

A FINANCIAL AND ECONOMIC SURVEY OF
SOUTH AUCKLAND
TOWN MILK PRODUCERS AND FACTORY
SUPPLY DAIRY FARMERS
1983-84

R.G. Moffitt

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PREFACE

The town milk industry has been linked to returns in the factory supply industry for many years by a pricing formula. While the formula has been changed from time to time, it is basically designed to provide equity between these two groups of milk producers. It is difficult to maintain such equity given that the production systems are so different. For this reason it is useful to carry out an analysis of comparative returns from time to time. Such an analysis is particularly relevant at this time given the examination of the Town Milk industry by the IDC.

R G Lattimore
Director

SUMMARY

A survey sample of South Auckland town milk and factory supply dairy farms was undertaken early in 1985. The object was to compare the financial and economic differences between the two types of dairy farms in 1983/84. A further objective was to assess the increased costs of autumn and winter milk production which have to be met on a town milk farm.

In the 1983/84 year the 29 town milk farms and 18 factory dairy farms had a similar average dairy productive area. Total labour units on the two average farms were similar although higher wages were paid on town supply farms.

A number of comparisons of output between the two farm systems are made but while there are many similarities between the two dairy farming enterprises, the day-to-day management of resources on each farm is different. This imposes difficulties when comparing some physical measures of output.

Over 12 months both average farms produced a similar quantity of milk. The actual butterfat produced on the average factory supply farm for the year was 19,757 kilograms or 320 kilograms per productive hectare. If the total litres on the town milk farm is converted to milkfat at a 4.28 per cent test, the annual total would be 16,854 kilograms (278 kilograms per productive hectare). The stocking rate on a town milk farm is low. All year-round milking demands careful pasture management including the setting aside of land for hay and silage production. In December 1983 the average number of milking cows was 85.17 on a town milk farm compared with 131.06 on a similar size factory supply farm.

Both average dairy farms grew and purchased a variety of supplementary feed. The total hay bale equivalents of supplementary feed on the average town milk farm was 4,994 bales. The factory supply farmer relies on pasture for most of his milking herds feed requirements and needs only half the supplementary feed.

Total assets were 65 per cent higher on a town milk farm with the value of freehold land (at \$10,918 per hectare) causing most of the difference. Land on the average factory supply farm was valued at \$5,098 per hectare.

A higher payment per litre for milk produced was received by the average town milk producer (22.41 cents per litre compared with 17.88 cents per litre). However the \$14,353 advantage in gross revenue was eroded by the \$19,653 higher total expenditure. Some of the main town milk farm costs contributing to this expenditure difference were feed, interest payments, rent and net depreciation.

The average town milk farm received a net farm income of \$25,191. This was 21 per cent (or \$5,300) less than that of the average factory supply farm (\$30,491).

It is difficult to compare two different types of dairy farms which have different objectives and receive a different payout per litre of milk. However, some comparisons of economic profitability such as return on capital (3.27 per cent for town milk farms and 4.11 per cent for factory supply farms) and a capital turnover percentage (21.32 per cent - town milk and 17.69 per cent - factory supply) have been made. Other financial ratios have also been calculated in the final chapter.

CHAPTER 1

BACKGROUND

1.1 Purpose of this Study

In late 1984 the Town Milk Producers' Federation of NZ (Inc) along with the NZ Milk Board commissioned the Agricultural Economics Research Unit to undertake a financial and economic survey of a sample of South Auckland town milk and factory supply dairy farms. The purpose of the study was to enable an accurate financial comparison to be made of the two types of dairy production in the one district. A further objective of the study was to continue the investigation into the costs of autumn and winter milk production in this district. The year before a preliminary study had been undertaken of 29 South Auckland town milk farms.¹

Whilst the financial performance of the two dairy systems can be compared it is more difficult to evaluate the management of the physical resources. Both dairy farming systems share many similar features but the day to day management of the productive assets of each farming system is different. The objectives of the two types of farming are not the same. One farmer must stagger his calving pattern and supplementary feed needs to maintain a continual daily milk production while the other arranges all his calving for the spring and his production follows the pasture growth curve.

In the final chapter this problem is discussed and a number of measures of comparative economic profitability are calculated.

1.2 Producer Prices ²

Because the annual balance dates of the NZ Milk Board (August), the NZ Dairy Board (May) and most dairy farmers (see Table 1) do not correspond, the calculation of the farmers 1983-84 producer prices extend over at least two years. In 1983-84 the price received by town milk producers (Table 2) was further influenced by the previous years continuing wage and price freeze.

Until the August 1982-83 year there had been no change in the basic method of fixing the town milk producer price. It had been linked to the average manufacturing price for whole milk. An increase in price of one per cent per kilogram of milkfat resulted in an increase of 0.06 cents per litre in the town milk producer price.

1 A Survey of the Costs of Producing Autumn & Winter Milk on Some South Auckland Town Supply Farms. R G Moffitt, Agricultural Economics Research Unit, unpublished, May 1984.

2 NZ Milk Board 30th and 31st Annual Reports, 1983 and 1984

TABLE 1

Balance Dates of South Auckland Farmer's
Annual Accounts 1983-84

	South Auckland Town Milk Farms	South Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Month Ending:	%	%
March	69	39
April	3.5	0
May	17	44
June	7	17
August	3.5	0
Total	100	100

In June 1983 the Dairy Board announced an advance end-of-season surplus payment for the 1982-83 season. This brought the average farm gate value for the season up from 333.48 cents to 360 cents per kilogram of milkfat. Traditionally this increase would have been wholly translated into the town milk producer price. However, because of the wage and price freeze, and the fact that town milk producers were essentially servicing the domestic market, Government ruled that for the remainder of the freeze and until 29 February 1984, town milk producer prices were restricted to the maximum approved for the 1981-82 year. These were based on an average farm gate value of 333.48 cents per kilogram of milkfat for wholemilk. After taking into account adjustments for variations in collection costs, the town milk supplier received 1.8102 cents per litre less for the August 1982-83 year than if the traditional price link had applied.

TABLE 2

National Average Town Milk Producer Prices

Year Commencing 1 September	Finest Grade Final Price (cents per litre)
1980	18.7347
1981	22.9593
1982	22.9593
1983 (To 29 February 1984)	23.4303
1983 (1 March to 31 Aug 1984)	24.0405

For the period 1 September 1983 to 29 February 1984 the initial town milk producer price was based on the manufacturing price of 333.48 cents per kilogram of milkfat. However Government later allowed an end-of-season surplus payout of 10 cents per kilogram of milkfat to be translated into the town milk price for the year. The final 1983/84 town milk price was based on farm gate values of 343.48 cents per kilogram of milkfat for the period September 1983/ February 1984, and 350 cents per kilogram for the March/August 1984 period (Table 2).

1.3 The Sample

The sampling unit for the survey was the farm, and the main sources of information the farmer and his annual farm accounts.

The survey area was in the South Auckland area, south of Manurewa to Pokeno. Most of the surveyed town milk farms were in the Karaka, Drury & Paerata districts. The factory supply dairy farms were mostly in three districts Manukau Peninsula, Aka Aka and Paparimu.

To be eligible for selection the following criteria needed to be met:

- (i) The farm engaged no sharemilker
- (ii) The farm received at least 75 per cent of gross revenue from milk sales and related dairy activity.

From previous town milk farmer surveys and information received from the producer company secretaries, details on the number of eligible South Auckland town milk producers was known. Information on the number of eligible factory supply dairy farmers was not as detailed but discussions with producer company executives did help define the eligible population (Table 3).

TABLE 3

South Auckland Dairy FarmPopulation and Sample Numbers 1983-84

	South Auckland Town Milk Farms	South Auckland Factory Supply Dairy Farms
Total Number of Dairy Farms	261	359
Number of Farms with Sharemilkers	119	118
Number of Farms with Less than 75% of Revenue from Dairy Activities	43	61 ^a
Number of Farms Eligible to Survey	99	180
Number of Farms Surveyed	29	18

a The estimated number of farms with less than 75% of revenue from dairy activities for the factory supply farms was based on the known proportion for the town milk farms.

A random sample was selected and farmers contacted by mail. Provided that the farm was found to be eligible and the farmer agreed to participate in the survey, a farm visit was undertaken. Where farms were found to be ineligible further replacement farmers were contacted until sufficient numbers were obtained.

CHAPTER 2

PHYSICAL AND PRODUCTION DATA

2.1 Farm Area

Table 4 compares the farm area of the two South Auckland dairy farm types, town milk farms and factory supply dairy farms.

The dairy productive area for both average farms was similar (60.59 ha for the average town supply farm and 61.68 ha for the average factory supply farm) although the total area, unproductive area and non-dairying land area was different. In total freehold area the factory supply farm had over 21 per cent more land at 69.87 hectares. The town milk farm however rented more land (9.04 ha compared with 3.15 ha).

TABLE 4

Average Areas of Town Milk & Factory Supply Dairy Farms

Area per Farm	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of farms surveyed	29	18
	<u>ha</u>	<u>ha</u>
Freehold Area	57.63	69.87
Crown & Maori Lease	0.28	0.10
Rented Area	9.04	3.15
Total Farm Area	66.95	73.12
Less Unproductive Area	3.28	7.00
Productive Area	63.67	66.12
Less Estimated Non-Dairying Area	4.95	6.38
Plus Estimated "Grazing Out" Area	1.87	1.94
Estimated Dairy Productive Area Utilised for Milk Production ^a	60.59	61.68

a Hereafter abbreviated to dairy productive hectares.

There was substantially more land which was classed as unproductive and non-dairying on the average factory supply farm (13.38 ha) compared with the town supply farm (8.23 ha). This probably reflects both the location of the town supply farms (with their higher land values, interest and rate payments) and the need to maintain continual milk production all year. This encourages the farmer to keep his unproductive and non-dairying land area to a minimum.

TABLE 5

Run-Off Area ^a

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Number of Farms with a Run-off Area	21	8
- Run-off Area (ha)	17.5	23.6
- Distance from Home Farm to Run-Off (km)	7	4

a The average for these results is calculated according to the number of practising farms.

Nearly three in every four town milk farmers have a run-off area where young stock and dry cows graze (Table 5). Fewer factory supply farms have land used as a run-off (44.4 per cent) but the area (23.6 hectares) is greater than that on a town milk farm (17.5 hectares).

The run-off area is closer to the farm on a factory supply farm (4 km) compared with the town milk farm (7km). The high value and more intensive farming of land around the town milk farms help force the latter farmer further away to find suitable land for a run-off.

2.2 Labour

Total labour units on a town supply farm were marginally higher (1.87 units) than on a factory supply dairy farm (1.78 units - Table 6). There was no marked difference in the composition of labour for the two average farms. A similar proportion of both permanent labour and family labour was used.

Most farmers thought they worked similar hours to their farm neighbours. It is likely that the dairy milking tasks of town milk farmers during the winter months result in longer hours being worked over this period than do factory supply farmers. On a factory supply farm the winter months are the usual time to catch up on maintenance and repairs to equipment.

TABLE 6

Types of Labour Units

Type of Labour	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Farmer	0.94	0.99
Permanent Family	0.41	0.37
Casual Family	0.06	0.01
Total Family Labour Units	1.41	1.37
Permanent Non-Family	0.38	0.39
Casual Non-Family	0.08	0.02
Total Non-Family Labour Units	0.46	0.41
Total Labour Units	1.87	1.78
Proportion of Permanent Labour	93%	98%
Proportion of Family Labour	75%	77%

Table 7 lists details of wages paid and the years of experience of non-family adult workers employed on these dairy farms. Higher wages were paid on the six town milk farms which employed a permanent non-family adult worker. This was an average of \$14,215 per year compared with \$10,600 per year on the three factory supply farms. The average dairy experience of these farm employees was less (2.8 years) on the town milk farms compared with the other dairy farms (5.8 years).

TABLE 7

Non-Family Adult Worker, Annual Wage Paid
and Years of Experience ^a

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Number of Farms with a Non-Family Adult Worker Employed All Year	6	3
- Annual Average Wage Paid	\$ 14,215	\$ 10,600
- Previous Years of Dairy Experience	2.8	5.8

^a The average for these results is calculated according to the number of practising farms.

Town milk farmers appear to pay higher wages to farm employees. This may be because of the competition from nearby industry in the southern Auckland suburbs. There is also a problem of high labour turnover on these farms. Some of the town milk farmers have built extra employee accommodation on their farm but they have found it very difficult to obtain reliable labour prepared to work the longer hours. They often choose to run the farm without any outside assistance.

TABLE 8

Farmer's Age, Years of Management Control and Number of Dependants		
	S. Auckland Town Milk Farms	S. Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Age of Farmer (principal decision-maker)	48	45
Number of Years of Management Control	22	17
Number of Dependants (including wife)	2.7	2.3

2.3 The Farmer

The average age of the farmers (Table 8) on the two types of dairy farms was very similar (48 years and 45 years). The town milk farmer has 2.7 dependants (including his wife) and has had management control of his farm for 22 years. The average factory supply farmer has 2.3 dependants and has had control of his farm for the last 17 years since he was 28 years old.

2.4 Milk Production

In this section a number of comparisons of output between the two farm systems are made. It should be remembered that while there are many similarities between the two dairy farming enterprises, the day-to-day management of resources on each farm is different. This imposes difficulties when comparing some physical measures of output (Table 9).

TABLE 9

Milk Production

Milk Production per Farm	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Dairy Productive Hectares (ha)	60.59	61.68
Town Milk Daily Quota (1)	639	
Town Milk Production Sold at Quota Prices (1)	257,392	
Town Milk Production Sold at Surplus Prices (1)	136,392	
Total Litres Produced (1)	393,784	398,449
Total kgs of Milkfat (kg) (Town milk litres converted to 4.28 % ^a Milkfat & actual factory supply kgs)	16,854	19,757
Kg Milkfat per Dairy Prod. Ha (kg)	278	320
Kg Milkfat per December Milking Cow (kg)	198	151
Average No. Milking Cows in June 1983 (No.)	76.78	0.13
Average No. Milking Cows in December 1983 (No.)	85.17	131.06
Number of December Milking Cows per Dairy Productive Ha. (No.)	1.41	2.12
Total Litres of Milk Produced in June 1983 (1)	27,090	17
Total Litres of Milk Produced in December 1983 (1)	37,072	47,764
Total Stock Units/Farm (No.)	941	1,028
Stock Units/Dairy Prod. ha (No.)	15.5	16.7
Litres/Dairy Prod. ha (1)	6,499	6,460

^a The average milk fat test for the 1983-84 Auckland town milk producers was 4.28 per cent.

Over 12 months both average farms produced a similar quantity of milk from a similar dairy productive area (Table 9). The town milk average farm produced 393,784 litres from 60.59 hectares or 6,499 litres per dairy productive hectare. The average factory supply dairy farm produced 398,449 litres from 61.68 hectares. This was 6,460 litres per dairy productive hectare.

Monthly production (Table 10) on the town supply farm was continuous. It varied from a low of 25,697 litres in April (from 79.35 cows), to a high of 39,643 litres in October (from 85.72 cows). Monthly production on the factory supply farm showed marked variation from virtually nothing in June to a peak of 55,424 litres in October (from 132.11 cows). A graphical representation of monthly production appears in Figure 1.

If the total litres on the town milk farm is converted to milkfat at a 4.28 per cent test, the total for the year would be 16,854 kilograms. The 4.28 per cent test was the average test for the Auckland town milk producers in 1983/84.³ The actual production on the average factory supply farm was 19,757 kilograms. To convert to the same quantity of milkfat as the factory supply farm, the average fat test for the town milk farm would have to increase from 4.28 per cent to a high 5.017 per cent.

In December the average number of milking cows numbered 85.17 on the town milk farm and 131.06 on the other average dairy farm - a 54 per cent increase. In other words if a town milk farmer in this district on 60.59 hectares of dairy productive land gave up his town milk quota to produce factory supply milkfat he could expect to increase his milking herd in December by 54 per cent.

The town milk farmer has a lower stocking rate in milking cows per productive hectare (1.41 compared with 2.12) because of the need to shut up more pasture for silage and hay production. The management of available pasture resources is more critical on a town milk farm in order to maintain continual milk production. Rainfall records indicate that late summer and autumn droughts in this region are not uncommon⁴ with town milk farmers feeding out silage as early as January. Fresh milking stock which need high feeding levels for optimum milk production early in their lactation, are regularly being introduced into the herd.

On a factory supply farm the maximum production of 13.53 litres per cow per day occurs in October (on town milk farms it reaches 15.19 litres in October) and by December production is starting to fall (at 11.76 litres per cow per day). Unlike the town supply herd, feed management after December is not as critical. Already about half the years milk has been collected and the cows milk response to extra nutrition is very limited. After January providing factory supply milking stock with excess feed cannot lead to a proportional increase in milk production.

3 Pers. comm. Viljoen, P.T. and Blackiston, R.P. (1985)

4 A Survey of the Costs of Producing Autumn and Winter Milk on Some South Auckland Town Supply Farms; R G Moffitt, AERU, unpublished, May 1984, p.7.

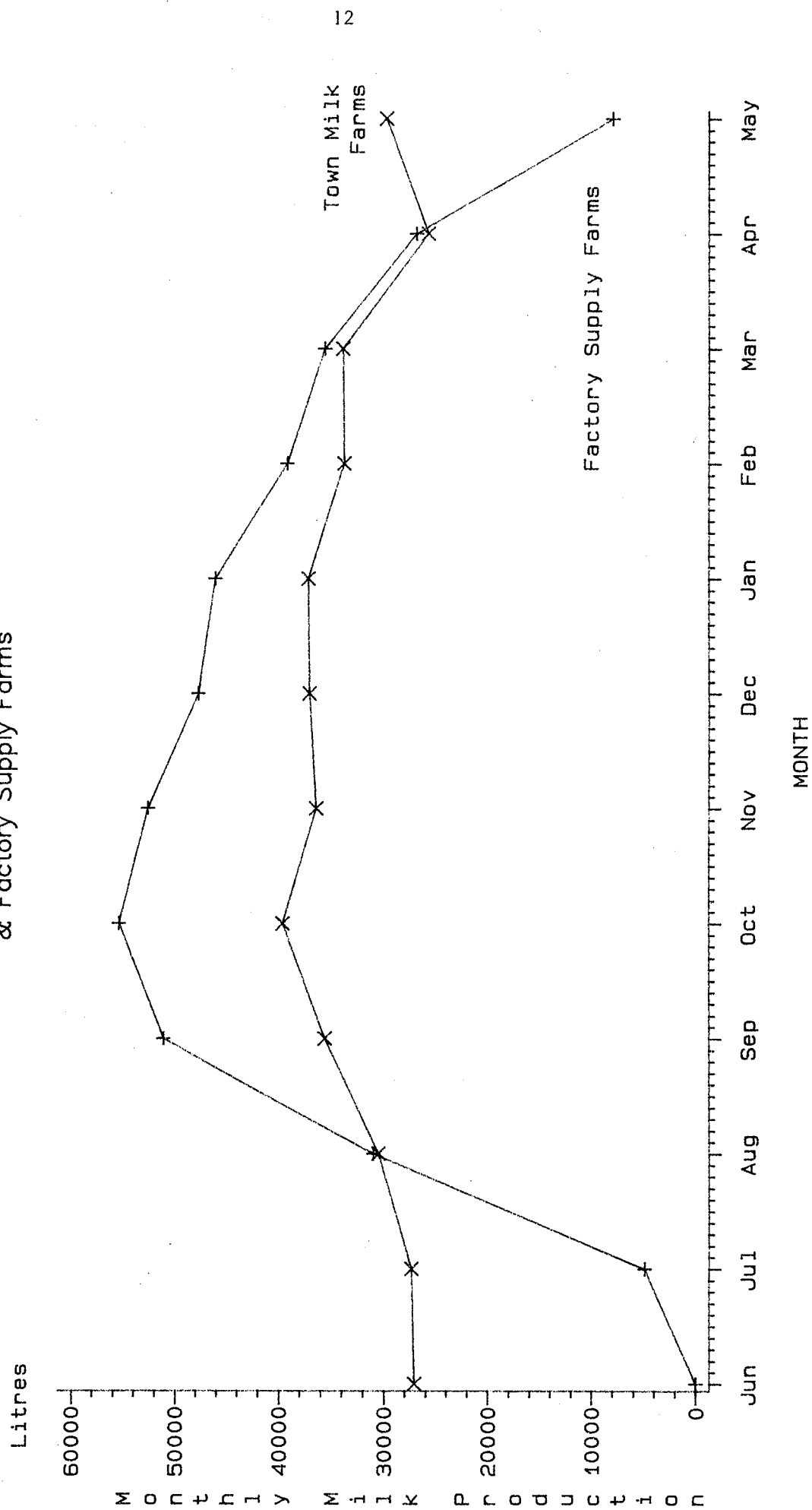
TABLE 10

Monthly Milk Production & Number of Milking Cows

		S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed		29	18
June 1983	Cows Milked	76.78	0.13
	Litres	27,090	17
July	Cows Milked	75.10	36.22
	Litres	27,325	4,880
August	Cows Milked	76.31	97.33
	Litres	30,486	31,002
September	Cows Milked	79.86	127.78
	Litres	35,574	51,122
October	Cows Milked	84.17	132.11
	Litres	39,643	55,424
November	Cows Milked	85.72	131.83
	Litres	36,422	52,633
December	Cows Milked	85.17	131.06
	Litres	37,072	47,764
Jan 1984	Cows Milked	81.76	130.33
	Litres	37,172	46,131
February	Cows Milked	80.14	128.44
	Litres	33,768	39,198
March	Cows Milked	79.24	126.28
	Litres	33,879	35,605
April	Cows Milked	79.35	111.77
	Litres	25,697	26,809
May	Cows Milked	79.12	59.23
	Litres	29,656	7,864
Total Litres for 12 Months		393,784	398,449

FIGURE 1

Monthly Average Milk Production For Town Milk
& Factory Supply Farms



2.5 Supplementary Feed Use

Tables 11 and 12 have details of the range and quantity of supplementary feed produced on the two types of farm.

The town milk producer closes off from grazing some of his farm in the late spring and early summer. This saved pasture is cut for hay and silage for later feeding out to the milking herd during the autumn droughts and cold winters when pasture growth is very slow.

TABLE 11

Supplementary Feed Use

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Total Litres Produced	393,784	398,449
Litres Converted to Milkfat & Actual Factory Supply (kgs)	16,578	19,757
Cows in Milk in December 1983	85.17	131.06
Dairy Productive Hectares	60.59	61.68
Home Grown Bales of Hay	1,784	1,252
Purchased Bales of Hay	469	529
	2,253	1,781
Tonnes of Silage Made (assessed at 15 tonnes per hectare)	261	71
Tonnes of Dairy Meal Purchased (includes calf feed)	6.62	1.13
Hectares of Greenfeed Drilled	0.74	0.56

In South Auckland the town milk producer made and purchased a total of 2253 bales of hay and made 261 tonnes of silage. He also purchased 6.62 tonnes of a dairy meal or bran ration and grew 0.74 hectares of greenfeed. The total hay bale equivalents of all this supplementary feed was 4,994 bales.

The factory supply farmer relies on pasture growth for most of his milking herds nutritional needs although as the soil water deficit develops and temperatures rise in the late summer and autumn some supplementary feed (usually silage) is fed to the milking herd. The total hay bale equivalents on the average factory supply farm at 2,607 bales was nearly half that of the town milk producer. Much of this conserved feed is fed out to the dry cows in the winter and leading up to calving.

TABLE 12

Supplementary Feed Converted to Dry Matter
and Hay Bale Equivalents

	S. Auckland Town Milk Farms	S. Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Total Bales of Hay (grown & purchased)	2,253	1,781
Dry Matter (kg)	51,706	40,874
Hay Bale Equivalents	(2,253)	(1,781)
Pasture Silage (Tonnes)	261	71
Dry Matter (kg)	52,200	14,200
Hay Bale Equivalents	(2,275)	(619)
Dairy Meal or Bran (Tonnes)	6.62	1.13
Dry matter (kg)	5,693	972
Hay Bale Equivalents	(248)	(42)
Greenfeed or Turnips (Ha)	0.74	0.56
Dry Matter (kg)	4,995	3,780
Hay Bale Equivalents	(218)	(165)
Total Dry Matter (kg)	----- 114,594 -----	----- 59,826 -----
Total Hay Bale Equivalents	----- (4,994) -----	----- (2,607) -----

Among the 29 surveyed town milk farms all but one made hay and a similar number made silage. While hay making was common on the factory supply farm (15 out of 18 farms) silage making was less common (10 out of 18 farms).

The 1.13 tonnes of dairy meal or bran listed for the average factory supply farm was made up solely of calf meal. Nearly half of the town milk producers purchased dairy meal or bran. The average quantity purchased was 14.77 tonnes and most was fed during the autumn and winter months.

CHAPTER 3

FINANCIAL DATA

3.1 Capital Structure

Total assets on the average town milk farm at \$737,787 were 65 per cent higher compared with the other dairy farm (Table 13). The major single item making up this difference was freehold land (re-valued to 31.12.1983). The average value of town milk farm land from the 29 farms surveyed was \$10,918 per hectare. This high value is a reflection of the proximity to the Auckland motorway and the increasing demand for horticultural land. On the more isolated factory supply dairy farms freehold land was worth \$5,098 per hectare.

Housing and farm buildings on the town milk farm were valued at \$45,559. This was 30 per cent higher than buildings on a factory supply farm. Farm vehicles were also higher in value on a town supply farm (\$19,836 compared with \$14,935). Dairy stock values however were lower (\$18,061 compared with \$21,012) and this would be due to the fewer stock and lower stocking rate.

On the town milk farm current liabilities were more than twice that of the other dairy farm (\$16,221 and \$7,147). Milk production must be maintained all year and the costs of supplementary feed conservation are high during the summer months. Some of the difference in liabilities may also be due to the different balance dates of the farmers annual accounts. Most townmilk farmers balance in March whereas most factory supply farmers balance in May or June. Creditors accounts for summer work and other summer expenses may not have been paid by March on the town milk farm but paid by May or June on the factory supply farm. The factory supply farm also receives many end-of-season and retrospective payments in the autumn when his costs of milk production are falling and this money could be used to reduce both his overdraft and the number of creditors.

The town milk farm has higher total fixed liabilities compared with the factory supply farm (\$110,955 and \$78,370). The most common source of funds on the town supply farm is from a family mortgage whereas the rural bank is the major lender to factory supply dairy farms. Equity is almost 70 per cent higher on a town milk farm compared with the factory supply farm.

3.2 Gross Revenue

Table 14 lists the gross revenue components and Table 15 has details for the milk sales of the average town milk farm.

Total gross revenue at \$102,949 was 16.2 per cent higher on the town supply farm compared with the factory supply farm (\$88,596). The most significant difference was milk sales which was 23.9 per cent greater than factory supply. Milk sales make up 85.7 per cent of all revenue on the town milk farm and 80.4 per cent on the other farm. On a factory supply farm livestock profit and contracting fees contribute more to revenue than they do on a town milk farm.

TABLE 13

Capital Structure - Value of all Assets and Liabilities

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Total Litres Produced	393,784	398,449
Litres Converted to Milkfat (kgs)	16,578	19,757
Cows in Milk in December 1983	85.17	131.06
Dairy Productive Hectares	60.59	61.68
<u>Assets</u>	<u>\$</u>	<u>\$</u>
Freehold Land (valued at 31.12.1983)	629,196	356,196
Farmers House (1/2)	21,314	18,588
Other Farm Houses	9,183	3,439
Farm Buildings	15,062	13,059
Plant & Equipment	8,351	6,387
Farm Vehicles	19,836	14,935
Dairy Stock	18,061	21,012
Other Stock	377	720
Company Shares	1,398	1,630
Total Farm Assets	722,778	435,966
Cash at Bank	7,524	5,916
Sundry Debtors	6,991	4,082
Other Current Assets	494	637
Total All Assets	737,787	446,601

Table 13 continued over page ...

TABLE 13 cont'd

Capital Structure - Value of All Assets and Liabilities

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
<u>Current Liabilities</u>	\$	\$
Bank Overdraft	7,345	4,345
Sundry Creditors	6,993	2,524
Other Current Liabilities	1,883	278
<u>Total Current Liabilities</u>	<u>16,221</u>	<u>7,147</u>
<u>Fixed Liabilities</u>		
Rural Bank Mortgages	27,363	40,720
Trading Bank Mortgages	3,028	6,379
Building Society Mortgages	1,511	956
Insurance Company Loans	6,780	7,297
Stock Firm Loans	0	87
Finance Co Loans	1,265	506
Solicitors Loans	18,276	12,141
Family Mortgages	52,605	8,589
Other Liabilities	127	1,695
<u>Total Fixed Liabilities</u>	<u>110,955</u>	<u>78,370</u>
<u>Total All Liabilities</u>	<u>127,176</u>	<u>85,517</u>
Equity	610,611	361,084
<u>Total</u>	<u>737,787</u>	<u>446,601</u>

Milk sales per litre of milk produced for the two farms averaged 22.41177 cents per litre on town milk farms and 17.87606 cents per litre on the other dairy farm, a difference of 4.5357 cents.

TABLE 14

Gross Revenue Components

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Total Litres Produced	393,784	398,449
Litres Converted to Milkfat (kgs)	16,578	19,757
Cows in Milk in December 1983	85.17	131.06
Dairy Productive Hectares	60.59	61.68
	\$	\$
Milk Sales	88,254	71,227
Produce Sold	130	145
Wool & Skins Sold	25	159
Contracting Fees	114	1,077
Rent & Lease Fees	977	690
Employee's House	422	97
Livestock Profit		
- Dairy	10,752	12,479
- Other Stock	577	470
Other Revenue	1,698	2,252
Gross Revenue	102,949	88,596
(Standard Deviation)	(40,743)	(32,139)

The standard deviation is an important measure of the dispersion of the data about the mean. The more dispersion there is in a body of data the bigger the standard deviation. Given this value it is possible to calculate the percentage in the sample that falls within 1, 2 or 3 standard deviations of the sample mean. Within plus or minus one standard deviation of the mean lie 68.3 per cent of the sample, 95.4 per cent lie within ± 2 standard deviations and 99.7 per cent lie within ± 3 standard deviations. Other statistics are listed in the Appendix.

The town milk farmer received a higher quota milk price for 65.36 per cent of his milk. If this proportion was also the same for his end-of-season, retrospective and other payments which totalled \$9,831 then his average payment per litre for quota milk was 25.4196 cents per litre. His payment for surplus milk (after adding in the proportion of end-of-season and other payments of \$3,405) was 16.7173 cents per litre. The major reason for the difference between the per litre payout for surplus milk (16.7173 cents) and the payout received by the factory supply farmers (17.87606 cents) was due to the different annual balance dates of the two farm types. The later the farmer balances the more likely he is to receive the final end-of-season and retrospective payments.

TABLE 15

Types of Milk Payments Received by South Auckland Town Milk Farmers

	South Auckland Town Milk Farms
Number of Farms Surveyed	29
Town Milk Production Sold at Quota Prices	257,392 litres
Cash Received for Quota Milk	\$ 59,002
Town Milk Production Sold at Surplus Prices	136,392 litres
Cash Received for Surplus Milk	\$ 19,396
Surplus Milk Converted to kgs Milkfat (at 4.21 % test)	5,742 kgs
Special Allowances Received	\$ 90
Penalties Paid	\$ -65
Farm Chilling Allowances	0
End of Season, Retrospective and Other Payments	\$ 9,831
Total Milk Payments Received (Milk Sales)	\$ 88,254

3.3 Expenditure

On the South Auckland town supply farm operating expenses totalled \$38,962 or \$6,837 more than comparable expenses from the other dairy farm type. Feed expenses made up more than half of this difference, followed by repairs and maintenance, vehicle expenses and fertiliser and seed.

As noted earlier the town milk farmer has to produce around twice as much supplementary feed compared with his factory supply dairy neighbour. The cost of feed (which usually includes contract haybaling and silage making costs) was 280.4% greater on a town supply farm. In addition the town milk farmer has higher labour costs (\$11,215 compared with \$7,852). The total of 1.87 labour units employed on a town milk farm were only 5.1% greater than on a factory supply dairy farm (1.78) but the proximity to Auckland's industrial suburbs may help to explain the Karaka district town milk farm's wage payments.

The need to continue milking for the extra three months during the cold winter period results in an increase in electricity costs (up 36.9 per cent). This increase is due to the extra water heating and lighting needs in the dairy shed during the winter.

The increase of other major expenses (eg. repairs and maintenance - up 24.9 per cent, and vehicle expenses - up 20.7 per cent) are due to the need to maintain a daily milk quota throughout the year. In order to ensure a continuous supply of milk the farmer has to maintain his equipment and vehicle resources. Unlike the factory supply dairy farmer he is unable to put aside some repairs until the winter season when the cows are dry.

After labour expenses the single largest operating expense was fertiliser and seed for both farm types. The town milk farmer spent nearly 15 per cent more on fertiliser and seed to help promote grass growth for as many months as possible.

Freight costs on the average town milk farm were very low. They were only 34.3 per cent of the average factory supply farms. This reflects the greater distance and diverse location of the surveyed factory supply farms. Nearly all of the 29 surveyed town milk farms were in the same Karaka - North Paerata district.

All administration expenses were higher on the town milk farm although the total - \$2654 - was only \$878 greater than that on the factory supply farm.

All overhead expenses were also higher on the town milk farm. The overhead total of \$18,329 was \$6,774 more than the total for the factory supply farm. The amount of rent paid by the town milk farm (\$2,203) was considerably greater than that paid by the factory supply farm (\$150). A common management practise on 21 of the 29 surveyed town milk farms was to rent land for use as a run-off for young and dry stock. This helps preserve the home farm grass for the milking cows. The average town milk farmer rented and leased 9.32 hectares compared with 3.25 hectares rented and leased by the factory supply farmer. The rental charge for land close to the Karaka district was higher than land further distant.

For both farm types interest payments made up the largest single overhead expense. The value of freehold farm land (updated to 31.12.1983) was \$10,918 per hectare on the average town milk farm and \$5,098 per hectare on the factory supply dairy farm. Interest payments totalled \$12,280 (or \$213 per freehold hectare) on the town milk farm and \$9,269 (or \$133 per freehold hectare) on the other dairy farm. The high value of land in the town milk supply area reflects the proximity of the motorway to Auckland and alternative land use activities such as horticulture.

The average town milk farm has \$73,746 invested in buildings, vehicles and plant and machinery. This is over 30 per cent more than the average factory supply farm. The town milk farmer has more money invested in these resources to help maintain year round milk production. The higher net depreciation reflects this higher investment.

Total expenses on the town milk farm was \$77,758 and this was \$19,653 greater than the total for the other dairy farm type. The main items contributing to this \$19,653 difference were feed (\$3,708 difference), interest (\$3,011), rent (\$2,053), net depreciation (\$1,801), non-family paid labour (\$1,718), repairs and maintenance (\$1,539) and rates (\$1,271 difference). Many of these costs are high solely because of the need to continue milk production during the winter months.

The high value of some of these costs, notably interest and rates are due to the location of the town milk farms. Nearly all town milk is produced on farms located on very high value land.

TABLE 16

Farm Expenditure Components

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Total Litres Produced	393,784	398,449
Litres Converted to Milkfat (kgs)	16,578	19,757
Cows in Milk in December 1983	85.17	131.06
Dairy Productive Hectares	60.59	61.68
<u>Labour</u>	\$	\$
Family Labour	1,769	1,175
Family Casual Labour	480	49
Non-Family Permanent & Casual Labour	5,798	4,080
Unpaid Family Labour	2,653	2,451
Labour Accommodation	515	97
Sub-Total Labour	11,215	7,852
<u>Operating</u>		
Animal Health	1,985	2,160
Breeding & Herd Testing	1,207	1,499
Contractors	1,118	1,334
Dairy Shed Expenses	1,903	1,915
Electricity	2,045	1,494
Fertiliser & Seed	7,901	6,891
Feed	5,763	2,055
Grazing Expenses	1,024	955
Freight	260	757
Weed & Pest Expenses	634	752
Vehicle Expenses	7,388	6,121
Repairs & Maintenance	7,731	6,192
Irrigation Expenses	3	0
Sub-Total Operating	38,962	32,125

Table 16 continued ...

TABLE 16 cont'd

Farm Expenditure Components

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
<u>Administration</u>	\$	\$
Accountancy	860	641
Telephone	687	431
General Administration	1,107	704
Sub-Total Administration	2,654	1,776
<u>Overheads</u>		
Insurance	1,336	897
Interest	12,280	9,269
Rates	2,510	1,239
Rent	2,203	150
Sub-total Overheads	18,329	11,555
Total Cash Expenses	71,160	53,308
Net Depreciation	6,598	4,797
Total Expenditure (standard deviation)	77,758 (34,126)	58,105 (20,347)

3.4 Net Farm Income

The average town milk farm received a net farm income (financial basis) of \$25,191. This was nearly 18 per cent (or \$5,300) less than the net farm income received by the average factory supply farm (\$30,491). Total revenue on the town milk farm was up by 16.2 per cent compared with the other farm but total expenses were also up by a more substantial 33.8 per cent. There was a \$14,353 difference in total revenue and a larger \$19,653 difference in total expenses (Table 17).

For his 257,392 litres of quota milk the town milk farmer received a total payment of \$65,428 (\$59,002 plus 65.36 per cent of the end-of-season payments of \$9,831). This is 25.4196 cents per litre or 593.92 cents per kilogram. The surplus milk returned 16.7173 cents per litre or 390.59 cents per kilogram. The factory supply producer received 17.8761 cents per litre or 360.51 cents per kilogram. The surplus milk per kilogram payout was higher for some town milk supply farmers in South Auckland because an extra premium was paid for town milk surplus milk which was used for the manufacture of cultured dairy foods.

TABLE 17

Net Farm Income Components

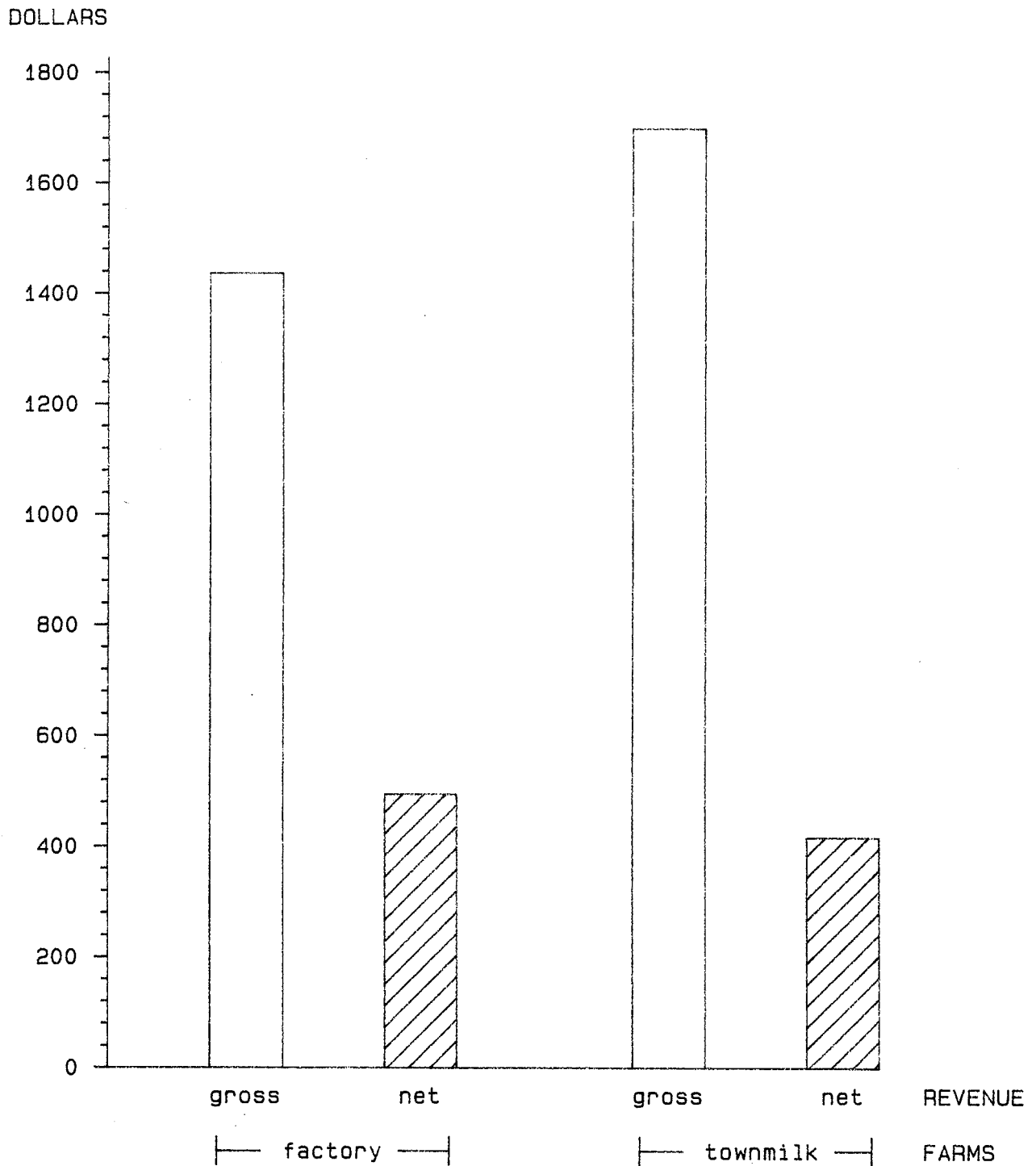
	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Total Litres Produced	393,784	398,449
Litres Converted to Milkfat (kgs)	16,578	19,757
Cows in Milk in December 1983	85.17	131.06
Dairy Productive Hectares	60.59	61.68
	\$	\$
Gross Revenue	\$102,949	\$88,596
Total Expenditure	77,758	58,105
Net Farm Income (standard deviation)	25,191 (15,977)	30,491 (17,445)
	\$	\$
Net Farm Income per Stock Unit	26.8	29.7
Net Farm Income per Dairy Productive Hectare	416	494
Net Farm Income per December Milking Cow	296	233

In June 1983 during the price freeze town milk producers were denied an advance end-of-season surplus payment of 1.8102 cents per litre. The freeze applied until 29 February 1984. Had this payment been made and providing expenditure remained the same, then net farm incomes for the two farm types would have been closer. If this increase is applied to quota milk only then revenue (and the net farm income) would have increased by \$4,659.

Had the town milk producer received an increase of one cent per litre above his average quota milk price of 25.4196 cents per litre then the result would have been an increase in total revenue of \$2,574. For the town milk farmer to have received the same net farm income as the factory supply farmer (\$30,491) his average payment for his 257,392 litres of quota milk would have had to increase from 25.4196 cents per litre to 27.4787 cents (up 2.0591 cents or 8.1 per cent).

FIGURE 2

Gross Revenue and Net Farm Income
Per Dairy Productive Hectare



A COMPARISON OF ECONOMIC PROFITABILITY

4.1 Introduction

When comparing two different types of dairy farm businesses, which have different objectives and receive a different payout per litre of milk, financial profits are not a reliable indicator of relative economic performance. Profits per cow or net income per hectare are more useful measures when evaluating the performance between farms engaged in the same farming activity. Other useful physical efficiency ratios such as milk production per hectare or milk production per cow can also be calculated. However it is important to recognise that maximizing a physical efficiency ratio is not necessarily consistent with economic efficiency. For example, production per cow can be enhanced if extra dairy meal is fed. To permit comparisons across different types (and sizes) of farm businesses, different financial ratios, such as the rate of return on capital can be applied.

It is important to note that the ratios derived from farm business accounts are all measures of average performance and give no indication of marginal efficiency. The marginal efficiency is a measure of what happens to the value of output (for example milk production) when extra or fewer units of a resource are used. For example, while output per man on a two man farm may be \$50,000, there is no guarantee that, by engaging a third man, output will increase by a further \$50,000. The last unit of any factor employed (in this case the third man) is termed the marginal unit, and the increase in the value of output, which results from engaging the marginal unit of the resource is called its marginal value product.⁵ An efficient farmer assesses the allocation of his marginal variable inputs rather than his average performance to achieve his maximum output.

In Table 18 three different measures of economic profitability are assessed. The calculations are similar to those published in the NZ Meat and Wool Board's Economic Service survey of sheep and beef farms.⁶ In calculating these results a number of assumptions are made and these should be taken into account when interpreting the results.

One major area of difference in this survey's interpretation is in the handling of the value of farm land. Any of the surveyed factory supply farms were capable of producing milk 365 days of the year. The high value of the Karaka district town milk farm land was due to its location and strong demand from horticulture - not because it was producing milk every day of the year. To enable a fair comparison of economic efficiency to be made and remove the bias created by the uneven land values, the average freehold area land value of the factory supply dairy farm is used for both farm types.

5 Size and Efficiency in Farming; D.K. Britton, B Hill, Saxon House, 1975

6 New Zealand Meat and Wool Board's Economic Service, Sheep and Beef Farm Survey, 1982-83, P.44

TABLE 18

Measures of Economic Profitability ^a

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Freehold Land Area (ha)	57.63	69.87
Rented and Grazing-out Area (ha)	10.91	5.09
	\$	\$
A. Return on Capital		
1. Working Expenses (Labour, Operating & Administration less Imputed Family Labour & Accommodation Costs)	49,663	39,205
2. Plus Assessed Managerial Reward (\$19,190 & \$14,416) plus 1% of Farm Capital (see 5)	23,938	19,370
3. Total Adjusted Working Expenses (1+2)	73,601	58,575
4. Working Capital (8.33% of 3)	6,131	4,879
5. Farm Capital (Capital Value of Buildings [excluding farmer's house], Plant & Machinery, Vehicles [less private car valued at \$8,170], Livestock and Freehold plus Rented and Grazing Land [assessed at factory supply value per hectare]) ^b	474,799	495,381
6. Total Farm Capital (4+5)	480,930	500,260

Table 18 continued ...

a Most of the terms used here are particular to this table alone. They are similar to those used by the NZ Meat & Wool Board's Economic Service in their "Sheep and Beef Farm Survey"

b The farm land for both the town milk and the factory supply farms are valued here at the same average factory supply per hectare figure (\$5,098 per hectare)

TABLE 18 cont'd

Measures of Economic Profitability

	S. Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
7. Net Farm Income	25,191	30,491
8. Plus Interest Paid	12,280	9,269
9. Plus Rent Paid	2,203	150
10. Sub-total (7+8+9)	39,674	39,910
11. Less Assessed Managerial Reward (2)	23,938	19,370
12. Economic Farm Surplus (10-11)	15,736	20,540
13. Less Assessed Opportunity Cost of Capital (11.8% of 6) ^c	56,750	59,031
14. Economic Farm Surplus less an Opportunity Cost of Capital (12-13) ^d	-41,014	-38,491
15. Rate of Return on Capital (12/6)	3.27% =====	4.11% =====
 B. <u>Capital Turnover Percentage</u>		
14. Gross Revenue (less worker's house)	102,527	88,499
15. Total Farm Capital (6)	480,930	500,260
16. Capital Turnover Percentage (14/15)	21.32% =====	17.69% =====
 C. <u>Labour & Management Residual</u>		
17. Total Farm Capital (6)	480,930	500,260
18. Plus Cash at Bank Sundry Debtors and Other Current Assets	15,009	10,635
19. Sub-Total (17+18)	495,939	510,895
20. Less Fixed Liabilities	110,955	78,370
21. Less Current Liabilities	16,221	7,147
22. Total Equity Capital (19-20-21)	368,763	425,378
23. Net Farm Income less Interest and Rent (10)	39,674	39,910
24. Less 12.0% of Equity Capital (22)	44,252	51,045
25. Labour & Management Residual - Loss (23-24)	-4,578 =====	-11,135 =====

c The 11.8% interest rate was the mean interest paid by farmers as noted in A Review of Agricultural Credit in NZ; J G Pryde and L.B. Bain, AERU Discussion Paper No. 93, June 1985, p.12

d Capital gains or losses on land have been excluded from this analysis.

4.2 Return on Farm Capital

The return on capital is the ratio of net output (expressed as adjusted net farm income) or economic farm surplus to total capital involved.

To make all the surveyed farms comparable the net farm income is adjusted so all farms are assumed to be freehold, un-encumbered and owner-operated. It is calculated by taking the net farm income and adding back the interest paid and the rent paid. The adjusted income is called the Economic Farm Surplus. This is the surplus available to an owner to pay interest on his investment after he has been paid an assessed sum for his labour and management skills.

The managerial reward is based on an arbitrary but realistic formula. It is assessed by first taking the average annual adult wage paid in the district (\$14,215 on town milk farms and \$10,600 on factory supply farms - Table 7), and adjusting it for the number of family permanent workers (1.35 and 1.36 - Table 6). This provides for farms where more than one working owner exists (e.g. a father and son partnership). A further addition to this imputed owners return to labour of \$19,190 (town milk) and \$14,416 (factory supply) is an imputed return to management. This takes account of the value of the farm (measured as one per cent of the average farm capital). As noted earlier any of the factory supply farms have the land and other resources which could be used to produce year-round milk. The high land value of the Karaka town milk farms (due to their location) would, if it is included in the calculation, distort this comparison. To avoid this, the average land value of the factory supply dairy farm is used for both farm types.

The total imputed managerial reward for the owner-operator(s) for his labour and management skill is \$23,938 for the town milk farm and \$19,370 for the factory supply dairy farm.

An accurate calculation of the return on capital is dependent on a reliable up-to-date valuation of the farm capital components. These components include land and improvements to land, buildings, livestock and plant and machinery. Historical cost accounting less depreciation can be applied to plant and equipment but this method cannot be applied, with any confidence, to the other capital items.

For the annual dairy stock account and balance sheet calculations the livestock has had standard values applied. For an accurate evaluation of an up-to-date capital value for livestock, they were re-assessed at end-of-year market values.

The valuation of land and improvements to land and building is more difficult to establish because these assets are valued according to their estimated market realisation and to a lesser extent by their productive capacity or the intensity with which the property is farmed. "The volume of production depends on a mixture of inputs, and therefore the only correct way of valuing land in economic theory is to assign to it, its value when the quantities of capital and labour used are such that the values of their marginal products equal their respective prices" ⁷

⁷ Ibid, p.44

As a measure of efficiency the rate of return on capital can be used to compare two farms of identical size which use the same amount of capital, other inputs and standardized output prices. Provided both farms had similar resources then the farm earning the higher return on capital is the more efficient.

The rate of return on invested capital, 3.27% (town milk) and 4.11% (factory supply) may seem low compared with other non-farm investment opportunities (for example shares, debentures or fixed term savings accounts). It should be recognised that the rate of return on capital does not include unrealised capital gains on land. If these capital gains on farm land were added to income in the calculations then the rate of return on total investment would often be considerably higher.

If the actual value of farm land for the average town milk farm (\$10,918 per hectare instead of \$5,098 per hectare of the factory supply farm land) was used in the calculation, then the rate of return on capital falls from 3.27 per cent to 1.80 per cent.

The economic farm surplus is the adjusted net farm income less an assessed managerial reward. If the opportunity cost of capital (assessed at 11.8 per cent of total farm capital) is subtracted from the economic farm surplus the balance, if positive, indicates that this farming system uses its resources profitably. If it is negative then these resources would be better employed elsewhere. It must be remembered that the economic farm surplus ought to include the value of land appreciation. This is excluded on this analysis because it is highly variable.

4.3 Capital Turnover Ratio

The capital turnover ratio measures the total farm revenue generated per dollar of farm business assets the farmer owns. It is used to indicate the efficiency with which capital is being employed in the business. Results from Table 18 demonstrate that the average town milk farm generates 21 cents in revenue for each dollar of capital invested. The average factory supply farm generates nearly 18 cents in revenue for every invested dollar of capital.

A more detailed evaluation of the efficiency of the business is possible by considering both the capital turnover percentage along with the rate of return on capital. Farms with a high capital turnover percentage together with a high rate of return on capital are likely to be using their resources more efficiently.

The usefulness of these measurements is limited by the accuracy of the estimation of the farm capital. Problems do exist when making comparisons between different dairy farm businesses because of the differences in the imputed value assigned to unpaid family labour and management and the different output prices. If the capital assets are valued at current market values and are equitable between different farm businesses (psychological factors such as locality value being ignored) then the capital turnover percentage can provide the basis for useful analyses.

The capital turnover percentage for town milk farms falls from 21.32 per cent to 11.73 per cent if the actual value of the farm land for the average town milk farm (\$10,918 per hectare) is used.

4.4 Estimated Labour and Management Residual

The estimated labour and management residual is an evaluation of what the farmer earns as a reward for his own labour and management. It assumes that he pays interest of 12 per cent on his own equity capital, in addition to the interest he already pays on borrowed capital. Total equity capital consists of total farm capital plus cash at bank, sundry debtors and other current assets. From this fixed and current liabilities are subtracted. Twelve per cent of this equity capital is subtracted from the net farm income to give a labour and management residual loss of - \$4,578 for the town milk farm and -\$11,135 for the factory supply farm.

If the actual value of farm land for the average town milk farm (\$10,918 per hectare) was used in the calculation instead of the value of the factory supply farm land (\$5,098 per hectare) then the labour and management residual would show a greater loss at -\$52,446.

The objective in calculating interest on equity capital is to estimate the opportunity return the farmer could realise by investing his equity capital elsewhere (such as in non-farm investments). It is important to note that management returns for one year alone may be misleading and returns for several years should be considered in judging the capability of the operation.

4.5 Other Financial Ratios

Another useful efficiency measure is the gross ratio. It illustrates the amount of total expenses spent per dollar of gross farm revenue. It is calculated by dividing total expenses by gross farm revenue. The gross ratio for the average town milk was 0.76 and it was 0.66 for the average factory supply farm. For each dollar of gross revenue earned the town milk farmer received 24 cents in net farm income. The factory supply farmer did better, because he did not have to produce milk during the high cost winter months. He earned 34 cents in net farm income per dollar of gross farm income.

The gross ratio is an indicator of cost control and can be used as a useful measure of efficiency in the use of resources.

The turnover ratio is another useful financial ratio. It measures the gross farm revenue generated per dollar of farm assets the farmer controls. The gross farm revenue is divided by the farm capital (at current market value) owned and rented. The turnover ratio for the two types of dairy farms is 0.22 (town milk) and 0.18 (factory supply). For each dollar of farm assets controlled, the town milk farmer generated \$0.22 in gross farm income.

The higher the value of this turnover ratio relative to similar-size farms, the more efficient the farmer.

4.6 Conclusion

Notwithstanding the fact that financial ratios are based on historical results and compare average figures and not marginal values, the calculation of a range of ratios from the farmer's financial accounts is very worthwhile. Often farm lenders use a variety of analytical ratios developed from balance sheet statements when assessing the viability of a borrowers financial base.

The different output prices found on these two types of dairy farms create another difficulty. Comparisons between some of the financial ratios of two or more different farming systems are more reliable when all output prices are market led. Both the town milk and factory supply producer prices share a linkage with the market established output milkfat price although for the town milk farmer the linkage is complicated because of a different base. This makes it more difficult to compare the ratios which involve a revenue or income component.

Another complication is the varying effect of capital gains reflected in the appreciating value of farm land. In this analysis this has been excluded because it is highly variable. The value of these various ratios is to help monitor the financial strength of the farm. Unfortunately unlike other non-agricultural industries there are few well established farm standards or norms for comparing financial or efficiency ratio values. Nor is information available to suggest what deviations from the norm is acceptable or what action is needed to correct an unsatisfactory situation. Until such comparative figures are published farmers are limited to comparing their own financial ratios over time.

APPENDIX

RELIABILITY OF SURVEY ESTIMATES

Estimates of farm characteristics based on a sample of farms are likely to differ from the estimate which would have been obtained, had all farms in the population been visited. The differences are called sampling errors and their likely size in percentage terms is the relative standard error of the estimates. The relative standard error is defined as the standard error (corrected for a small population) divided by the mean. The smaller the relative standard error, the more reliable the estimate.

Table 19 sets out the mean and relative standard error for key survey variables. For example, Table 19 shows that for South Auckland Town Milk farms the survey estimate of average net farm income is \$25,191 with a relative standard error (RSE) of 9.90 per cent. In other words, it is 95 per cent confident that the true value of average net farm income lies within the range of 1.96×9.90 per cent \times \$25,191 either side of the estimated value. That is within \$25,191 \pm \$4,888.

TABLE 19

Relative Standard Errors (RSE) of Some Key Variables

	S.Auckland Town Milk Farms	S.Auckland Factory Supply Dairy Farms
Number of Farms Surveyed	29	18
Dairy Productive Hectares		
- Mean	60.59	61.68
- RSE (%)	5.87	8.50
Total Litres Produced		
- Mean	393,784	398,449
- RSE (%)	5.83	6.54
Milking Cows in December		
- Mean	85.17	131.06
- RSE (%)	4.70	7.47
Gross Revenue		
- Mean	102,949	88,596
- RSE (%)	6.18	8.11
Total Expenditure		
- Mean	77,758	58,105
- RSE (%)	6.85	7.83
Net Farm Income		
- Mean	25,191	30,491
- RSE (%)	9.90	12.79

Using a two-sided hypothesis test for comparing two means, it was not possible to reject the null hypothesis that the town milk sample mean net income figure is equal to the factory supply sample mean net income figure at the 95 per cent level of confidence. However, at a confidence level of 64 per cent the mean of the Town milk net farm income is statistically different from the mean of the factory supply net farm income. For the second case this indicates that there is a probability level of 0.34 of having a type 1 error. There is a high probability of rejecting a true null hypothesis (that there is no difference in the mean) and a low probability of accepting a false null hypothesis.

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