) in the 2 years. Marketing expenses in Australia averaged US$17 million (AUS$24 million) in the 2 years.

Total operating revenues for the AMLC for the fiscal year ending June 30, 1994, was US$67.4 million (AUS$97.5 million), down from US$71.1 million (AUS$101.1 million) in the preceding year. Slaughter levies (a charge applied for animals slaughtered) and export charges collected for live sheep and lambs for the fiscal year ending June 30, 1994, were US$15.4 million (AUS$22.3 million), down from US$16.0 million (AUS$22.8 million) in the year ending June 30, 1993. The slaughter rates of levy effective from July 1, 1994, have been US$0.51 (AUS$0.741) for lambs and US$0.22 (AUS$0.321) for sheep; export charges effective from July 1, 1994, have been US$0.18 (AUS$0.262) for both live sheep and lambs. Transaction levies for cattle, and beef production levies for the fiscal year ending June 30, 1994, were US$46.4 million (AUS$67.1 million), down from US$50.3 million (AUS$71.6 million) in the previous year. The AMLC also received export market grants from the Australian Government of US$175,750 (AUS$250,000) in fiscal year 1993 and US$172,950 in fiscal year 1994. The grants are part of general operating revenue and represent revenues for various farm sectors.[95]

### Wool International[96]

Wool International (WI) is an Australian statutory authority that officially came into existence on December 1, 1993, under provisions of the Wool International Act, 1993 (WI Act, 1993).[97] WI replaced the Australian Wool Realization Commission. WI has five major tasks: to sell Australia's wool stockpile (3.67 million bales as of June 30, 1994) consistent with a fixed quantity rule from July 1, 1994, onward; to effectively manage nonwool assets; to develop efficient liquid forward markets for wool; to provide services to the Australian wool industry; and to prepare for privatization, enabling ownership of residual assets to formally pass to woolgrowers.[98]

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[93] Data on expenses and revenues of the AMLC in this section were taken from the AMLC *1993-1994 Annual Report*, financial statement, pp. 55-64, except as noted.

[94] Exports of Australian beef to the United States were valued at $694.3 million in 1994, whereas comparable exports of Australian lamb and mutton were valued at $34.6 million. See AMLC, *Statistical Review*, July 93-June 94, p. 24.

[95] Trendl, counsel for AMLC, conversation with USITC staff, May 2, 1995.

[96] The information in this section on Wool International is principally from "Wool International," *Annual Report 1993-1994*, Nov. 25, 1994.

[97] WI is directly responsible to the Minister for Primary Industry and Energy.

[98] WI, *Annual Report 1993-1994*, p. 16.

*WI programs*

Under the WI Act, 1993, WI is required to sell from its wool stockpile at least 28,000 bales per month for the 6 months between July and December 1994 and 187,000 bales per quarter from January 1995 until privatization. During FY 1993-94, WI sold 286,000 bales. WI has authority to buy wool to maintain its net position in relation to the fixed quantity sales schedule. However, this authority to buy wool is narrowly defined. The WI Act, 1993 indicates that WI is not to be a trader in the day-to-day operations of the market. Rather, any buying activity is to be used on specific occasions, where needed to ensure that WI meets the legislated disposal schedule.[99]

To develop efficient liquid forward markets for wool, WI has established a forward sales program as the main method of selling the stockpile. WI has also conducted auction sales for both spot and deferred delivery and entered into private tenders for deferred and spot delivery. WI has also worked with the Sidney Futures Exchange to establish a future exchange for wool. As part of its responsibility to provide services to the Australian wool industry, WI conducts market reporting services previously handled by the Australian Wool Corporation.

Under current law, the privatization of WI is to occur no sooner than July 1, 1997, provided there is sufficient net worth. Growers initially are to receive shares in proportion to wool tax paid over the 4 years, from 1993-94 to 1996-97, in conformity with privatization directions of the WI Act, 1993.

*WI revenues and wool tax*[100]

WI's first Annual Report indicated that its operating revenues, before abnormal items, were derived primarily by a wool tax (generally, 4.5 percent on the value of shorn wool on which shorn wool tax was paid) and sales of wool from the WI stockpile. Additionally, in 1993 the Australian Government contributed US$15.8 million (AUS$22.5 million). For 1993, the wool tax amounted to US$138 million (AUS$197 million) and accounted for 57 percent of the total operating revenues of US$245 million (AUS$348 million), while sales of wool from the WI stockpile amounted to US$49 million (AUS$70 million) and accounted for 20 percent. The aforementioned government contribution accounted for 6 percent. For 1994, the wool tax amounted to US$79 million (AUS$114 million) and accounted for 34 percent of the total operating revenues before abnormal items of US$233 million (AUS$337 million), while sales of wool amounted to US$111 million (AUS$161 million) and accounted for 48 percent; there was no government contribution. In both 1993 and 1994, property rentals and interest accounted for most of the remaining operating revenues.

*Australian Wool Realization Commission*

The Australian Wool Realization Commission (AWRC) was established under the provisions of the Australian Wool Realization Commission Act, 1991. On its establishment in 1992, the AWRC took over the US$2.1 billion (AUS$2.7 billion) debt and 4.6 million bales wool stockpile of the Australian Wool Corporation.[101] A program associated with the AWRC, the Wool Industry Supplementary Payment Scheme (WISPS), was established by the Australian Federal Government in March 1991. The announced purpose of the program was to compensate woolgrowers for the difference between the market price after the abolition of the Reserve Price Scheme[102] and that during February-June, 1991,

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[99] The information in this paragraph is from WI, *Annual Report 1993-1994*, p. 16.

[100] Data on WI Revenues and Wool Tax were taken from the Annual Report Financial Statements, Nov. 25, 1994, pp. 49-69.

[101] AWRC, *Annual Report 1991-1992*, Dec. 1, 1992, p. 1.

[102] As reported in the *Australian Wool Corporation Annual Report 1987-1988*, page 24, the AWC operated the Reserve Price Scheme (RPS) to provide price stability for Australian wool. Under the RPS the AWC bought and held wool offered at auction that failed to attract a trade bid equal to or above the (continued...)

when the Reserve Price for wool was still in effect. Total payments over the life of the WISPS were AUS$311 million (consisting of AUS$300 million of Australian Federal Government funds and AUS$11 million of AWRC funds). This program was terminated in 1992.[103]

*The Australian Wool Corporation*[104]

The Australian Wool Corporation (AWC), a statutory authority, has the objective to improve the performance of the wool industry in Australia and promote wool and wool products within and outside Australia by facilitating efficient marketing and improving the quality of Australian wool. As noted earlier, the AWC's function in the marketing of wool was taken over by the AWRC. During 1992 and 1993, the AWC's International Market Development group expanded its activities in Asia, the Commonwealth of Independent States (CIS), and Egypt. The AWC was reported to have received Australian Federal Government grants of US$18 million (AUS$25 million) in 1992-93.[105]

**Australian State and Territory Programs**

State governments provide certain outlays relating to livestock production, although data on specific state programs are not available. Such funds are primarily for research, extension service, inspection, disease and pest control, and soil conservation. Table 3-19 shows estimated total State government budgetary outlays for Australian sheepmeat production by State and Territory, for FY91.[106]

According to Mr. Michael J. Taylor, Secretary for Agriculture, Department of Agriculture Victoria, the Australian Government has reduced regulation over the last 20 years and placed greater emphasis on private industry. The State of Victoria does not maintain separate statistics on the lamb industry and relies on that collected by ABARE in Canberra. The Victorian Department of Agriculture provides support to the sheep and wool industry in the form of research from funds it receives from the AMLC.[107]

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[102] (...continued)
reserve price established by the AWC. The RPS was reported to be financed entirely by woolgrowers through the Market Support Fund of a wool tax levy.

[103] AWRC, *Annual Report 1991-1992*, p. 12.

[104] The information in this section on the AWC is principally from USDA, FAS "Agricultural Situation, Competitor Market Promotion Activities - Australia," (AGR No. AS4009), Feb. 9, 1994, p. 5.

[105] USDA, FAS, "Agricultural Situation, Government Expenditure on Agricultural Promotion," (AGR No. AS4021), May 3, 1994, p. 1.

[106] *Meat Processing*, vol. II, Apr. 20, 1994, p. 136.

[107] Michael J. Taylor, secretary for Agriculture, USITC staff interview, Ballarat, Australia, Mar. 20, 1995.

Table 3-19
Australian State government budgetary outlays and ratio of outlays to farm gate value to the pigmeat, sheepmeat, and beef and veal industries, fiscal year 1991[1]

| State/Territory | Pigmeat | Sheepmeat | Beef and veal | Total |
|---|---|---|---|---|
| | (1,000 of U.S. dollars) | | | |
| Queensland | 31,117 | 577 | 33,336 | 65,030 |
| New South Wales | 5,944 | 1,667 | 28,593 | 36,205 |
| Victoria | 2,071 | 1,339 | 10,419 | 13,829 |
| North Territory | 97 | 0 | 8,508 | 8,605 |
| Western Australia | 1,565 | 5,236 | 6,478 | 13,279 |
| South Australia | 1,326 | 576 | 2,475 | 4,377 |
| Tasmania | 272 | 410 | 1,091 | 1,773 |
| Total | 42,392 | 9,805 | 90,900 | 143,098 |
| | Ratio of outlays to farm gate value | | | |
| | (Percent) | | | |
| Queensland | 3 | 3 | 3 | |
| New South Wales | 4 | 4 | 4 | |
| Victoria | 2 | 2 | 2 | |
| North Territory | 6 | ([2]) | 12 | |
| Western Australia | 4 | 10 | 5 | |
| South Australia | 2 | 2 | 2 | |
| Tasmania | 3 | 8 | 2 | |

[1] July 1990-June 1991.
[2] Not applicable.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from Industry Commission *Meat Processing*, vol. II; app. No. 38, (Australia Government Publication Service, Canberra), Apr. 20, 1994, p. 136.

Table 3-17
Total Rural Adjustment Scheme (RAS 92) expenditure during 1993-94[1]

*(1,000 U.S. dollars)*

| Item | Normal expenditures | | | Exceptional Circumstances | | | Other expenditure | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Farm productivity | Skills | Reestablishment | Wool | Drought | Rain | RAS1988 | Administration | |
| NSW | | | | | | | | | |
| Commonwealth | 1,949 | 457 | 4,459 | 6,009 | 1,033 | 896 | 20,477 | 2,129 | 37,408 |
| State | 217 | 51 | 495 | 2,102 | 254 | 206 | 0 | 237 | 3,562 |
| QLD | | | | | | | | | |
| Commonwealth | 4,235 | 91 | 1,158 | 1,694 | 9,165 | 0 | 6,109 | 3,044 | 25,496 |
| State | 470 | 10 | 129 | 529 | 2,632 | 0 | 0 | 338 | 4,108 |
| SA | | | | | | | | | |
| Commonwealth | 1,013 | 229 | 2,020 | 2,313 | 0 | 4,342 | 6,006 | 1,384 | 17,307 |
| State | 113 | 26 | 224 | 529 | 0 | 4,407 | 0 | 154 | 5,453 |
| VIC | | | | | | | | | |
| Commonwealth | 1,449 | 108 | 2,053 | 1,514 | 0 | 374 | 7,345 | 1,793 | 14,635 |
| State | 161 | 12 | 228 | 306 | 0 | 89 | 0 | 199 | 996 |
| WA | | | | | | | | | |
| Commonwealth | 1,059 | 446 | 291 | 1,434 | 0 | 0 | 1,514 | 1,377 | 6,120 |
| State | 118 | 50 | 33 | 510 | 0 | 0 | 0 | 153 | 863 |
| TAS | | | | | | | | | |
| Commonwealth | 401 | 29 | 71 | 454 | 0 | 0 | 1,014 | 517 | 2,486 |
| State | 44 | 3 | 8 | 52 | 0 | 0 | 0 | 57 | 165 |
| NT | | | | | | | | | |
| Commonwealth | 218 | 21 | 28 | 0 | 0 | 0 | 167 | 131 | 565 |
| State | 24 | 2 | 3 | 0 | 0 | 0 | 0 | 15 | 44 |
| Total: | | | | | | | | | |
| Commonwealth | 10,324 | 1,380 | 10,079 | 13,417 | 10,198 | 5,612 | 42,632 | 10,375 | 104,017 |
| State | 1,147 | 153 | 1,120 | 4,028 | 2,885 | 4,702 | 0 | 1,153 | 15,191 |

[1] Fiscal year July 1 through June 30.

Source: *Rural Adjustment Scheme Advisory Council*, Annual Report 1993-94 (Canberra, Australian Government Publishing Service, Nov. 21, 1994), p. 50.

## CHAPTER 4: NEW ZEALAND INDUSTRY

### Structure and Operations of the New Zealand Industry

Sheep are raised throughout New Zealand, and producers benefit from nearly ideal climatic and grazing conditions. Many of New Zealand's sheep are dual-purpose breeds, producing both wool and meat. The most common breed is the Romney, a breed not commonly raised in the United States. Other important breeds include the Coopworth, Perendale, Corriedale, and Merino.[1]

#### *Sheep Inventory*

The sheep inventory in New Zealand declined steadily from 58 million animals in 1990[2] to 50 million animals in 1994 (table 4-1), continuing a long-term decline from 70 million in 1982. The decline in sheep numbers reflects in part lower wool prices and the continued movement, especially in northern regions, away from sheep raising and toward dairying and beef cattle production.[3] During the past decade, approximately 2.0 million acres of pastoral lands were converted to forestry and horticulture, and an additional 1.2 million acres is projected to be converted this decade.[4] New Zealand comprises chiefly the North Island and South Island (see figure 4-1). In the North Island, approximately 44,478 acres were converted from grazing lands to forestry in 1994.[5]

The decline in sheep inventory occurred in both the North Island and the South Island. However, the greatest decline occurred in the North Island as shown in the following tabulation (1,000 animals):[6]

| Region | 1990 | 1991 | 1992 | 1993 | 1994[1] |
|---|---|---|---|---|---|
| North Island | 27,844 | 26,355 | 24,720 | 23,250 | 22,950 |
| South Island | 30,008 | 28,807 | 27,804 | 26,748 | 27,190 |
| Total | 57,852 | 55,162 | 52,568[2] | 50,298[2] | 50,140 |

[1] Estimated.
[2] Figures may not add.

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[1] Toni Bywater, Ph.D., Lincoln University, interviewed by USITC staff, Canterbury, New Zealand, Mar. 30, 1995.
[2] Year ending June 30.
[3] New Zealand's Ministry of Agriculture and Fisheries, *Situation and Outlook for New Zealand Agriculture* (*SONZA*), 1994, p. 32.
[4] New Zealand Meat Producers Board (NZMPB), *Strategic Plan 1993-2000*, Aug. 23, 1993, p. 1.
[5] NZ Meat & Wool Board's Economic Service (NZEC), *Annual Review of the New Zealand Sheep and Beef Industry*, 1993-94, p. 4.
[6] Ibid., various issues for 1990-93 data; data for 1994 compiled from NZEC, paper G2079, May 4, 1995, p. 15.

Table 4-1
Sheep and lambs: New Zealand total sheep numbers, of ewes, of lambs docked, and of lambs slaughtered, 1990-94

*(1,000 animals)*

| Year | Total number of Sheep | Ewes | Number of lambs Docked | Slaughtered | Lambing percentage |
|---|---|---|---|---|---|
| 1990 | 57,852 | 40,453 | 40,616 | 25,149 | 100.4 |
| 1991 | 55,162 | 36,631 | 38,716 | 27,275 | 105.7 |
| 1992 | 52,568 | 36,684 | 35,033 | 28,073 | 95.5 |
| 1993[1] | 50,298 | 35,375 | 37,430 | 23,398 | 105.4 |
| 1994[1] | 50,140 | 35,160 | 38,000 | 26,211 | 108.0 |

[1] Preliminary.

Note.--Total number of sheep, of ewes, and of lambs docked (tailed) are for yearend June 30, whereas the number of lambs slaughtered are for yearend Sept. 30.

Source: 1990-92 data compiled from statistics of the New Zealand Meat & Wool Board's Economic Service, *Annual Review of The New Zealand Sheep and Beef Industry*, 1993-94, pp. 22 and 25; 1993-94 data compiled from statistics of the New Zealand Meat Producers Board, Annual Report 1994, p. 56.

FIGURE 4-1
Location of principal lamb producing areas in New Zealand, 1995

The North Island accounted for 46 percent of the total sheep inventory in 1994, down 2 percent from 1990, and the South Island accounted for 54 percent, up 2 percent from 1990. During 1990-94, the sheep inventory in the North Island fell by 18 percent, while the inventory of sheep in the South Island fell by 9 percent. Principal sheep-raising regions in the South Island include Otago-Southland and Canterbury-Westland, representing 29 and 25 percent, respectively, of the total sheep inventory (figure 4-1). Principal sheep raising regions of the North Island include East Coast, North-South Auckland, and Taranaki-Wanganui-Manawatu, accounting for 21, 15, and 10 percent, respectively, of sheep inventory as of June 30, 1994.

### *Growing Operations*

Sheep in New Zealand generally require no shelter and little or no supplemental feed (grain) as grazing in most of New Zealand is available throughout the year. The New Zealand Meat & Wool Board's Economic Service (NZEC) estimates that, in 1993, there were 19,600 New Zealand farms with about 50 million sheep.[7] Specific farm characteristics (acreage, animal-carrying capacity, primary sheep type, and so forth) vary significantly and are mostly dependent upon the climate, soil fertilities, and topography.

Sheep farming in New Zealand can be divided into three regions: the lowland, the hill country, and the high country. The lowland region is generally located on flat or rolling country and is capable of being plowed. This region includes Southland on the South Island, which is the most intensive sheep belt in New Zealand. Farmers in this area generally employ a controlled grazing system, in which the grazing areas are constantly rotated.[8] The NZEC estimates that an average South Island intensive finishing farm would be about 500 acres with 2,400 sheep and 15 cattle, and the operation would be capable of carrying about 5 to 6 sheep or stock units per acre (one stock unit is equivalent to one ewe).[9]

The hill country is mostly in the North Island and has been developed out of bush or forest. The NZEC estimates that, in 1993, there were 7,250 hill country farms with an average farm estimated to be about 2,300 acres with 3,600 sheep and 300 cattle. North Island hill country farms averaged about four stock units per acre, whereas South Island hill farms averaged about one and one-fourth. In general, the North Island's climate is milder and wetter than the South Island's.

High country sheep farms are located in the South Island. This land is generally described as unproductive steep mountain land that is erosion prone, dry, and located from 3,000 to 6,000 feet above sea level.[10] The majority of land classified as high country (6.2 million acres) is owned by the New Zealand Government (Crown lands) and is commonly leased, with use restrictions, generally by farmers who have adjoining properties.[11] The NZEC estimates the number of high country farms at 250, with 2.5 million sheep (nearly all Merinos). The average high country sheep operation is about

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[7] NZEC, *The New Zealand Sheep and Beef Farm Survey 1992-93*, publication No. 2075, Feb. 1995, p. 10.

[8] Sheep producers Alistar Crossen of Balcutha, NZ, and Neil and Mary Ann Winters, Invercargill, NZ, interviewed by USITC staff, Mar. 30, 1995.

[9] One ewe = 1 stock unit; one hogget or wether = 0.7 stock units; one cow = 5.5 stock units; one mature stag (male deer) = 2.1 stock units.

[10] John Acland, sheep farmer, interviewed by USITC staff, Mt. Peel Station, South Island, New Zealand, Apr. 1, 1995.

[11] Bob Austin, general manager of LANDCORP, interviewed by USITC staff, Wellington, New Zealand, Mar. 28, 1995.

25,000 acres, with about 9,000 sheep, 300 cattle, and 60 deer and is on average capable of supporting about one sheep per three to four acres.[12]

There is little foreign ownership of sheep farms in New Zealand, and the Overseas Investment Commission (OIC) must approve all investments in rural land. During 1991-94, the OIC approved foreign purchases of sheep farms totaling 54,000 hectares (133,434 acres), or less than 1 percent of all sheep farming land. However, the OIC does not collect information on the share of these lands that were actually purchased by foreign interests.[13]

### *Meat Packing and Processing Sector*

Farmer-owned cooperatives own most of the New Zealand sheep/lamb meat processing industry.[14] There is currently no foreign ownership in New Zealand's processing plants. Among the largest lamb meat processors are Affco New Zealand Ltd. (Affco), Alliance Freezing Company, Ltd, Primary Producers Cooperative Ltd (PPCS), Lowe Walker, and Richmond. Lowe Walker is the only major privately owned firm.[15] Since 1992, one new lamb slaughtering plant has begun production (AFFCO Northland) and it is estimated there were about 33 lamb-slaughtering plants (eligible to produce for export) in early 1995.[16] During 1994, two large meat-processing companies went into receivership. Fortex, a major lamb and deer processor, closed two lamb-processing plants located in the South Island (Mosgiel and Ashburton), leaving a debt to farmers of NZ$10.5 million (US$6.3 million) for livestock delivered.[17] The plant in Mosgiel was purchased by PPCS and does not slaughter lambs, but undertakes further processing.[18] The Ashburton plant was purchased by Canterbury Meat Packers Ltd. and presently slaughters and processes sheep, lambs, and beef.[19] Excess production capacity has been a major problem affecting the New Zealand meat-processing sector for several years.

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[12] NZEC, *The New Zealand Sheep and Beef Farm Survey 1992-93*, publication No. 2075, Feb. 1995, p. 14.

[13] Sandra O'Leary, deputy assistant secretary, Bureau of East Asia and Pacific Affairs, Department of State, statement before the Senate Foreign Relations Committee, The Asian and Pacific Affairs Subcommittee, Mar. 29, 1995, p. 19.

[14] The New Zealand Commerce Commission is a government agency established under the Commerce Act of 1986. The Commission, among other things, conducted a study of the New Zealand sheep and lamb sector and released a report, Commerce Commission Decision No. 273 (ISSN No. 0114-2720), Feb. 2, 1995. The New Zealand Commerce Commission defines the meat-processing industry as "those companies that undertake the slaughter of livestock, cutting the carcasses into desired forms, packing, and freezing or chilling the products." Further processing of meat into cuts to meet the specifications of particular purchasers is sometimes undertaken by separate companies. Commission report, p. 13.

[15] Theodore Horoschak, Agricultural attache, Embassy of the United States, interviewed by USITC staff, Wellington, New Zealand, Mar. 27, 1995.

[16] New Zealand Meat Producers Board officials, interviewed by USITC staff, Wellington, New Zealand, Apr. 1995.

[17] USDA, FAS, "Meat Industry Restructuring and Closures," AGR No: NZ4027, Aug. 25, 1994.

[18] New Zealand's Commerce Commission Decision No. 273, ISSN No. 0114-2720, Feb. 2, 1995, p. 23.

[19] Ibid.

In August 1994, Weddel,[20] a major sheep and cattle processor, closed six plants (four of which processed sheepmeat) in the North Island owing farmers NZ$35.0 million (US$21 million) for livestock delivered.[21] A consortium of North Island meat-processing companies[22] formed Trial Run Holdings Limited that ultimately purchased and permanently closed the slaughter facilities previously operated by Weddel in an effort to reduce processing capacity.[23] High exit costs, usually in the form of redundancy payments[24] and clean-up cost can result in inefficient plants remaining open or being purchased by other meat processors.[25] There are few choices for meat packing plants; thus, had the consortium not purchased and closed the Weddel plants, the plants would most likely have re-opened under new ownership.[26] The permanent closure of the Weddel plants does not prevent new entrants into the processing sector, and existing processors can expand capacity if required to meet slaughter requirements. Quota allocations are required for New Zealand's sheep meat exports to the European Union (EU). With the subsequent closure of Weddel plants, their quota allocation (10 percent of the total quota for sheepmeat during 1995) was transferred to the purchaser of the plants.[27]

Members of the consortium accounted for over 70 percent of the meat processing in the North Island during 1993-94 (beef, sheep, and lamb), and Weddel accounted for most of the remainder.[28] The purchase was investigated for anticompetitive behavior by the New Zealand Commerce Commission (Commerce Commission) under the Commerce Act. The Commerce Commission approved the transaction as acceptable under the Act and ruled that sufficient competition remains in the industry to ensure competitive demand for slaughter animals at the farm gate.[29] In addition, the Commerce Commission concluded that the benefit to the public from the proposal would significantly outweigh the detriments from the loss of competition.[30] The decision is being appealed.[31]

The Commerce Commission reported excess current capacity[32] at 6 percent for sheep-processing plants in the North Island (before the closing of Weddel). Since the closure of the Weddel plants, North Island processors have been able to expand physical capacity to accommodate increased livestock supplies caused by drought on the East Coast. Some plants have increased capacity by working a second shift and by converting to the inverted chain processing system.[33] Some producers have experienced delays in slaughtering services during peak slaughtering periods; however, considerable excess

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[20] Weddel was owned by Western United Co., Ltd., a privately held foreign company.

[21] USDA, FAS, AGR No: NZ4027, Aug. 25, 1994.

[22] Trial Run Holdings Limited, acting as trustee for the consortium members, is owned by the consortium members.

[23] John A. Preston, chief investigator, New Zealand Commerce Commission (Commerce Commission), interviewed by USITC staff, Wellington, New Zealand, Mar. 28, 1995.

[24] Severance payments.

[25] Commerce Commission, p. 47.

[26] Ibid., p. 57.

[27] Ibid., p. 46.

[28] Ibid., p. 4.

[29] Commerce Commission Decision No. 273, ISSN No. 0114-2720, Feb. 2, 1995.

[30] Ibid., p. 76.

[31] John A. Preston and Tony Ilott, Commerce Commission, interviewed by USITC staff, Wellington, New Zealand, Mar. 28, 1995.

[32] Current capacity is defined as the maximum throughput, given that no change is made to existing management practices, plant configurations, manning levels, or to industrial agreements. Commerce Commission, p. 48.

[33] The inverted chain processing system is discussed later in this chapter.

capacity still exists during nonpeak slaughter periods when supplies of sheep are low.

Some New Zealand plants are large-volume operations. For example, the Alliance Lorneville plant, located in the South Island, is the world's largest sheep-processing plant.[34] This plant slaughters approximately 22,000 sheep daily and operates about 7 months a year. The plant operates six chains, all using the inverted chain processing system. In addition, to the advantages stated above, Alliance officials stated that fewer workers are required with the inverted chain system. The plant employs approximately 1,400 workers (of which 350 work the kill floor). Approximately 2.6 million lambs will be processed in 1995. Most of the meat is further processed (for example, trimmed, deboned, or prepared into chef or retail ready cuts), placed in air-tight plastic packages, boxed, and shipped. Only about 20 percent of the lamb processed is shipped in carcass form.

Major markets for Alliance's lamb meat include Europe and Japan. In recent years, Alliance officials reported that these markets have demanded a greater share of further processed products. The plant also custom slaughters for the domestic supermarket chains.

[34] Roger J. Driver, plant manager, and John W. Ellis, production manager of Alliance Group, Lorneville plant, interviewed by USITC staff, Invercargill, New Zealand, Mar. 31, 1995.

## Lamb Meat Production, Consumption, and Prices

### *Production*

The number of lambs slaughtered increased from 25 million animals in 1990 (year ending September 30) to 28 million animals in 1992, then declined to 23 million in 1993 (table 4-1). Such production rose to 26 million animals in 1994. The increase in lamb slaughter during 1994 reflected an increase in the number of lambs born in the preceding spring and a high rate of lamb survival owing to good weather around most of New Zealand. The decline in slaughter in 1993 reflects both a continuing rundown of the sheep flock and fewer lambs available for slaughter because of unfavorable weather during the winter of 1992, which resulted in significant losses of livestock numbers.[35]

New Zealand's production of live lambs (lamb crop), as measured by the number of lambs tailed (docked), declined from 41 million animals in 1990 (year ending June 30) to 35 million animals in 1992, and then rose to 38 million in 1994 (table 4-1). The overall decline in lamb production reflects, in large part, the decline in total sheep numbers and the number of ewes kept for breeding purposes.

The number of ewes kept for breeding purpose declined by 13 percent during the period from 40 million animals at yearend June 30, 1990, to 35 million animals at yearend June 30, 1994 (table 4-1). The lambing rate (lambs tailed as a percentage of ewes mated in the previous autumn) is also shown in table 4-1.

New Zealand lamb meat production increased from 772 million pounds (carcass-weight basis) in 1990 (year ending September 30) to 882 million pounds in 1992 (table 4-2), reflecting an increase in the number of lambs slaughtered as well as an increase in average carcass weights. Such production declined in 1993 to 783 million pounds, then rose to 849 million pounds in 1994. The average export carcass weight increased steadily during 1990-94 from 13.71 kilograms (30 pounds) to 15.00 kilograms (33 pounds).

During 1990-94, sheepmeat (mutton and lamb) production accounted for between 44 and 51 percent of New Zealand's meat production as shown in table 4-3. Lamb accounted for 33 percent, and mutton for 13 percent in 1994.

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[35] NZEC, *Annual Review of the New Zealand Sheep and Beef Industry*, 1992-93, p. 18.

Table 4-2
Sheepmeat: New Zealand production, exports, and exports as a share of production, by types, 1990-94[1]

| Type | 1990 | 1991 | 1992 | 1993 | 1994[2] |
|---|---|---|---|---|---|
| | --(Million pounds, carcass weight)-- | | | | |
| Production: | | | | | |
| Lamb meat | 772 | 849 | 882 | 783 | 849 |
| Mutton | 397 | 375 | 408 | 342 | 320 |
| Total sheepmeat | 1,169 | 1,224 | 1,290 | 1,125 | 1,169 |
| Exports: | | | | | |
| Lamb meat | 732 | 807 | 838 | 747 | 827 |
| Mutton | 229 | 227 | 249 | 238 | 227 |
| Total sheepmeat | 961 | 1,034 | 1,087 | 985 | 1,054 |
| | ----------(Percent)---------- | | | | |
| Exports as a share of production: | | | | | |
| Lamb meat | 95 | 95 | 95 | 95 | 97 |
| Mutton | 58 | 61 | 61 | 70 | 71 |
| Total sheepmeat | 82 | 84 | 84 | 88 | 90 |

[1] Yearend Sept. 30.
[2] Estimated.

Source: New Zealand Meat & Wool Board's Economic Service, *Annual Review of the New Zealand Sheep and Beef Industry*, 1993-94, p. 26.

Table 4-3
Meat,[1] mutton, and lamb: New Zealand production and lamb and mutton as a share of meat production, by years, 1990-94[2]

| Year | Production | | | Share of production | |
|---|---|---|---|---|---|
| | Meat | Mutton | Lamb | Mutton | Lamb |
| | ---(Million pounds)--- | | | -----(Percent)----- | |
| 1990 | 2,318 | 397 | 772 | 17 | 33 |
| 1991 | 2,509 | 375 | 849 | 15 | 34 |
| 1992 | 2,596 | 408 | 882 | 16 | 34 |
| 1993 | 2,511 | 342 | 783 | 14 | 31 |
| 1994 | 2,549 | 320 | 849 | 13 | 33 |

[1] Beef, veal, mutton, lamb, and pork.
[2] Yearend Sept. 30.

Source: Compiled from New Zealand Meat & Wool Board's Economic Service, *Annual Review of the New Zealand Sheep and Beef Industry*, 1993-94, p. 26.

***Consumption***

Lamb meat consumption in New Zealand during 1993 is shown in the following tabulation:

| Meat type | Annual meat consumption (Million pounds) | Share of total consumption --(Percent)--- | Per capita meat consumption ---(Pounds)---- |
|---|---|---|---|
| Beef | 231 | 34 | 67 |

| | | | |
|---|---|---|---|
| Veal . . . . . | 2 | ([1]) | ([1]) |
| Mutton . . . . | 122 | 18 | 35 |
| Lamb . . . . . | 65 | 9 | 19 |
| Pigmeats . . . | 112 | 16 | 33 |
| Poultry . . . | 158 | 23 | 46 |
| Total . . . | 689 | 100 | 200 |

[1] Negligible.

Source: Compiled from official statistics of the NZEC, *Annual Review of the New Zealand Sheep and Beef Industry, 1993-94*, p. 25.

Lamb meat accounted for about 9 percent of total meat consumption. Per capita consumption of lamb meat in New Zealand declined steadily from 28 pounds in 1991 to 19 pounds in 1993, or by 32 percent.[36] The decline in consumption reflects competition from lower priced white meats.[37] As noted earlier, lamb meat production declined in 1993.

### *Prices*

Relatively few lambs are sold on a live basis; therefore, price statistics of lambs on a live basis are not collected or reported.[38] Prices New Zealand farmers receive for their lambs are determined after the lambs are slaughtered by carcass weight and yield for the slaughtered animals. The price of lamb carcasses in New Zealand is significantly less than prices received by U.S. farmers for slaughter lambs. This primarily reflects the smaller carcass size derived from New Zealand lambs.

During 1990-93, the annual average price for New Zealand lamb carcasses[39] generally increased from a low of $42.92 per hundred-weight (cwt) in 1991 to a high of $61.08 in 1993. During the first 6 months of 1994, the average price was $60.83 per cwt. Table 4-4 shows monthly lamb carcass prices

[36] Ibid., 1991-92, p. 20 and 1993-94, p. 25.
[37] *SONZA*, 1994, p. 34.
[38] Sam Smith, economic counselor, American Embassy, and Janet Skilton, research officer, NZMPB, interviewed by USITC staff, Wellington, New Zealand, Mar. 27, 1995.
[39] Export grade PM lamb, 13-16 kg (equal to 29-35 pounds).

Table 4-4
Lamb carcasses: Prices in New Zealand, by months, Jan. 1990-June 1994

*(U.S. dollars per cwt)*

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 ..... | 46.77 | 46.68 | 43.71 | 42.98 | 46.65 | 48.15 | 57.05 | 60.82 | 56.76 | 63.82 | 61.23 | 56.23 |
| 1991 ..... | 52.39 | 51.41 | 49.09 | 43.72 | 44.26 | 45.71 | 40.48 | 40.57 | 40.19 | 35.49 | 37.03 | 36.09 |
| 1992 ..... | 38.76 | 40.47 | 40.76 | 37.59 | 38.09 | 42.14 | 44.61 | 46.81 | 49.57 | 54.61 | 53.33 | 54.23 |
| 1993 ..... | 54.95 | 52.91 | 52.39 | 53.07 | 57.86 | 60.23 | 64.90 | 66.00 | 67.82 | 65.68 | 69.43 | 67.70 |
| 1994 ..... | 66.04 | 63.35 | 59.19 | 60.37 | 56.28 | 61.45 | | | | | | |

Source: Derived from New Zealand Meat and Wool Board's Economic Service, *Annual Review of the New Zealand Sheep and Beef Industry*, various issues.

paid to New Zealand farmers for January 1990 through June 1994. Changes in monthly lamb carcass prices generally reflect prices for New Zealand lamb sold on the London wholesale market and foreign exchange rates.[40] In addition, increases in prices could reflect limited supplies resulting in the meatpackers' bidding up lamb prices to maintain slaughter levels. Quarterly average retail prices for lamb/hogget[41] chops and shanks in New Zealand are shown in table 4-5.

Table 4-6 shows monthly London wholesale prices for New Zealand lamb carcasses for January 1990 through June 1994. These prices fell from a peak of US$119.72 per cwt in August 1990 to $88.99 per cwt in August 1991 and generally reflected substantial declines in prices of competing meats, primarily British domestic sheep meat and pigmeat.[42] During August 1991 through January 1994, New Zealand lamb carcass prices generally increased in the United Kingdom (to US$129.66 per cwt), reflecting a general shortage of sheepmeat in that market and voluntary restraint agreement (VRA) limitations on the quantity of imports.[43] Subsequently, New Zealand lamb carcass prices declined to US$116.54 per cwt in June 1994.

### *Production Costs and Profitability*

**Live lamb sector**

Nearly all New Zealand sheep producers raise cattle. Consequently, separate financial data are not available for sheep operations. Table 4-7 shows average revenue (cash) and expenditures (cash) for New Zealand sheep and beef farms for 1991-92 through 1994-95.[44] Total expenditures per farm increased from US$57,747 (NZ$104,012) in 1991-92 to US$62,776 (NZ$111,900) in 1993-94. Expenditures are projected to total US$68,554 (NZ$112,200) in 1994-95. Major cost components included fertilizer, lime, and seeds, repair and maintenance, and interest. Expenditures for fertilizer and repair and maintenance increased steadily from 1991-92 through 1993-94, accounting for 15 and 8 percent, respectively, of total farm expenditures in the latter year. Fertilizer expenditures are projected to decline in 1994-95. Significant declines in gross farm income during the late 1980s resulted in the decline of fertilizer applications on many farms as a way to reduce expenditures.[45] However, with an increase in farm incomes in the early 1990s, fertilizer sales increased. Repairs and maintenance rose from US$4,341 (NZ$7,818) per farm in 1991-92 to US$5,377 (NZ$8,800) in 1994-95. Some New Zealand farmers report

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[40] NZEC, *Annual Review of the New Zealand Sheep and Beef Industry*, 1993-94, p. 23.

[41] Hoggets are yearlings.

[42] *SONZA*, 1992, pp. 28-29.

[43] *SONZA*, 1994, p. 29.

[44] NZEC Service, Paper No. G2076, Mar. 2, 1995. The data are based on an annual survey of 530 randomly selected sheep and beef farms conducted by the NZ Meat & Wool Board's Economic Service.

[45] NZEC, *Annual Review of the New Zealand Sheep and Beef Industry*, 1987-88, Aug. 1988, p. 9.

Table 4-5
Chops and shanks: Quarterly average retail prices for lamb/hogget chops and shanks in New Zealand, 1990-94

*(In U.S. dollars per pound)*

| Year | Chops | Shanks |
|---|---|---|
| 1990: | | |
| Jan.-Mar. | 1.58 | 1.76 |
| Apr.-June | 1.61 | 1.76 |
| July-Sept. | 1.70 | 1.81 |
| Oct.-Dec. | 1.71 | 1.82 |
| 1991: | | |
| Jan.-Mar. | 1.66 | 1.79 |
| Apr.-June | 1.60 | 1.63 |
| July-Sept. | 1.59 | 1.73 |
| Oct.-Dec. | 1.59 | 1.59 |
| 1992: | | |
| Jan.-Mar. | 1.48 | 1.62 |
| Apr.-June | 1.49 | 2.14 |
| July-Sept. | 2.12 | 1.90 |
| Oct.-Dec. | 1.76 | 1.87 |
| 1993: | | |
| Jan.-Mar. | 1.80 | 1.92 |
| Apr.-June | 1.82 | 1.87 |
| July-Sept. | 1.89 | 1.96 |
| Oct.-Dec. | 1.90 | 2.02 |
| 1994: | | |
| Jan.-Mar. | 2.04 | 2.22 |
| Apr.-June | 1.99 | 2.17 |
| July-Sept. | 1.96 | 2.22 |
| Oct.-Dec. | 1.93 | 2.18 |

Source: Compiled from facsimile submitted by counsel for NZMPB, May 1995.

that, in the short run, the use of fertilizer and expenditures on repair and maintenance may be reduced to lower production costs, but such expenditures are required in the long-run in order to sustain farm productivity.[46]

[46] New Zealand sheep producers, Alistar Crossen, Balcutha, New Zealand, and Neil and Mary Ann Winters, Invercargill, New Zealand, interviewed by USITC staff, Mar. 30, 1995.

Table 4-6
London wholesale prices for New Zealand lamb, by months, Jan. 1990-June 1994

*(U.S. dollars per cwt)*

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 ..... | 107.71 | 112.43 | 106.69 | 110.82 | 114.55 | 114.97 | 116.66 | 119.72 | 115.06 | 117.72 | 113.51 | 112.32 |
| 1991 ..... | 109.82 | 109.55 | 101.40 | 96.29 | 95.67 | 90.05 | 89.77 | 88.99 | 91.34 | 90.48 | 95.40 | 103.28 |
| 1992 ..... | 98.93 | 103.94 | 101.25 | 103.88 | 108.35 | 109.54 | 113.20 | 114.37 | 109.31 | 109.42 | 104.42 | 106.61 |
| 1993 ..... | 108.32 | 104.12 | 110.96 | 117.74 | 123.84 | 125.66 | 124.90 | 127.43 | 129.98 | 128.78 | 124.47 | 125.16 |
| 1994 ..... | 129.66 | 126.51 | 127.65 | 125.92 | 117.17 | 116.54 | | | | | | |

Source: Derived from New Zealand Meat and Wool Board's Economic Service, *Annual Review of the New Zealand Sheep and Beef Industry*, various issues.

Table 4-7
Sheep and beef: Revenue and expenditure per New Zealand farm, all classes, 1991-92 through 1994-95 (year ended June 30)

*(U.S. dollars)*

| Item | 1991-92 | 1992-93 | 1993-94 | 1994-95[1] |
|---|---|---|---|---|
| Farm revenue: | | | | |
| Sheep | 23,028 | 28,400 | 34,333 | 32,139 |
| Wool | 20,903 | 18,059 | 18,794 | 26,395 |
| Cattle | 21,518 | 23,225 | 22,777 | 22,851 |
| Crop & other | 9,545 | 9,909 | 9,986 | 11,059 |
| Gross revenue | 74,995 | 79,593 | 85,889 | 92,444 |
| Expenditures: | | | | |
| Interest | 10,398 | 8,584 | 8,303 | 10,448 |
| Fertilizer, lime and seeds | 6,566 | 8,612 | 9,144 | 8,982 |
| Repairs and maintenance | 4,341 | 4,744 | 5,273 | 5,377 |
| Other | 36,442 | 38,407 | 40,055 | 43,748 |
| Total expenditures | 57,747 | 60,348 | 62,776 | 68,554 |
| Farm profit before tax | 17,247 | 19,245 | 23,113 | 23,890 |
| Real farm profit index (Base 1990-91=1000) | 592 | 654 | 774 | 789 |

[1] Projected.

Source: Compiled from statistics of the NZEC, Service Paper, No. G2076, Mar. 2, 1995.

During 1991-92 through 1993-94, interest costs[47] declined by 21 percent, reflecting lower interest rates and debt levels.[48] Many farmers are using interest savings to reduce debt levels.[49] The drop in interest rates during 1993 was estimated to have saved the average sheep and beef farm US$1,115 (NZ$2,100) in interest payments over a full year.[50]

Expenditures for wages, shearing, depreciation, animal health, fuel, electricity, and other input costs are included in the "Other Expenditures" category.[51] Collectively, such other expenditures accounted for about 63 percent of total farm expenditures during the period.

Gross farm revenue for the average sheep and beef farm rose steadily from US$74,995 (NZ$135,077) in 1991-92 to US$92,444 (NZ$151,300) in 1994-95 (table 4-7 and figure 4-2).[52] Sheep (lamb and mutton) sales accounted for 35 percent of farm revenues in 1994-95, down from 40 percent in 1993-94. Revenue from sales of wool accounted for 29 percent of total revenue in 1994-95, up 22 percent from the previous year. Other major sources of revenue include sales of cattle and crops.

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[47] Interest expenditure consists of actual payments of interest on mortgages, bank overdrafts and on debit balances of stock firm current accounts. It does not include any allowances for interest on the farmer's own equity. See NZEC, *The New Zealand Sheep and Beef Farm Survey 1992-93*, Feb. 1995, p.40.

[48] NZEC, *Annual Review of the New Zealand Sheep and Beef Industry*, 1993-94, p. 13.

[49] Ibid.

[50] *SONZA*, 1994, p. 15.

[51] Trevor Playford, North American Director, NZMPB, interviewed by USITC staff, May 12, 1995.

[52] NZEC, *Annual Review of the New Zealand Sheep and Beef Industry*, 1991-92, p. 10.

Average farm profit before tax rose steadily from US$17,247 (NZ$31,065) in 1991-92 to US$23,890 (NZ$39,100) in 1994-95, or by 39 percent. During the early to mid 1980s the New Zealand meat-processing industry experienced many work stoppages.[53] The Labour Relations Act 1987 led to the restructuring of the meat-processing industry and helped improved efficiency in the processing sector. This Act simplified the registration of unions and defined lawful and unlawful strikes and lockouts. It also stated that "the slaughtering of meat for the domestic or export market" was defined as a Part B essential service for which notice of an intent to strike of no less than 3 days was required.[54]

In addition, the Employment Contracts Act 1991 (ECA) made major changes to the basis of employment in all occupations. Compulsory union membership was abolished, and unions were no longer officially registered as one of the negotiating parties to an enterprise agreement.[55] According to the Commerce Commission, the ECA has been a major factor in reducing NZ processing costs.[56]

A significant improvement in lamb and sheep processing has been the development of the "inverted chain." Traditionally, lambs and sheep were hung by their rear feet and the skin was pulled down over the head. Under the inverted chain process, lambs and sheep are hung by all four legs and the skin is removed from the head down. Advantages of the inverted chain process include faster processing and improved hygiene. The cost to convert to the inverted chain system was estimated to be between NZ$500,000 to $600,000 per chain (US$296,600 to US$356,000 in 1994). Most packers in New Zealand have converted to the inverted chain system.

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[53] The following information on the New Zealand meat processing industry was adapted from Commerce Commission Decision No. 273, Feb. 2, 1995, unless otherwise noted.

[54] Ibid., p. 16.

[55] *Industry Commission, Meat Processing*, vol. I, No. 38 (Australia: Australian Government Publication Service, Melbourne, Australia, Apr. 20, 1994), p. 43.

[56] Decision No. 273, p. 44.

FIGURE 4-2
Sheep and beef: Revenue per New Zealand farm, all classes 1991-92 through 1994-95 (year ending June 30)

**Meat packing and processing sector**

New Zealand meat processors as a whole reportedly experienced substantial losses in 1991, 1993, and 1994.[57] In addition, the New Zealand Commerce Commission, as part of Decision No. 273, reviewed the annual accounts of several North Island meat processors and, in February 1995, concluded that "the financial performance of the industry has been markedly unsatisfactory in recent years."[58] Another report suggested that "aggregate economic value added by the industry was negative in each of the five years from 1989 to 1993 and that economic value totalling NZ$750 million was lost in that time."[59] Southpac Corporation Limited estimated that a further loss of US$98 million (NZ$165 million) would occur in 1994.

The major costs incurred by the New Zealand meat packing and processing sector include the cost of livestock and labor. According to the Commerce Commission, competition for livestock among the four multiplant processors (AFFCO, Weddel, Richmond, and Lowe Walker), who accounted for 68 percent of the sheep kill in the North Island, caused them to pay more for livestock than was justified by the returns for product in export markets. Processors sought to maximize output in order to reduce average costs as well as to secure entitlements to quota.[60]

### *Wool Production*

New Zealand is the world's fourth largest wool producer, accounting for 13 percent of production in marketing year[61] 1994. Such production declined steadily from 1990 to 1993, then rose to 472 million pounds in 1994 (table 3-11). The estimated value[62] of such production amounted to US$508 million (NZ$906 million).[63] The decline in production during 1990 through 1993 reflects the decline in total sheep numbers and, in 1993, the high death rates of wool-type sheep and the low per-head wool production because of unfavorable weather. Wool production increased by 11 percent in 1994 compared with 1993 as favorable wool growing conditions resulted in higher shorn wool weights offsetting any further decline in sheep numbers.[64]

## Exports

### *Lamb Meat*

The bulk of New Zealand's lamb meat production is exported. Table 4-2 shows New Zealand's lamb meat exports (carcass-weight basis) for 1990-94. Exports increased from 732 million pounds in 1990 (95 percent of production) to 838 million pounds (95 percent) in 1992, then dropped to 747 million pounds (95 percent) in 1993 and rose to 827 million pounds in 1994 (97 percent). Changes in the quantity exported generally reflected the number of lambs slaughtered and the average export carcass weight. The increase in the quantity of exports in 1994 generally reflects an increase in the number of lambs slaughtered in that year.

In recent years, the share of New Zealand lamb meat exported in the form of carcasses has decreased, but the share exported in the form of cuts and boneless product has increased. Table 4-8 shows New Zealand's export by type for 1990-94. During this

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[57] Discussion document coordinated by Alan Jackson, Ph.D., of the Boston Consulting Group, and submitted to the New Zealand Commerce Commission on October 6, 1994, in connection with Decision No. 273, p. 21.

[58] Ibid., p. 22.

[59] Ibid., and discussion paper by Southpac Corporation Limited, submitted to the New Zealand Commerce Commission in July 1994, p. 22.

[60] Ibid., p. 42.

[61] July/June marketing year.

[62] Value estimated by USITC staff from data reported by USDA, *Cotton and Wool Situation and Outlook*, Nov. 1994, p. 28.

[63] See appendix I for average monthly exchange rates of New Zealand; rates reflect U.S. dollars per New Zealand dollar.

[64] Ibid.

period, exports of lamb cuts generally increased from 52 percent to 63 percent of total lamb meat exports (shipping-weight basis), while exports of lamb carcasses fell from 48 percent to 36 percent. Boneless lamb exports increased from 2 million pounds in 1990 to 6 million pounds in 1993, then fell slightly to 5 million pounds in 1994.

Table 4-8
Lamb meat: New Zealand exports by types (shipping-weight basis), 1990-94[1]

| Item | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|
| | (*Million pounds*) | | | | |
| Lamb cuts | 297 | 354 | 382 | 402 | 423 |
| Lamb carcasses | 276 | 273 | 299 | 175 | 239 |
| Lamb boneless | 2 | 4 | 6 | 6 | 5 |
| Total | 575 | 631 | 687 | 582 | 667 |
| | (*Share of total percent*) | | | | |
| Lamb cuts | 52 | 56 | 56 | 69 | 63 |
| Lamb carcasses | 48 | 43 | 43 | 30 | 36 |
| Lamb boneless | (2) | 1 | 1 | 1 | 1 |
| Total | 100 | 100 | 100 | 100 | 100 |

[1] Yearend Sept. 30.
[2] Less than 0.5 percent.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the *New Zealand Meat Producers Board Annual Report*, various issues.

New Zealand's lamb meat exports on a product-weight basis peaked at 739 million pounds in 1992, then fell to 592 million pounds in 1993 (table 4-9). Such exports rose to 604 million pounds in 1994. The European Union (EU) is the largest market for New Zealand lamb meat exports and accounted for 52 percent, by quantity, in 1994. Other major markets include the Middle East, Pacific,[65] North America, and Asia.

The United Kingdom is the largest single market, accounting for 25 percent of total lamb meat exports by quantity in 1994. Other significant EU markets were Germany, accounting for 7 percent, and France and Greece, each accounting for 5 percent. Exports of sheepmeat (mutton and lamb) to the EU are subject to quantitative restrictions under various voluntary restraint agreements (VRAs). The 1994 sheepmeat VRA for New Zealand was 205,600 metric tons (453 million pounds) with no levy. Within this VRA, there was an allowance for 13,500 tons (29.7 million pounds) of high-value chilled sheepmeat, up from 1,500 tons (3.3 million pounds) in 1993.[66] The 1995 VRA provides for a New Zealand sheepmeat quota of 225,000 metric tons (496 million pounds), nearly a 10-percent increase. In addition, restrictions on chilled lamb imports are scheduled to be removed by July 1, 1995.[67]

New Zealand's lamb meat exports to the Middle East increased from 87 million pounds in 1990 to 175 million pounds in 1992, fell to 83 million in 1993, and rose to 91 million pounds in 1994 (table 4-9). The rise and subsequent decline in exports to the Middle East largely resulted by changes in the quantity exported to Iran. Such exports rose from 18 million pounds in 1990 to 96 million pounds in 1992, then declined to zero in 1993 and 1994. Trade sources report that Iran dropped out of the market as a result

[65] Primarily, Papua New Guinea and Fiji.
[66] *SONZA*, 1994, p. 5.
[67] NZMPB, *Annual Report, 1994*, p. 11.

of increased New Zealand lamb prices in 1993 and remained out of the market in 1994.[68] Saudi Arabia and Jordan have been the largest markets for New Zealand lamb meat in the Middle East since 1993.

New Zealand lamb meat exports to the Pacific region rose from 56 million pounds in 1990 to 90 million pounds in 1994 (table 4-9), accounting for 15 percent in 1994. Papua New Guinea and Fiji were the major markets for the Pacific region, accounting for 54 and 22 percent of such exports in 1994. Such exports consist largely of less expensive cuts,[69] such as flaps.[70] Exports to Asia declined from 54 million pounds in 1990 to 36 million pounds in 1994, primarily as a result of the declining exports to Japan (40 million pounds to 22 million pounds).

During 1990-94, exports to North America increased from 33 million pounds to 42 million pounds (table 4-9). During 1990-94, exports to the United States ranged from a low of 10 million pounds in 1991 to a high of

[68] Ibid., 1993, Jan. 10, 1994, p. 13.
[69] Prehearing submission of the NZMPB, Mar. 29, 1995, p. 17.
[70] The *New Zealand Meat Trade Guide* defines "flap" as a type of cut consisting of the abdominal wall tissues and rib ends.

Table 4-9
Lamb meat: New Zealand exports by principal markets, 1990-94[1]

(*Million pounds, product-weight basis*)

| Market | 1990 | 1991 | 1992 | 1993 | 1994[2] |
|---|---|---|---|---|---|
| EU: | | | | | |
| United Kingdom | 206 | 175 | 199 | 165 | 153 |
| Germany | 25 | 31 | 35 | 40 | 42 |
| France | 14 | 30 | 37 | 31 | 26 |
| Greece | 24 | 20 | 33 | 22 | 26 |
| All other | 75 | 74 | 78 | 64 | 65 |
| Total EU | 344 | 330 | 382 | 320 | 312 |
| Middle East: | | | | | |
| Saudi Arabia | 20 | 32 | 35 | 35 | 52 |
| Jordan | 18 | 29 | 23 | 29 | 22 |
| Iran | 18 | 65 | 96 | 0 | 0 |
| All other | 31 | 15 | 22 | 19 | 17 |
| Total Middle East | 87 | 141 | 175 | 83 | 91 |
| Asia: | | | | | |
| Japan | 40 | 40 | 27 | 28 | 22 |
| All other | 14 | 13 | 13 | 12 | 14 |
| Total Asia | 54 | 53 | 40 | 39 | 36 |
| Pacific: | | | | | |
| Papua New Guinea | 24 | 30 | 36 | 36 | 49 |
| Fiji | 15 | 16 | 20 | 19 | 20 |
| All other | 17 | 17 | 20 | 29 | 21 |
| Total Pacific | 56 | 63 | 76 | 84 | 90 |
| North America: | | | | | |
| Canada | 19 | 16 | 15 | 16 | 16 |
| United States | 11 | 10 | 12 | 16 | 15 |
| Mexico | 4 | 7 | 8 | 8 | 11 |
| Total North America | 33 | 34 | 35 | 40 | 42 |
| All other | 26 | 24 | 31 | 26 | 33 |
| Grand total | 600 | 645 | 739 | 592 | 604 |

[1] Yearend Sept. 30.
[2] Preliminary.

Note.--Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the *New Zealand Meat Producers Board Annual Report*, various issues.

16 million pounds in 1993. Such exports fell slightly to 15 million pounds in 1994. Lamb meat exports to the United States accounted for 2.5 percent (quantity basis) of total New Zealand lamb exports in 1994. Exports to Mexico increased from 4 million pounds to 11 million pounds during 1990-94. Exports to Canada remained fairly constant and averaged 16 million pounds annually during the period.

Promotion and advertising of New Zealand lamb meat in the U.S. market is funded by the NZMPB through the NZ Spring Lamb Co. and by private New Zealand exporters and their U.S. representatives and importers. Foreign promotion/market information expenses for all meat exports by the NZMPB totaled NZ$5.2 million (US$3.0 million) in 1994 (year

ending September), down from NZ$8.1 million (US$4.3 million) in 1993.[71] In recent years, the NZ Spring Lamb Co. spent approximately US$120,000-180,000 annually promoting NZ lamb in the United States.[72]

Limited promotional assistance is available through the New Zealand Trade Development Board (TRADENZ), a New Zealand Government trade promotion agency.[73] For FY94 (year ending June), total government funding for direct export promotion was NZ$6.0 million (US$3.4 million) up from NZ$4.7 million (US$2.5 million) in FY93.[74] Such funding tends to be targeted to sectors that do not have the backing of producer boards, such as food, beverage, and agribusiness. Funding was used primarily for market analysis, promotion, and consultancy services through special projects with the fishing, venison, wine, tanning, beef, persimmon, calla lily, and forestry industries.[75]

### *Live Sheep Exports*

New Zealand's exports of live sheep (including lambs) fluctuated during 1990-94 as shown in table 4-10. Saudi Arabia was the sole New Zealand export market during 1990-94. In December 1990, a disagreement over animal health standards resulted in a temporary stoppage of live lamb exports to Saudi Arabia; exports to this market resumed in March 1991. However, in October 1994, New Zealand suspended indefinitely exports of live lambs to Saudi Arabia and to the Gulf States because of "An unacceptably high death rate in transit."[76]

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[71] NZMPB, *Annual Report*, 1994, p. 42.

[72] Graham W. Valentine, chairman, and Llew Pointon, manager of New Zealand Spring Lamb Co., interviewed by USITC staff, Wellington, New Zealand, Mar. 27, 1995.

[73] Ibid., p. 16.

[74] USDA, FAS, "Competitor Market Promotion Report," AGR No. NZ5008, Feb. 21, 1995, p. 2.

[75] Ibid., p. 1.

[76] USDA, FAS, "NZ Live Lamb Exports Suspended," AGR No. NZ4030, Wellington, New Zealand, Oct. 4, 1994, p. 1.

Table 4-10
Live sheep and lambs: New Zealand exports, 1990-94[1]

*(1,000 animals)*

| Year | Lambs | Sheep | Total |
|---|---|---|---|
| 1990 | 1,126 | 256 | 1,383 |
| 1991 | 510 | 431 | 941 |
| 1992 | 811 | 527 | 1,337 |
| 1993 | 343 | 1,021 | 1,364 |
| 1994[2] | 111 | 720 | 832 |

[1] Year ending September 30.
[2] Estimated.

Source: Compiled from official statistics of New Zealand Meat & Wool Board's Economic Service, *Annual Review of the New Zealand Sheep and Beef Industry*, 1993-94, p. 23.

### *Wool Exports*

New Zealand is the second largest exporter of wool, accounting for 27 percent of world exports (by quantity, clean basis) during marketing year[77] 1994 (table 3-11). The following tabulation shows the value of New Zealand wool exports for marketing years 1990/1994 as estimated by the USITC staff:[78]

| Marketing year | Millions of US dollars |
|---|---|
| 1990 | 636 |
| 1991 | 464 |
| 1992 | 523 |
| 1993 | 397 |
| 1994 | 518 |

The irregular decline in New Zealand's wool exports during 1990-93 reflects in part declining international wool demand and prices. During this period New Zealand's wool production declined and inventories increased. In marketing year 1994, international wool demand and prices increased, and as a result exports increased significantly.[79]

### New Zealand Grading System

The New Zealand grading system is more complex than that used by the United States. It consists of three export carcass classes and four export-processing classes. New Zealand does not have a compulsory domestic grading system for lamb.

The New Zealand Meat Producers Board (NZMPB) has statutory authority to establish classification and quality standards for export meat.[80] New Zealand meat exports are certified by veterinarians from the New Zealand Ministry of Agriculture and Fisheries (MAF) guaranteeing that the meat complies with the public health and hygiene requirements of the country to which it is sold. All meats and meat products are monitored to ensure that they do not contain residues that exceed internationally agreed levels or the specific residue requirements of an importing country or are harmful to

[77] July/June marketing year.
[78] Ibid.
[79] *SONZA*, 1994, p. 39.
[80] NZMPB, *New Zealand Meat Guide to Carcass Classification*, July 1992.

health. Dressed carcasses are classified according to animal type, weight, and fat content (and in some cases muscling), with classification conducted by full time specialist graders employed by each processor. The NZMPB defines lamb as "young sheep under 12 months of age or which do not have any permanent incisor teeth in wear."[81] In addition, all export meat is cut to objectively defined specifications and given a standard packing number to simplify ordering.[82] New Zealand lamb exports must also meet standards for tenderness.[83]

## New Zealand Government Assistance

Government assistance to New Zealand agriculture has declined significantly since the 1980s. Animal and plant health service, research, and climatic disaster relief are the major areas in which the government provides assistance.[84] New Zealand Government programs with respect to lamb are well documented since New Zealand was the subject of a countervailing duty order issued September 1985 and revoked in May 1995. The U.S. Department of Commerce (DOC) provided a description of the New Zealand programs they reviewed in conjunction with the CVD order in the Federal Register of March 1, 1995, (60 F.R. 11072). The DOC notice covered the following programs: (1) Livestock Incentive Scheme, (2) Regional Development Suspensory Loan Scheme, (3) Export Assistance Grant Scheme, (4) the Export Market Development Taxation Incentive, (5) Export Suspensory Loan Scheme, and (6) Export Programme Grant Scheme/Export Programme Suspensory Loan Scheme. The descriptions of these programs that follow are those of the DOC and are taken directly from the March 1, 1995, Federal Register notice. In addition, a synopsis of other New Zealand programs and assistance is provided below.

### Programs Reviewed Under the CVD

#### *Livestock Incentive Scheme*

As described by the DOC, this program was introduced in 1976 to encourage farmers to increase permanently their number of livestock. Under the scheme a farmer engaged in a stock increase program, for a minimum of one and a maximum of three years, could opt for one of two incentives: (1) An interest-free suspensory loan of NZ$12 for each additional stock unit carried; or (2) a deduction of NZ$24 from taxable income for each additional stock unit carried. If the livestock increase was met, farmers who elected to take out loans wrote the loans off as tax-free grants. For farmers electing the tax option, the provisional tax deduction could be applied toward tax liability in any of the 3 years after completion of the development program. Applications to participate in the program were accepted until March 31, 1982. No new loans have been given under this program since 1983, and no tax credits have been authorized since the 1983-84 government fiscal year.

During the 1991-92 New Zealand government fiscal year, the DOC found no outstanding loans that had not been converted to grants and no tax credits that remained to be claimed by lamb producers. This program was found by the DOC to have been countervailable because benefits under this program are available only to farmers with livestock herds, and, as such, are limited to a specific enterprise or industry, or group of enterprises or industries.[85] The Department of Commerce determined the total subsidy to be 0.0013 percent ad valorem for all firms for the period April 1, 1992, through March 31, 1993.

#### *Regional Development Suspensory Loan Scheme*

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[81] Ibid.

[82] NZMPB, *New Zealand Meat Trade Guide*, 1991.

[83] To meet the tenderness standard, all lamb carcasses are subject to (1) accelerated conditioning, which reduces conditioning time from 18 to 24 hours to about 2 hours or to (2) aging, a holding treatment that achieves extra tenderness.

[84] *SONZA*, 1993, p. 27.

[85] For DOC's notice of this action, see 50 F.R. 28236, June 25, 1985, and 50 F.R. 37708, Sept. 17, 1985, Final Affirmative Countervailing Duty Determination and Countervailing Duty Order; Lamb Meat From New Zealand.

As described by the DOC, the Regional Development Suspensory Loan Scheme (RDSL) was established to encourage utilization of resources in priority regions of New Zealand. Nonpriority regions did not qualify for regional development assistance. The RDSL program administered by the Development Finance Corp. provided interest-free loans that were later converted to grants if development objectives were met. DOC originally found this program to be countervailable because it provided government-funded financing to specific regions in New Zealand on terms inconsistent with commercial considerations.

The RDSL was terminated on April 21, 1986, by the Government of New Zealand (GONZ) and replaced by the Regional Development Investigation Grants Scheme (RDIGS). In 1988 the name of the program was changed to the Business Development Investigation Grant Scheme (BDIGS). All New Zealand taxpayers from any region are eligible to apply to this program. The criteria for eligible projects under the program are (1) the project must be a lawful activity, and (2) the activity must be new to the region in that its technical feasibility and/or commercial viability has yet to be established in the region.

The BDIGS helps applicants in assessing the feasibility of a new activity by providing grants to cover such expenses as accountant fees, Ministry of Agriculture and Fisheries soil studies, pilot plant costs, marketing consultant fees, and travel costs of visiting a similar operation in another country. These grants may cover up to 50 percent of the costs related to the project feasibility studies. The DOC verified that, as of June 1989, there are no regional distinctions made by this program or by the government with respect to eligibility for these grants.

The DOC examined the use of BDIGS and found that no producers or exporters of lamb meat used the program at any time between early 1991 to June 1994. The BDIGS is available to all sectors of the economy and all regions within New Zealand; thus, the DOC found that it is not countervailable.

*Expert Assistance Grant Scheme*

As described by the DOC, the Expert Assistance Grant Scheme (EAGS) was established in 1992 by the Ministry of Commerce (MOC) to assist small businesses (10 employees or less) in their efforts to become more competitive. Under the program, grants are provided to small firms in any industry throughout New Zealand. Grants are provided to firms that are hiring "experts" to help improve quality and provide expertise that is not available within the firm.

The DOC examined the EAGS program and found that no producers or exporters of lamb meat used the program at any time between early 1991 to June 1994. DOC found the EAGS program to be available to all sectors of the economy and all regions within New Zealand. Because this program is not limited to a specific enterprise or industry, or group of enterprises, or to companies in specific regions, the DOC found that it is not countervailable.[86]

*The Export Market Development Taxation Incentive*

As described by the DOC, the Export Market Development Taxation Incentive (EMDTI) was established in the 1979 Amendment to the Income Tax Act of 1976; exporters have received tax credits for a certain percentage of their export market development expenditures. Qualifying expenditures included those incurred principally for seeking and developing new markets, retaining existing markets, and obtaining market information. An exporter who took advantage of this tax credit could not deduct the qualifying expenditures as ordinary business expenses in calculating taxable income.

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[86] 60 F.R. 11072 and 11074, Lamb Meat From New Zealand; Preliminary Results of Countervailing Duty Administrative Review and Intent to Revoke the Countervailing Duty Order, Mar. 1, 1995.

Because this program was contingent upon exportation, the DOC previously found this program to confer a countervailable grant or subsidy.[87]

Effective with the government fiscal year beginning April 1, 1990, the GONZ eliminated the EMDTI tax credit, and all formerly eligible expenditures are subject to the rules for ordinary business expenses in calculating taxable income. Because certain corporate fiscal years do not correspond with the GONZ's fiscal year, some residual benefits were still possible. However, the DOC reports that no lamb meat exporter claimed benefits under this program on their tax return during the DOC's review period April 1, 1992 through March 31, 1993. The DOC saw no evidence that EMDTI tax credits were given or that they existed during the review period. Accordingly, the DOC determined that this program has been terminated and that there are no residual benefits to lamb meat producers or exporters.[88]

***Export Suspensory Loan Scheme***

As described by the DOC, Export Suspensory Loan Scheme (ESLS), administered by the Department of Trade & Industry and the Development Finance Corporation (DFC), was established in the 1973 budget and modified by Cabinet decision in 1978. The program's purpose is to provide loans to assist exporters in purchasing equipment needed to expand their production of export goods. The loans covered up to 40 percent of eligible expenditures and were converted to grants if predetermined export targets were met. If the export targets were not met, the loans could be partially converted to grants or called in full at the DFC's long-term interest rates. The ESLS was terminated on March 31, 1985, and the DOC verified that no new loans under this program were granted after that date. The DOC had previously found this program to be countervailable because benefits under this program are contingent on export performance and because the program provided loans that (1) could be at rates lower than those available from commercial sources, and (2) could be converted to grants.[89]

The DOC examined this program and found that there were no outstanding ESLS loans during the review period April 1, 1992, through March 31, 1993. The final payments on loans under this program were made during the 1990-91 New Zealand Government fiscal year. In addition, the DOC saw no evidence that ESLS loans were used by lamb meat exporters during the review period. Consequently, the DOC determined that this program has been terminated and that there are no residual benefits to lamb meat producers or exporters.[90]

***Export Programme Grant Scheme/Export Programme Suspensory Loan Scheme***

As described by the DOC, the Export Programme Grant Scheme/Export Programme Suspensory Loan Scheme (EPGS) program was established in the 1979 Budget to encourage marketing research in targeted foreign markets. The grants, amounting to 64 percent of budgeted expenditures, were available for up to 3 years. In 1982, the grant program was converted to the EPSLS, a suspensory loan program. Loans covering up to 40 percent of eligible expenditures were available to established exporters who increased their net foreign exchanged earnings through the marketing of specific goods or services in a designated foreign market. If a predetermined sales forecast was accomplished, the suspensory loan was converted into a grant; if the forecast was not met, the exporter repaid the loan with interest.

During DOC's administrative review covering the period April 1, 1986, though March 31, 1987, the DOC verified the EPSLS program and found that on May 23, 1985, the

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[87] 56 F.R. 27243, June 13, 1991, Lamb Meat From New Zealand, Preliminary Results of Countervailing Duty Administrative Review and 56 F.R. 48423, Aug. 13, 1991, Lamb Meat From New Zealand, Final Results of Countervailing Duty Administrative Review cited in 60 F.R. 11074.

[88] 60 F.R. 11072, Mar. 1, 1995.

[89] 50 F.R. 37708, Sept. 17, 1985, Final Affirmative CVD Determination and CVD Order; Lamb Meat From New Zealand.

[90] 60 F.R. 11072, Mar. 1, 1995.

GONZ terminated the program. In addition, the GONZ announced that its commitments made under the program prior to that date would be met. DOC cited a 1988 verification report in which it concluded that no lamb meat exporters were using this program at the time it was terminated.[91] Further, the DOC, during the review period April 1, 1992, through March 31, 1993, found no evidence that this program was used by lamb meat exporters. Accordingly, the DOC determined that this program has been terminated and that there are no residual benefits to lamb meat producers or exporters.

### Other New Zealand Programs

The New Zealand Ministry of Agriculture and Fisheries (MAF) implements the Government's policies and programs to derive maximum benefit to the nation from farming, horticulture, and fishing.[92] MAF advises government on policy and provides advisory and other services to agricultural industries. MAF's quality management system provides quarantine services and related animal health services. In addition, meat inspection service is provided to the meat, game, farmed deer, and export fish industries to ensure that quality standards and overseas market requirements are met.

The management and organization of New Zealand's Government-funded research have undergone major reform in recent years. Agricultural research previously conducted by scientists employed by government agencies, including the MAF Technology and the Department of Scientific and Industrial Research, is now the responsibility of the ten new so called Crown Research Institutes (CRIs).[93]

The overall structural organization of the science system (research and development) is now divided into three areas: policy, funding, and science operations. Policy advice is provided by the Ministry of Research, Science and Technology (MRST), and funds for research and development and scientific services are allocated by the Foundation for Research, Science and Technology (FRST).[94] The CRIs are funded by the FRST and compete with other researchers for public funding.[95] The most important component of the new system is the Public Good Science Fund (PGSF).

#### *Public Good Science Fund*

Administered by the MRST, the PGSF is the single largest source of public research funding in New Zealand.[96] Created in 1990, the PGSF is the primary means by which the Government invests in science on behalf of New Zealand citizens. Approximately 60 percent of New Zealand's Government total research expenditures moves through the PGSF.[97] In October 1992, the MRST issued a "Statement of Science Priorities" for the PGSF setting out a series of strategic goals, including funding allocations by designated science areas.[98] The Statement sets out 5-year funding targets for designated science areas; however, funding levels can be modified.[99]

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[91] 54 F.R. 1950, May 8, 1989, Lamb Meat From New Zealand; Final Results of CVD Administrative Review.

[92] *New Zealand Official Yearbook*, 1988-89, Wellington, New Zealand, Oct. 1988, pp. 78 & 57.

[93] *SONZA*, various issues.

[94] Ministry of Research, Science and Technology (MRST), *The Science System In New Zealand*, Wellington, New Zealand, Aug. 1994, pp. 3-4.

[95] *SONZA*, 1992, p. 17.

[96] *Investing in Science for Our Future*, p. i.

[97] MRST, *Investing in Science for Our Future*, Wellington, New Zealand, Oct. 1992, p. 3.

[98] "The Formal Priority Statement Directed to the Foundation for Research, Science and Technology," app. J.

[99] *The Science System in New Zealand*, Aug. 1994, p. 8.

Funding for research in FY 1991-92 amounted to US$129 million[100] (NZ$232 million).[101] Funding, totaling US$11.9 million (NZ$21.1 million), was allocated for the sheep, beef, meat processing, and fibre processing science area for 1992-93; of which about US$7.5 million (NZ$13.4 million) was allocated to sheep production.[102] Funding for the 1994-95 year amounted to US$174 million (NZ$284 million).

According to MAF, total government research funding is expected to increase over the next several years with dairying, forestry, and fisheries likely to be major beneficiaries. In addition, research funding will be directed toward processing and product development and toward molecular biology technology within the agricultural sector, whereas funding for operational research will be cut. The cut in operational research includes: "research into sustainability of agricultural systems; animal welfare; control of pests such as weeds; rabbits and possums; or, policies to protect market access."[103]

**Technology for Business Growth Scheme**

The Technology for Business Growth Scheme (TBG), which provides funds for research, is administered by the FRST. The goals of the TBG are to "permit New Zealand industry to benefit directly from the results of Government funded R and D."[104] Foreign-owned firms may participate in the TBG as long as they can demonstrate that the "benefits" of New Zealand Government-funded research will be "captured" in New Zealand.[105] Approximately 10 percent of the companies participating in the TBG are foreign-owned and, 1 percent of the total are American owned.

The TBG funding is applicable specifically to the private sector. Firms apply to FRST for funding for research projects. Once a funding proposal has been approved, the firm and a Crown Research Institute (CRI), university, or other government research body jointly perform the research. Any intellectual property rights that are developed are retained by the participating firm. Funding for the TBG has been about NZ$10.6 million (US$6.5 million) per year in recent years.[106] Allocations of TBG funds represent assistance to many industries, but data are not available to identify assistance to live lamb and sheep growers or processors of lamb meat.

**Public grazing lands**

As part of the 1948 Land Act, the New Zealand Government established Crown pastoral leases on about 6.2 million acres of the South Island high country (approximately 20 percent of the South Island).[107] An estimated 1.6 million sheep (primarily Merino), or 3 percent of the total sheep population, are grazed on Crown lands during part of the year. During 1984-93, wool accounted for 68.5 percent of gross revenue of pastoral farms; cattle, for 13 percent; sheep, for 10 percent; lamb, for 5.5 percent; and other livestock, for 3 percent.[108]

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[100] Includes goods and services tax of 12.5 percent.
[101] *The Science System in New Zealand*, p. 7.
[102] *Investing in Science for Our Future*, annex C, p. 27.
[103] *SONZA*, 1994, p. 21.
[104] U.S. Department of State telegram, "U.S. Firms Access to New Zealand Government Research Programs," Aug. 1994, p. 3.
[105] The following information on TBG was derived from a submission from the American Embassy, Wellington, NZ, entitled "U.S. Firms Access to New Zealand Government Research Programs" and from Commissioner Rohr, submission during fieldwork in New Zealand in February 1995.
[106] *The Science System in New Zealand*, p. 8.
[107] "Final Report from the Working Party on Sustainable Land Management," *South Island High Country Review*, Apr. 1994.
[108] Ibid., p. 47.

There are currently 340 South Island farms wholly or partially under pastoral leases, and such leases can be freely traded.[109] The lessee has perpetual right of renewal, exclusive occupation, and the right to graze animals.[110] Lease rates are set at 1.5 to 2.25 percent of the land's unimproved value and are reviewed every 11 years.[111] All improvements on the land, such as fencing and buildings, are owned by the lessee.[112] The lessee cannot use the land for any other purpose other than pastoral farming.

The management of the South Island pastoral leases is under review. The New Zealand's Minister of Lands has proposed that some pastoral leases be sold to freehold leases and be made available for other uses, such as eco-tourism and conservation.[113]

### New Zealand Federal Government Statutory Authority[114]

#### *New Zealand Meat Producers Board*

The New Zealand Meat Producers Board (NZMPB) is a statutory body established under the Meat Export Control Act 1921-22 (Act) that seeks to represent the interests of livestock producers in New Zealand. Recent legislative changes increased the NZMPB's powers and commercial autonomy. The Meat Export Control Amendment Act of 1989 contained major changes to the NZMPB's existing Act and repealed the Meat Export Prices Act 1976.[115] Compulsory slaughter levies are collected on all livestock at time of slaughter to finance the NZMPB. The levy rate for lambs and sheep remained unchanged during 1990-94 at NZ$0.47 (US$0.28 in 1994) per animal.[116] To improve the skills of persons in the meat industry, the NZMPB also provides funding for the Farm Education and Training Association, now registered as the Industry Training Organization for the on-farm sector.[117]

The NZMPB attempts to create an environment that ensures the highest returns to the New Zealand producer for meat exported.[118] The United States accounted for nearly 55 percent of New Zealand's beef and veal (product weight) exports and about 2.5 percent of lamb meat exports in 1994.[119] The NZMPB is responsible for overseeing the marketing of meat for export, including grading and quality standards. The NZMPB issues licenses to meat exporters (many of whom are also processors) who can devote the necessary resources to develop markets overseas. Once approved for a licence, new applicants are required to operate for a probationary period of about 1 year, at which time they may be granted

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[109] South Island High Country Committee, Federated Farmers of New Zealand Inc., "High Country Land Reform Good for the Land, Good for People," news release, Mar. 9, 1995.

[110] Bob Austin, general manager of LANDCORP, interviewed by USITC staff, Wellington, New Zealand, Mar. 28, 1995.

[111] Ibid.

[112] *South Island High Country Review*, p. 84

[113] South Island High Country Committee, "High Country Land Reform," news release.

[114] The Government of New Zealand provides legal authority for certain agriculture related organizations, although direct financial assistance may not be provided.

[115] *Agricultural Marketing Regulation - Reality Versus Doctrine*, a report prepared by ACIL, Australia Pty. Ltd. for the New Zealand Business Roundtable, Oct. 1992, p. 153.

[116] NZMPB, *Annual Report*, 1994, p. 39.

[117] Ibid., 1993, p. 15.

[118] Trevor Playford, North American director of the NZMPB, conversation with USITC staff, May 12, 1995. According to Playford, the NZMPB does not purchase or market meat; however, it has statutory authority to do so. This authority is expected to be removed in amendments to upcoming Board legislation by the New Zealand Parliament.

[119] NZMPB, *Annual Report*, 1994, pp. 54-55.

a full licence. As of September 1994, there were 56 full export licenses and 38 probationary licenses.[120]

After receiving recommendations by the Meat Planning Council (MPC),[121] the Meat Board issues special access market licenses for certain markets, but not for the United States. Countries or areas in which special access market licenses are required for sheepmeat as of September 30, 1994, include Iraq, Jordan, Egypt, Syria, Morocco, Tunisia, Algeria, Libya, Canada, Mexico, North Asia, and South Korea. The NZ Lamb Company (North America) Ltd. is the sole licensed exporter of New Zealand sheepmeat to Canada.[122]

### *Meat Planning Council*

The Meat Planning Council (MPC) was established jointly by the NZMPB and the NZ Meat Industry Association (MIA) in 1991. The MPC is a policy forum composed of members of the NZMPB and meat export companies. The main objective of the MPC "is to take an overview of global marketing, with the aim of ensuring that the commercial activities of individual companies do not run counter to the wider national goal of optimizing international marketplace returns."[123] The MPC makes recommendations to the NZMPB on the issue of, and conditions to be attached to, meat export licenses. Commercial cooperation agreements incorporating a system of marketplace franchising have been established with all licensed exporters. Under the franchise system, the right to export to a specific market dependents upon conforming to certain conditions, including, when applicable, a performance bond.[124] Regions subject to performance bonds include North America, the United Kingdom, continental Europe, and the Middle East.[125]

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[120] Ibid., p. 35.
[121] The Meat Planning Council is discussed later in this chapter.
[122] NZMPB, *Annual Report*, 1994, p. 37.
[123] Ibid., p. 16.
[124] Ibid.
[125] Meat Planning Council, *A Guide to the Meat Planning Council*, updated, Dec. 12, 1994.

# CHAPTER 5: ANALYSIS OF COMPETITIVE FACTORS

Since the Commission's 1990 report on lamb meat, significant government policy and economic events have occurred that have affected the competitiveness of the industry. First, the effect of the termination of the wool incentive payments will be shortly felt, and the full impact is yet unknown. Second, the industry's already fragile infrastructure has been unraveling: three packing plants have closed and the number of growers has dropped significantly. Third, more restrictive measures relating to environmental issues have forced many growers to make decisions about new operating practices. Fourth, imports of lamb meat from Australia and New Zealand have increased and account for an increasing percentage of U.S. consumption. Some U.S. growers view the Australian and New Zealand industries as competitors doing business under fewer constraints and with the advantage of more supportive governments.

This chapter is organized into three major sections. The first section highlights supply factors for the U.S. industry, assessing them relative to Australia and New Zealand. The second section highlights demand-related factors in the U.S. market for U.S., Australian, and New Zealand lamb meat. The third section examines the relationships among lamb meat imports, domestic production, and prices through a data-oriented econometric modelling method called vector autoregression (VAR).

## Analysis of Lamb Supply

The following section provides a comparative assessment of factors affecting supply in the U.S., Australian, and New Zealand lamb and lamb meat sectors, which are summarized in table 5-1 along with the nature of government involvement. The United States appears to have a competitive advantage in a number of supply factors, including low-cost concentrates (primarily grains) to growers and, at least in certain areas of the United States, other agriculture alternatives to sheep raising. In addition, the U.S. labor force in the lamb meat packing and processing sector appears to be more efficient than the sectors in Australia and New Zealand, and the U.S. packing sector appears to be more profitable. However, New Zealand appears to have competitive advantages of low-cost grass and hay, favorable climate, and no predators. New Zealand and Australia appear to have the competitive edge with respect to labor in the sheep raising sector and general industry infrastructure.

### *Industry Size and Infrastructure*

The U.S. industry is much smaller, in terms of both live sheep and lamb inventories and lamb meat production, than the industries of Australia and New Zealand as shown in table 5-2. In 1994, there were about 15 sheep and lambs in Australia for each sheep and lamb in the United States and about 6 sheep and lambs in New Zealand for each sheep and lamb in the United States. In terms of lamb meat production, the gap between the United States and Australia and the United States and New Zealand was much narrower. There were about

Table 5-1
Competitive conditions[1] reflecting production and supply in the U.S., Australian, and New Zealand live lamb and lamb meat sectors, 1994

| Competitive conditions | United States | Australia | New Zealand |
|---|---|---|---|
| **Analysis of lamb supply:** | | | |
| Industry size and infrastructure | + | +++ | +++ |
| Lamb growing costs: | | | |
| Feed (concentrates, mostly grains) | +++ | ([2]) | ([2]) |
| Feed (grass and hay) | ++ | ++ | +++ |
| Climate and topography | ++ | ++ | +++ |
| Labor | + | +++ | +++ |
| Predator problems | + | ++ | +++ |
| Other land use options | +++ | ++ | ++ |
| Lamb meat packing and processing costs: | | | |
| Plant economies of scale | + | ++ | ++ |
| Labor | +++ | + | ++ |
| Packer profitability | +++ | ++ | + |
| Production fluctuations | + | ++ | ([2]) |
| Live lamb cost to packers | + | ++ | ++ |
| Export marketing: | + | +++ | +++ |
| Government policies: | | | |
| Payments for wool production | Yes[3] | None[4] | None |
| Government support (USDA, DPIE, MAF) | Yes | Yes | Yes |
| Government sanctioned associations (ASI, AMLC, NZMPB) | Yes | Yes | Yes |
| Government leasing of grazing lands | Yes | Yes | Yes |
| Import tariffs (*Rate*) | 1¢/kilogram | Free | Free |

[1] Varies according to area of country considered; judgment is based on entire country.
[2] Not applicable.
[3] Payments under the National Wool Act of 1954 are to end in 1996.
[4] Last application for payment in 1992.

Note.--Among the competitive conditions ranking factors, "+++" is most favorable, "++" is favorable, and "+" is least favorable.

Source: Estimated by the U.S. International Trade Commission staff.

Table 5-2
Sheep and lambs: Industry structure measures for the U.S. industry with respect to producers in Australia and New Zealand, 1994

| Structure | United States | Australia | New Zealand |
|---|---|---|---|
| Sheep inventory[1] *(million animals)* | 8.9 | 133.7 | 49.9 |
| Sheep type *(million animals)*:[2] | | | |
| Wool-type | 0.4 | 102.9 | 3.7 |
| Meat-type | 2.7 | 18.8 | ([3]) |
| Dual purpose | 5.8 | 12.0 | 44.2 |
| Lamb production *(million animals)*[4] | 5.9 | ([5]) | 38.0 |
| Lamb slaughter *(million animals)*[6] | 4.9 | 15.0 | 26.2 |
| Average carcass weight *(pounds)* | 63 | 40 | 33 |
| Change in inventory size 1990-94 *(percent)* | -21 | -21 | -14 |
| Lamb meat production *(million pounds)* | 300 | 584 | 849 |
| Change in lamb meat production 1990-94 *(percent)* | -13 | -10 | 10 |
| Imports of lamb meat in home market *(million pounds)* | 38.7 | ([7]) | ([7]) |
| Exports of lamb meat *(million pounds)* | ([7]) | 136 | 827 |
| Percent of production exported *(by quantity)* | ([7]) | 23 | 97 |
| Percent of production exported to the United States *(by quantity)* | ([8]) | 4 | 2 |
| Percent of exports shipped to the United States *(by quantity)* | ([8]) | 17.4 | 2.4 |
| Population (human) *(million)* | 260.0 | 18.5 | 3.5 |
| Per capita consumption in home market *(pounds)* | 1.4 | 19 | 24 |

[1] As of Jan. 1, 1995 for the United States; as of Mar. 31, 1994, for Australia; and as of June 30, 1994, for New Zealand.
[2] Type generally defined by share of income returned to producer.
[3] There are few meat-type sheep in New Zealand, but an estimated 3 to 5 percent of the inventory consists of so-called specialty breeds, such as coarse-wool breeds used for crossbreeding.
[4] Calendar year 1994 for the United States, year ending Sept. 31, 1994, for New Zealand.
[5] Not available.
[6] Calendar year 1994 for the United States; year ending June 30, 1994, for Australia; and year ending Sept. 31, 1994, for New Zealand.
[7] Negligible.
[8] Not applicable.

Source: Compiled by USITC staff from various sources. For details, see separate country chapters.

2.8 pounds of lamb meat produced in New Zealand for each pound in the United States and about 1.9 pounds in Australia.[1] Primarily as a result of larger

[1] The relatively small quantity of lamb meat production (in relation to the total sheep inventory) in Australia in comparison to that in the United States reflects the large share of the Australian sheep and lamb population that is
(continued...)

sheep inventories and the relative importance of this sector in relation to the national economies, both Australia and New Zealand generally benefit from a more developed and larger industry infrastructure (that is, such trained labor as shepherds and shearers, stock trucks, packing plant numbers and size, computerized marketing services, and so forth) when compared with the United States.

### *Lamb Growing Costs*

**Feed**

In New Zealand and Australia sheep and lamb growers normally raise their animals almost exclusively on pasture and have essentially no expenses for grain or other concentrates (table 5-2).[2] Conversely, in the United States grains or other concentrates and protein supplements are a significant cost even under range management. The American Sheep Industry Association (ASI) estimates that feed costs (for the maintenance of the ewes, through the weaning of lambs) were the largest cost under range management. As a national average, grains and protein supplements are estimated to have accounted for about 19 percent of variable cash expenses in 1994 (table 2-9).

**Climate and topography**

Sheep and lambs are raised under a wide range of climates and topography in the United States, Australia, and New Zealand. In the United States, production regions include prime agricultural regions of the Midwest with fertile soils, rainfall nearly ideal for forages, and level topography. Conversely, some regions of the Western United States have less fertile soil, limited rainfall, and topography so steep as to limit agricultural production to sheep or goats.[3] New Zealand sheep and lambs are raised under lowland, hill country, and high country conditions. Similarly, Australian sheep and lamb production regions include moist regions receiving 28 inches or so of rain per year, regions receiving slightly less, dry regions, and very dry regions.[4]

Among the countries under consideration, New Zealand appears to generally have the longest grazing season and the mildest climate. Australia has generally a mild climate and long grazing season but is subject to periodic droughts; indeed, as of April 1995, more than 45 percent of the sheep in Australia were in drought-plagued regions.[5] A large portion of the sheep and lambs in the United States are raised in areas with harsh climates, such as West Texas, Colorado, and Wyoming.

Also, the milder climate under which most sheep and lambs are raised in Australia and New Zealand permits outdoor lambing and limits expenses

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[1] (...continued)
kept mostly or entirely for the production of wool. The relatively small production of lamb meat (in relation to the sheep flock) in New Zealand relative to that in the United States reflects, in part, the higher average slaughter weight in the United States.

[2] Tony Bywater, professor of farm management, Lincoln University, interviewed by USITC staff, Christchurch, New Zealand, Mar. 28, 1995.

[3] Miller, president, ASI, transcript of the hearing pp. 52-54.

[4] Troup, president, SCA, interviewed by USITC staff, Feb. 7, 1995.

[5] Ibid.

associated with buildings,[6] whereas in the United States, it is a common practice for lambs to be born indoors. In the United States, buildings are estimated by the USITC to have accounted for 8 percent of variable cash expenses in 1993 (table 2-9).

**Labor**

The United States appears to have a comparative labor disadvantage in the live sheep and lamb sector in relation to both Australia and New Zealand. Many U.S. growers employ shepherds from other countries, and some domestic interests have complained about U.S. Federal Government immigration regulations. In addition, some domestic interests have noted a shortage of sheep shearers in the United States. One U.S. grower noted that many sheep in the United States are sheared by crews from Australia and New Zealand.[7] In contrast, both Australia and New Zealand appear to have abundant supplies of skilled labor in all aspects of the live sheep and lamb sector.[8]

**Predator problems**

Costs associated with losses to predators are apparently much lower for sheep and lamb growers in Australia and New Zealand. In Australia, there are some losses of sheep to the dingo[9] and of lambs to red foxes.[10] However, predators are reported not to be a serious problem for the Australian sheep and lamb sector. Losses to predators in New Zealand appear to be negligible.[11] As noted earlier, predator losses in the United States have

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[6] Troup, interviewed by USITC staff, Ballarat, Australia, Mar. 21, 1995, and Bywater, interviewed by USITC staff, Christchurch, New Zealand, Mar. 28, 1995.

[7] Etchepare, president, Warren Live Stock Co., interviewed by USITC staff, Cheyenne, WY, Oct. 13, 1994.

[8] USITC staff field work in Australia and New Zealand, Apr. 1995.

[9] R.J. Downward and J.E. Bromeli, *The Development of a Policy for the Management of Dingo Populations in South Australia*, ed. L.R. Davis and R.E. Marsh, Proc. 14th Vertebr. Pest Conf. (California: University of CA, 1990).

[10] Troup, interviewed by USITC staff, Washington, DC, Feb. 7, 1995.

[11] USITC staff, fieldwork, South Island, New Zealand, Mar. 1995.

long been a major concern for domestic growers and were estimated to amount to US$17.7 million in 1994.[12]

**Other land use options**

Because of the wide diversity of conditions in each of the three countries, generalizations about sheep and lamb production in the three countries under consideration are difficult. While portions of the Western United States have limited or no economically viable alternative to sheep, some sheep-raising regions of the Western United States could grow cattle, or grains, or hay. Agricultural alternatives in the Corn Belt are typically more extensive.

In parts of southern Australia, growers have considerable opportunities to substitute grains and wool-type for meat-type sheep.[13] However, such a shift is expensive, requires a long period of time, and may not always be economically practicable.[14]

Producers in New Zealand probably have fewer options to lamb and sheep production than their counterparts in the United States or Australia. Grain production in New Zealand is generally precluded by fungus diseases associated with the moist climate, and the opportunity to grow wool-type sheep appears to be limited. Forestry and cattle production provide alternatives to sheep and lamb production in New Zealand, and, indeed, there appears to have been some such shifting in recent years.

### *Lamb Meat Packing and Processing Costs*

**Australia**

Among the factors that seem important in evaluating the competitive conditions of the U.S. and Australian lamb packing and processing sector are labor unrest (strikes), worker wage rates, costs of animals for processing, and seasonal variations in the quantities of lambs available for slaughter and processing. The Australian meat packing and processing sector may be somewhat inefficient in relation to counterparts in other countries, including the United States and New Zealand (table 5-2). The Australian Industry Commission conducted a study on the competitiveness of the Australian meat industry. The Industry Commission found that despite some recent improvements, Australia's meat-processing industry operates at significantly higher cost than the processing industries of most countries (including those of the United States) with which it competes.[15]

The Australian meat industry has had a high level of labor unrest which has adversely influenced the development of the meat packing and processing sector. In 1991,[16] the number of days lost per 1,000 employees because of strikes and other labor actions was six times greater in the meat industry than in all manufacturing, mining, and transportation industries--1,535 days

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[12] USDA, NASS, *Sheep and Goat Predator Losses*, Apr. 27, 1995, p. 1.
[13] Industry Commission, *Meat Processing*, vol. 1, Apr. 20, 1994, p. 5.
[14] Troup, transcript of the hearing, pp. 156-157.
[15] Industry Commission, *Meat Processing*, vol. I (Melbourne, Australia: Australian Government Publishing Service, Apr. 1994), p. XV.
[16] Although 1991 is the most recent year for which data are available, the Industry Commission did not indicate that there had been a significant change in the situation in recent years.

per 1,000 contrasted with 265 days per 1,000.[17] In contrast, U.S. packers reported no significant changes in their production of lamb meat since January 1, 1990 because of strikes.[18]

A private study funded by the Australian Meat Research Corporation (MRC) in Australia and conducted by Booz-Allen & Hamilton found that processing costs in the Australian beef sector were much higher than in other countries, including in the United States, Argentina, Ireland, and New Zealand.[19] One industry source reported that processing costs for the lamb sector would be similar to that of the beef sector, although the lamb sector was not separately reported in this study.[20]

Notwithstanding the assessments by the Industry Commission, the Australian meat sector compares favorably with its U.S. counterpart by some measures since lamb meat packers and processors in Australia appear to benefit from relatively low-cost live animals for processing in relation to their counterparts in the United States. Additionally, average wage rates for packing house workers in the United States appear to exceed the range of Australian meat-processing industry workers, although detailed statistics are not available. Australian average weekly earnings in the meat sector in May 1993 ranged from AUS$464 (equal to US$324) to AUS$579 (US$393) depending on State or Territory,[21] whereas, in the United States, the 1993 average weekly earnings in the meat packing sector was US$403.60.[22]

**New Zealand**

Among the factors that seem important in evaluating the competitive conditions of the U.S. and New Zealand packing and processing sectors, are profitability and such related factors as company debt levels, capacity utilization, costs of lamb for slaughter, nature of the work force, economies of scale, and technological innovations. Capacity in this sector appears to have been significantly reduced in 1994, as certain lamb meat-producing facilities were closed.

Notwithstanding profitability limitations, the New Zealand lamb packing and processing sector appears to have some advantages. As noted previously, New Zealand, in general, benefits from economies of scale (because of certain large plants and the relatively large lamb population), a geographically concentrated industry that minimizes transportation costs (lamb production areas are seldom more than 3 hours from a slaughter plant), and technological innovations, such as the "inverted chain" production system. The relatively large cost of converting to the inverted chain production system is apparently more economical in large-volume plants that can spread the cost over a large number of lambs.

Another difference noted between the U.S. and New Zealand lamb packing and processing sector is the ownership pattern either directly or through cooperatives--in the United States ownership by growers is minimal, whereas,

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[17] *Meat Processing*, Apr. 20, 1994, p. 175.

[18] The USITC received responses from all large-volume lamb packing companies in the United States, and these companies accounted for more than 89 percent of U.S. lamb slaughter.

[19] *Meat Processing*, Apr. 20, 1994, p. 41.

[20] Bernard, divisional manager of AMLC, USITC staff interview, Sydney, Australia, Mar. 20, 1995.

[21] Ibid., p. 117.

[22] U.S. average weekly earnings estimated by the staff of the USITC based on questionnaire response.

in New Zealand, grower-owned cooperatives account for all but one of the major lamb packing and processing companies. However, there is no evidence that ownership patterns convey a competitive advantage.

The United States lamb packing sector appears to have been generally profitable during 1990-94 (as shown by responses to the Commission's questionnaire to packers), whereas, the New Zealand counterpart appears to have generally not been profitable. New Zealand lamb packers and processors appear to have had high levels of debt and interest payments. Also, excess capacity pressured packers to pay unsustainable high levels for live lambs for processing; expenses associated with closing plants discouraged exit from the industry. Booz-Allen & Hamilton found the New Zealand meat processing sector to be lower cost than the Australian but higher cost than that of the United States.

### *Production Fluctuations*

The Australian Industry Commission noted that, among major meat types, lamb (and veal) in Australia exhibited the most variation in the quantity of production over a given period of time.[23] Lamb meat production in the United States is also known to be seasonal. The annual standard deviations of lamb meat production (as a percentage of annual average production)[24] for the United States and Australia for 1990-94 are shown in the following tabulation:[25]

| | United States | Australia |
|---|---|---|
| 1990 | 6.9 | 12.2 |
| 1991 | 10.6 | 11.1 |
| 1992 | 9.7 | 6.9 |
| 1993 | 9.6 | 7.2 |
| 1994 | 15.3 | 9.6 |

Indeed, lamb meat production in the United States appears to be somewhat more variable than production in Australia in recent years. Seasonality of lamb meat production is thought to be of less significance to the New Zealand lamb meat sector because packers in that country typically freeze meat for reasons other than seasonality of production. They are thus able to store their product and to distribute it in response to market demands.[26]

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[23] *Meat Processing*, Apr. 20, 1994, p. 22.

[24] For example, in 1994, U.S. monthly production was more variable compared to Australian monthly production.

[25] The annual standard deviation as a percentage of annual average production was calculated by USITC staff from monthly production of lamb meat for each year.

[26] Data for monthly lamb meat production were obtained for both the United States and Australia for the period January 1990-December 1994. Standard deviations were then calculated for each year of the time period, and an annual average was also calculated. Dividing the standard deviation by the annual average lamb meat production yielded the percentage of the standard

(continued...)

### *Live Lamb Cost to Packers*

Table 5-3 and figure 5-1[27] show the prices received by growers for lambs marketed in New South Wales, Victoria, South Australia, and in the United States[28] during January 1990 through the first half of 1994; South Australia and Victoria account for most of the lamb meat exported to the United States, New South Wales, the location of a large share of Australia's population, is considered representative of the Australian domestic market.[29] The Australian prices are for lambs that are estimated to yield carcasses that weigh between 40 to 44 pounds, the size typically used for exports to the United States.

The prices of such live lambs in Australia are, on average, below such prices in the United States. However, it should be noted that there are important differences between animals in the two countries, specifically,

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[26] (...continued)
deviation to the annual average lamb meat production. This ratio shows the volatility of production in Australia and the United States where increases in the percentages are positively correlated with more volatile production. For example, in 1990, the percentage of volatility in the United States was 6.9 percent, while, in Australia, it was 12.2 percent indicating that monthly production in the United States was sustained at more or less the same levels throughout the year. However, in Australia, production fluctuated considerably.

[27] Figure includes prices for Victoria, South Australia, and the United States.

[28] The U.S. price is the price for Prime/Choice slaughter lambs at San Angelo, Texas.

[29] USITC staff, fieldwork, Australia, Mar. 1995.

Table 5-3
Live lambs: Average monthly prices in the United States and selected Australian States, by month, January 1990-June 1994

*(U.S. Dollars per 100 pound)*

| Country | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990: | | | | | | | | | | | | | |
| United States | 54.90 | 60.38 | 63.69 | 63.13 | 62.25 | 53.56 | 53.25 | 51.20 | 51.75 | 52.50 | 50.42 | 48.08 | 55.43 |
| Australia | | | | | | | | | | | | | |
| New South Wales | 47.94 | 53.83 | 48.19 | 57.36 | 57.06 | 54.56 | 49.96 | 54.44 | 42.40 | 37.59 | 33.02 | 32.49 | 47.40 |
| Victoria | 60.59 | 64.17 | 58.88 | 61.83 | 61.62 | 65.02 | 64.56 | 56.49 | 47.72 | 40.49 | 38.98 | 36.33 | 54.72 |
| South Australia | 51.20 | 58.55 | 55.28 | 59.23 | 61.45 | 65.87 | 71.49 | 57.59 | 38.85 | 30.87 | 31.13 | 35.11 | 51.38 |
| 1991: | | | | | | | | | | | | | |
| United States | 47.63 | 45.81 | 54.88 | 55.50 | 57.70 | 55.75 | 55.50 | 54.31 | 53.25 | 51.20 | 52.08 | 54.25 | 53.16 |
| Australia | | | | | | | | | | | | | |
| New South Wales | 50.09 | 49.00 | 47.01 | 41.90 | 39.33 | 48.94 | 48.47 | 52.27 | 40.32 | 24.62 | 32.47 | 35.79 | 42.52 |
| Victoria | 48.18 | 52.95 | 49.52 | 46.56 | 42.00 | 45.94 | 55.40 | 49.97 | 45.72 | 35.70 | 31.90 | 34.39 | 44.85 |
| South Australia | 42.06 | 46.38 | 47.22 | 43.06 | 41.37 | 49.28 | 52.15 | 40.21 | 41.76 | 31.27 | 33.54 | 33.48 | 41.82 |
| 1992: | | | | | | | | | | | | | |
| United States | 58.56 | 57.69 | 66.55 | 74.63 | 68.88 | 64.50 | 58.17 | 52.38 | 53.61 | 52.81 | 56.93 | 67.25 | 61.00 |
| Australia | | | | | | | | | | | | | |
| New South Wales | 39.33 | 39.73 | 37.44 | 38.49 | 40.59 | 42.94 | 51.71 | 43.72 | 40.74 | 42.02 | 43.18 | 46.83 | 42.23 |
| Victoria | 48.05 | 43.75 | 42.67 | 45.30 | 43.06 | 50.38 | 53.94 | 47.34 | 43.26 | 41.08 | 46.56 | 51.31 | 46.39 |
| South Australia | 45.44 | 40.58 | 41.64 | 41.26 | 40.11 | 40.89 | 43.53 | 48.33 | 43.36 | 39.88 | 41.87 | 51.93 | 43.23 |
| 1993: | | | | | | | | | | | | | |
| United States | 69.88 | 73.38 | 75.50 | 71.25 | 62.50 | 57.75 | 57.00 | 58.87 | 66.08 | 65.62 | 65.69 | 68.44 | 61.09 |
| Australia | | | | | | | | | | | | | |
| New South Wales | 52.35 | 55.85 | 54.19 | 52.41 | 48.32 | 54.65 | 69.80 | 71.28 | 64.00 | 48.63 | 49.68 | 49.71 | 55.91 |
| Victoria | 58.46 | 63.13 | 63.56 | 62.36 | 61.95 | 63.16 | 70.35 | 78.29 | 74.58 | 53.37 | 52.25 | 52.34 | 62.82 |
| South Australia | 59.01 | 59.17 | 57.24 | 56.26 | 54.50 | 57.16 | 67.95 | 73.59 | 66.15 | 45.81 | 44.71 | 48.89 | 57.54 |
| 1994: | | | | | | | | | | | | | |
| United States | 56.67 | 62.31 | 61.19 | 51.25 | 60.94 | 66.92 | | | | | | | |
| Australia | | | | | | | | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| New South Wales ..... | 55.41 | 57.10 | 56.36 | 51.42 | 52.08 | 52.69 |
| Victoria ..... | 62.36 | 64.64 | 60.94 | 55.70 | 51.35 | 49.97 |
| South Australia ..... | 59.04 | 55.06 | 56.85 | 54.66 | 53.00 | 54.52 |

Source: U.S. prices for 1990-93 compiled from USDA, ERS, Red Meat Yearbook, (Statistical Bulletin No. 885), Aug. 1994, table 78, p. 80; 1994 compiled from USDA, ERS, "Cattle and Sheep Outlook," (LDP-CS-5) Feb. 14, 1995. Australian prices compiled from official statistics of the AMLC, *Statistical Review*, July 93-June 94, p. 15.

FIGURE 5-1
Live lambs in the U.S. and Australia: Average monthly prices, Jan. 1990-June 1994

lambs in the United States are typically larger and, hence, yield larger carcasses.

The price of live lambs in the United States and Australia varies significantly from year to year. The average price in Victoria in 1990 was only 1 percent less than the U.S. average but was 24 percent less in 1992 and 4 percent less during the first half of 1994. The average price in South Australia in 1990 was 8 percent less than the U.S. average but was 30 percent less in 1992 and 8 percent less during the first half of 1994.

The average price of live lambs in Australia does occasionally exceed that of the United States. The average in Victoria exceeded that in the United States in 15 months during 1990-94, including 3 months in the first half of 1994, and the average in South Australia exceeded that of the United States in 9 months, including 2 months in the first half of 1994.

Table 5-4 and figure 5-2 show the price received by growers in New Zealand for the carcasses derived from the lambs they marketed during January 1990 through the first half of 1994. In New Zealand lambs for slaughter are typically not sold on a live basis and, hence, such data are not collected.[30] The price of lamb carcasses in New Zealand consistently averaged below such prices in the United States. However, it should be noted that the size of New Zealand lamb carcasses are smaller than those in Australia and significantly smaller than those in the United States and that the lambs in New Zealand are grass-fed.

### *Export Marketing*

The United States has traditionally been a net importer of lamb meat. The share of U.S. lamb meat consumption accounted for by imports increased from 6.7 percent in 1990 to 11.4 percent in 1994, as the quantity of imports generally increased and domestic production declined (table 2-15). U.S. exports of lamb meat are negligible. Although estimated U.S. exports of live lambs have increased in recent years, in 1994 such exports were equal to only about 2 percent of the lamb crop.

New Zealand and Australia have traditionally been exporters of agricultural products, including meat. Exports to all markets accounted for 97 percent of New Zealand's and 23 percent of Australia's lamb meat production in 1994 (table 5-2). Both countries have long established channels of distribution, such as export-oriented companies and export arms of the Australian Meat and Live-stock Corporation (AMLC) and New Zealand Meat Producers
Board (NZMPB), and infrastructure, such as ships and warehouses. Imports of lamb meat into both Australia and New Zealand were negligible during 1990-94.[31]

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[30] Officials of the NZMPB, interviewed by USITC staff, Wellington, New Zealand, Mar. 27, 1995.

[31] USDA, FAS, *Livestock*, (AGR No. AS5007) Jan. 24, 1995, p. 5, and *Livestock*, (AGR No. NZ5007) Feb. 1, 1995, p. 10.

Table 5-4
Lamb carcasses: Prices in the United States and New Zealand, by months, Jan. 1990-June 1994

*(U.S. Dollars per pound)*

| Country | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990: | | | | | | | | | | | | |
| United States | 1.12 | 1.28 | 1.35 | 1.23 | 1.25 | 1.20 | 1.25 | 1.20 | 1.20 | 1.20 | 1.15 | 1.14 |
| New Zealand | 0.47 | 0.47 | 0.44 | 0.43 | 0.47 | 0.48 | 0.57 | 0.61 | 0.57 | 0.64 | 0.61 | 0.56 |
| 1991: | | | | | | | | | | | | |
| United States | 1.09 | 1.07 | 1.19 | 1.22 | 1.25 | 1.24 | 1.25 | 1.21 | 1.18 | 1.13 | 1.11 | 1.13 |
| New Zealand | 0.52 | 0.51 | 0.49 | 0.44 | 0.44 | 0.46 | 0.40 | 0.41 | 0.40 | 0.35 | 0.37 | 0.36 |
| 1992: | | | | | | | | | | | | |
| United States | 1.15 | 1.23 | 1.37 | 1.44 | 1.43 | 1.40 | 1.36 | 1.25 | 1.26 | 1.21 | 1.29 | 1.40 |
| New Zealand | 0.39 | 0.40 | 0.41 | 0.38 | 0.38 | 0.42 | 0.45 | 0.47 | 0.50 | 0.55 | 0.53 | 0.54 |
| 1993: | | | | | | | | | | | | |
| United States | 1.46 | 1.58 | 1.68 | 1.54 | 1.43 | 1.33 | 1.25 | 1.36 | 1.40 | 1.40 | 1.41 | 1.44 |
| New Zealand | 0.55 | 0.53 | 0.52 | 0.53 | 0.58 | 0.60 | 0.65 | 0.66 | 0.68 | 0.66 | 0.69 | 0.68 |
| 1994: | | | | | | | | | | | | |
| United States | 1.31 | 1.34 | 1.37 | 1.31 | 1.30 | 1.46 | | | | | | |
| New Zealand | 0.66 | 0.63 | 0.59 | 0.60 | 0.56 | 0.61 | | | | | | |

Source: U.S. prices for 1990-93 compiled from USDA, ERS, "Redmeat Yearbook" (Statistical Bulletin No. 885), Table 86, Aug. 1994, p.88; 1994 compiled from USDA, ERS, "Cattle and Sheep Outlook" (LDP-CS-5), Feb. 14, 1994. New Zealand prices compiled from New Zealand Meat and Wool Board's Economic Service, *Annual Review of the New Zealand Sheep and Beef Industry*, various issues.

FIGURE 5-2
Lamb carcasses: Prices in the United States and New Zealand, by months, Jan. 1990-Oct. 1994

Domestic production supplies the bulk of U.S. consumption of lamb meat with the remainder supplied by Australia and New Zealand. Australia and New Zealand's market shares increased during 1990-94 as shown in the following tabulation (in percent):

| Year | United States | Australia | New Zealand |
|---|---|---|---|
| 1990 . . | 93.3 | 3.6 | 3.1 |
| 1991 . . | 93.0 | 3.9 | 3.0 |
| 1992 . . | 92.4 | 4.2 | 3.5 |
| 1993 . . | 88.9 | 6.5 | 4.7 |
| 1994 . . | 88.6 | 6.8 | 4.7 |

### *Government Policies*

The USITC was asked to provide information on government assistance regardless of whether that assistance may constitute subsidy under the U.S. countervailing duty law. The following section reviews direct payments to sheep and lamb growers in the United States, Australia, and New Zealand. General government support through government agencies, including the USDA, and agencies that can be viewed as their counterpart, Department of Primary Industries and Energy (DPIE) in Australia and Ministry of Agriculture and Fisheries (MAF) in New Zealand are reviewed. Also, government-sanctioned associations, the ASI, the AMLC, and the NZMPB are reviewed.

#### Australia and New Zealand direct support

Australian Federal Government support for the lamb sector, both live and processing, appears to be limited. A program associated with the Australian wool sector, the Wool Industry Supplementary Payment Scheme, described in chapter 3, made payments to sheep growers for wool. Total payments over the life of the program, which began in March 1991 and was terminated in 1992, were AUS$311 million, AUS$300 million of Australian Federal Government funds and AUS$11 million of Australian Wool Realization Corporation funds.[32]

New Zealand Government support for the lamb sector, both live and processing, also appears to be limited. As the result of a countervailing duty petition filed March 26, 1985, U.S. imports of lamb meat from New Zealand became subject to countervailing duties.[33] The U.S. Department of Commerce (DOC) conducts "administrative reviews" of foreign government programs as part of administering the U.S. countervailing duty law. On May 22, 1995, a DOC administrative review final determination was published reporting that the subsidy for the period April 1, 1992, through March 31, 1993, was *de minimis* for all firms.[34] In addition, DOC determined that the Government of New Zealand has abolished all subsidy programs for lamb meat for a period of 3 consecutive years. Accordingly, the DOC announced it was revoking the countervailing duty order.[35]

The aforementioned ITA determinations are consistent with recent publications, indicating that the Government of New Zealand significantly reduced its support for agriculture. Chapter 4 also noted that the New Zealand Federal Government has supported and scheduled to continue supporting research in the sheep sector.

#### United States

In the United States, the National Wool Act of 1954, as amended, provides for wool incentive payments to growers. However, the Omnibus Budget Reconciliation Act of 1993,

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[32] Australian Wool Realization Commission, *Annual Report*, 1991/1992, Dec. 1, 1992, p. 12.
[33] 50 F.R. 37708, Sept. 17, 1985, "Final Affirmative Countervailing Duty Determination and Countervailing Duty Order; Lamb Meat From New Zealand."
[34] 60 F.R. 27082, May 22, 1995, Notice of Final Results of Countervailing Duty Administrative Review and Revocation of Countervailing Duty Order.
[35] Ibid.

Public Law 103-130,[36] provided for a phaseout of the wool and mohair programs over the 1994 and 1995 marketing years and repealed the Wool Act to be effective December 31, 1995. For the 1994 marketing year (payments made April 1995), producers are to receive only 75 percent of their calculated payment, and, for the 1995 marketing year (payments made April 1996), they are to receive only 50 percent. The Wool Act and other U.S. government programs are discussed in the "U.S. Industry and Market," section.

Research by Whipple and Menkhaus investigated the impacts of the Wool Act using an econometric model of the U.S. sheep-related products industry.[37] That analysis compared model runs with and without the Wool Act over the 1960-85 period. Their results suggest that the Wool Act has resulted in annual levels of wool production that are from 2 to 20 percent higher; domestic lamb production levels that are 1 to 17 percent higher; U.S. wool imports that are 1 to 6 percent lower; and lamb imports that are 1 to 23 percent lower. These results are supported by the Commission staff's econometric findings (presented later in this chapter) that eliminating Wool Act benefits should result in a slight drop in U.S. lamb meat production. However, testimony by the ASI at the Commission's hearing suggests that wool production is expected to fall after the Wool Act is eliminated, although there may be an increasing switch of livestock from wool-type to primarily meat-type animals.[38]

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[36] Enacted November 1, 1993.

[37] Whipple and Menkhaus, *Welfare Implications*, 1990, pp. 38-40.

[38] Transcript of the Commission hearing for investigation No. 332-357, Apr. 6, 1995: Orwick, director of Government Affairs, ASI, testimony, pp. 29 and 46; Harbaugh, Director, American Lamb Council, ASI, testimony, pp. 54-55; and Miller, president, ASI, Inc., testimony, p. 73.

**General Government support**

The Australian Federal Government (DPIE) operates a number of so-called "Sub-programs" that are related to agriculture and apply to, but are not limited to, sheep growers. These programs include the Livestock and Pastoral Sub- program; the Rural Adjustment and Services Sub-program; the Quarantine and Inspection Sub-program; and the Agricultural and Resource Economic Analysis Sub-program.

The New Zealand MAF is the main government agent in the agricultural sector. MAF programs include the Agriculture Quarantine Service, Animal Health Services, Dairy Services, Meat Services, and Plant Services.

In the United States a number of agriculture related programs are conducted by the USDA, including general research done by the Economic Research Service, Extension Service, and Animal and Plant Health Inspection Service. Although sheep and lamb growers may benefit from certain of these programs, the programs are not industry specific.

**Government sanctioned associations**

The Federal Governments of Australia, New Zealand, and the United States provide statutory authority for the AMLC, NZMPB, and ASI,[39] respectively. However, the governments do not necessarily provide funds to the organizations. Each of the organizations is funded almost exclusively by producers, although each has received limited contributions from its respective Federal Government and the contribution to the NZMPB was used for beef promotion. The government contributions were described earlier in this report.

**Government leasing of grazing lands**

In Australia and New Zealand almost all sheep and lambs grazed on public lands are wool-type (Merino) sheep that are not suitable for the production of lambs for meat. Public lands in Australia are typically leased for 99 years, whereas leases in New Zealand are for 11 years; in the United States leases are almost all for 10 years. In Australia an estimated 10 to 15 percent of the sheep spend at least part of the year on public lands, and in New Zealand, this figure is estimated to be 5 percent. According to the ASI, 25 percent of the U.S. sheep population spends a portion of the year foraging on federal lands.[40]

[39] The enabling legislation for the ASI is the National Wool Act of 1954.
[40] Orwick, director, Government Affairs and Natural Resources, ASI, transcript of the hearing, p. 31.

## *Analysis of Demand for Lamb Meat*

The following section provides a comparative assessment of factors affecting demand for lamb meat in the United States, Australia, and New Zealand. Table 5-5 summarizes these factors.

### *Product Form*

Much of the imported lamb meat has characteristics that differentiate it from the domestic lamb meat. In the U.S. market, the preference and choice of individual consumers among fresh, chilled, or frozen lamb meat; carcass and cut size, and grain-fed or grass-fed lamb appear to vary considerably.

#### Fresh, chilled, or frozen lamb meat

Domestic lamb meat is typically sold fresh or chilled, whereas imported meat is often sold frozen (table 2-14). Some consumers prefer fresh meat because of perceived quality differences.[41] Consumer concerns about frozen meat include how long the meat has been frozen and whether it has been thawed and refrozen. However, ASI officials report that of the sales of fresh or chilled lamb made to the food service sector, fully 90 percent are subsequently frozen by the food service entities and distributors.[42] Also, an official of a major U.S. lamb breaker company[43] reported that there are certain customers, such as cruise lines, that prefer frozen lamb meat whether domestic or imported.[44]

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[41] Research data show that the maximum length of time after slaughter in which chilled lamb meat remains suitable for human consumption ranges from 21 to 24 days, given optimum care of the meat. Beyond that point, bacterial growth, or so-called bacteria count, becomes excessive. Officials of the American Meat Institute (AMI), a trade association representing meat packers and processors, indicated that, by sealing lamb meat in certain plastic materials, its shelf life could theoretically be extended up to 8 weeks. Several officials of grocery chains indicated that, in practice, fresh or chilled lamb meat and other meats are sold well before they exceed their maximum shelf life. The officials indicated that lamb meat must be sold within a week or so after the lamb is slaughtered. After this time, the meat darkens and can be sold only at a significant discount.

[42] Harbaugh, ASI, transcript of the hearing, p. 26.

[43] Official of B. Rosen and Sons, Inc., telephone conversation with USITC staff, Apr. 26, 1995.

[44] The AMLC describes frozen lamb as being at -10 °C or below (14 °F or below) and also defines fresh (chilled) lamb as maintained at -1.5 °C to 3 °C (29 °F to 37 °F) for shipping. The AMI reports that there are no industry or U.S. Federal Government specifications defining the terms chilled or frozen, but, as a general rule, frozen meat is expected to be 0 °F or colder and chilled meat is expected to be between 28 °F and 32 °F. The ASI reference to "fully 90 percent of sales of fresh or chilled lamb made to the food service sector being frozen by the food service entities and distributors" refers to lamb meat that is between 28 °F and 32 °F that the ASI considers to be frozen.

Competitive conditions[1] reflecting demand in the U.S., Australian, and New Zealand lamb meat sectors, 1994

| Competitive conditions | United States | Australia | New Zealand |
|---|---|---|---|
| **Analysis of demand for lamb meat:** | | | |
| Product form (fresh/frozen, large/small cuts, grain-fed/grass-fed) | Consumer Preference | Consumer Preference | Consumer Preference |
| Prices of Australian and New Zealand lamb meat in the U.S. market:[2] | | | |
| Fresh: | | | |
| Carcasses | (3) | (4) | More than domestic |
| Racks | (3) | More than domestic | More than domestic |
| Legs | (3) | Generally more than domestic | Generally more than domestic |
| Shoulders | (3) | Less than domestic since May | Less than domestic since May |
| Frozen: | | | |
| Carcasses | (3) | (4) | Less than fresh domestic |
| Racks | (3) | (4) | More than fresh or frozen domestic |
| Legs | (3) | Less than fresh or frozen domestic | Less than frozen domestic |
| Shoulders | (3) | Less than fresh domestic | Less than fresh domestic |
| Retail prices in home markets | More than Australia and New Zealand | Less than the U.S. | Less than the U.S. |
| Promotion expenditures | + | ++ | + |
| Transportation costs to the U.S. market | (3) | + | + |
| Exchange rates | (3) | (5) | (5) |

[1] May vary according to area of country considered.
[2] The following observations compare the price of imported lamb meat with domestic lamb meat.
[3] Not applicable.
[4] Australian prices are not available.
[5] The effect of the exchange rate of the Australian or New Zealand dollar against the U.S. dollar varies over time depending on the supply and demand conditions prevailing in the currency markets.

Note.--Among the competitive conditions ranking factors, "+++" is most favorable, "++" is favorable, and "+" is least favorable.

Source: Estimated by the U.S. International Trade Commission staff.

The AMLC[45] reports that fresh (chilled) Australian lamb is exported to the United States under the FARL program, and the product must meet specifications.[46] FARL products are sold to both the retail and food service sectors and, according to the AMLC, its product is most directly comparable to domestic lamb.[47] The NZMPB reports that chilled New Zealand lamb is sold almost exclusively to particular market segments, such as specialty retail outlets and white table cloth restaurants.[48]

The NZMPB also reported that, for the food service trade, the preference for fresh lamb, while undeniable, is less significant and is offset to a certain extent by characteristics of the frozen product including the longer shelf life and more uniform pricing throughout the year.[49]

**Carcass and cut size**

Domestic lamb carcasses and the cuts derived from them are typically larger than imported carcasses and cuts. Lamb carcasses vary significantly in size mostly as the result of 1) variations in the age at which animals are slaughtered--from about 2 months to 14 months;[50] 2) genetics--U.S. breeds are typically larger than Australian and New Zealand breeds; and 3) the manner in which the animals are raised, with grain-fed animals typically being heavier than grass-fed. The average carcass weight for lambs slaughtered under Federal inspection in the United States in 1994 was 63 pounds each.[51] Australian carcasses averaged about 40 pounds each.[52] Lamb carcasses in New Zealand averaged 33 pounds.[53]

A U.S. meat distributor reported that, when some restaurants specifically requested large lamb cuts, he supplied them with domestic; when other restaurants requested smaller cuts, he supplied them with imports.[54] Another distributor reported that typical distributors offer racks that include a 32-ounce domestic rack, a 22-ounce Australian rack and a 12-ounce New Zealand rack,[55] and an NZMPB official testified that the U.S. market for New Zealand carcasses tended to be for lighter carcasses.[56]

**Grain-fed or grass-fed lamb**

According to an official of the ASI, most domestic lamb meat is derived from grain-fed animals,[57] whereas New Zealand and Australian lamb meat is derived from grass-fed animals. Domestic interests contend that the American consumer seems to prefer the taste of grain-fed lamb.[58] However, the AMLC has stressed the range-fed (grass-fed) nature of Australian lamb in its FARL promotional campaign.

**Further processed cuts**

In the United States shipments of boxed lamb (primal cuts) to major retail

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[45] Prehearing brief of the AMLC, pp. 9-11.
[46] The FARL program is described in chapter 3 entitled "Australian Industry."
[47] Prehearing brief of the AMLC, p. 9.
[48] Prehearing submission of the NZMPB, p. 6.
[49] Ibid., pp. 5-6.
[50] Taylor, *Scientific Farm Animal Production*, p. 150.
[51] USDA, NASS, *Livestock Slaughter 1994 Summary*, (Mt An 1-2-1 (95)), Mar. 1995, p. 5.
[52] AMLC, *Statistical Review July 93-June 94*, p. 7.
[53] New Zealand Meat & Wool Board's Economic Service, *Annual Review of the New Zealand Sheep and Beef Industry*, 1993-94, p. 26.
[54] Furter, vice president and sales manager, Luce-Carmel Meat Co., transcript of the hearing, pp. 85-86.
[55] Bowman, AMONA Foods, transcript of the hearing, p. 102.
[56] Bryant, transcript of the hearing, p. 128.
[57] Miller, president, ASI, transcript of the hearing, p. 68.
[58] Ibid., p. 68.

distributors is becoming the norm.[59] However, some packers and processors are providing further processed cuts, including seasoned retail display case-ready products.[60]

In addition to some carcasses and primal cuts, imported lamb meat also includes further processed items. According to the AMLC, FARL products include value added primal and subprimal[61] cuts.[62] Distributor testimony suggests that a large share of imported lamb meat from Australia and New Zealand consists of relatively high-priced and further processed cuts.

### Questionnaire Responses of Importers and Purchasers

Commission questionnaires were sent to nine purchasers and nine importers and requested respondents to rate as superior, comparable, or inferior Australian or New Zealand lamb meat in relation to U.S.-produced lamb meat for a number of factors including, but not limited to, price, quality, and consistency. Purchaser and importer respondents were also asked to rank as unimportant, somewhat important, important, and very important the aforementioned factors by the power they have to influence their decision in purchasing (or importing) domestic or imported lamb meat. Separate responses were requested for fresh or chilled lamb meat and for frozen lamb meat. Not all respondents rated or ranked all factors. For analytical purposes, in some instances, responses are combined for fresh and frozen lamb meat, thus, the total number of responses may exceed the number of respondents.

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[59] TAMRC, p. 151.
[60] Postconference brief of the ASI, exhibit 4.
[61] Primal cuts may be divided into smaller cuts referred to as subprimal cuts; such cuts are, in turn, divided into retail cuts.
[62] Prehearing brief of the AMLC, p. 9.

### *Factors Other Than Price*

The Commission questionnaire requested comparisons between imported and domestic lamb relating to such factors as product quality, palatability, fat content, consistency of product specifications, shelf life, availability, packaging, and servicing. Generally, the most common response to the aforementioned factors was that the imported and domestic products are comparable.

Purchasers responding to the Commission questionnaire demonstrated a diversity of opinions concerning the importance of cut size in a comparison among the U.S., Australian, and New Zealand lamb meat. For imports, 5 of the 15 purchasers reported the imports to be superior; 5, comparable; and 5, inferior. The 11 importers' responses were somewhat less diverse: 6 reported the imports to be superior; 1, comparable; and 4, inferior. Of the 17 purchasers' responses, 13 reported the size of cuts to be very important or important; 3, somewhat important; and 1, unimportant.

Sixteen of 18 purchaser responses ranked quality of lamb meat to be very important regarding purchase decisions. Unlike purchasers, importers were slightly less certain about quality. Although three reported that quality was very important, and six reported quality important, four reported that it was unimportant.

Commenting on terms of sale, of the 19 purchasers, 8 reported Australian terms of sales to be comparable to the United States; 8, New Zealand terms of sales to be comparable; and 3, Australia terms of sale to be inferior. Eight purchasers reported terms of sale to be an important influence, and eight, only somewhat important or unimportant. Only 2 importers reported terms of sale to be important, and 10, somewhat important or unimportant.

### *Prices of Australian, New Zealand, and U.S. Lamb Meat in the U.S. Market*

The Commission sent questionnaires to nine purchasers of lamb meat of Australian, New Zealand (imports), and U.S. (domestic) origin. The retailers included selected large-volume retail grocery chains and cruise-ship lines. The recipients were asked, among other things, to report the prices they paid for lamb carcasses and selected cuts, specifically ribs (racks), legs, and, shoulders, during January 1990, through December 1994.

The results from responses to the Commission's questionnaire are presented in percentage differences between the price of domestic and imported products for reasons of confidentiality. Respondents did not necessarily provide data for all cuts, for all months, and for each of the countries. It should be noted that the prices reported represent a range of specifications for each of the categories and that some respondents changed the specifications of the product they purchased during the reporting period; therefore, price comparisons must be made with caution. Price comparisons data are presented below for fresh imported and fresh domestic meat prices, frozen imported and frozen domestic prices, and for frozen imported meat and fresh domestic.

**Purchasers' Questionnaire Responses**

Prices paid by purchasers of Australian fresh or chilled racks were reported for most of the last half of 1992, parts of 1993 (the first 2 months), and for 1994. The prices paid ranged from 5 to 47 percent less than the prices of domestic fresh or chilled racks during 1992 and 1993 (figure 5-3). However, during 1994, prices for Australian fresh racks were higher by 7 percent to 123 percent. Prices were also reported for Australian frozen racks for 1990 and 1991, and those prices were typically 40 to 60 percent below the prices paid for the domestic fresh product (figure 5-4).

Prices paid for Australian fresh or chilled legs were reported for July 1992 through 1994. The prices paid for Australian legs were less than the prices for domestic legs from July 1992 until April 1993 by 8 to 37 percent (figure 5-5). However, since May 1993, the price for Australian legs was *generally* higher--1 to 62 percent. Prices were also reported for Australian frozen legs for 1990 through 1992, and those prices were significantly below the prices paid for the domestic fresh product.

Prices paid for Australian fresh or chilled shoulders were reported for July 1992 through 1994. The prices paid for Australian shoulders were higher than domestic fresh

shoulders (by 1 to 51 percent) through April 1994 (figure 5-6). However, beginning in May 1994, the price reported for Australian shoulders was lower by 1 percent to 34 percent.

Prices paid by purchasers for New Zealand fresh or chilled carcasses were higher than the domestic price in every month between March 1993 and December 1994 (the only months for which comparisons are reported), with the New Zealand price being 19 to 59 percent higher (figure 5-7).

Prices paid by purchasers for New Zealand frozen racks were also higher than the domestic frozen rack prices in every month between January 1992 and December 1994 (the only months for which comparisons are reported), with the New Zealand price being between 26 and 106 percent higher (figure 5-8). Price comparisons between New Zealand frozen racks and domestic fresh racks show that New Zealand frozen racks were lower priced than domestic fresh racks in every month except December during 1990 but, thereafter, generally higher. New Zealand frozen racks were priced higher than domestic fresh racks in every month in 1994 (between 21 and 91 percent higher in that year) (figure 5-4).

New Zealand fresh leg prices were generally below the prices for domestic legs during 1990 through April 1993 and, thereafter, were generally above the domestic price although there were some months in which the New Zealand prices were lower (figure 5-5). Prices paid for New Zealand fresh or chilled shoulders were rather stable during 1990 and through the first half of 1994 whereas the price for domestic shoulders was rather unstable. The domestic shoulder prices fluctuated above and below the New Zealand price (figure 5-6). However, beginning in May 1994, the domestic price rose above that of the New Zealand and ranged from 8 percent above to 30 percent above.

FIGURE 5-3
Fresh racks: Australian prices relative to U.S. prices, Jan. 1992-Dec. 1994

FIGURE 5-4
Frozen racks: Australian and New Zealand prices relative to U.S. fresh prices, Jan. 1990-Dec. 1994

FIGURE 5-5
Fresh legs: Australian and New Zealand prices relative to U.S. prices, Jan. 1990-Dec. 1994

FIGURE 5-6
Fresh shoulders: Australian and New Zealand prices relative to U.S. prices, Jan. 1990-Dec. 1994

FIGURE 5-7
Fresh carcasses: New Zealand prices relative to U.S. prices, Jan. 1993-Dec. 1994

FIGURE 5-8
Frozen racks: New Zealand prices relative to U.S. prices, Jan. 1991-Dec. 1994

**Importers' questionnaire responses**

The Commission also sent questionnaires to nine importers of Australian and New Zealand lamb meat. The importers were asked, among other things, to report the prices they received for lamb carcasses and selected cuts, specifically racks, legs, and shoulders during January 1990-December 1994.

Prices importers reported receiving for frozen New Zealand carcasses during March 1993, through December 1994, (the only period for which comparable prices were reported) were between 15 and 43 percent below prices purchasers reported paying for fresh domestic carcasses.

Between January 1990 and February 1993, prices importers reported receiving for fresh New Zealand racks were less than the prices purchasers reported paying for fresh domestic racks in all but 1 month in 1990, 7 months in 1991, 2 months in 1992, and the first 2 months of 1993. However, since March 1993, the price of fresh New Zealand racks has exceeded the price purchasers reported paying for domestic fresh racks, with the margin ranging from 5 to 144 percent.

Importers reported prices for frozen Australian legs during every month but 1 during 1993-94 were below prices purchasers reported paying for frozen domestic legs (between 9 and 27 percent below). Also, importers' prices for frozen New Zealand legs were below (less than 1 percent to 13 percent) prices purchasers reported paying for frozen domestic legs in every month during 1993-94.

Prices importers reported receiving for frozen Australian shoulders were below the prices purchasers reported paying for fresh domestic shoulders in every month during 1990-94, with the margin ranging from 7 to 64 percent. The importers' price for frozen New Zealand shoulders exceeded the purchasers' price of fresh domestic shoulders in the first 4 months of 1990 but was less than the prices purchasers reported paying for fresh domestic shoulders during May 1990 through December 1994, with the margin ranging from less than 1 to 59 percent.

Purchasers overwhelmingly reported imports to be superior in price in a comparison among the United States, Australia, and New Zealand. Combining the responses for fresh, chilled, and frozen lamb, eight purchasers reported that the Australian price was superior; six, that the New Zealand was superior; none, that the price was comparable; and only one, that New Zealand fresh lamb was inferior. Purchasers also overwhelmingly reported imports to be superior in terms of consistency of product price. Seven reported that the Australian price consistency was superior; six, that the New Zealand price was superior; only one, that price is comparable; and only one, that New Zealand fresh lamb was inferior.

Price and consistency of price were reported to be very important influence for U.S. purchasers of lamb meat by 10 of the 18 respondent purchasers, and an important influence by 8. However, quality was reported to be a very important influence in 16 responses and availability was ranked as very important in 15 responses. No respondent purchasers of U.S., Australian,

or New Zealand lamb meat ranked quality, availability, price or price consistency as somewhat important or unimportant.

Unlike the purchaser, the nine respondent importers were less certain about price. None reported price to be very important; five, important; and four, somewhat important. Consistency of product price was reported to be very important by two importers; important, by four; somewhat important, by three; and unimportant, by four.

Responding to the Commission's questionnaire, importers reported that fresh or chilled racks from Australia were typically priced below racks from New Zealand; fresh or chilled legs from New Zealand were priced below legs from Australia; and fresh or chilled shoulders from New Zealand were generally priced below shoulders from Australia (except in the last quarter of 1994). Frozen racks from Australia and New Zealand were relatively close in price, until the last half of 1994 when Australian prices rose and New Zealand prices declined. The price of frozen legs and shoulders from Australia was typically below the price of their counterparts from New Zealand.

In general, the prices paid by importers were more volatile than the prices paid by purchasers and, in general, the margin or difference between the price paid by importers and purchasers is small, except for frozen ribs from New Zealand. Commenting for imported fresh, chilled, or frozen lamb combined, none of the importers reported that imported lamb meat was superior in price to domestic; three, that the price was comparable; and four, that imports were inferior. However, nine importers reported imports to be superior in terms of consistency of product price and two reported comparability. For terms of sale, there were only three respondents, all of whom reported comparability.

### *Retail Prices in the United States, Australia, and New Zealand*

Retail lamb cut prices in Australia and in the United States are shown in table 5-6. The Australian prices are low in relation to such prices in the United States. However, they include cuts from lambs that are estimated to yield carcasses that weigh between 18 to 35 pounds, and such lambs are typically lower priced than heavier lambs. Retail prices for New Zealand lamb chops and shanks in the home market are shown in table 4-5. Such prices are less than U.S. prices for similar cuts reflecting cuts derived from smaller carcasses.

Table 5-6
Lamb: Retail prices for selected cuts in the United States and selected cities in Australia 1991-94

*(U.S. dollar per pound)*

| Item/Year | Sydney | Melbourne | Brisbane | Adelaide | Perth | Hobart | United States |
|---|---|---|---|---|---|---|---|
| Leg: | | | | | | | |
| 1991 | 1.84 | 1.84 | 1.99 | 1.62 | 2.00 | 1.76 | 2.90 |
| 1992 | 1.75 | 1.80 | 1.89 | 1.51 | 1.81 | 1.73 | 2.84 |
| 1993 | 1.72 | 1.69 | 1.74 | 1.49 | 1.72 | 1.54 | 2.85 |
| 1994 | 1.93 | 2.04 | 1.86 | 1.63 | 1.78 | 1.72 | 3.04 |
| Chop-loins: | | | | | | | |
| 1991 | 2.13 | 2.77 | 2.43 | 2.17 | 2.56 | 2.27 | 7.00 |
| 1992 | 1.95 | 2.62 | 2.33 | 1.95 | 2.57 | 2.26 | 6.77 |
| 1993 | 1.99 | 2.40 | 2.17 | 1.94 | 2.41 | 2.05 | 6.45 |
| 1994 | 2.23 | 2.53 | 2.44 | 2.13 | 2.45 | 2.18 | 6.36 |

Source: Data for Australia compiled from Australian Meat & Live-stock Corporation, *Statistical Review*, July 1993-June 1994, p. 19; data for U.S. compiled from prehearing brief of the ASI, exhibit 2.

### *Promotion Expenditures*

During the course of the investigation, including the public hearing, domestic interests expressed concern and interest about promotional campaigns. The following discussion provides information, including expenditures, on promotional programs in the U.S. market.

The AMLC expenditures for export marketing in the United States declined from AUS$14.4 million (US$10.1 million) in the Australian fiscal year[63] 1993 to AUS$9.8 million (US$6.9 million) in 1994.[64] The AMLC reports that its total export marketing expenditures in the United States include expenditures for meat of other species of animals, including beef, accounting for a large share of Australian meat sales in the United States. The total AMLC expenditures also include administrative costs. AMLC expenditures on lamb meat sales in 1994 promote only FARL lamb and amounted to about US$1.5 million, including limited expenditures in Canada.[65]

The New Zealand Spring Lamb Company (which is owned jointly by the NZMPB and by three New Zealand meatpackers) reported that it spends about US$120,000 to US$180,000 per year on lamb meat promotion in the United States.[66]

ASI expenditures for lamb marketing amounted to US$2.5 million in the year ending September 30, 1994.[67] On a per-pound basis, promotional expenses for lamb by the AMLC appear to amount to about US6.6¢, whereas promotional expenses by the ASI appear to amount to about US0.8¢.

The 10 purchasers responding to the Commission's questionnaire on promotional programs, reported that promotional programs, in general, among the United States, Australia, and New Zealand were comparable. Of the 10 purchaser respondents, 1 reported that the Australian promotional programs for fresh lamb were superior, 1 reported that those of the New Zealand were superior, and 3 reported that the Australian programs were inferior. None of the purchasers reported the promotional programs to be very important factors influencing their purchases. However, four reported them important; eight, somewhat important; and six, unimportant. In general, five of the seven importers reported promotional programs for imports to be inferior to domestic; however, one reported comparability, and one reported the imports to be superior. Nine importers reported that promotional programs were generally unimportant factors influencing purchase decisions, but, for fresh lamb, two respondents reported that they were very important, and one reported them to be important.

### *Transportation Costs*

While all lamb meat suppliers face internal transportation costs within the United States, Australian and New Zealand lamb meat suppliers in the U.S. market face an obvious disadvantage in terms of international transportation costs. Transportation rates applicable to U.S. imports from Australia and New Zealand were reported to average 85¢ per pound by air and 24¢ per pound by surface.[68]

### *Exchange Rates*

Table 5-7 provides nominal U.S./New Zealand and U.S./Australian exchange rates in terms of U.S. dollars per New Zealand or Australian dollar. The exchange rate between two freely convertible currencies (such as between the U.S. dollar and the dollar of New Zealand or Australia) reflects the supply and demand conditions for these currencies in

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[63] The Australian fiscal year is July 1-June 30.

[64] *AMLC 1993-1994 Annual Report*, p. 58, and postconference brief of the ASI.

[65] Counsel for the AMLC, telephone conversation with USITC staff, May 12, 1995.

[66] Grahm Valentine, chairman, and Llew Pointon, general manager of the New Zealand Spring Lamb Company, interviewed by USITC staff, Wellington, New Zealand, Mar. 27, 1995.

[67] ASI Financial statements as of September 30, 1994, p. 14.

[68] Weinstein, president, Foodcomm International, transcript of the hearing, p. 97.

those countries. Such changes affect trade between countries through the exchange rate effects on prices--here the prices of foreign lamb denominated in U.S. dollars.[69] Generally, U.S. meat distributors who import foreign lamb into the United States[70] and foreign lamb producers who market their lamb in the United States[71] testified that exchange rate movements are important and that exchange rate movements are a closely watched variable.

The two quarterly exchange rates did not vary much over the 1990:1-1994:4[72] period. This suggests that the values of the U.S. dollar relative to the New Zealand and Australian dollars were stable and did not vary much over this period.

The U.S. dollar weakened slightly by about 5 percent relative to the New Zealand dollar over the 5-year period: a New Zealand dollar was worth 59.3 U.S. cents in 1990:1 and 62.2 U.S. cents in 1994:4. Throughout this period, the exchange rate varied within the range of 0.51-0.62.

The U.S. dollar strengthened slightly by 1.3 percent relative to the Australian dollar over the same period: an Australian dollar was worth 76.6 U.S. cents in 1990:1 and 75.5 U.S. cents in 1994:4. Throughout this period, the exchange rate varied within the band of 0.67-0.81.

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[69] USITC publication 2805, Sept. 1994, p. 10.

[70] Joel Weinstein, president, Foodcomm International, transcripts of the Commission hearing on the investigation No. 332-357, Apr. 6, 1995.

[71] Laurie Bryant, North American director, New Zealand Meat Producers Board, transcripts of the Commission hearing on the investigation 332-357, Apr. 6, 1995, pp. 143-44.

[72] Quarters are denoted numerically by the number placed on the right side of the colon, with "1" reflecting the January-March quarter, "2" reflecting the April-June quarter, etc.

Table 5-7
Nominal exchange rates[1] of New Zealand and Australia: Average quarterly rates in U.S. dollars per unit of non-U.S. currency

| Period | | New Zealand Exchange Rate | Australian Exchange Rate |
|---|---|---|---|
| 1990: | Jan.-Mar. | .5934 | .7659 |
| | Apr.-June | .5785 | .7681 |
| | July-Sept. | .6088 | .8087 |
| | Oct.-Dec. | .6071 | .7824 |
| 1991: | Jan.-Mar. | .5974 | .7784 |
| | Apr.-June | .5846 | .7719 |
| | July-Sept. | .5739 | .7819 |
| | Oct.-Dec. | .5607 | .7841 |
| 1992: | Jan.-Mar. | .5437 | .7531 |
| | Apr.-June | .5401 | .7584 |
| | July-Sept. | .5427 | .7312 |
| | Oct.-Dec. | .5259 | .6986 |
| 1993: | Jan.-Mar. | .5196 | .6875 |
| | Apr.-June | .5407 | .6949 |
| | July-Sept. | .5507 | .6694 |
| | Oct.-Dec. | .5519 | .6686 |
| 1994: | Jan.-Mar. | .5697 | .7078 |
| | Apr.-June | .5815 | .7246 |
| | July-Sept. | .6016 | .7389 |
| | Oct.-Dec. | .6902 | .7554 |

[1] Rates are the nominal "rh" rates which are average quarterly rates specified in U.S. dollars per unit of foreign currency: The "New Zealand exchange rate" reflects U.S. dollars per New Zealand dollar and the "Australian exchange rate" reflects U.S. dollars per Australian dollar.

Source: International Monetary Fund. *International Financial Statistics*, relevant monthly issues, Mar. 1994-Jun. 1995.

During the 1990:1-1994:4 period, both exchange rates, and hence the U.S. dollar values relative to the New Zealand and Australia dollars, varied mildly within narrow bands. Consequently, exchange rate variation likely had mild impacts on U.S. lamb imports from these countries.

### Econometric Relationships Among Lamb Meat Imports, Production, and Prices[73, 74]

In previous sections of this report, important issues as to the role of lamb meat imports in the U.S. market, including the substitutability of U.S. and foreign lamb meat, have been raised. Additionally, U.S. growers have cited the termination of the wool program as an important factor that will affect U.S. lamb meat supply in future years. More specifically, whether imports markedly or insignificantly influence quantities and price of U.S.-produced lamb (hereafter domestic lamb), whether the domestic lamb quantity and price of domestic lamb elastically or inelastically respond to each other, or whether eliminating the Wool Act benefits will greatly or inconsequentially influence the U.S. sheep-related markets are important facets of the competitive environment that producers and consumers face. And yet, while such relationships are implied by theory to some degree, it is shown below that the degrees to which such relationships hold are in great debate both in this investigation and for agricultural economists generally. This degree of contention provides an opportunity to use an econometric modelling approach to provide empirical insights on the degree to which such relationships hold. In this section of the report, an econometric model is estimated and used to examine the relationships between imports, domestic lamb slaughtered and consumed, U.S. wool production, producer prices received for lamb and wool, and the U.S. wool program.

#### Modelling Approach

An economic model can be useful to help illuminate the competitive conditions affecting the U.S. sheep-related markets, and this requires capturing important relationships among the lamb growing, lamb meat producing, and wool producing sectors, as well as the lamb import markets. Therefore, modelling the industry at the farmgate appears desireable for this investigation.[75] As noted earlier, decisions made by lamb

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[73] Commissioner Newquist notes that in the context of this investigation, economic modelling provides only "estimates" regarding the impact of any event or series of events (e.g., increases in imports, elimination of Wool Act assistance) on the domestic lamb industry.

In his view, economic models rely on the manipulation of a number of assumptions and variables, all of which differ according to the information sought and the judgment and prejudices of the modeler. Thus, models measuring the impact of a single event can and do produce widely divergent "results."

For purposes of this investigation, therefore, Commissioner Newquist considers economic modelling to be but one of many tools available to the Commission to analyze and assess the domestic lamb industry.

For further discussion of Commissioner Newquist's understanding of economic modelling, particularly its limitations, see, *The Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements*, Inv. No. 332-344, USITC Pub. 2900 at XI ("Views of Commissioner Don Newquist")(June 1995); see also, *Potential Impact on the U.S. Economy and Industries of the GATT Uruguay Round Agreements*, Volume I, Inv. No. 332-353, USITC Pub. 2790 at I-7, n.17 (June 1994); *Potential Impact on the U.S. Economy and Selected Industries of the North American Free-Trade Agreement*, Inv. No. 332-337, USITC Pub. 2597 at 1-6, n.9 (January 1993).

[74] For Commissioner Bragg's views on economic modelling, see *The Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements*, Inv. No. 332-344, "Views of Commissioner Bragg," at XIII-XIV.

[75] Recently, the Commission conducted an econometric analysis of the effects on the U.S. lamb meat industry at the wholesale (i.e., meat packing) level

(continued...)

growers ultimately determine the supply of domestic lamb meat to the U.S. market. Each year lamb growers assess the prices and net returns received from slaughter lambs and decide if ewe lambs will be slaughtered or retained as a capital good for breeding purposes. The decision to retain ewes for breeding indicates optimism, whereas the decision to sell lambs for slaughter indicates that farmers do not anticipate high enough prices to hold back lambs for increased future production.

To estimate likely relationships in the U.S. lamb meat industry, Commission staff estimated a vector autoregression (VAR) model of the following system of annual U.S. sheep-related market variables:

1. U.S. equilibrium levels of lamb/sheep meat slaughtered and consumed (hereafter, equilibrium domestic meat quantity or equilibrium "lamb" meat quantity)[76]

2. U.S. market price for lamb (hereafter, lamb price)

3. U.S. wool production

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[75] (...continued)
[see USITC, *The Econometric Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements*, Investigation No. 332-344, pub. 2900]. The previous investigation's modelling work focused on estimating the effects of specific countervailing duty orders on the U.S. lamb meat industry, while this investigation's modelling effort focuses on the more general task of revealing the competitive conditions characterizing the U.S. sheep-related markets and focuses on markets at the farm level. Consequently, the model approaches are necessarily different, and modelling results are not directly comparable.

[76] This quantity is hereafter referred to as lamb meat because most of the quantity is lamb meat. In 1994, about 93 percent of sheep-related meat production was lamb meat, and only about 6 percent was mutton. See U.S. Department of Agriculture, National Agricultural Statistics Service, *Livestock Slaughter, 1994 Summary*, publication No. Mt An 1-2-1(95), March 1994, pp. 5, 84. These data are provided in appendix K.

4. Wool price received by U.S. wool producers (hereafter, market wool price)

5. Ratio of the Wool Act's support price to the market wool price (hereafter, RATIO)

6. U.S. lamb meat imports (hereafter, lamb imports)

Equilibrium domestic meat quantity is total U.S. lamb and mutton slaughtered (consumed) in millions of pounds, published by the U.S. Department of Agriculture (USDA).[77] The official U.S. Department of Commerce data on imported lamb quantities (millions of pounds) serve as U.S. lamb meat imports. Lamb price is the average price of spring lambs (slaughter, Choice) of either 75-105 or 80-110 pounds, at Sioux Falls, South Dakota, compiled by the USDA's Agricultural Marketing Service (USDA, AMS).[78]

Following Whipple and Menkhaus, the model includes both U.S. wool production quantities and the relevant wool price variables to account for jointness of the lamb meat and wool production processes.[79] U.S. wool production is reflected by shorn wool production published by the USDA, Agricultural Stabilization and Conservation Service (USDA, ASCS).[80] The two rates of return relevant to U.S. wool producers are the market price for wool and the ratio of the wool support price over the market wool price (RATIO).[81,82] RATIO serves as a per-unit return to wool production over and above the market price paid by the Federal Government to the producer. The wool support price and

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[77] For 1970-93 data, see USDA, Economic Research Service (ERS), *Red Meats Yearbook 1994* (Statistical Bulletin No. 885), table 97, p. 99. For 1958-69 data, see USDA, ERS, *Livestock and Meat Statistics*, relevant supplement issues. The 1994 data were obtained from USDA, ERS, *Cattle and Sheep Situation and Outlook Report*, Feb. 14, 1995. These data are provided in appendix K.

[78] These unpublished prices constituted the only consistent U.S. live lamb price series located by Commission staff since the 1950s. Prices cited in table 2-10 (Choice slaughter lambs) were not used because they were not available for an adequate time frame and with enough observations to use in this econometric model. The data were obtained from USDA, AMS by private communication with Commission staff. Because of shutdowns and subsequent reopenings of price-reporting meatpacking plants in the Sioux Falls, SD, area, a price was not reported for 1992, but was reported thereafter for 1993 and 1994. Staff used the 1992 price value of feeder lambs (90-110 pounds), as a 1992 value proxy. Commission staff deemed this number to be the closest substitute for the 1992 value from the price data sheets obtained from USDA, AMS. These data are provided in appendix K.

[79] See Glen D. Whipple and Dale J. Menkhaus, "Welfare Implications of the Wool Act," *W. J. Agricultural Economics* vol. 15, No. 1 (July 1990), pp. 33-44.

[80] USDA, ASCS published the 1958-93 data in *ASCS Commodity Fact Sheet, Wool, 1993*. The 1994 shorn wool estimate was obtained by Commission staff in a private communication with USDA, ASCS staff. These data are provided in appendix K.

[81] According to Whipple and Menkhaus, there are two per-unit rates of wool return relevant to the farmer: the wool support price (when the market price has been below the support price) and the market price. See Glen D. Whipple and Dale J. Menkhaus, "Wool Act."

[82] RATIO was included as a separate endogenous variable because Federal Government behavior in determining the wool support price, RATIO's numerator, was clearly endogenous. Over the 34-year estimation period, the support price changed 23 times, generally trended upward from $0.62 to $2.09 per pound, and often increased and decreased from year to year. See USDA, ASCS, "Commodity Fact Sheet, Wool, 1993." Data on the U.S. wool support price and the market price of U.S.-produced wool required to calculate RATIO are included in appendix K.

the market wool price were obtained from USDA, ASCS.[83]

The effects of world lamb markets are reflected in this model through inclusion of a single import quantity variable. Foreign levels of production, domestic demand, export supply, and foreign lamb meat prices are exogenously determined at the farmgate level.[84]

As stated, theory implies that, to some degree, imports may influence the quantity and price of domestic lamb, that U.S. lamb price and quantity respond to each other, and that elimination of the Wool Act will influence the U.S. sheep-related markets. Yet the degree to which these three relationships hold are highly debated by the U.S. producer and foreign producer interests who testified in this investigation, and by agricultural economists in the literature.

First, there is little or no consensus on the degree of influence that imports and rates of U.S. market penetration from imports, have played, and are playing, in the industry's competitive structure; opinions "run the full gamut." U.S. lamb-producing interests[85] claim that the primarily frozen, smaller-cut, and range-fed imports and the primarily fresh, larger-cut, and grain-fed domestic lamb are sufficiently similar to directly compete in the same markets and result in the suppression of U.S. prices and the displacement of U.S. lamb. At other end of the spectrum, the foreign lamb-producing interests[86] claim that domestic and imported products are sufficiently different so as not to compete with each other at all, and not result in U.S. lamb price suppression and in displacement of U.S. lamb quantities. Recent Commission research,[87] conducted at the wholesale market level as opposed to the farm-level focus of the present investigation, suggests an answer between these two extremes: that imports have had minor effects on U.S. lamb meat and lamb import markets.

Secondly, the degree that U.S.-produced quantities and U.S. prices respond to each other illuminates another major competitive condition of the U.S. industry in great contention. Estimates of the price elasticity of demand range along about a ten-fold spectrum, from -0.3 to -4.0,[88] a range which includes the Commission's recent wholesale

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[83] Ibid.

[84] Other studies that have modeled the U.S. lamb meat industry at the farmgate level have also excluded foreign market variables, such as import prices, from demand and supply equations. See G. Whipple and D. Menkhaus, "An Econometric Investigation of the Demand for lamb," *Sheep Industry Development Research Journal*, vol. 5, No. 1, 1989, pp. 7-11, and Texas Agricultural Marketing Research Center (TAMRC), Lamb Study Team, *Assessment of Marketing Strategies to Enhance Returns to Lamb Producers*, TAMRC Commodity Market Research Report CM-1-91 (College Station, TX: Texas A&M University, Dec. 1991).

[85] See transcripts of the Commission hearing on investigation No. 332-357, Apr. 6, 1995: testimony generally at pp. 13-32; and testimony of Pierce Miller, president, ASIA, at pp. 38-39.

[86] See transcripts of the Commission hearing on investigation No. 332-357, Apr. 6, 1995: testimony of Laurie Bryant, North American director, New Zealand Meat Producers Board (NZMPB), at pp. 128-34; and testimony of Frances Cassidy, chief executive officer, Australian Meat and Livestock Corporation, at pp. 164-66, 169-70, and 174-75.

[87] USITC, *The Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements*, investigation No. 332-344, publication 2900, June 1995, ch. 8: Lamb Meat.

[88] The -0.3 estimate was provided by D. Anderson, "An Econometric Model of the U.S. Sheep and Mohair Industries for Policy Analysis," unpublished Ph.D. dissertation, Texas A&M University, College Station, TX, June 1994. Anderson also provided other elasticity estimates implied by his model and simulations, but not reported in the dissertation, in an Oct. 13, 1994 memorandum to Commission staff. The -4.0 estimate was provided by G. Whipple and D. Menkhaus, "An Econometric Investigation of the Demand for Lamb," *Sheep Industry Development Research Journal*, vol. 5, No. 1 (1989), pp. 7-25.

level estimate of -0.8.[89] Estimates of the price elasticity of U.S. supply range along an even larger spectrum from 0.01 to 11.38, a range which includes the recent Commission wholesale level estimate of 2.8.[90]

And thirdly, the future impacts on the U.S. sheep-related industry and the industry's competitive conditions from the elimination of the half-century-old Wool Act benefits, are unknown. Whipple and Menkhaus[91] found that the Wool Act benefits to U.S. producers have been generally modest, with implications to modest burdens to farmers when the benefits are eliminated. Anderson[92] and U.S. lamb and wool producer interests,[93] on the other hand, claim that elimination of Wool Act benefits will incur more severe losses for U.S. producers.

Given such wide ranges of debate, an empirical approach which utilizes data-based evidence to suggest not only whether such relationships hold, but also the degree to which they hold, is desirable. Consequently, a modelling approach based on vector autoregression (VAR) econometrics was chosen. VAR econometrics loosely imposes theory with as few a priori (theoretical) restrictions as possible so as to permit the regularities embedded in the data to reveal themselves.[94] These regularities are history's average interrelationships among these variables, and provide evidence on if and how the individually modelled variables react to a shock in one of the variables. A VAR model posits each of the above six endogenous variables as a function of a specified number of lags (here two) of all six variables. Hence a system of six endogenous variables results, where each variable interacts with the others through lags.[95] Additionally, each equation contains the following exogenous variables: constant (or intercept), a time trend, and two lags of an animal inventory variable relating the number of sheep and lambs on farms on January 1 of each year.[96] The estimated VAR model provides a reduced form framework for the six U.S. lamb-market-related variables defined above.[97]

The VAR model was estimated over the 1961-94 period. Statistical evidence strongly indicates that the resulting model is a well-specified one, based on a battery of diagnostic testing standards established in the econometric literature. Specific details on model estimation, choice of lag structure, and the model's diagnostics and empirical validation are provided in appendix L.

**Model Simulations and Results**

The data-oriented VAR model provides the average dynamic patterns with which the six variables have historically reacted to movements in each other. Such dynamics provide insights concerning the nature of the modelled system's competitive conditions. More specifically, Commission staff conducted five different model simulations:

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[89] See USITC publication 2900, ch. 8: Lamb Meat.

[90] Ibid.

[91] Whipple and Menkhaus, "Welfare Implications of the Wool Act," 1989, p. 39.

[92] Anderson, 1994.

[93] Transcripts of the Commission hearing on investigation No. 332-357, Apr. 6, 1995: testimony of P. Orwick, director of Government Affairs, ASIA, pp. 45-46; and testimony of P. Miller, president, ASIA, pp. 73-74.

[94] For a detailed description of vector autoregression econometric methods, see D.A. Bessler, "Analysis of Dynamic Economic Relationships: An Application to the U.S. Hog Market," *Canadian Journal of Agricultural Economics*, vol. 32 (1984), pp. 109-24.

[95] See C. Sims, "Macroeconomics and Reality," *Econometrica*, vol. 48, No. 1 (1980), pp. 1-48. See also Bessler, "Dynamic Economic Relationships."

[96] These data are in 1,000 head and were published by the U.S. Department of Agriculture in two publications: the 1958-69 data are from *Livestock and Meat Statistics* (Statistical Bulletins 522 and 784); data from 1970 and on are from *Red Meat Year Book, 1994*, (Statistical Bulletin 885).

[97] J. Hamilton, *Time Series Analysis*, pp. 324-27. Hamilton provides a discussion on the relationship of reduced-form VAR models and more theoretically based structural econometric models.

Simulation 1: Positive shock (increase) in U.S. lamb imports and the nature and degree of responses in (a) U.S. lamb price, (b) equilibrium domestic meat quantity, (c) U.S. wool production, and (d) U.S. wool price.
Simulation 2: Positive shock (increase) in the equilibrium lamb meat quantity slaughtered and consumed, and the nature and degree of responses in (a) U.S. lamb price, (b) U.S. wool production, (c) U.S. wool price, and (d) U.S. lamb imports.

Simulation 3: Positive shock (increase) in U.S. lamb price and the nature and degree of responses in (a) equilibrium domestic meat quantity, (b) U.S. wool production, (c) U.S. wool price, and (d) U.S. lamb imports.

Simulation 4: Elimination of the Wool Act, emulated by a decline in RATIO, the effective rate of wool return over and above the market price wool price, and the nature and degree of responses in (a) U.S. lamb price, (b) equilibrium meat quantity, (c) U.S. wool price, and (d) U.S. lamb imports.

Simulation 5: Elimination of the Wool Act, emulated by a decline in RATIO, and the nature and degree of responses in (a) U.S. lamb price, (b) equilibrium meat quantity, and (c) U.S. lamb imports. For reasons provided below, this simulation uses a slightly altered model from that of simulation 4.

The estimated VAR model was simulated under the five simulations above using the impulse response function, and multipliers can be calculated from each simulation's statistically nonzero impulse responses.[98] The multipliers, provided in table 5-8, indicate the model's percentage change in the response variable per percentage change in the shock variable. Sign is important: a positive multiplier suggests that each percentage change in the shock variable has generally coincided with response variable changes in the same direction, while a negative multiplier suggests that each shock variable change has generally coincided with response variable changes in the opposing direction. For example, each percent increase in U.S. lamb price (simulation 3) has, on average historically, elicited a 0.38 percent drop in the equilibrium quantity of meat slaughtered and consumed.

### *Simulation 1: Effect of Increased Imports*

The results in table 5-8 indicate that, on average historically, each percent rise in U.S. lamb imports displaced some domestic lamb quantities, although such displacement was slight (one twentieth of a percent), and apparently insufficient to influence U.S. lamb price. This result falls within the spectrum of debate formed by testimony of the foreign producer

[98] Not much attention is paid to RATIO as a response variable in simulations 1-3. This is because over the 34-year estimation period of 1961-1994, the support price has generally increased, although erratically, from $0.62/lb to $2.09/lb. Hence, an increase (decrease) in the wool market price translates into a somewhat more pronounced RATIO decrease (increase) rather transparently. See USDA, ASCS, "Commodity Fact Sheet, Wool, 1993."

Table 5-8
Multipliers for U.S. sheep-related markets under five simulations[1]

| | Simulation 1, increased lamb imports | Simulation 2, increased meat quantity[2] | Simulation 3, increased lamb price | Simulation 4, Wool Act's elimination[3] | Simulation 5, Wool Act's elimination[3] |
|---|---|---|---|---|---|
| U.S. lamb price | N/S | -1.43 | N/R | -0.14 | N/S |
| Meat slaughtered, consumed | -.05 | N/R | -.38 | .07 | .05 |
| U.S. wool production | N/S | .27 | -.20 | N/S | N/S |
| U.S. wool price | N/S | -2.9 | 1.6 | -0.95 | N/R |
| U.S. lamb imports | N/R | -2.6 | N/S | N/S | N/S |
| RATIO | N/S | 3.3 | -1.8 | N/R | N/R |

[1] The "N/S" and "N/R" labels denote situations where responses were statistically insignificant (at the 10-percent significance level) and/or not relevant to the simulation.

[2] "Meat quantity" here refers to the U.S. equilibrium quantity of sheep and lamb meat slaughtered and consumed, also denoted as "meat slaughtered and consumed" above. This variable is defined in the text.

[3] For reasons explained in the text, simulations 4 and 5 were driven by slightly different models.

Source: Simulation results of Commission staff's econometric model.

interests,[99] who testified that lamb imports are sufficiently different from U.S. domestic lamb so as not to displace the U.S. quantities or depress U.S. lamb price, and of the domestic producers,[100] who testified that lamb imports are sufficiently similar to domestic lamb quantities, so as to displace the U.S.-produced quantities and suppress U.S. lamb price. These first simulation results are consistent with recent Commission findings that certain subsidized lamb imports have had mild adverse effects of less than a percent on U.S. lamb meat output, price, and revenue.[101]

### *Simulations 2 and 3: Market effects of changes in U.S. quantity and price*

Results from simulations 2 (column 2) and 3 (column 3) suggest that changes in U.S. lamb price and in the level of domestic lamb slaughtered and consumed, and not changes in import levels, tend to be the most important factors in U.S. lamb-related markets. On average historically, each percent rise in the quantity of U.S. lamb meat slaughtered and consumed has coincided with a 1.4-percent drop in price; a 0.27-percent increase in wool production as more slaughter-slated lambs are shorn; and a 2.9-percent decline in wool price. Each percent increase in U.S. lamb price has coincided with, on average historically, a 0.38-percent decrease in U.S. lamb meat slaughtered and consumed, as consumers demand less of the more highly priced lamb and as producers save ewe lambs for breeding purposes. This switch toward meat-producing animals may account for the result that each percent rise in lamb price results in a 0.2-percent fall in wool production and in a rise in the market price of U.S. wool.

[99] See transcripts of the Commission's hearing on investigation No. 332-357, Apr. 6, 1995, testimony of Frances Cassidy, chief executive officer, AMLC, at pp. 164-70. See also the posthearing brief submitted to the Commission on Apr. 24, 1995.

[100] See transcripts of the Commission's hearing on investigation No. 332-357, Apr. 6, 1995, testimony of P. Miller, president, ASIA, at pp. 38-39. See also the posthearing brief submitted to Commission investigation No. 332-357 on behalf of ASIA, Apr. 24, 1995, at pp. 3-7, 8-9, and 12-15.

[101] USITC publication 2900, chapter 8: Lamb Meat, p. 8-28 through 8-29.

### *Simulations 4 and 5: Elimination of Wool Act benefits*

Two simulations (4 and 5 in columns 4 and 5, respectively) were used to analyze the probable impacts on the U.S. sheep-related industry of eliminating Wool Act benefits, the accrual of which will end in calendar year 1995. An analytical limitation of using economic models to analyze such a change in "regime" as elimination of Wool Act benefits, which have been in effect since the 1950s, is encountered: econometric models estimated with past data or economic models based on parameters estimated from past data, when the Wool Act was in effect, are used to characterize conditions of the new "regime" of markets without the Wool Act. One cannot know the true nature of these future market conditions without Wool Act benefits because the new regime has not yet occurred. Because of this limitation, two alternative VAR models were estimated and simulated. Simulations 4 and 5 both imposed a decline in RATIO, the ratio of the support price over the U.S. market wool price, on a model, although the models used differed slightly.

As pointed out by Whipple and Menkhaus,[102] there are two rates of wool producer returns under the Wool Act: the wool market price and the level of Federal support over and above the market price represented by the ratio of the support price over the market wool price or RATIO.[103] Under the new regime without Wool Act benefits, the current ratio of the higher support price over the lower market price would likely reduce to unity, as Federal support levels over and above the market price falls to zero. For the first year or two after Wool Act's elimination, it is likely that producers, as they have for the last four decades, would look at the market price in terms of RATIO, as the effective return to wool production falls from above unity to equal unity as benefits terminate. A unity RATIO would suggest no level of Government support over and above market price. Simulation 4 uses the same model of Wool Act conditions used in simulations 1-3. Simulation 5 uses the above-specified model (used in simulations 1-4) which was re-estimated without the wool market price, and with RATIO included, to obtain a model of future conditions without the Wool Act. So while simulation 4 uses the old-regime data and a model of Wool Act conditions to characterize the new regime, simulation 5 uses old-regime data to reestimate the model for the new regime. At this point in time, one does not know which approach is more accurate, as conditions without Wool Act benefits have yet to occur.

Simulation 4 suggests that each percent decline in RATIO would coincide mild 0.07 percent fall in U.S. domestic quantity, and a 0.14 percent rise in U.S. lamb price, and a 0.95 percent rise in wool price, perhaps as the marginally profitable farmers leave the now less-profitable industry without Wool Act benefits. Simulation 5's results suggest that each percent drop in RATIO would coincide with a lesser 0.05 percent drop in U.S. quantity, with no other effects. Both the simulations generate similarly mild declines in lamb meat production.

### *Findings From Combined Simulation Results*

Simulations 1, 2, and 3 suggest that increases in domestic lamb quantity displace imports to a far greater degree than increases in imports displace domestic quantities. This may indicate that the U.S. market prefers the primarily fresh and larger-cut domestic lamb over the primarily frozen and smaller-cut imported lamb. These results suggest that U.S. quantity increases can decrease imports; that increased imports have done little to U.S. price or quantity; and that promoting increased U.S. lamb production and consumption may be an effective deterrent to imports. According to the model (of

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[102] See Whipple and Menkhaus, "Wool Act."

[103] The wool support price exceeded the wool market price during all years since the 1960 except during 1979. Further, the support price was modeled as an endogenous variable because Federal Government behavior in determining the support price, and hence incentive payments, has been endogenous. The wool support price annually changed 23 times during the 34 years ending 1994. Having sometimes increased and decreased, the per-pound support price generally trended upward from $1.23 to $2.09 during 1980-94. See USDA, ASCS, "Commodity Fact Sheet, Wool, 1993."

scenarios 1-4), suppressing imports would do little to support U.S. lamb price or bolster domestic quantities of lamb slaughtered and consumed.

Simulations 4 and 5 suggest that elimination of the Wool Act benefits may result in reductions in U.S. domestic wool production, along with mildly higher prices of U.S.-produced wool. The model results suggest that elimination of Wool Act benefits will likely result in some contraction of the U.S. industry, as U.S. lamb quantities fall, and U.S. lamb price increases, as some producers exit the industry. The multipliers for quantity response from a change in RATIO are very inelastic (0.07 for simulation 4 and 0.5 for simulation 5), suggesting mild reductions. Perhaps the quantity responses are not more pronounced because of the limited opportunities U.S. sheep farmers have, in such areas as the Southwest, to switch to such other lines of livestock production as beef or pork production.[104]

[104] In response to Commission cross examination, Pierce Miller, president, ASIA, noted that such sheep farmers cannot easily switch to other kinds of livestock production because of terrain and climatic conditions that are not amenable to production of other livestock such as cattle. See transcripts of the Commission hearing 332-357, Apr. 6, 1995, at pp. 52-54.

APPENDIX A
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AMBASSADOR MICHAEL KANTOR,
THE UNITED STATES TRADE
REPRESENTATIVE, REQUESTING
THE INVESTIGATION

APPENDIX B
NOTICE OF INSTITUTION OF
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HEARING, AND RESCHEDULING OF
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APPENDIX K
TIME-SERIES DATA USED IN
ESTIMATING THE TIME-SERIES

# ECONOMETRIC MODEL

Appendix K: Time-Series data used in estimating the Time Series Econometric Model

| Year | U.S.-produced lamb meat quantity *(million pounds)* | Annual inventory, Jun. 1st *(1,000 animals)* | U.S. lamb meat imports *(million pounds)* | U.S. slaughter lamb price, Sioux Falls, SD *(dollars per cwt)* | U.S. wool support price *(dollars per pound)* | Price of U.S.-produced wool *(dollars per pound)* | U.S. shorn wool production *(million pounds)* |
|---|---|---|---|---|---|---|---|
| 1961 | 832.0 | 32,725 | 10.940 | 17.26 | .62 | .429 | 259.2 |
| 1962 | 808.0 | 30,969 | 13.178 | 21.77 | .62 | .477 | 246.6 |
| 1963 | 770.0 | 29,176 | 18.924 | 20.75 | .62 | .485 | 232.4 |
| 1964 | 715.0 | 27,116 | 10.439 | 23.22 | .62 | .532 | 212.3 |
| 1965 | 651.0 | 25,127 | 12.517 | 24.82 | .62 | .471 | 201.5 |
| 1966 | 650.0 | 24,734 | 14.884 | 24.99 | .65 | .521 | 195.1 |
| 1967 | 646.0 | 23,953 | 12.267 | 25.35 | .66 | .398 | 189.0 |
| 1968 | 602.0 | 22,223 | 22.896 | 27.05 | .67 | .405 | 177.4 |
| 1969 | 551.0 | 21,350 | 43.864 | 29.23 | .69 | .418 | 165.7 |
| 1970 | 551.0 | 20,423 | 43.493 | 28.36 | .72 | .355 | 161.6 |
| 1971 | 555.0 | 19,731 | 38.230 | 29.05 | .72 | .194 | 160.2 |
| 1972 | 543.0 | 18,739 | 37.289 | 32.30 | .72 | .350 | 158.5 |
| 1973 | 512.0 | 17,641 | 27.292 | 37.15 | .72 | .827 | 143.7 |
| 1974 | 464.0 | 16,310 | 17.812 | 41.53 | .72 | .591 | 131.4 |
| 1975 | 411.0 | 14,515 | 24.617 | 42.99 | .72 | .447 | 119.5 |
| 1976 | 371.0 | 13,311 | 34.273 | 47.05 | .72 | .657 | 111.1 |
| 1977 | 350.0 | 12,722 | 21.154 | 53.62 | .99 | .720 | 107.3 |
| 1978 | 310.0 | 12,421 | 38.015 | 61.53 | 1.08 | .745 | 102.9 |
| 1979 | 291.0 | 12,365 | 42.690 | 65.44 | 1.15 | .863 | 104.9 |
| 1980 | 318.0 | 12,699 | 33.009 | 66.55 | 1.23 | .881 | 105.4 |
| 1981 | 338.0 | 12,947 | 31.081 | 60.72 | 1.35 | .945 | 109.8 |
| 1982 | 365.0 | 12,997 | 18.671 | 58.88 | 1.37 | .684 | 106.1 |
| 1983 | 375.0 | 12,140 | 17.998 | 52.11 | 1.53 | .613 | 102.9 |
| 1984 | 379.0 | 11,559 | 18.378 | 63.04 | 1.65 | .795 | 95.7 |
| 1985 | 359.0 | 10,716 | 31.993 | 70.96 | 1.65 | .633 | 88.1 |
| 1986 | 338.0 | 10,145 | 27.962 | 71.94 | 1.78 | .668 | 84.4 |
| 1987 | 315.0 | 10,572 | 28.729 | 79.82 | 1.81 | .917 | 84.5 |
| 1988 | 335.0 | 10,945 | 29.543 | 61.69 | 1.78 | 1.380 | 89.5 |
| 1989 | 347.0 | 10,858 | 28.482 | 69.23 | 1.77 | 1.240 | 89.2 |
| 1990 | 363.0 | 11,363 | 24.928 | 55.77 | 1.82 | .800 | 88.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1991 . . . . . | 363.0 | 11,200 | 26.022 | 52.75 | 1.88 | .550 | 87.6 |
| 1992 . . . . . | 348.0 | 10,750 | 27.488 | 58.85 | 1.97 | .740 | 82.9 |
| 1993 . . . . . | 337.0 | 10,013 | 40.976 | 57.79 | 2.04 | .510 | 77.5 |
| 1994 . . . . . | 312.0 | 9,079 | 38.683 | 72.58 | 2.09 | .780 | 68.6 |

Note: Sources are specified in Chapter 5 of the report. "RATIO" is formed by dividing the U.S. Wool support price by the prices of U.S.-produced wool.

APPENDIX L
TECHNICAL MODELLING APPENDIX

## Vector Autoregression Econometrics and the Competitive Conditions of Lamb-Related Markets

As part of the task of investigating the competitive conditions affecting the U.S. lamb industry, the USITC is requested to provide information on U.S. and foreign lamb-related markets, U.S. imports and exports, and other information concerning competitive conditions related to the lamb industry. An econometric model of U.S. lamb-related markets aids the Commission and Commission staff to accomplish these tasks.

For reasons discussed in the report, Commission staff applied a data-oriented method called vector autoregression (VAR) econometrics, which loosely imposes theory with as few a priori (theoretical) restrictions as possible so as to permit the regularities embedded in data on the following U.S. lamb-related factors to reveal themselves: U.S. domestically-produced lamb and sheep meat slaughtered and consumed, wool production, market prices for lamb and wool, and the ratio of the wool support price to market wool prices.[1] These regularities are history's average interrelationships among these variables, and provide evidence on if, and how, the individually modeled variables react to a shock in one of the variables.

A VAR model is a data-driven one. Using methods detailed below, Commission staff has estimated a VAR model of the following system of annual U.S. lamb-related market variables over the 1961-1994 period:

1. U.S. equilibrium levels of lamb/sheep meat slaughtered and consumed (hereafter equilibrium domestic meat quantity or equilibrium "lamb" meat quantity)[2]
2. U.S. market price for lamb (hereafter, lamb price)
3. U.S. wool production
4. Ratio of the Wool Act's support price to market wool price (hereafter RATIO)
5. U.S. lamb meat imports (hereafter lamb imports)
6. U.S. market price of wool (hereafter, market wool price)

Equilibrium domestic meat quantity is total U.S. lamb and mutton slaughtered (consumed)

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[1] For a detailed description of vector autoregression econometric methods, see D.A. Bessler, "Analysis of Dynamic Economic Relationships: An Application to the U.S. Hog Market," *Canadian Journal of Agricultural Economics*, vol. 32, 1984, pp. 109-24.

[2] This quantity is hereafter referred to as lamb meat because most of the quantity is lamb meat. In 1994, about 93 percent of sheep-related meat production was lamb meat, and only about 6 percent was mutton. See U.S. Department of Agriculture, National Agricultural Statistics Service, *Livestock Slaughter, 1994 Summary*, publication no. Mt An 1-2-1(95), March 1994, pp. 5, 84.

in millions of pounds, published by the U.S. Department of Agriculture (USDA).[3] The official U.S. Department of Commerce data on imported lamb quantities (millions of pounds) serve as U.S. lamb meat imports. Lamb price is the average price of spring lambs, choice carcasses of either 75-105 or 80-110 pounds, at Sioux Falls, South Dakota, compiled by the USDA's Agricultural Marketing Service (USDA, AMS).[4]

U.S. wool production is reflected by shorn wool production published by the USDA, Agricultural Stabilization and Conservation Service (USDA, ASCS).[5] RATIO is the ratio of the wool support price over the market wool price, and serves as a per-unit return to wool production over and above the market price paid by the Federal Government to the producer. The wool support price and the wool price were obtained from USDA, ASCS.[6]

**Estimated VAR Model and Adequacy of Specification**

By a VAR model's definition, each of the above six endogenous variables was posited a function of a specified number (here, two) of lags of not only itself, but also of each of the remaining endogenous variables. Based on the results of Tiao and Box's likelihood ratio test procedures for lag structure determination, and of Commission staff's market knowledge, a two-lag structure was selected.[7] Following Bessler's[8] reasoning then, the estimated VAR model is an annual system of six endogenous variables, where each such variable is permitted to influence all other endogenous variables through lags.

Based on previous Commission findings that U.S. lamb consumption, lamb production, and live inventories of sheep and lambs have been generally declining since World War 2, a time trend was included in each equation, as
was a constant (intercept).[9] Additionally, Commission staff included two lags of the live January 1

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[3] For 1970-93 data, see USDA, Economic Research Service (ERS), *Red Meats Yearbook 1994*, Statistical Bulletin No. 885, table 97, p. 99. For 1958-69 data, see USDA, ERS, *Livestock and Meat Statistics*, relevant supplement issues. The 1994 data were obtained from USDA, ERS, *Cattle and Sheep Situation and Outlook Report*, February 14, 1995.

[4] These unpublished prices constituted the only consistent U.S. lamb price series located by Commission staff back to the 1950s. The data were obtained from USDA, AMS by private communication with Commission staff. Because of shutdowns, and subsequent reopenings, of price-reporting meatpacking plants in the Sioux Falls, SD, area, a price was not reported for 1992, but was reported thereafter for 1993 and 1994. Staff used the 1992 price value of feeder sheep spring lambs, choice and fancy (90-110 pounds) as a 1992 value proxy. Commission staff deemed this number to be the closest substitute for the 1992 value from the price data sheets obtained from USDA, AMS.

[5] USDA, ASCS published the 1958-93 data in *ASCS Commodity Fact Sheet, Wool, 1993*. The 1994 shorn wool estimate was obtained by Commission staff in a private communication with USDA, ASCS staff.

[6] Ibid.

[7] For the likelihood ratio test procedures for lag structure determination, see G. Tiao and G.E.P. Box, "Modeling Multiple Time Series: With Applications," *Journal of the American Statistical Association*, vol. 76 (1981), pp. 1-20. For procedures on combining Tiao-Box methods with market knowledge to determine lag structure, see D.A. Bessler, "Dynamic Economic Relationships," 1984. Note also that three yearly observations, 1958-60, were set-aside for the Tiao-Box lag selection procedures, thereby rendering a 1961-94 annual estimation period.

[8] D. Bessler, "Dynamic Economic Relationships," 1984.

[9] USITC publication 2345, *Lamb Meat Imports*, p. 4.4.

inventories of live sheep and lambs on farms in each equation.[10]

The above-specified model was appropriately estimated with 1961-94 annual data, using ordinary least squares[11] and Doan's[12] estimation package, Regression Analysis of Time Series (RATS). Data of the nonbinary variables were modeled in natural logarithms such that shocks to, and impulse responses in, the logged variables represent approximate proportional changes in the nonlogged variables, and approximate percent changes in the nonlogged variables when multiplied by 100. Evidence at the five percent significance level from Ljung-Box portmanteau tests and augmented Dickey-Fuller tests conducted on the estimated residuals of each of the six VAR model equations suggest that the equations are adequately specified.

Harvey[13] and Granger and Newbold[14] note that a Ljung-Box portmanteau value, calculated for an estimated equation's residuals, tests the null hypothesis that the equation has been adequately specified. The Ljung-Box values, which range from 16.0 to 22 for the six model equations, fall below the critical chi-square value of 25.0, leading to the conclusion that evidence at the five percent significance level is insufficient to reject the null hypothesis that each of the six equations are adequately specified.

Stationarity of the estimated equations, reflected by the stationarity of an equation's residuals, provides another accepted check on whether the estimated equation has been adequately specified. Augmented Dickey-Fuller (ADF) $\tau_\mu$ and $\tau_\tau$ tests, as detailed by Engle and Granger[15] and Hamilton,[16] were calculated for the residuals of each of the six equations to test the null hypotheses of both tests that the residuals are not stationary. The six ADF $\tau_\mu$ and six $\tau_\tau$ values are all negative, and have absolute values of at least 3.8. That all ADF values are negative, and have absolute values in excess of those of the critical test values (2.89 for the $\tau_\mu$ tests and 3.45 for the $\tau_\tau$ tests), suggests that evidence is sufficient to reject the null hypotheses that all six equations are nonstationary. Commission staff therefore concluded that, based on the ADF test results, the equations have been adequately specified.

## VAR Model Impulse Response Functions and Model Simulations

Following Hamilton's[17] reasoning, the estimated VAR model provides a reduced-form

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[10] The USDA, ERS publishes a number of sources for this 1958-94 data. The 1970-94 data are in the *Red Meats Yearbook, 1993*, Statistical Bulletin no. 885, table 104, p. 106. The 1958-69 data were obtained from *Livestock and Meat Statistics*, Statistical Bulletin no. 784, table 174, p. 270, Sept. 1989. The 1994 estimate was obtained by private communication of Commission staff with the staff of USDA, ERS.

[11] For a discussion on the appropriateness of OLS as a VAR model estimator, see D.A. Bessler, "Dynamic Economic Relationships," 1984.

[12] T. Doan, *Regression Analysis of Time Series (RATS), User's Manual, Version 3.10*, (Evanston, IL; VAR Econometrics, 1990).

[13] A. Harvey, *The Econometric Analysis of Time Series*, (Cambridge, MA: MIT Press, 1990).

[14] C.W.J. Granger and Newbold, *Forecasting Economic Time Series* (New York: Academic Press, 1986), pp. 99-101.

[15] R.F. Engle and C.W.J. Granger, "Cointegration and Error Correction: Representation, Estimation, and Testing," *Econometrics*, vol. 55 (1987), pp. 251-76.

[16] J.D. Hamilton, *Time Series Analysis* (Princeton, NJ: Princeton University Press, 1994), pp. 516-17.

[17] J. Hamilton, *Time Series Analysis*, pp. 324-27. Hamilton provides a discussion on the relationship of reduced-form VAR models and more

(continued...)

structure of the six U.S. lamb-market-related variables defined above. As a reduced form model, the equilibrium domestic meat quantity is not quantity supplied or demanded, but rather the equilibrium quantity of lamb/sheep meat slaughtered *and* consumed.

The model provides the average dynamic patterns with which the six variables have historically reacted to movements in each other, and such dynamics provide insights concerning the modeled system's competitive nature. For example, whether imports significantly influence quantities and price of U.S.-produced lamb, whether the equilibrium meat quantity is sensitive or inelastic to lamb price changes, or whether the U.S. sheep-related markets will be affected by eliminating the Wool Act benefits will influence the U.S. lamb-related markets are important facets of the competitive environment that face U.S. producers and consumers.

More specifically, Commission staff conducted the following simulation experiments:

Simulation 1: Positive shock (increase) in U.S. lamb imports and the nature and degree of responses in (a) U.S. lamb price, (b) equilibrium domestic meat quantity, (c) U.S. wool production, and (d) market wool price.

Simulation 2: Positive shock (increase) in the equilibrium lamb meat quantity slaughtered and consumed, and the nature and degree of responses in (a) U.S. lamb price, (b) U.S. wool production, (c) market wool price, and (d) U.S. lamb imports.

Simulation 3: Positive shock (increase) in U.S. lamb price and the nature and degree of responses in (a) equilibrium lamb meat quantity, (b) U.S. wool production, (c) market wool price, and (d) U.S. lamb imports.

Simulation 4: Elimination of the Wool Act, emulated by a fall in wool price support (in the form of a decrease in RATIO), and the nature and degree of responses in (a) U.S. lamb price, (b) equilibrium lamb meat quantity, (c) market wool price, and (d) U.S. lamb imports.

Simulation 5: Elimination of the Wool Act emulated by a decline in RATIO, and the nature and degree of responses in (a) U.S. lamb price, (b) equilibrium lamb meat quantity, and (c) U.S. lamb imports. For reasons specified in the report, the model driving this simulation is slightly altered from that of simulation 4.

One aspect of the VAR model of the U.S. lamb-related market variables is the response in the system's variables to each of the shocks cited above. In particular, for example, it is of particular interest to those who wish to ascertain the U.S. market's degree of competitiveness whether changes in U.S. lamb imports will or will not appreciably affect U.S. price or production; whether changes in U.S. lamb price or equilibrium lamb meat quantity will or will not influence U.S. level of wool production and price; or whether elimination of the Federal government's wool price support will or will not influence the lamb-related meat and wool markets. So the impulse response function permits imposition of a change in one of the variables (four such shocks, one per simulation cited above), and an examination of the historically average "nature" (degree and direction) of responses in the remaining (non-shocked)

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[17] (...continued)
theoretically based structural econometric models.

endogenous variables. For example, in simulation 3, an increase in U.S. lamb prices is imposed on the model, and Commission staff then examines how history's average 1961-94 patterns would "handle" this shock in terms of the degree and direction of response in equilibrium lamb meat quantity, U.S. wool production, market wool price, U.S. lamb imports, and RATIO.

Insofar as the variables are modeled in natural logarithms, then shocks to, and impulse responses in, the VAR model's logged variables provide approximate proportional changes in the nonlogged variables. These proportional changes are approximate percent changes when multiplied by 100. An impulse response in one model variable from a shock in another model variable imposed on the VAR model reflects the proportional change in the response variable from levels which would have occurred without the shock.[18] Impulse responses and multipliers indicate the inter-equilibrious adjustments that history has, on average, required to bring the response variable from pre-shock equilibrium levels to post-shock equilibrium levels.[19]

The estimated VAR model was simulated under the four simulations above using the impulse response function.[20] Since the data were modeled in natural logarithms, then shocks to, and impulse responses in, the modeled variables reflect approximate proportional changes in the non-logged variables. The proportional changes represent approximate percent changes when multiplied by 100. Using Kloek and VanDijk's[21] Monte Carlo procedures, Commission staff determined those impulse responses which are statistically nonzero (10 percent significance level) in the four simulations.[22]

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[18] See Bessler, "Dynamic Economic Relationships." See also R. Babula, P. Colling, and G. Gajewski, "Dynamic Impacts of Rising Lumber Prices on Housing-Related Prices," *Agribusiness: An International Journal*, vol 10, No. 5, pp. 373-388.

[19] Ibid.

[20] The six VAR equations may have contemporaneously correlated innovations or residuals. Failure to account for contemporaneously correlated current residuals will provide impulse responses not representative of historical patterns. A Choleski decomposition was imposed on the VAR model for each experiment to orthogonalize the current innovation matrix, such that the variance/covariance matrix was identity in each of the four simulations. The Choleski decompositions resolve the problem of contemporaneous correlation or feedback. Each of the four decompositions requires the imposition of a Wold causal ordering among the current values of the dependent variables, with the shock variable usually placed atop the ordering, providing that theory sanctions such placement. Theory "guides" each ordering. In simulation 1, the ordering is as follows: U.S. lamb imports, meat quantity, U.S. lamb price, U.S. wool production, market wool price, and RATIO. Scenario 2's ordering was: meat quantity, U.S. lamb price, U.S. lamb imports, U.S. wool production, RATIO, and market wool price. Scenario 3's ordering was: U.S. lamb price, U.S. lamb imports, meat quantity, U.S. wool production, RATIO, and market wool price. For scenario 4, the ordering was: RATIO, U.S. wool production, market wool price, domestic quantity, U.S. lamb imports, and U.S. lamb price. For scenario 5, the ordering was: RATIO, U.S. wool production, domestic quantity, U.S. lamb imports, and U.S. lamb price. For detailed discussions of Choleski decompositions, and theory-based Wold causal orderings, for VAR models, see C. Sims, "Macroeconomics and Reality," *Econometrica*, vol. 48, (1980), pp. 1-48. Also, see D.A. Bessler, "Dynamic Economic Relationships," 1984.

[21] T. Kloek and H.K. VanDijk, "Bayesian Estimates of Equation System Parameters: An Application of Monte Carlo," *Econometrica*, vol. 46 (1978), pp. 1-20.

[22] Data are annual. Statistically nonzero impulses were restricted to the first or second impulse response. Therefore, Commission staff did not present the impulses, since patterns were generally only one impulse, and at most 2

(continued...)

Multipliers can be calculated from each simulation's statistically nonzero impulse responses.[23] That is, in each simulation, the statistically nonzero responses of the remaining endogenous and "nonshocked" variables are summarized into response multipliers, and these multipliers are summarized in table 1. Likened to elasticities, the multipliers indicate the model's percentage change in the response variable per percentage change in the shock variable. Sign is important: a positive (negative) multiplier suggests that each percentage change in the shock variable has generally elicited response variable changes in the same (opposing) direction. For example, each percent increase in U.S. lamb price (simulation 3) has, on average historically, elicited a 0.38 percent drop in the equilibrium quantity of meat slaughtered and consumed. The simulation results are presented and analyzed in Chapter 5.

Table 1
Multipliers for U.S. sheep-related markets under five simulations[1]

| | Simulation 1, increased lamb imports | Simulation 2, increased meat quantity[2] | Simulation 3, increased lamb price | Simulation 4, Wool Act's elimination[3] | Simulation 5, Wool Act's elimination[3] |
|---|---|---|---|---|---|
| U.S. lamb price | N/S | -1.43 | N/R | -0.14 | N/S |
| Meat slaughtered, consumed | -.05 | N/R | -.38 | .07 | .05 |
| U.S. wool production | N/S | .27 | -.20 | N/S | N/S |
| U.S. wool price | N/S | -2.9 | 1.6 | -0.95 | N/R |
| U.S. lamb imports | N/R | -2.6 | N/S | N/S | N/S |
| RATIO | N/S | 3.3 | -1.8 | N/R | N/R |

[1] The "N/S" and "N/R" labels denote situations where responses were statistically insignificant (at the 10-percent significance level) and/or not relevant to the simulation.

[2] "Meat quantity" here refers to the U.S. equilibrium quantity of sheep and lamb meat slaughtered and consumed, also denoted as "meat slaughtered and consumed" above. This variable is defined in the text.

[3] For reasons explained in the text, simulations 4 and 5 were driven by slightly different models.

Source: Simulation results of Commission staff's econometric model.

[22] (...continued)
impulses.

[23] For detailed calculation procedures, see R.A. Babula and D.A. Bessler, "The Corn/Egg Price Transmission Mechanism," *Southern Journal of Agricultural Economics*, vol. 22 (Dec. 1990), pp. 82-83. Also, see USITC, *Wheat, Wheat Flour, and Semolina*, investigation No. 22-54. USITC publication 2794, Appendix N.