FACTOR COST ANALYSIS OF A NEW ZEALAND MEAT PROCESSING COMPANY

M.D.Clemes

L.D. Woods

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PREFACE

In an earlier report, Chudleigh, Clemes, and Woods (1978) identified trends in unit marketing charges for New Zealand export livestock from farm gate to f.o.b. for the 1971 through 1976 seasons ending September 30. They found then that nominal killing and freezing charges were increasing at a far greater rate than the other charges in the marketing chain and at a greater rate than either the consumer price index or the wage rate index.

Because of this trend, and because of the absolute size of the national total of such charges, ($181,000,000 ($1976) the authors suggested that a factor cost study of the freezing works operation was required to further investigate killing and freezing charges, Chudleigh et. al. (1978) This resulting report is based on such a study and provides an economic interpretation of killing and processing factor costs for sheep and lamb (later expressed as lamb equivalents). The confidential factor costs were provided by a New Zealand Freezing Company for the 1971 through 1979 seasons ending August 31.

R G Lattimore
Director

ACKNOWLEDGEMENTS

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Deep appreciation is expressed to the processing company providing the cost information and its staff members for their valuable assistance.

A special thanks to Susan Clemes who typed this report, and Rosemary Searle who helped with some final typing.

SUMMARY

The New Zealand meat freezing industry has traditionally purchased animals for slaughter on the basis of a "schedule price" expressed as a net dressed weight value. In assessing this value, companies estimate the value to them of the meat and skins derived and deduct from this a standard "killing and processing charge". These charges are normally set for an entire killing season and are calculated prior to the season beginning.

In calculating these charges companies combine considerations not only of the expected costs of factors involved in killing and processing livestock but also of anticipated throughputs, by product revenues, and profit requirements. In addition these calculations have traditionally been performed in an environment involving official scrutiny and approval by government agencies. For these reasons trends in "official killing and processing charges" have not been a reliable indicator of true factor costs over time.

In this report, true factor costs for killing and processing are obtained and analysed for a typical company. From this analysis the authors are able to confirm and quantify the widely held belief that throughput flows significantly affect per unit costs. Further, an economic explanation is advanced to explain this phenomenon in terms of the particular nature of fixed and variable costs within a multi-chain system operating in the face of significant manning and seasonal constraints.

Arising from these relationships several implications are drawn for the company itself and for the industry at large. Notable among these implications is the claim that, of itself, the conventional wisdom of "spreading the kill" as a means of reducing killing and processing charges is not only questionable in its effects but may also be deleterious to the development of "further processing" in the industry.

CHAPTER 1

THE TOPIC

1.0 Background

The New Zealand Meat Industry has continued to make a large contribution to New Zealand export earnings, $2,392,600,000 ($1984) NZMPB (1984) and its overall contribution to the New Zealand economy has been significant, New Zealand Freezing Companies Association (Inc.) (Anon., 1979).

This major industry has, for sometime, faced many problems both in its overseas markets, Begg (1978) and within New Zealand, Rattray (1979).

Rising killing and freezing charges have often been suggested as a major internal problem as the charges represent approximately 80% of the total costs incurred by a lamb carcase from farm gate to f.o.b., Rattray (1979).

These charges are also important as they represent a direct cost to the on-farm producer. In addition, these charges (costs to the industry) are primarily internal in origin and are therefore costs that are within the control of New Zealand.

One way to increase real returns to livestock producers (apart from real increases in their product prices) is to limit or reduce any real increases occuring in killing and freezing charges.

The first step in limiting or reducing any real increases occuring in these charges must be to identify all the industry costs that affect the charges.

This report has attempted to do this accurately, and then provide insight into ways which may limit or reduce future killing and processing costs thereby increasing real returns to producers.

1.1 Objectives

The specific objectives of this report were:

1. To identify all the factor costs of killing and processing sheep and lamb (including the processing of by products) from works gate to ex-works, in a representative New Zealand Freezing Company.

2. To identify the relationship between the freezing companies operational structure and its associated factor costs.

3. To analyze any real increase in the costs of killing and processing livestock.

4. To identify the relationship between stock throughput numbers and real killing and processing costs, using capacity utilization as a measure of cost-efficiency.

5. To model real killing and processing costs and predict these costs.

6. To examine the implications for the company and the industry of any real increases or decreases in these costs arising from different capacity utilization levels.

7. To suggest ways to limit any cost increases that may occur in the future.

1.2 Killing And Processing Costs

In this report, killing and processing costs pertain to actual company costs of killing (slaughtering) stock and processing the resulting carcases and by products.

Published killing and freezing carcase charges, such as those in the New Zealand Meat Producers Board Annual Reports, pertain however to charges (costs to the producers) for carcases only. These charges allow for conservative throughput flows and normal profit margins. The unpublished costs for processing by products are off-set by the processing companies using revenue from the sale of the by products.

CHAPTER 2

INTRODUCTION TO COMPANY

This report is based on analysis of factor cost data confidentially supplied by a New Zealand Freezing Company. The company was a multi-plant processor of sheep and lamb for export and was a licensed meat exporter.

The number of processing works owned by the company, their combined throughput capacity and the combined throughput number processed has changed during the 9 seasons for which data was supplied, ie. 1970/71 through 1978/79. Figure 2.1 depicts combined capacities and throughputs expressed in lamb equivalents for the period studied.

In order to complete an accurate and realistic analysis, the relationship between the freezing company's operational structure and its associated factor costs must be clearly identified. To assist the reader in this task, the physical movement of sheep and lambs through a representative processing works is described using a flow chart.

The freezing company providing information operated each of its processing works using the "single site" concept prevalent in the New Zealand Meat Processing Industry.

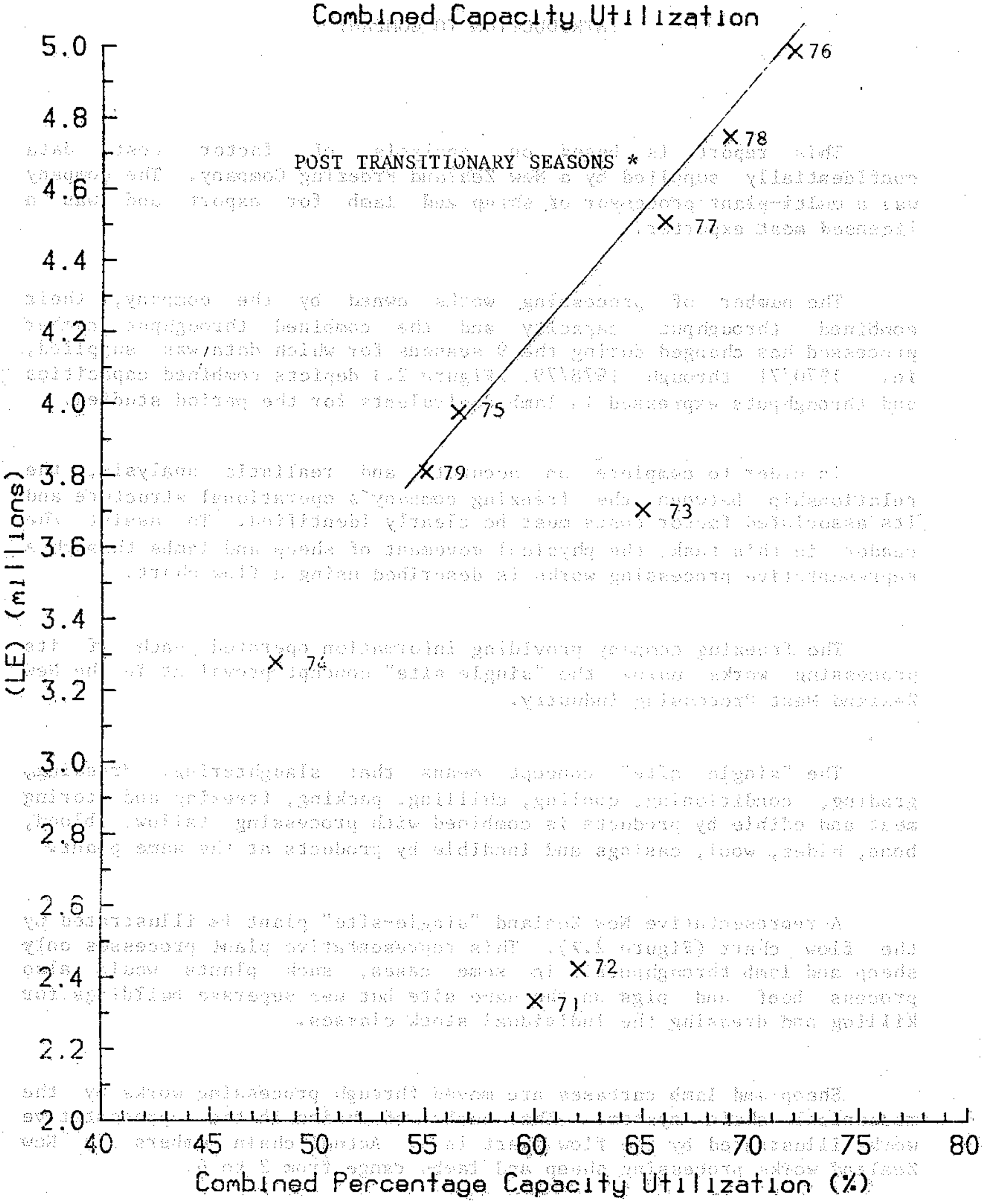
The "single site" concept means that slaughtering, dressing, grading, conditioning, cooling, chilling, packing, freezing and storing meat and edible by products is combined with processing tallow, blood, bone, hides, wool, casings and inedible by products at the same plant.

A representative New Zealand "single-site" plant is illustrated by the flow chart (Figure 2.2). This representative plant processes only sheep and lamb throughputs. In some cases, such plants would also process beef and pigs on the same site but use seperate buildings for killing and dressing the individual stock classes.

Sheep and lamb carcases are moved through processing works by the mechanical chain system. The number of chains in the representative works illustrated by the flow chart is 5. Actual chain numbers in New Zealand works processing sheep and lambs range from 2 to 6.

The various processing works owned by the company providing information each had the same general sheep and lamb throughput flows as the representative works. The physical layout of these works varied according to geographic location, number of chains and year of construction. While the exact internal layout of these works varied

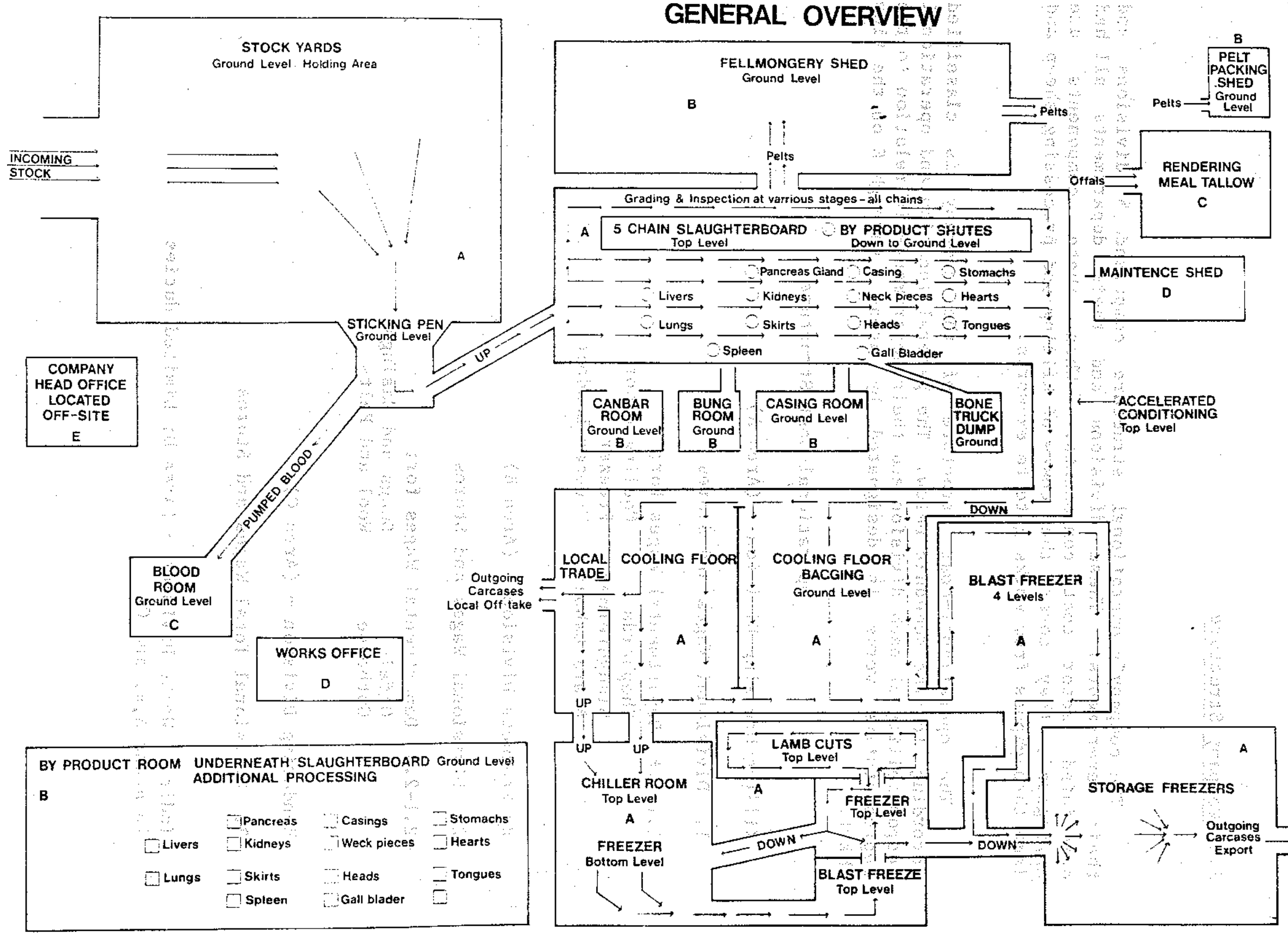
FIGURE 2.1



* Refer Section 4.4

FIGURE 2.2

STOCK THROUGHPUT FLOW ⟶ DIRECTION
GENERAL OVERVIEW



slightly, the mechanical chain system, manning standards and overall processing sequence were reasonably standardized for all the company's works.

2.0 Company Structure

The company's operational structure comprised 5 divisions and their departments. These divisions and their departments all had associated factor cost components. When these components are aggregated, they cover the costs of killing and processing sheep and lamb throughputs from works gate to ex-works.

The operational-cost structure of the company is classified according to the schedule below. The general location and operational responsibility of each division and their departments in relation to the representative works is designated by areas A through E on the flow chart.

Operational-Cost Structure

Killing-Dressing Division - (Area A)

1. Divisional Wages and Stores

1.1-1.6 Departmental Wages for;

Shepherds	Cooling Floor
Slaughtermen	Freezer
Board Labour	Freezer Loadout

By Products Division - (Area B)

2. Divisional Wages and Stores

2.1-2.4 Departmental Wages for;

Offals	Bungs and Casings
Guthouse	Wool and Pelts

Rendering Division - (Area C)

3. Divisional Total Wages and Stores

Indirect Works Division - (Area D; Limited duties in areas A,B, and C)

4. Divisional Total Costs

4.1-4.7 Departmental Plant operating Costs for;

Energy	Sundry
Wages	Repairs and Maintenance
Salaries	Work Shop Loss
Depreciation	

Central Administration Division (Head Office) - (Area E; Overides all areas.)

5. Divisional Total Costs

5.1-5.9 Departmental Overhead costs for;
General Manager
Secretary and Administration
Controller-Finance
Accounting Services
Corporate Planning
Shipping and Distribution
Processing Division
Unrecovered Railage and Pool Guarantee
Stock Procurement

Head Office Departmental Overhead Costs for the Marketing Department have not been included as it operated autonomously during the study period.

Factor costs associated with certain special lamb cuts have not been included to ensure confidentiality.

2.1 Functions Of Divisions And Departments

The divisions and their departments are responsible for the following functions;

1. Killing and Dressing Division

Divisional Wages comprise the aggregate of wages for the following Departments;

Shepherds - Unload, count, sort and move stock through the yards to the sticking pens.
Slaughtermen - Kill stock, dress and trim carcases.
Board Labour - Assist slaughtermen, inspect, hang, and wash carcases, clean and sweep slaughterboard.
Cooling Floor - Grade, count, stamp, weigh and bag carcases.

Freezer - Cut, bone, sort, package and stack carcases.
Freezer Loadout - Ticket, pallet and load carcases for ex-works market destinations.

Division Stores - Part of over 2000 inventory items including gloves, knives, helmets, boots, brooms, bags, cartons, chemicals, hoses and other goods specific to killing-dressing.

2. By Products Division

Divisional Wages comprise the aggregate of wages for the following Departments;

Offals - Trim, clean, inspect and package edible and inedible meat and organs.
Guthouse - Pull, strip and clean edible and inedible meat and organs.
Bungs and Casings - Cut, clean, sort, salt and package bungs and casings.
Wool and Pelts - Scrape pelts, clean and sort wool, preserve hides.

Divisional Stores - Part of over 2000 inventory items including plastic bags, barrels, salt, scrapers, knives, cartons and other goods specific to by products.

3. Rendering Division

Divisional Wages - Wages paid for rendering offals into meal, tallow, blood and bone.

Divisional Stores - Part of 2000 inventory items including meal bags, chemicals, plastic bags and other goods specific to rendering.

4. Indirect Works Division

Indirect Works Division costs are the aggregate of the Departmental Plant Operating Costs for the following departments;

Energy - Coal, oil and electric power for the operation of each works.
Wages - Works carpenters, engineers, storemen, carriers, first aid workers and all other people employed on a yearly basis using an hourly wage rate.
Salaries - On-works management and salaried office workers.
Depreciation - Depreciation of plant and equipment at each works.
Sundry - Works insurance, rates, rents, laundry, freight for inward goods, cafeteria expenses, stationery, vehicle expenses, inventory losses and associated costs.

Repairs and Maintenance - Works repairs and maintenance, material purchases for works improvements, includes all costs associated with hygiene.

Workshop Loss - Costs incurred providing works staff and employees with meat.

5. Central Administration Division (Head Office)

Central Administration Division costs are the aggregate of Departmental Overhead Costs for the following departments;

General Manager - Salaries, superannuation, printing, stationery, telephone, vehicle, secretarial and other sundry costs of senior company management.

Secretary and Administration - Salaries, superannuation and sundry costs of department management, staff training, public relations, travel, donations, head office depreciation, insurance, lighting and heating.

Controller-Finance - Interest paid on overdrafts and term loans. Net of interest earned.

Accounting Services - Salaries, superannuation, stationery, computer services and sundry costs of the accounting department.

Corporate Planning - Salaries, superannuation, stationery and sundry costs of the corporate planning department. Includes costs for engineers located in the head office.

Shipping and Distribution - Salaries, superannuation, stationery and sundry costs of the shipping and distribution department.

Processing Division - Salaries, superannuation, stationery and other sundry costs of by products administration industrial relations managers and operation of company farms.

Unrecovered Railage and Pool Guarantee - Cost of transporting stock past nearest export works, freight and pool guarantee losses.

Stock Procurement - Net cost of stock procurement, drafters salaries and travel expenses, cost of stock kept on company farms and in holding yards.

CHAPTER 3

REAL PER CARCASE COSTS

3.0 Costs

In this report both divisional and departmental costs have been calculated on a per carcase, real (inflation adjusted), multi-plant basis. In producing these results, a number of conversions were necessary.

Since several classes of stock were processed (ie. mutton, lamb, and beef) total throughputs were converted to lamb equivalent terms using approximate factors derived in consultation with the company. It should be pointed out that beef processing only accounted for less than 4% of total throughput and pertained to only a few departments. Costs were converted from a nominal to a real basis by the use of specific indices developed for this study. (Further detail is available from Clemes, 1984.)

Costs and throughputs were amalgamated over all plants operating during the study period. There was a single discrete change in the number of plants operated by the company during the study period; further comment on this is made later.

The annual total real, per carcase, costs for killing and processing during 1970-1979 are shown in Table 3.1 The relative importance of individual divisions within these costs are shown in Table 3.2. More detailed information is available in Clemes, 1984.

The reader is reminded that these costs cannot be compared directly with published per carcase charges as quoted by the New Zealand Meat Producers Board for reasons outlined in Chapter 1.

TABLE 3.1

LAMB EQUIVALENT REAL COSTS, KILLING AND PROCESSING ($1979)

Season	Total	Per c/c
1970/71	18,473,434	7.9087
1971/72	21,365,809	8.8045
1972/73	28,316,293	7.6375
1973/74	29,625,301	9.0325
1974/75	36,104,976	9.077
1975/76	40,761,498	8.1666
1976/77	38,224,812	8.472
1977/78	40,284,768	8.4768
1978/79	36,897,748	9.602

TABLE 3.2

DIVISIONAL PER CARCASE REAL COSTS AS A PER CENT OF TOTAL (%)

Division	Season								
	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79
Killing-Dressing	23	23	30	26	33	33	31	33	33
By Products	18	18	19	17	18	19	18	18	17
Rendering	2	2	2	2	1.5	1	1	1	1
Indirect Works	32	31	35	34	35	36	38	35	35
Central Admin.	25	26	14	21	12.5	11	12	13	14
Total all divisions	100	100	100	100	100	100	100	100	100

CHAPTER 4

FACTORS AFFECTING REAL PER CARCASE COSTS 1970-79

During the study period total killing and processing costs increased 22% in real terms. Several factors were investigated in an attempt to explain this. Four factors in particular were investigated at length.

4.0 Hygiene Expenditures

One reason provided by the company for the real increase in their costs was the large non-productive expenditure on hygiene requirements undertaken during the study period.

Large hygiene expenditures arising from the Hygiene Regulations Act 1971, have been associated with rising nominal per carcase killing and freezing costs for all freezing works in the industry, Nordmeyer (1974). Davis (1979/80) estimated hygiene expenditure would total $382 million ($1979) for the entire industry to comply with the regulations and concluded the expenditure would lead to associated operating cost increases for all freezing works.

For the company itself, real per carcase cost increased from 1970/71 to 1978/79 by 91% in the Killing-Dressing Division Wages and by 43% for Indirect Works Departmental Repairs and Maintenance.

In the Killing-Dressing Division, slaughtermen, board labourers and inspectors have been added steadily since 1971 to satisfy the hygiene regulations. Schedules of manning standards are confidential, however standards for one works show the number of hourly workers increased from 704 in 1975/76 to 741 in 1978/79 in the Killing-Dressing Division to fulfill hygiene requirements. This increase added approximately $0.09 ($1979) to per carcase costs. While the additional labour was necessary to satisfy the Hygiene Regulations Act 1971, it has been of no value in increasing productivity per labour hour at the works level.

Indirect Works Departmental Repairs and Maintenance costs also include expenditure for the upgrading or replacement of plant and equipment to satisfy the Hygiene Regulations Act 1971. In almost all cases the upgrading or replacement of plant and equipment to satisfy the regulations has not increased the works' productivity. Company sources suggest it has had the opposite effect in certain areas of the slaughterboard due to crowding already tight space allocations for equipment and labourers.

4.1 Reallocation Of Factors Between Divisions And Departments

One method for the company to limit the real increase in its per carcase costs would have been to change its internal staffing and capital allocations.

Substituting efficient divisional inputs for less efficient ones when possible in the processing system could have limited the real increase in per carcase costs. If this were the case the real proportion (percentage) of each division's contribution to Killing and Processing per carcase costs would have changed over the period. In this study, however, it was found that there had been no significant deliberate change in the real proportion of each divisions contribution to Killing and Processing Costs as shown in Table 3.2.

In 1972/73 the Killing-Dressing Division's proportion did increase but only due to a direct result of the increase in manning standards for hygiene requirements. In 1972/73 the Central Administration Division's proportion decreased due only to the acquistion of a fourth works with no corresponding increase in Division staff numbers. In 1973/74 this Division's proportion increased as staff numbers were increased to cope with the additional throughput numbers. Then in the following seasons this Division's proportion remained constant as the acquired works became fully operational and higher throughput levels were achieved.

Within divisions, it was further found that departmental per carcase costs show the same trend as the Divisional per carcase costs, with only slight increases or decreases arising primarily from temporary inter-departmental staff movements or cyclical material purchases.

4.2 Technological Changes And Productivity

Technological improvements at the works level could have increased productivity and limited the real increase in Killing and Processing Costs during the study period. An increase in productivity (stock processed per labour unit) at the works level would have had the same effect on these costs.

Cameron (1976) suggests for the meat industry overall, a slow rate of technological change at the works level and emphasizes the fall in labour productivity. The company concurs that technological improvements at their works, solely for increasing productivity, have been limited and would not have had a significant affect on per carcase costs during the period. They also note that productivity (stock processed per labour unit) is fixed by the system of maximum daily kill and this did not alter during the nine seasons. The individual works maximum daily chain tallies (chains are geared to exactly achieve these tallies) were constant at either 3000 or 3500 lambs per chain from the 1970/71 through 1978/79 seasons, which supports the company's statement.

4.3 Throughput Numbers

The fourth condition which may have affected the company's per carcase costs were changes in throughput numbers during the study period. It is generally claimed that higher throughput numbers, given the same capacity, will result in lower per carcase costs.

Seasonal stock throughput numbers (lamb equivalents) processed by the company have varied over the nine seasons. In the 1970/71 and 1971/72 seasons, throughput numbers were less than 2,700,000 (LE). In the 1972/73 season, throughput numbers increased to over 3,400,000 (LE), due to the acquisition of an additional plant. In the following season, 1973/74, throughputs decreased approximately 400,000 (LE). In 1974/75 they increased to approximately 4,000,000 (LE) In 1975/76, 1976/77 and 1977/78 seasonal throughputs were all above 4,500,000 (LE), decreasing to approximately 3,800,000 (LE) in 1978/79. The increases or decreases in seasonal throughput numbers at the company works follow national trends in seasonal throughput variations (New Zealand Meat Producer Board Annual Reports, 1971 through 1979).

Figures (4.1-4.6) show graphically, for each division, the companys real per carcase costs plotted against its throughput numbers for seasons ending August 31. It should be noted that divisional throughput numbers do not agree due to the use of different ratios when converting stock classes to lamb equivalents.

4.4 Transitionary Seasons, 1970/71-1973/74

It must be also noted that an accurate interpretation of these graphical relationships can only be made with knowledge of factors affecting company structure during the 1970/71 through 1973/74 seasons. During these four transitionary seasons accounting procedures were improved, in part by computers, and thus factor cost information was more defined onwards from the 1972/73 seasons. Also, an additional works was acquired by the company at the end of the 1971/72 season. Rationalization of this works followed at that time, finishing at the end of the 1973/74 season.

For all divisions, the graphs show an increase in both real per carcase costs and throughputs from the 1970/71 to 1971/72 seasons. This increase in real costs (apart from that due to hygiene expenditure discussed in Section 4.1) was attributed to more accurate factor cost information, rather than a decrease in efficiency due to the higher throughput numbers.

In the 1972/73 season, a marked increase in throughput numbers and a significant decrease in real per carcase costs is shown by the graphs. The significant decrease in costs in this season was a direct result of the increase in throughputs of approximately 700,000 (LE) from the acquired works, with no increase in managerial or salaried staff numbers. In particular, the Indirect Works and Central Administration Division graphs show the effect of increasing throughputs without adjusting managerial or salaried staff numbers. Staff adjustments began early in 1973 in the Indirect Works Division and were completed before the 1973/74 season. Staff adjustments were made just prior to the 1973/74 season in the Central Administration Division.

4.5 Relationships Between Costs And Throughputs

A clear relationship between real per carcase costs and throughputs is shown for each division in Graphs 4.1 and 4.5 provided the 1974/75 through 1978/79 seasons are viewed separately from the 1970/71 through 1973/74 transitionary seasons. In the 1974/75 through 1978/79 seasons total killing and processing real per carcase costs steadily decreased as throughput numbers increased from approximately 3,800,000 (LE) to 4,700,000 (LE) (Graph 4.6). Throughout this latter period, capacity was constant.

For these five seasons all the Division graphs show the same trend, with real per carcase costs decreasing as throughputs increase. The only exception is the 2.5% increase in By Product Division costs when throughputs increased by approximately 135,000 (LE). This 2.5% increase was due to costs incurred in more thorough processing of offals, wool and pelts in response to higher export prices for these products relative to other season's prices during the study period.

Previously it was mentioned that hygiene expenditure had increased over the study period. If it is assumed these expenses increased annually then any adjustment of Figures 4.1 to 4.6 to correct for changing hygiene costs can only improve the clarity of the negative relationship between costs and throughput.

FIGURE 4.1

Killing — Dressing Division Real Costs ($ 1979)

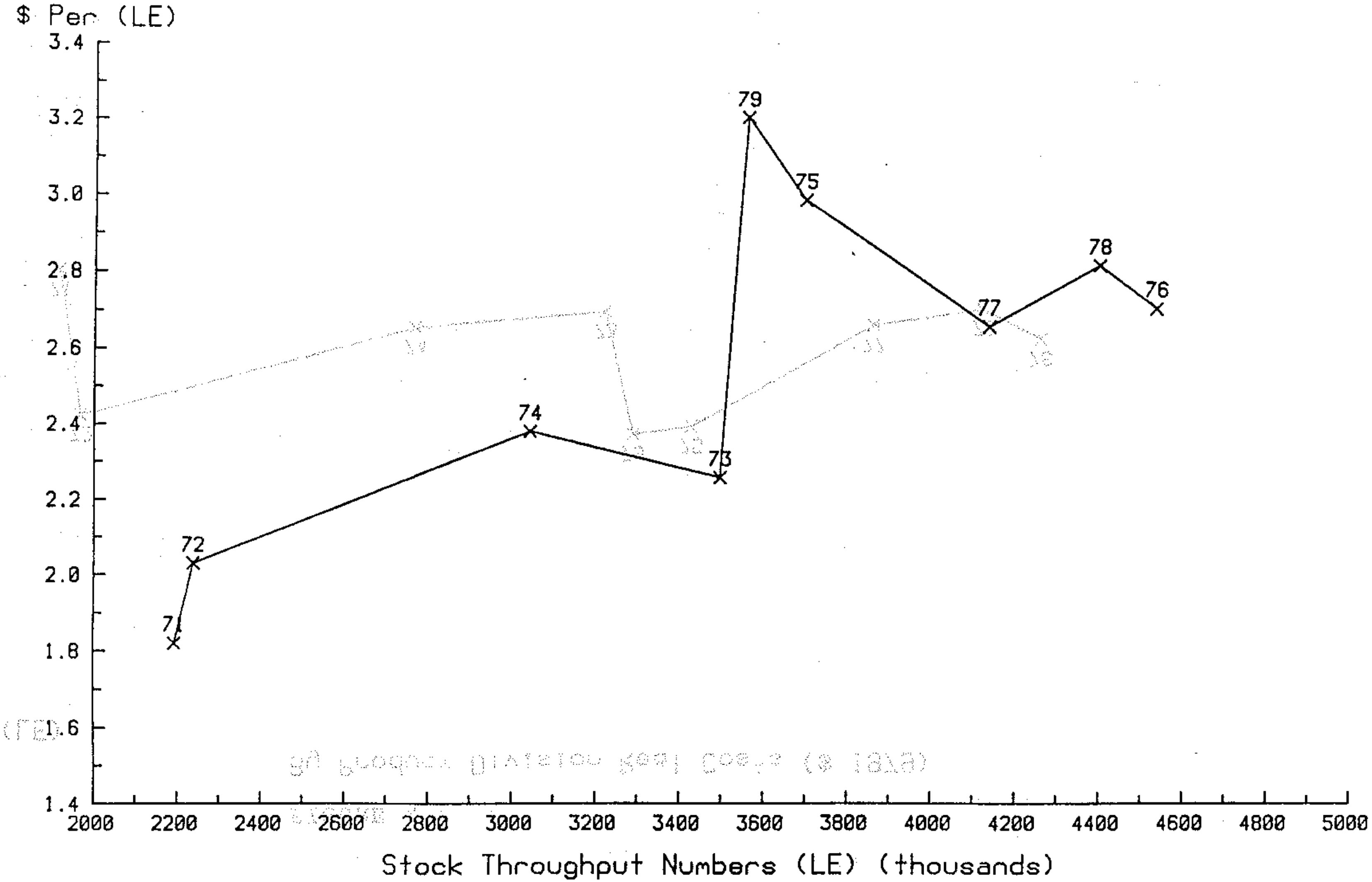


FIGURE 4.2

By Product Division Real Costs ($ 1979)

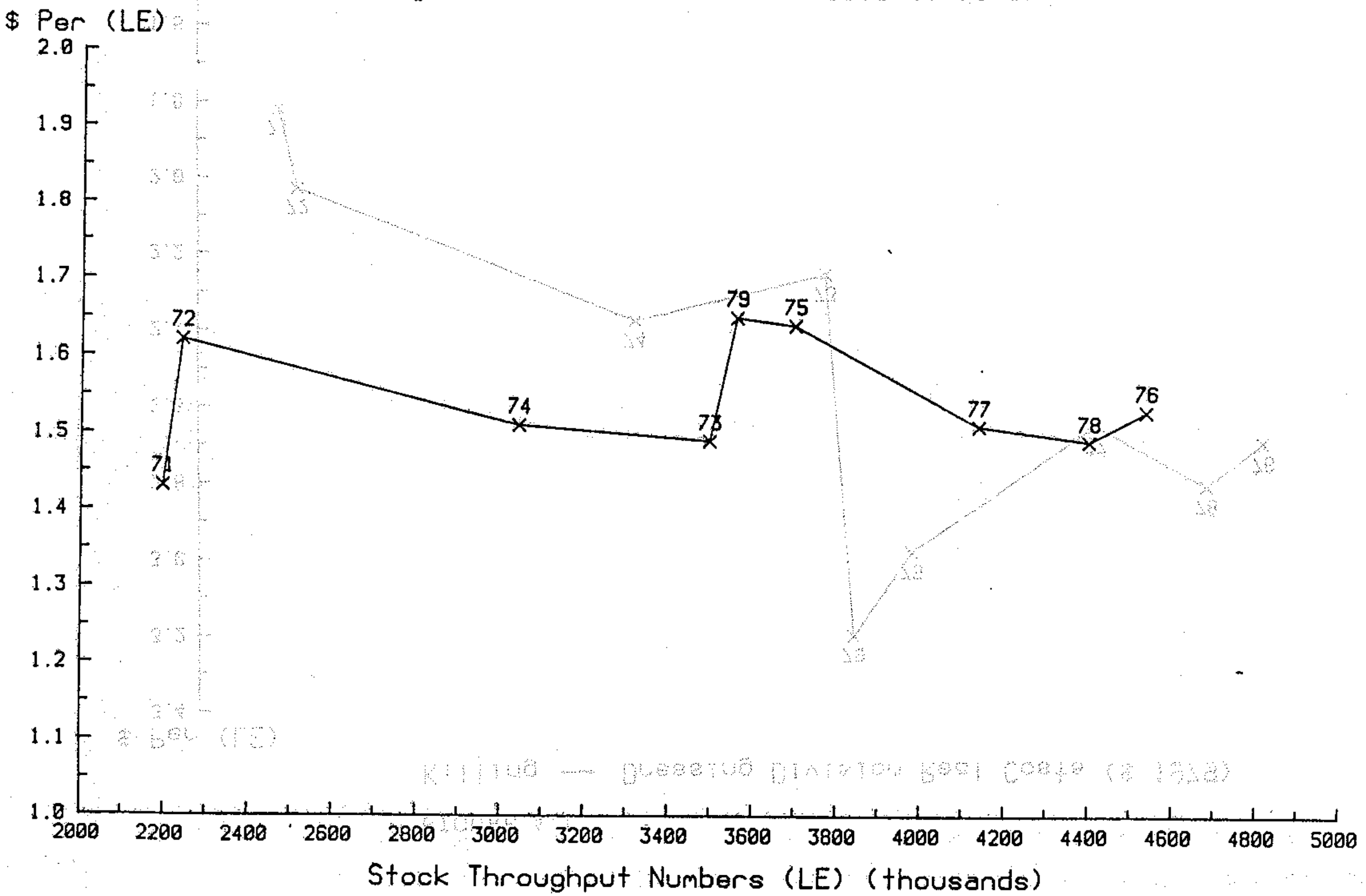


FIGURE 4.3

Rendering Division Real Costs ($ 1979)

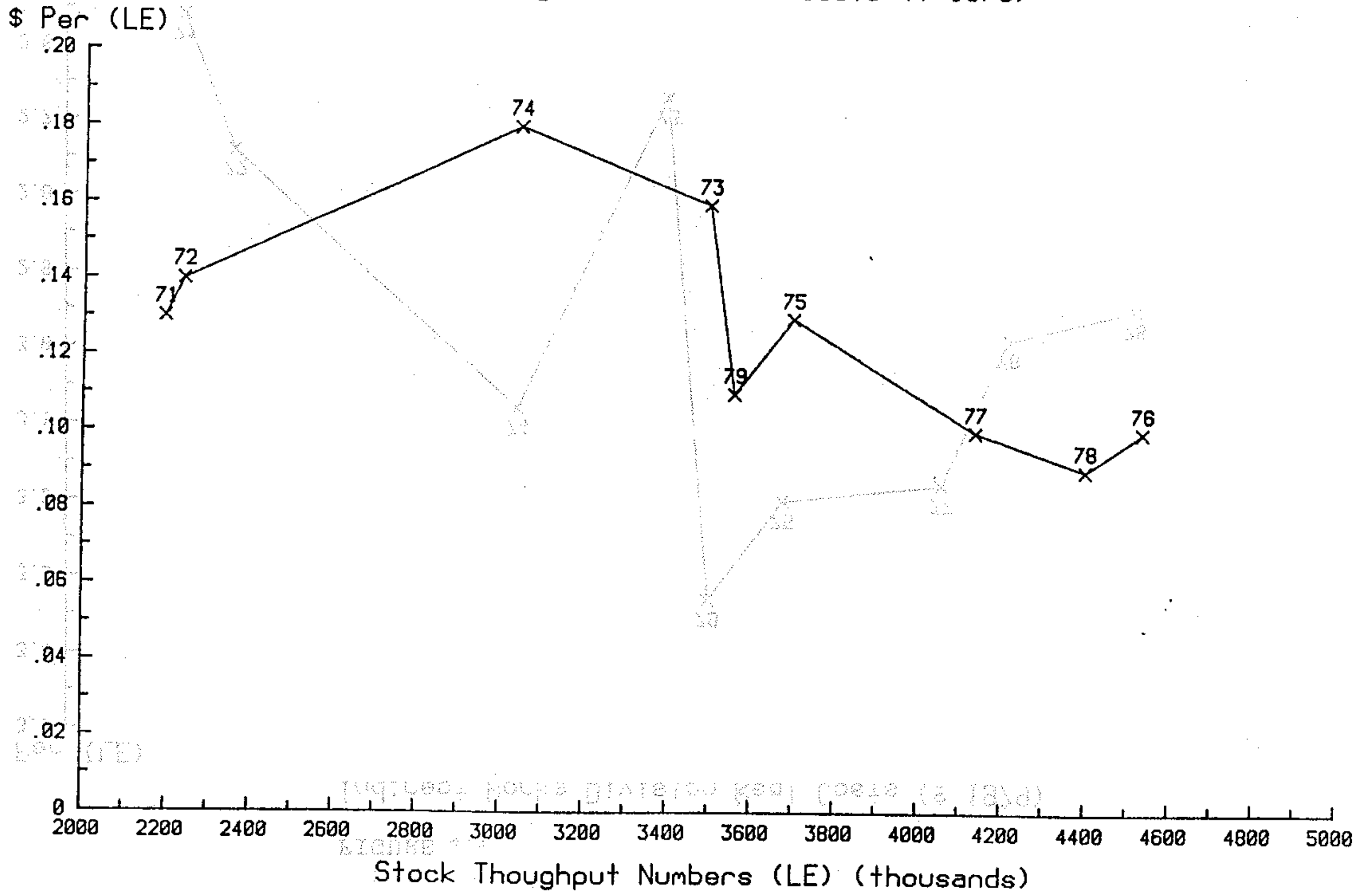


FIGURE 4.4

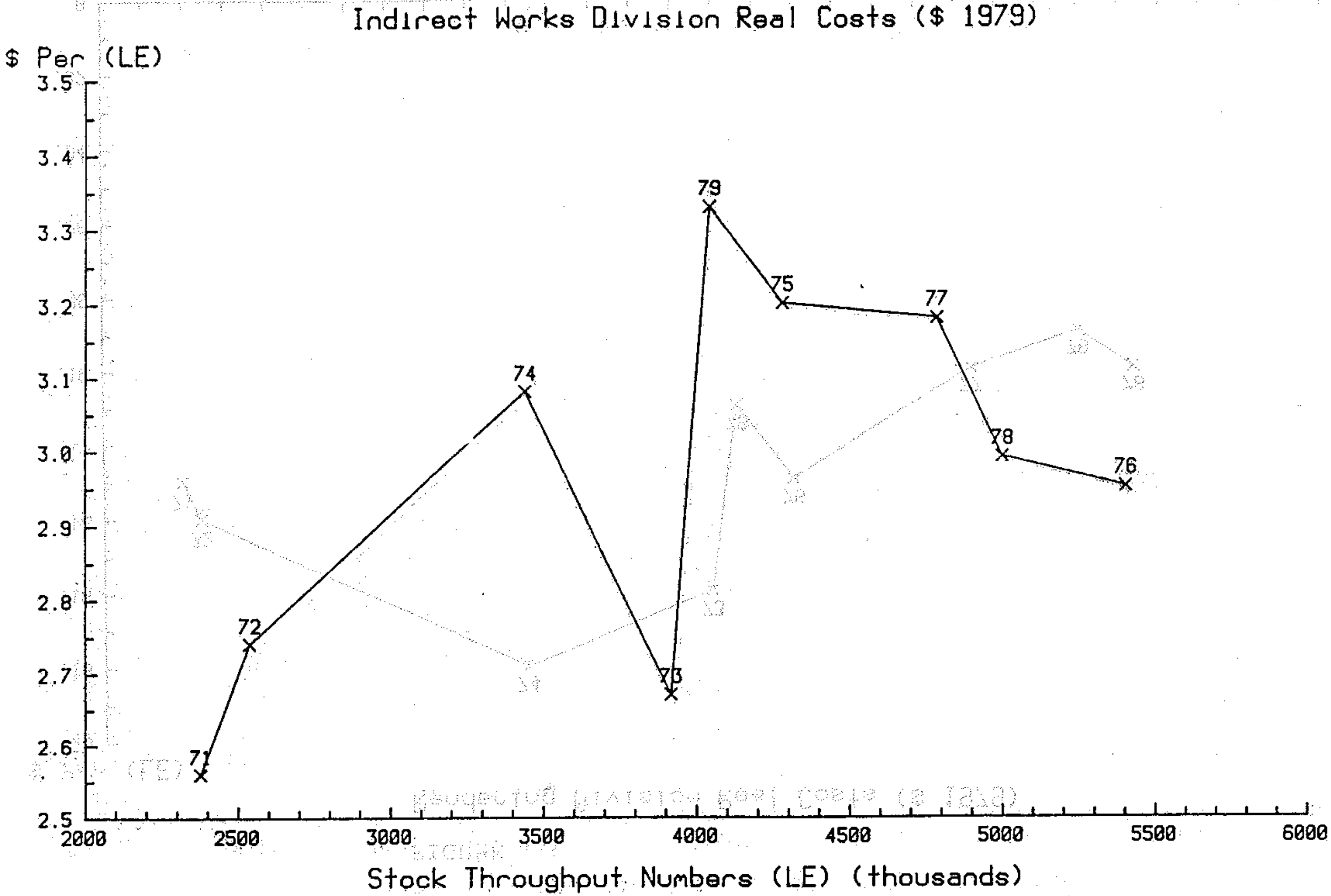

Indirect Works Division Real Costs ($ 1979)
$ Per (LE)
3.5
3.4
3.3
3.2
3.1
3.0
2.9
2.8
2.7
2.6
2.5
71
72
74
73
79
75
77
78
76
2000
2500
3000
3500
4000
4500
5000
5500
6000
Stock Throughput Numbers (LE) (thousands)

FIGURE 4.5

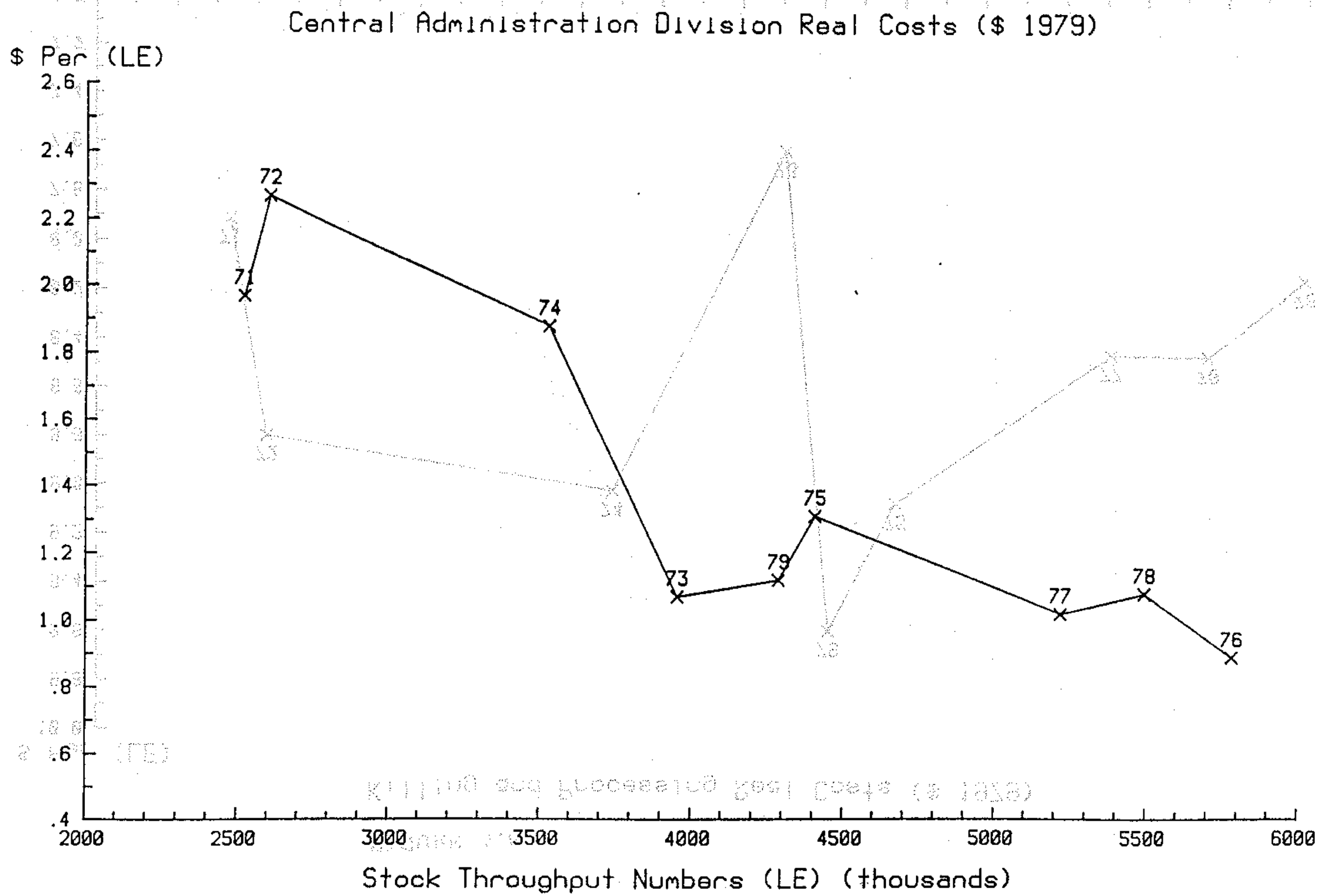
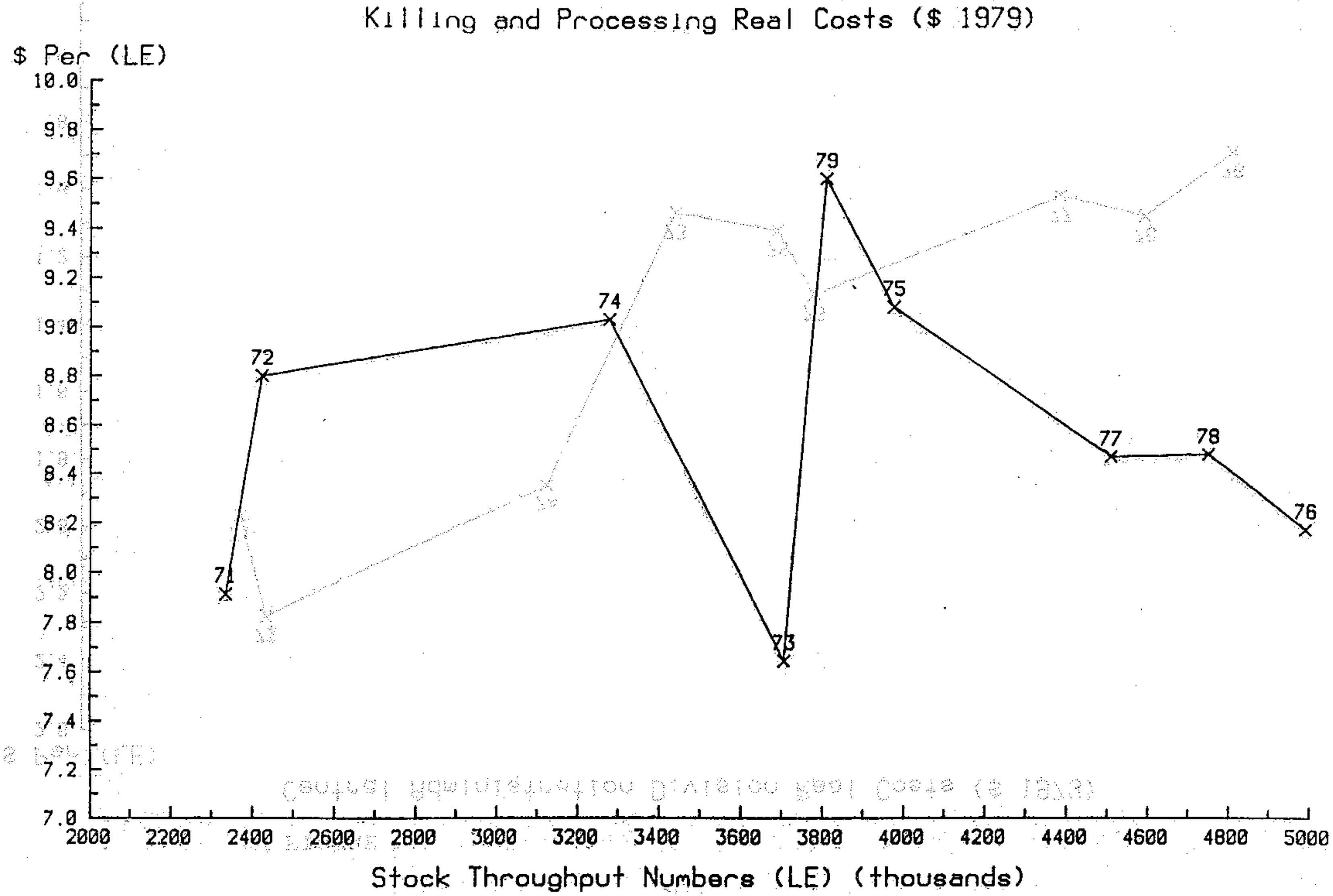

Central Administration Division Real Costs ($ 1979)
$ Per (LE)
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
.8
.6
.4
2000
2500
3000
3500
4000
4500
5000
5500
6000
Stock Throughput Numbers (LE) (thousands)
71
72
74
73
79
75
77
78
76

FIGURE 4.6


Killing and Processing Real Costs ($ 1979)
$ Per (LE)
10.0
9.8
9.6
9.4
9.2
9.0
8.8
8.6
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
Stock Throughput Numbers (LE) (thousands)
71
72
74
73
79
75
77
78
76

CHAPTER 5

CAPACITY UTILIZATIONS

5.0 Relationships Between Costs And Capacity Utilization

In Chapter Four, the Figures 4.1 and 4.5 suggested that real per carcase costs were strongly affected by throughputs for any given capacity level. A more general form of the above relationship can be obtained by comparing costs with capacity utilization levels.

Full capacity (100% capacity), the maximum number of lamb equivalents that can be feasibly processed during a season, for the company's works has been calculated for each of the nine seasons in the study period and for each of the three seasons following. As the company acquired an additional works and rationalized it during the study period, full capacity has not been constant.

TABLE 5.1

Full Capacity Calculations (100% Capacity)/
1970-1982

200 Working Days

Season	Lamb Equivalents
1970/71 & 1971/72	3,900,000
1972/73	5,700,000
1973/74 - 1981/82	6,900,000

The full capacities above have been calculated using a 5 day, 40 weeks season. This is 8 weeks shorter than the one suggested by Sheppard (1982). Company sources indicate however that running all chains at capacity during a season of this length would necessitate a minimum 12 weeks close-down period for repairs and maintenance. The 40 week period does not include Saturday morning kills.

Figures 5.1 through 5.7 show graphically the effect of capacity utilization on real per carcase costs for the 1970/71 through 1978/79 seasons ending August 31. These graphs also show predicted real per carcase costs for the 1970/71 through 1981/82 seasons which will be discussed in the next section.

It should also be noted that capacity utilization percentages for divisions do not agree due to the use of different ratios when converting different stock classes to lamb equivalents.

With the exception of the transitionary seasons 1970/71 through 1973/74, explained in Chapter 4, all the divisions real per carcase costs decrease as capacity utilization increases. Figure 5.2 shows the trend for Killing and Processing Costs for 1974/75 through 1978/79, which omits the transitionary seasons. The trends are similar in all divisions for the 1974/75 through 1978/79 seasons.

The basic reasons for the strong relationships shown in the above graphs, and in the graphs of the previous chapter will be examined in Chapter 6.

5.1 <u>Comparing Low And High Throughput Seasons</u>

For Killing and Processing Costs, the increase in capacity utilization from 55% (1978/79) to 72% (1975/76) decreased real per carcase costs by 17.5% or $1.44 ($1979), from $9.602 to $8.166.

Table 5.2 shows the real increase or decrease in the company's overhead, chain determined, and variable costs for the same two periods. As explained further in Section 6.3.1, "overhead costs" refer to fixed costs incurred regardless of chains being open or not, "chain determined costs" refer to costs directly associated with individual chains, and "variable" costs are those directly associated with throughput volumes.

The increase in capacity utilization caused, as expected, a decrease in real per carcase overhead and chain determined costs (all fixed costs once in the period of all-chain operation). The increase in real per carcase variable costs which occurred was attributed primarily to fluctuations in inventories (Stores) which occur over seasons of high and low throughput numbers.

TABLE 5.2

<u>Increased Capacity Utilization (1978/79)-(1975/76)</u>

<u>($1979)</u>

Cost	Increase + or Decrease - ($ per carcase)
Overhead	-0.82
Chain Determined	-0.86
Variable	+0.24
Total Decrease	-1.44

Since total costs increased from \$36,897,748 (\$9.602 x 3,842,715) to \$40,761,498 (\$8.166 x 4,991,245) the average Killing and Processing Cost per additional throughput (average marginal cost) was \$3.36 (\$1979) per carcase.

5.2 Marginal Costs At High Throughputs

For the 1970/71 through 1981/82 seasons actual capacity utilization was highest in the 1980/81 season for all divisions except Central Administration. In this division it was approximately equal to the 1975/76 season which was the highest in the actual study period. (As was stated in Section 5.2 capacity utilizations will not agree for all divisions due to the use of different conversion ratios when converting export beef to lamb equivalents.)

In order to predict the additional effect of increasing capacity utilization on per carcase costs a comparison was sought between the highest capacity utilization season (1980/81) and the second highest capacity utilization season (1975/76). While actual costs for 1975/76 were available, costs had to be predicted for 1980/81. To enable the above comparison the effect on per carcase costs of increasing capacity utilization (by increasing throughputs) was estimated for each of the divisions shown in Figures 5.1 through 5.6 using regression analysis of the functional form, $Y = a+b/X$ where;

Y = total cost
X = lamb equivalents (throughputs)

The predicted real per carcase costs for the Central Administration Division shown in Figure 5.7 were made using the same form, but with Y=per carcase costs. The change in the dependent variable was necessary to obtain significant test statistics as this division's costs are all fixed. (A summary of the test statistics is given in Clemes, 1984.)

For Killing and Processing Costs the increase in capacity utilization from 72% (1975/76) to 76% (1980/81) decreased predicted real per carcase costs by \$0.34 (\$1979) from \$8.166 to \$7.83.

FIGURE 5.1

Effect of Capacity Utilization on Killing and Processing Costs ($ 1979)

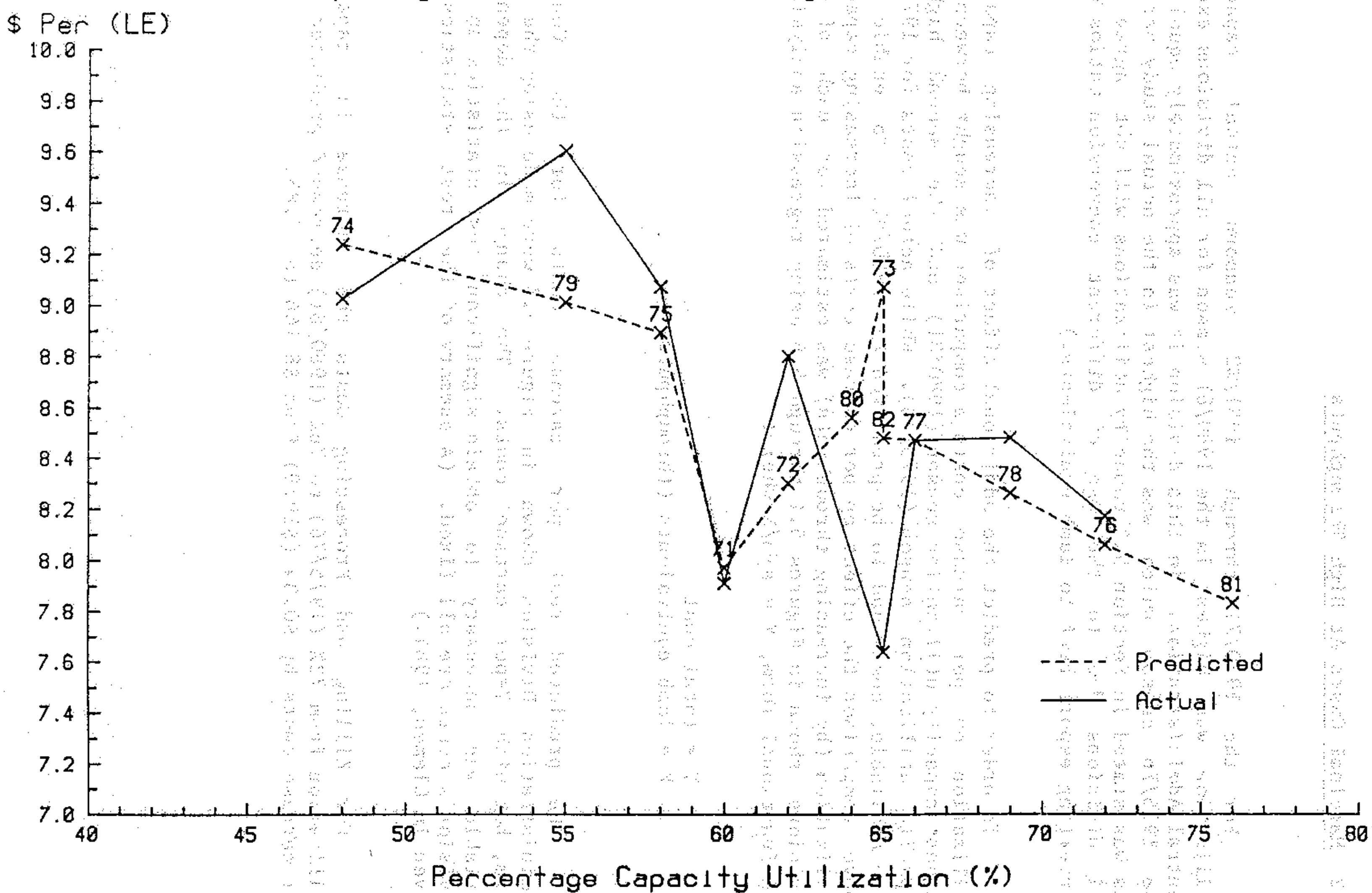


FIGURE 5.2

Effect of Capacity Utilization on Killing and Processing Costs ($ 1979)

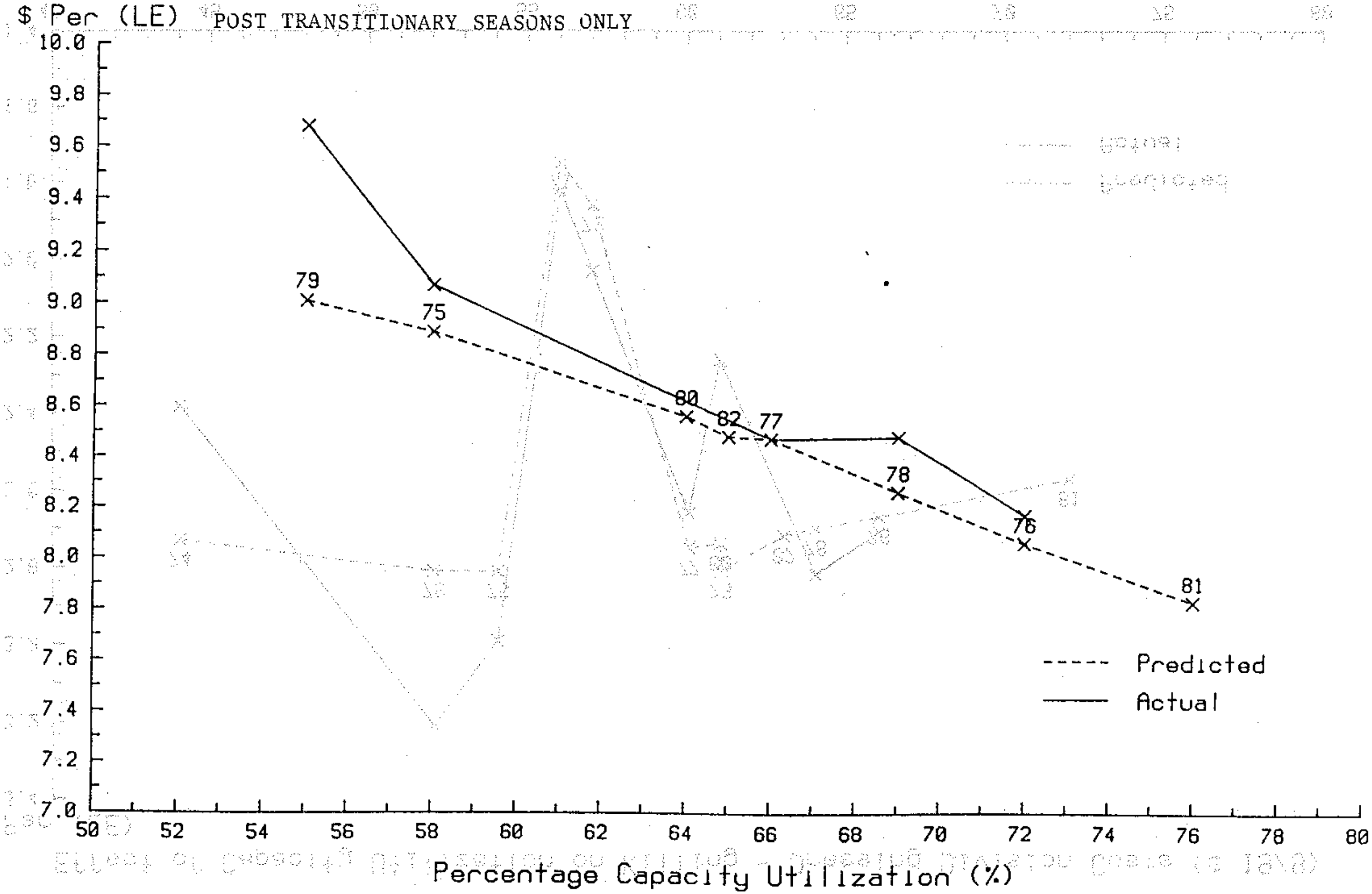


FIGURE 5.3

Effect of Capacity Utilization on Killing - Dressing Division Costs ($ 1979)

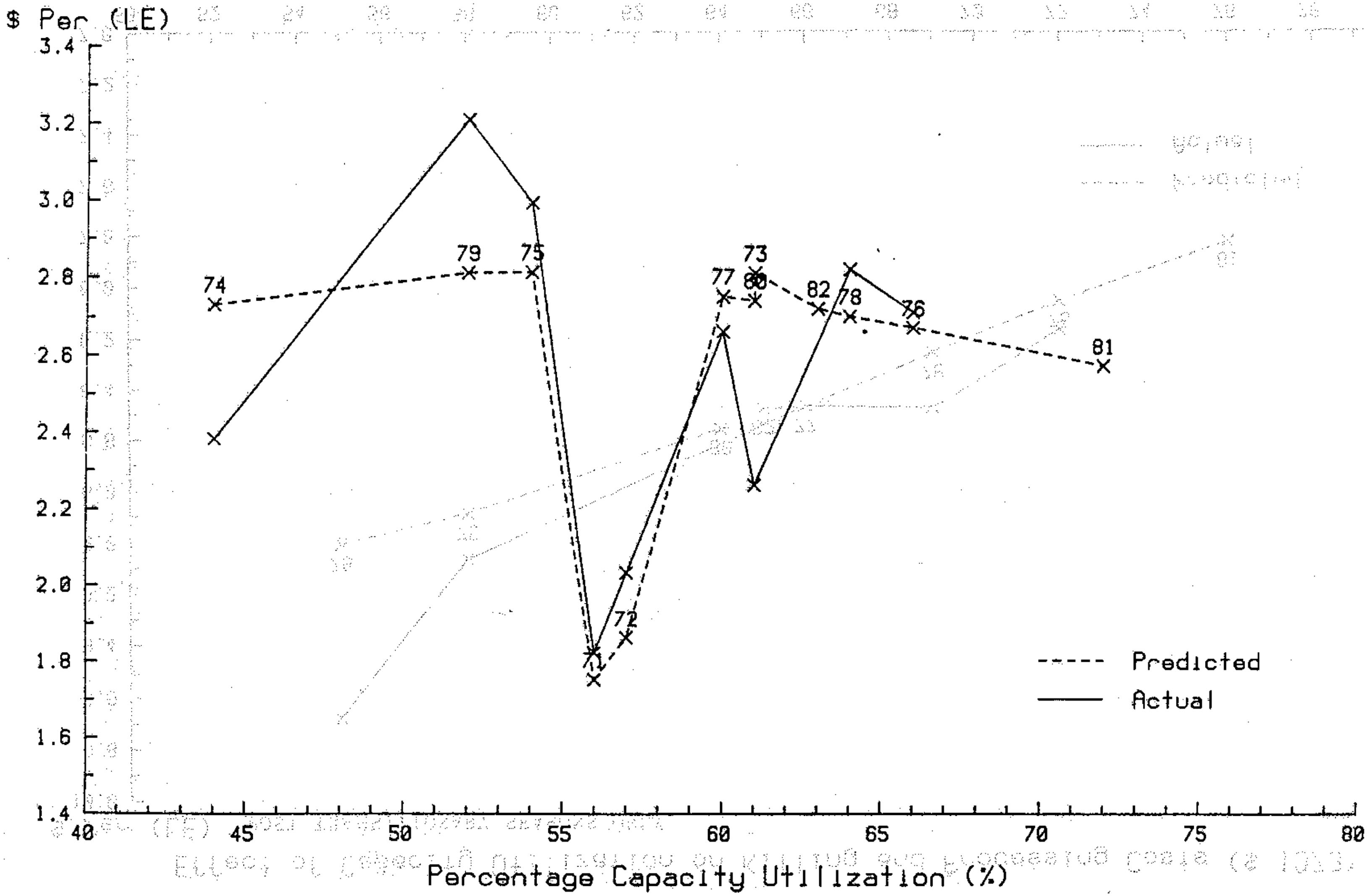


FIGURE 5.4

Effect of Capacity Utilization on By Product Division Costs ($ 1979)

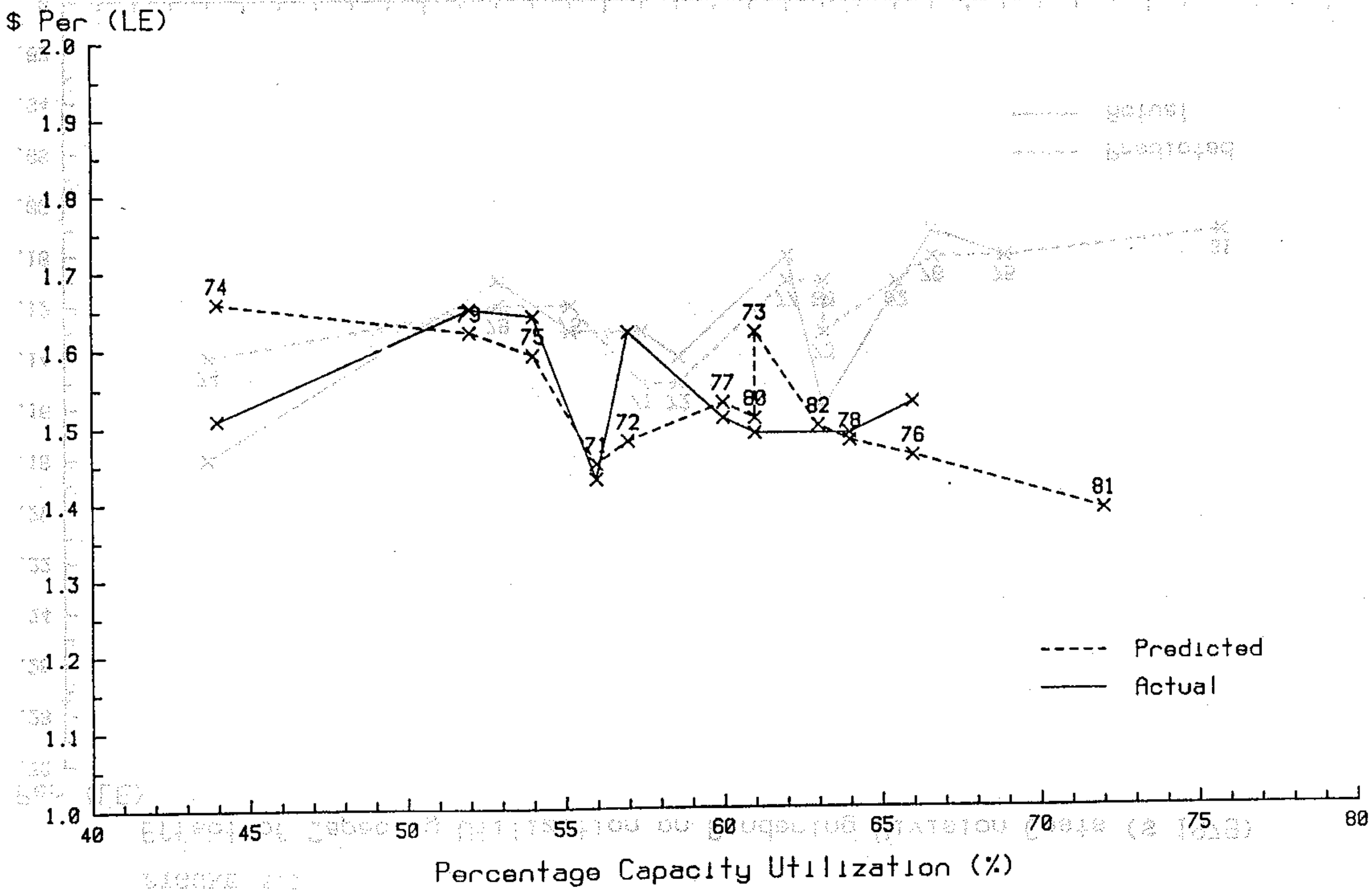


FIGURE 5.5

Effect of Capacity Utilization on Rendering Division Costs ($ 1979)

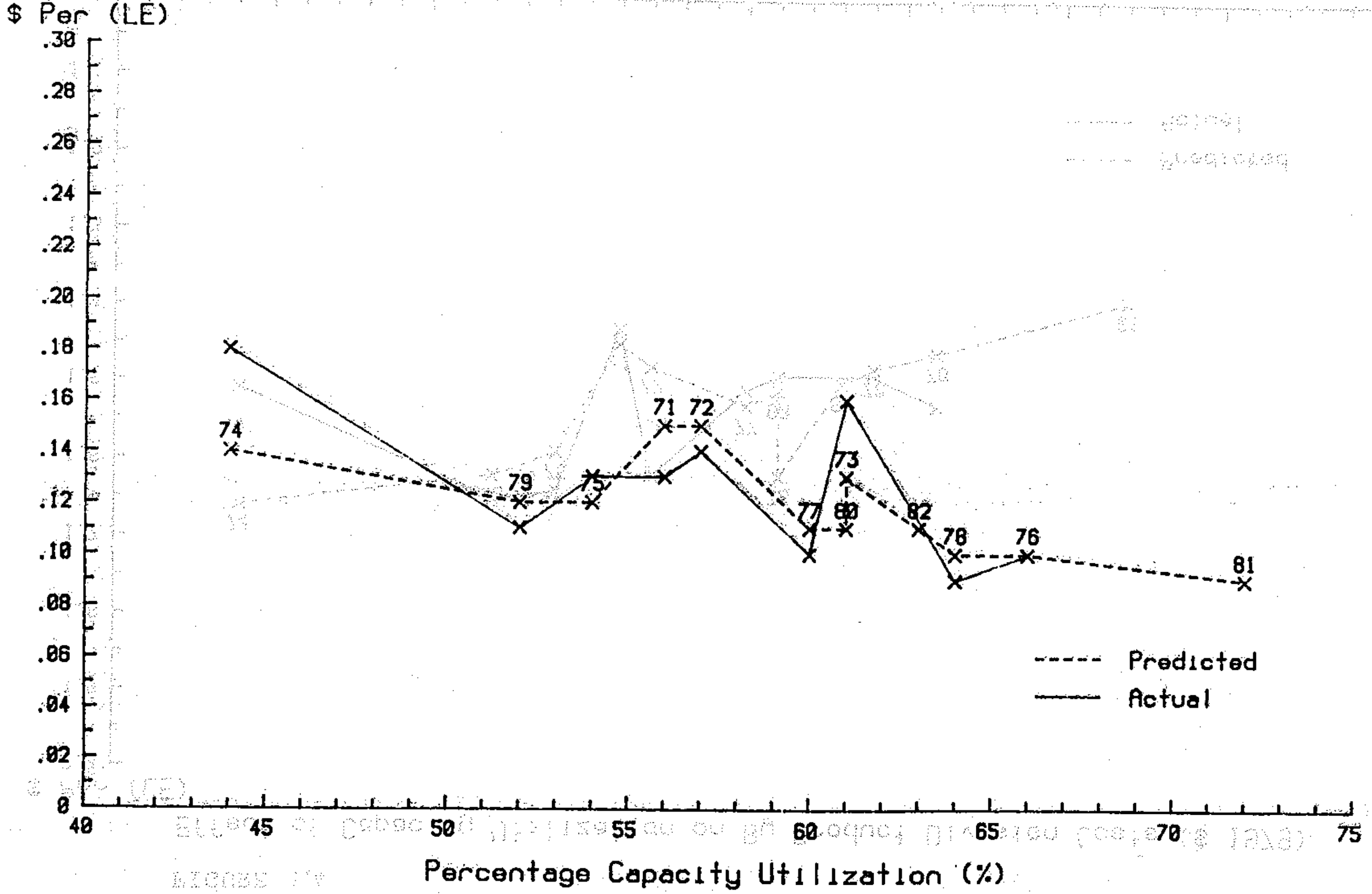


FIGURE 5.6

Effect of Capacity Utilisation on Indirect Works Division Costs ($ 1979)

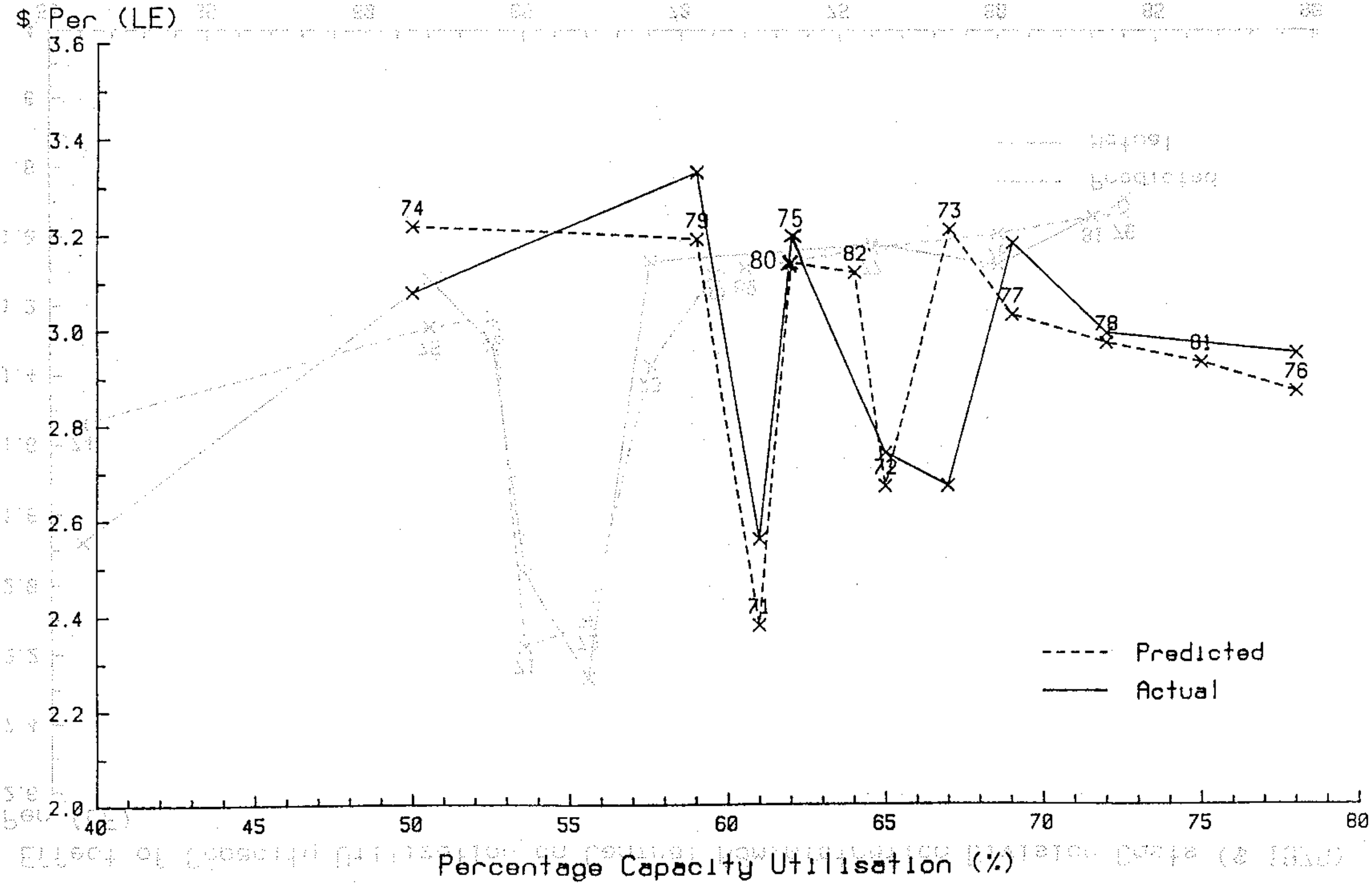


FIGURE 5.7

Effect of Capacity Utilization on Central Administration Division Costs ($ 1979)

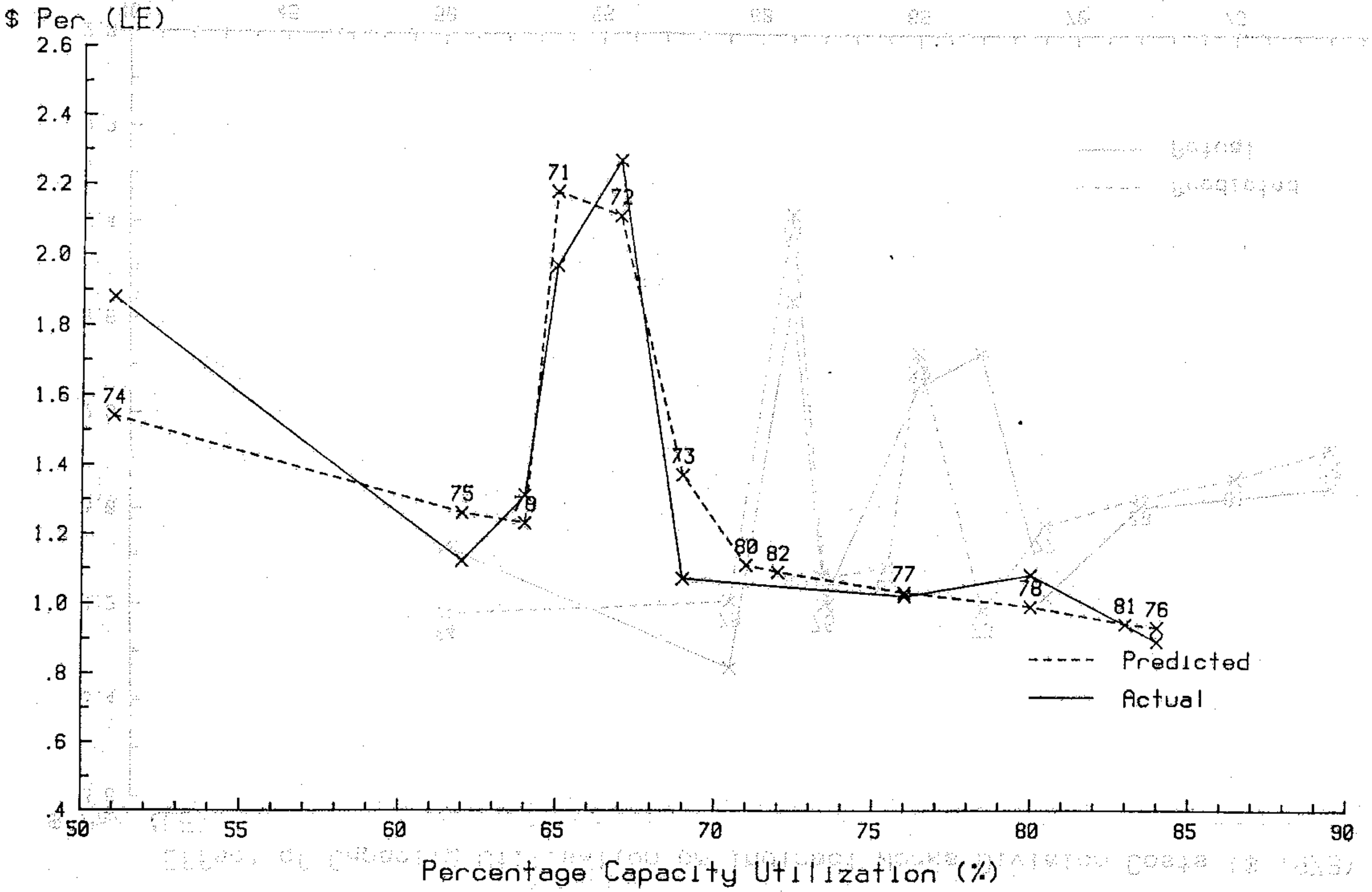


Table 5.3 shows the increase or decrease in the overhead, chain determined and variable costs for the same two periods.

TABLE 5.3

Increased Capacity Utilization (1975/76)-(1980/81)

($1979)

Cost	Increase + or Decrease - ($ per carcase)
Overhead	-0.06
Chain determined	-0.23
Variable	-0.05
Total Decrease	-0.34

Since total costs increased from $40,761,498 ($8.166 x 4,991,245) to $41,187,500 ($7.831 x 5,259,020) the predicted average Killing and Processing cost per additional throughput (average marginal cost) was $1.59 ($1979) per carcase.

The implication of this fall in average additional costs is that the marginal cost curve is relatively low at higher levels of capacity utilization.

CHAPTER 6

THE MULTI-CHAIN SYSTEM AND ITS EFFECTS ON COSTS

6.0 Effect Of Seasonality On N.Z. Meat Processing

The seasonal weather conditions of New Zealand mean that stock (sheep and lambs) production is planned for the period of maximum pasture growth which results in a seasonal supply of stock to the works for processing.

One effect of this is the often discussed peak kill period, usually January, February and March in the South Island (Inness and Zwart, 1979). Outside the peak kill period there is a staggered flow rate of stock to the works during October, November and December and April, May, June and July.

The length of the peak kill period and the staggered flow rate depends primarily on feed conditions, individual farming practices, geographic location of the farm, type of lamb produced and also throughput numbers in any one season.

The company has adapted its processing system to cope with their peak kill period and the staggered rate of stock flows to their works, through use of a multi-chain system.

6.1 The Multi-Chain System

The flow chart of Chapter 2 provided a representative introduction to the multichain system. Details of the chain system specific to the company for the study period are given below.

The maximum daily kill (set by union negotiations) for the company's works is set at either 3000 or 3500 lambs per chain depending on the individual works and can not be exceeded. For each chain fixed manning standards apply. These determine the maximum manning levels the company must budget for. Certain historical agreements have meant that manning standards do not increase in linear fashion as chains are opened, as shown in Table 6.3.

The staggered rate at which on-farm stock is sent to the works necessitates the company to open its chains in sequence with the flow rate, while not exceeding the maximum daily kill per chain.

Initially, stock starts arriving at the works in early October and the No.1 chain starts operating at this time. Stock numbers steadily increase through November to December and the No.2, No.3 or (for a 5 chain works) the No.4 and No.5 chains are opened according to the flow, and under the maximum daily kill constraint.

Once the No.3 (or No.5) chains are opened, all chains are kept fully operational five days per week (with a Saturday morning kill when necessary during the peak period) until insufficient stock is available for the operation of all chains. At this time, usually May or June, the process reverses with the No.5 (for a 5 chain works) or the No.3 (for a 3 chain works) closing first, with the other chains following on a last-on/first-off basis until all chains are closed at the end of the season, usually in July or August.

Tables 6.1 and 6.2 illustrate the timing of chain operations with the flow rate of stock for a 3 and 5 chain works in a representative season.

TABLE 6.1

Timing of Chain Operations

3 Chain Works

Chain No.		Date	Cumulative Sheep and Lamb Kill
1	on	21 Oct.	0
2	on	11 Nov.	29,386
3	on	24 Nov.	76,095
3	off	3 June	1,229,607
2	off	5 June	1,252,447
1	off	11 June	1,260,840

Period of all-chain operation 76,095 to 1,229,607 sheep and lambs.

TABLE 6.2

Timing of Chain Operations

5 Chain Works

Chain No.		Date	Cumulative Sheep and Lamb Kill
1	on	6 Oct.	0
2	on	13 Oct.	17,552
3	on	5 Nov.	89,381
4	on	17 Nov.	122,680
5	on	1 Dec.	206,060
5	off	26 May	1,635,798
4	off	27 May	1,647,796
3	off	3 June	1,690,350
2	off	12 June	1,734,813
1	off	21 July	1,857,089

Period of all-chain operation 206,060 to 1,635,798 sheep and lambs.

Once a chain is opened, manning standards required for processing on that chain are fixed and do not alter regardless of throughput until the chain is closed. Low daily chain tallies do not reduce the manning standards, nor do they reduce the number of paid hours, even if less than eight hours are worked due to the low tallies.

At the beginning of the season, especially in those with high throughputs, chains tend to fill their maximum daily kill levels relatively quickly and thus total manning levels and total throughputs tend to merge relatively quickly.

The closing of chains at the end of the season is not nearly as systematic and manning levels decrease more slowly than do stock flows. This carry over of excess labour is most noticeable in seasons of low throughput numbers.

6.2 Fixed And Variable Costs

Bannock, Baxter and Reeves (1978) define fixed costs in the short run as costs that do not vary with output and variable costs as those costs that vary with output.

The New Zealand Freezing Companies Association (Inc.), (Anon.,1979) imply fixed costs typically make up approximately 12% and variable costs 88% of a works processing cost structure.

The company, at the start of a typical season, classifies its Killing and Processing Costs as 12% "fixed" (eg office expenses), 35% "semi-variable" (costs that have a "fixed" component eg energy) and 53% "variable", (eg chain labour, stores).

Analysis of company manning standards (in particular those positions that are manned, regardless of the number of chains operating) suggested however, that many of the companies "semi-variable" and "variable" costs were better interpreted as "fixed" costs. Because of the maximum daily kill agreements it can be assumed that all chains will be open at some stage of the season. Because of the fixed manning standards most labour costs will in fact be incurred regardless of throughput numbers in a season - ie they are fixed costs to the company. Table 6.4 reveals that in a typical season, 86% of total costs could thus be interpreted as "fixed costs". Such proportions make it inevitable that increasing thoughput must significantly reduce cost per unit of throughput.

6.3 Chain Opening And Cost Proportions

In section 6.2 reference was made to the effect on fixed costs of fixed manning standards and delayed closing of chains at season end. To examine this more closely, total costs for a representative season were apportioned as follows. A first category of "fixed" costs were those not affected by the number of chains operating. Of these some (eg central office) were not affected by the length of the killing season while others (eg energy) were. A second category of "fixed" costs were those associated with the opening of successive chains. These "chain-determined costs" were in turn apportioned between individual chains based on the company's wage records. All other costs were defined as variable costs that varied directly with annual throughput (eg stores).

6.4 Budgeted Manning Standards And Adjusted Chain Costs

Based on agreements negotiated between the company and various unions a schedule of expected manning levels per chain is compiled annually. The relevant schedules for a typical season of the study period are reproduced in Table 6.3, expressed in labour units and converted to index values.

Table 6.3

Budgeted Manning Standards for a Typical Season

(Indexed Labour Units)

5 Chain Works		
Budgeted Chain 1	Labour Units	17.7
Budgeted Chain 2	Labour Units	10.6
Budgeted Chain 3	Labour Units	9.4
Budgeted Chain 4	Labour Units	11.2
Budgeted Chain 5	Labour Units	8.1
3 Chain Works		
Budgeted Chain 1	Labour Units	24.2
Budgeted Chain 2	Labour Units	17.6
Budgeted Chain 3	Labour Units	15.2

Within these budgeted manning standards, allowance is made for the employment of some labour units in advance of, or later than their assigned chain opening. For instance, in the budgeted standards for chain 4, allowance is made for a period of time in which chain 5 labour is employed even though chain 5 was not actually open.

The weekly costs for operating individual chains will thus not always correspond to budgeted levels. To correct for this problem, adjusted costs have been calculated for a typical season in the study period. These adjustments have been based on actual wage records, the resulting per-chain costs appear in Table 6.4 expressed in index value form. Adjustments could only be made for a 5 chain plant, however, the same pattern can be expected for a 3 chain plant.

TABLE 6.4

Allocation of Costs for a Typical 43 Week Season (Index Values)

	Per Week	Weeks Involved	Annual Total
Overhead Costs			
Fixed Costs-Unaffected by Season Length	.28	43	12.00
Fixed Costs-Affected by Season Length	.49	43	21.00
Chain Determined Costs			
Costs Fixed While Chain 1 Open	.29	43	12.57
Costs Fixed While Chain 2 Open	.32	37	11.68
Costs Fixed While Chain 3 Open	.33	33	11.01
Costs Fixed While Chain 4 Open	.36	30	10.70
Costs Fixed While Chain 5 Open	.25	28	7.04
Total Fixed Costs			86.00
Variable Costs			
Variable costs Relating to Throughput			14.00
Total All Costs			100.00

The major feature of Table 6.4 is the revelation that the average weekly costs for individual chains vary considerably from those indicated by the budgeted manning standards.

In particular the last chain has markedly lower average weekly costs than the No. 3 and No. 4 chains. Chain 1 also has lower cost than that indicated by the budgeted data.

6.5 Benefits Of All-Chain Operation

Once all chains are fully operating overhead costs are spread over maximum permitted throughput numbers and weekly real per carcase costs are minimised. The total effect of this on annual costs depends on the duration of the all-chain period.

In seasons of high throughput numbers the company is able to open and fully utilize its successive chains rapidly (move into the period of all-chain operation quickly) and this reduces the period of higher per carcase costs. If throughput numbers are low in a season, chain openings and attainment of full utilizations are slower (delaying the move into the period of all-chain operation) and this lengthens the period of high per carcase costs with the effect of increasing average costs for the season.

At the end of a season when successive chains are closed, the carry over of labour makes the reduction of chain determined costs sticky, with non-productive wages being paid. In particular, this situation occurs towards the end of a season with low throughput numbers, during which overtime and Saturday morning kills have been restricted. Once again, this situation has the effect of increasing average real per carcase costs for the season.

CHAPTER 7

POSSIBLE STRATEGIES FOR REDUCING PROCESSING COSTS, FOR INDIVIDUAL COMPANIES

7.0 Spreading The Kill

Much discussion on limiting increases in killing and freezing charges has centred on spreading the seasonal kill since the "Spread of the Kill Sub-Committee" of the Agriculture Production Councils Meat Committee reported on its benefits in 1970.

Herlihy (1970) suggested spreading the actual seasonal kill would benefit the freezing companies by allowing a more efficient use of capital (higher capacity utilization) and lower wage rates by providing more permanent employment.

The New Zealand Freezing Companies Association (Inc.) (Anon.,1979) suggested that spreading the actual seasonal kill could be substantially advantageous to the farmer as more efficient use of resources by the freezing industry would ultimately be reflected in lower killing charges.

Sheppard(1982), while arguing also for the benefits of a spread kill in improving capacity utilization qualifies this by calling also for smaller, more flexible, capital intensive works rather than conventional types of works.

The above studies implicitly assume that in the face of fixed throughputs, spreading of the kill would enable companies to correspondingly reduce capacity, in other words to reduce the number of chains operated. Two arguments would suggest that this is unlikely. Firstly the peak weekly throughput of say a five chain works would need to be guaranteed of falling by more than 20% (after allowing for discretionary Saturday killing) before the company even contemplated closing the fifth chain. This guarantee would have to cover both normal and drought years, and both trouble-free and troublesome years of industrial conflict. Secondly there appear to be considerable institutional impediments in quitting excess capacity in the industry. Sheppard (1982) for instance, reports that in 1979/80, a record slaughter year, "no region in New Zealand achieved maximum monthly capacity utilization in any month and average annual utilization ranged from 25 percent to 42 percent, depending on region" (p.43).

If it is assumed that capacity is fixed as far as the company is concerned, then spreading the kill becomes of dubious benefit. Indeed the company's cost structure, as revealed in Table 6.4, implies that spreading a given throughput evenly over a season could in fact increase killing and processing costs compared with the normal peaked pattern. This result follows from the relative costs of intermediate and final chains, and of long and short seasons. This is further discussed in section 7.3.

7.1 Improving Capacity Utilization

For the company's works, the single most important factor in decreasing real Killing and Processing Costs using improved capacity utilization is consistently high throughput numbers over all seasons. In addition to the cost savings due to extended all-chain operation, more consistent high capacity utilization would also aid management in corporate planning, inventory control and selecting staff levels which could further improve efficiency and act to limit future real per carcase cost increases.

Ensuring consistently high seasonal throughputs depends on a number of factors. Some of the more crucial ones such as world economic conditions, changes in consumer preferences, levels of protection in export markets and New Zealand government incentives or disencentives are beyond the control of the company. However, improved stock rebates and regional production incentives could be used to attract the throughputs required for high capacity utilization in the company works during seasons of low national throughput numbers.

The reduction in average per carcase cost of killing and processing the 1,100,000 additional throughputs referred to in Table 5.2 indicates sizeable rebates and other production incentives could be paid to regional producers to attract stock. These regional incentive payments could then be off-set either by the additional profitability from marketing the 1,100,000 carcases and their by-products, or from the additional processing revenue generated at the works level if the processing was done for non-company meat exporters.

For example, as a means of transforming a season of low capacity utilization (55%) into a high season (72%), the company could have paid a rebate of approximately $1.00 ($1979) per lamb equivalent over all throughputs and still maintained a $0.44 ($1979) per carcase cost saving if the transformation occurred.

7.2 Adjustments To Daily Kills

One possible method of adjusting daily kill to reduce costs would involve longer hours being worked per weekday, and maximum daily kills, being increased more than proportionately to the increased labour costs.

Adjustments to the maximum daily kill could decrease average per carcase costs during the period of all-chain operation.

Company sources indicate a higher daily per carcase cost is associated with Saturday morning kills compared with weekday kills. This is because Saturday wage hours are at penal rates while throughput cannot exceed half the maximum daily kill. If all Saturday killing was introduced at regular weekday pay rates under the maximum daily kill, costs would be reduced.

7.3 Further Peaking The Kill

Changing to all Saturday killing or to longer week day hours in the face of constant seasonal throughputs would also have the effect of "peaking the kill". This could eliminate on-farm management problems often associated with spreading the actual seasonal kill on classes of farm land that cannot adapt and participate in off-peak production, Barton (1973), New Zealand Freezing Companies Association (Inc.) (Anon., 1979). These producers would be able to have their stock killed more readily during the peak. While "peaking the kill" rather than "spreading the kill" does not affect capacity utilisation, it does lengthen the period of all-chain operation, and should also mean a shorter killing season, thus the company's costs for conventional processing are likely to fall.

In Table 6.4 the weekly costs of operating individual chains in a normal season have been estimated. To estimate the effect on company costs of a change in normal killing patterns these same weekly costs have been used to construct Table 7.1. In Table 7.1 three different kill patterns have been compared, handling an annual throughput of approximately 2.6 million L.E. with all patterns assuming that while chains are open, they are always running at 100% capacity and subject to adjusted manning standards as discussed in section 6.3.1.

The first kill pattern is the typically tapered flow referred to in Table 6.4. The second kill pattern involves a much more evenly spread flow resulting in a longer season and a shorter all-chain peak. The third kill pattern is an extremely peaked flow resulting in a short killing season and a longer all-chain peak. Needless to say many assumptions have been made in such an analysis but it seems clear, from a company point of view, that spreading of the kill for cost reasons only is of dubious benefit.

TABLE 7.1

Effect of Fixed Costs of Altering Annual Throughput Flows

Within Existing Plants

(All Values Derived from Table 6.4)

A. Typical 43 Wk Pattern (Assuming Chains Always at 100% When Open)

	Cum Kill	Combined Per wk Cost	Annual Total
Chain Determined Costs			
Chain 1: 6 wks @ 15000	90,000	0.29	1.74
Chain 1-2: 4 wks @ 30000	210,000	0.61	2.44
Chain 1-3: 3 wks @ 45000	345,000	0.94	2.82
Chain 1-4: 2 wks @ 60000	465,000	1.30	2.60
Chain 1-5: 28 wks @ 75000	2,565,000	1.55	43.40
Overhead Costs			
Fixed Costs - Unaffected by Season Length			12.00
Fixed Costs - Affected by Season length		0.49	21.00
			86.00

B. Evenly Spread 48 Wk Pattern (Assuming Chains Always at 100% When Open)

	Cum Kill	Per wk cost	Annual Total
Chain Determined Costs			
Chain 1: 8 wks at 15000	120,000	0.29	2.32
Chain 1-2: 7 wks at 30000	330,000	0.61	4.27
Chain 1-3: 5 wks at 45000	555,000	0.94	4.70
Chain (1-4) 6 wks at 60000	915,000	1.30	7.80
Chain 1-5 22 wks at 75000	2,565,000	1.55	34.10
Overhead Costs			
Fixed Costs - Unaffected by Season Length			12.00
Fixed Costs - Affected by Season Length			23.52
Total Fixed Costs			88.71

C. Peaked 34.2 Week Season (Assuming 5 Chains Opened, and Always at 100%)

	Cum Kill	Per Wk Cost	Annual Total
Chain Determined Costs			
Chain 1-5 34.2 wks @ 75000 =	2,565,000	1.55	53.01
Overhead Costs			
Fixed Costs - Unaffected by Season Length			12.00
Fixed Costs - Affected by Season Length		0.49	16.70
Total Fixed Costs			81.71

7.4 Further Processing

Peaking the kill would also have the additional benefit of freeing plant and labour longer for further processing of high value added products. All chains would be shut for longer periods in the season allowing the period of further processing to be markedly extended.

Silcock and Sheppard (1981) suggested that further processing of meat could reduce the seasonality in the meat industry by providing a longer employment period for seasonal meat workers as well as improving plant and capital utilization. The New Zealand Freezing Companies Association (Inc.) (Anon.,1979) also saw potential in processing by products and special lamb cuts in the off-season (non-all-chain period) to extend employment and better utilize works capacity.

Mechanised tasks (such as mechanical pelt pullers) being developed by the industry will divert labour from the Slaughterboard area. The Killing-Dressing Division primarily operates in this area. Higher capacity utilizations have had the least beneficial effect on this division's real per carcase costs over the study period. If labour from this division can be re-deployed in the further processing of meat (which company sources indicate requires a high manual input) it could help to maintain employment levels and allow continued mechanisation through less union resistance.

The longer employment period may also help to limit increases in real wage rates, Herlihy (1970) and assist in improving industrial relations, Turkington (1976).

CHAPTER 8

INDUSTRY STRATEGIES FOR REDUCING PROCESSING COSTS

8.0 Increased National Throughputs Through Existing Plants

The New Zealand livestock sector is considered capable of substantial increases in its production ,Taylor (1980). However, increasing livestock production (in particular sheep and lambs) is of negligible value to New Zealand if export markets cannot absorb the additional product at acceptable export price levels which demand elasticities for world sheepmeat calculated by Blyth (1982) indicate, or rising internal costs erode the income of producers, New Zealand Planning Council (1978).

Other writers have expressed concern that internal rises in processing charges could jeopardize export markets by reducing the viability of the New Zealand Meat Industry, Harrison (1975), Calder (1977), aside from complex problems already existing in these export markets, Begg (1978).

The actual and predicted decreases in real Killing and Processing per carcase costs and the low additional real per carcase costs associated with higher capacity utilizations determined in Chapter 6 for the company could have a significant effect on some of these problems facing the New Zealand Meat Industry.

If increased sheep and lamb production leads to consistently higher capacity utilizations the findings of Chapter 6 suggest that real killing and processing costs will reduce because of the low average additional real per carcase costs at the higher capacity utilizations e.g. $1.59 ($1979). This low additional average real per carcase cost should enable the extra production to be absorbed more readily in export markets.

In the 1978/79 season, New Zealand freezing works killed and processed 31,436,007 lamb equivalents for export (NZMPB Annual Report 1978/79) for a total cost estimated at $300 million ($1979), based on the study company's data. There was sufficient average excess capacity available during the season to kill and process significantly additional throughputs, Sheppard (1982).

If the industry could have had a 30% increase in throughputs (10,000,000 LE) the additional cost of killing and processing them would have been $33,600,000 ($1979) based on the study company's data. An additional increase of 4% in throughputs (in addition to the 10,000,000 LE) could have been killed and processed for $2,544,000 ($1979).

In accordance with these lower per unit costs, operating at consistently higher capacity utilizations could allow the industry to plan and coordinate production, mechanisation, staffing levels, further processing and marketing activities. This could also help to limit future increases in real killing and processing costs, increase returns to producers (through lower real charges) and ensure the export viability of the industry.

8.1 Size Of Freezing Works In New Zealand

One often suggested method to reduce costs in the meat industry is a change to smaller (one or two chain satellite works) highly mechanised processing plants, located closer to production points with fewer employees engaged in slaughtering and the further processing of meat during a longer season, New Zealand Freezing Companies Association (Inc.) (Anon.,1979) and various company submissions to the Meat Industry Meeting, Legislative Chamber, 1979.

To date, no published studies have calculated or estimated a short run average cost curve for a satellite works processing sheep and lambs. This study has only been concerned with a constant plant configuration; it has not sought to compare costs of different sized plants. Preliminary investigation by the company however, indicate the significant capital costs of a small satellite works completely negate any possible gains in processing efficiency that may be achieved over traditional sized works. It is thus not certain that satellite works with this described structure could maintain lower killing and processing costs than larger 3 or 5 chain traditional works.

Moreover, the construction of satellite works throughout New Zealand could (without substantial increases in stock numbers) have the following effects on the larger works:

1. It will be most difficult, through the increasing of throughputs, the adjusting of daily kills and the relaxing of fixed manning standards for the larger works to increase capacity utilization and thus to achieve greater economies of scale than at present.

2. As the smaller satellite works are constructed it would slowly decrease throughput flows into the larger works. The resulting lower capacity utilizations would increase average costs at the larger works with the likely outcome being an increase in their charges. Those producers unable to have their stock killed and processed at the satellite works would have to pay the higher charges.

3. The hygiene expenditure over the past decade at the larger works (a sunk cost, but one that would have to be repeated at all satellite works) would be nullified.

Any large works that did survive may do so on their level of equity and not on their relative current efficiency.

4. If the satellite works do have a lower cost structure however, an industry wide rationalization involving the closing of large works should occur. The cost of this rationalization could be justified as one way to ensure the viability of the New Zealand Meat Industry in the long run.

However, before extensive industry rationalization occurs, every effort should be made to discover the relative efficiencies and cost structures of the smaller works.

Further, any industry rationalization that does occur should be done under open, competitive conditions to ensure the maximum efficiency of the processor and minimum killing and processing costs for the producer.

8.2 Reducing The Capacity Of The New Zealand Freezing Industry

The importance of capacity utilization on costs has been stressed several times in this report. While considerable expansion of livestock numbers is technically feasible, recent marketing and policy developments in New Zealand suggest stock throughput numbers are unlikely to increase in the near future. Capacity utilization overall can thus only be improved by the closure of some freezing works, in particular those not exhibiting locational and operational efficiencies.

Theoretically, the greatest possible reduction in capacity would be made possible with an exactly even spread of kill over a longer season. The authors regard such an ideal kill pattern as unlikely, however, for reasons mentioned earlier in this report. The likely continued peak in the kill pattern suggests some excess capacity is inevitable.

While previous studies have indicated there is very high excess slaughtering capacity in the industry, this has not been borne out by the actions of companies. This would suggest that areas other than the slaughterboard have been nearer to capacity than generally appreciated.

If the observations made in preparing this report are valid generally, is is unlikely that significant reductions in industry capacities, given current technology and manning agreements, are going to eventuate. In the face of relatively unchanged capacity our conclusions in Chapter 7 may thus be pertiment for the industry as a whole. In particular the long-standing argument for a greater spread of the kill seems questionable.

8.3 Further Processing In New Zealand Freezing Works

Any increase in further processing with current levels of throughput should enable many overhead costs to be recovered and thus reduce total killing and processing costs. As argued in Section 7.5 peaking the kill would enable greater degrees of such further processing to occur.

8.4 An Optimal Strategy?

This study suggests that industry costs for killing and processing will be minimised with a somewhat reduced number of currently existing plants, each handling a throughput flow of considerable "peakedness" and in consequence being able to carry out maximum amounts of "further processing". This is in contrast to proponents for "even spreading of the kill" who would suggest a greater reduction of currently existing plants but not envisage as much "further processing" developing. Both arguments assume that existing plants are of optimal chain size and that greater transport costs do not offset the benefits of reducing plant numbers. Needless to say, further research needs to be carried out to examine the impact of lifting these two assumptions.

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