Dairy Australia
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Research Report

Victorian dairy industry milk supply trends: Analysis of the drivers of farm profit

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AT A GLANCE

KEY FINDINGS

REFERENCE

RESEARCH REPORT
SUMMARY OF FINDINGS

1. Increasing off-peak milk production does not guarantee a flat milk supply curve. Farmers can achieve a high off peak milk percentage by shifting their calving pattern. This may deliver marginal benefit to processors as it can simply shift the lowest month of production to another point in the season. A better measure of variation in monthly supply is provided by the calculation of plant utilisation.

2. Not all farmers have used more intensive supplementary feeding systems in the shift from a highly seasonal milk production curve to more off peak milk and higher plant utilisation. Whilst the trend of increased supplementary feed does exist, there are many examples of farms that have made the transition with relatively high levels of pasture in the cow diet, and with a high proportion of this pasture as grazed by cows

3. Farm operating cost and return on investment is poorly correlated with off peak milk production and plant utilisation. There are year to year changes in cost and return but, on average, comparable investment return is achieved across a wide range of farm systems.

4. The analysis shows that, regardless of off-peak percentage or plant utilisation levels, the most significant factor correlating with farm economics is the proportion of directly grazed pasture in the diet.

5. The data shows that farms with less than 40% grazed pasture in the diet have a high risk exposure to milk price and feed price. It is more difficult to show a definite trend in risk or economic performance for farms with greater than 40% grazed pasture. As farms increase pasture consumption, climate risk becomes more significant. Pasture base farmers do however have many options to mitigate this risk, including: varying feed purchases; the use of fodder reserves; and an appropriate stocking rate.

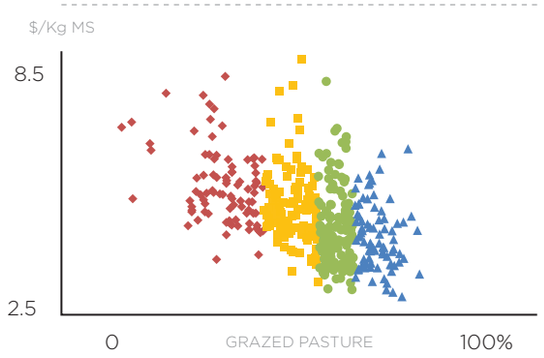
6. The relationships between income, operating cost, margin, capital investment and return are consistent across all regions of Victoria. Northern Victoria has however shown the greatest shift towards flatter milk production and more intensive feed systems - this being driven by the dry conditions of the past decade and the associated cost and availability of irrigation water.

The bottom line for southeast Australian dairy farms: It is not what calving pattern and production supply curve you generate... it is how you get there.

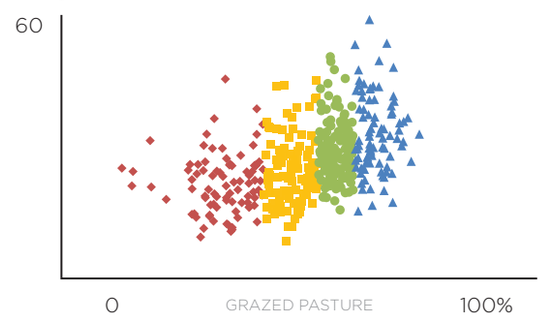
GRAZED PASTURE

0–40% 40–55% 55–65% 65–100%

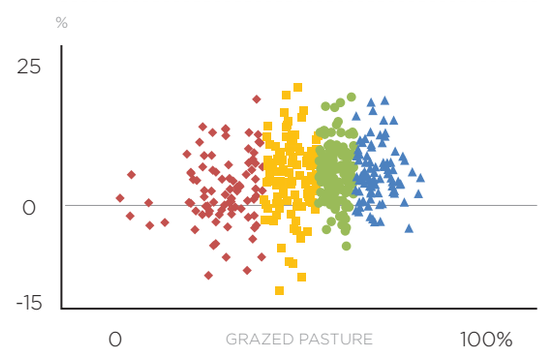
TOTAL OPERATING COST



TOTAL CAPITAL EMPLOYED



RETURN ON CAPITAL



This series of charts illustrates the most significant finding of the study. Plotted here is the complete 6 year history of 134 farms and 416 annual data sets of the DIFMP study.

The first chart shows the remarkable consistency of the trend in total farm operating cost versus the percentage of grazed pasture in the cow diet (this excludes financing costs).

Offsetting farm operating cost is the reverse trend in total capital employed in the farm enterprise.

The net effect of operating cost and capital investment is a relatively consistent range for return on capital across the wide diversity Victorian regions and farm systems.

KEY FINDING 1

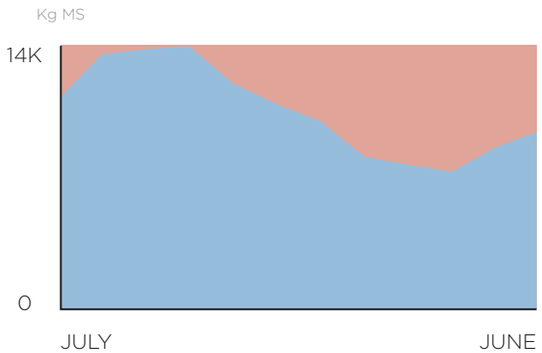
INCREASING OFF PEAK MILK PRODUCTION DOES NOT ALWAYS FLATTEN THE PRODUCTION CURVE

Milk payment systems focus seasonal premiums on either specific months or a general “off peak” premium. In southeast Australia the off peak period is usually defined by the months February to July. Farmers have many options for increasing off peak milk production. Shifts in the timing of calving, or a split calving pattern, are the more common methods. An extended calving pattern, increased off peak supplementary feed or extended lactation periods also flatten seasonal milk output.

From a processors perspective, increased milk in the off peak period is a desired outcome of the seasonal payment incentives. What is more important is a flat milk supply. This is best measured by the concept of “plant utilisation” rather than the percentage of off peak milk. Plant utilisation is defined as the average milk production as a percentage of the peak production month.

The DIFMP data shows a clear trend towards more off peak milk production. The data also shows that some farmers have still maintained a large difference between the peak and the lowest month of production. These farmers are getting the benefit of higher seasonal incentives but delivering back to processors only marginal gains in plant utilisation.

PLANT UTILISATION EXAMPLE

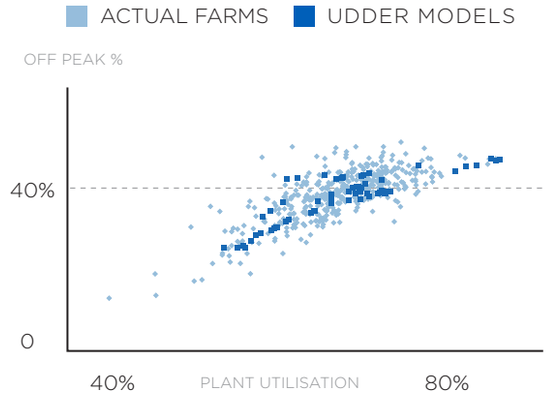


This chart and table illustrates the calculation of plant utilisation. This is equivalent to the area of the production region (blue) as a percentage of the total chart area. The supply curve is typical of a farm with 70/30 spring/ autumn split calving pattern. For this supply pattern off peak milk % may not change but plant utilisation will be lower if farmers dry off autumn calving cows earlier in the summer.

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
% of Milk Solids	8.8	10.7	10.9	11.0	9.5	8.6	7.9	6.4	6.1	5.8	6.8	7.5
% Plant Utilisation	80	97	99	100	86	78	72	59	56	53	62	68

Average Plant Utilisation	**75.8%**
Off Peak Milk (Jul + Feb to Jun)	**41.5%**

RELATIONSHIP BETWEEN PLANT UTILISATION AND OFF PEAK MILK %



The comparison between plant utilisation and off peak milk % is shown here for the completed DIFMP data set. The Victorian dairy industry has shifted to an average of approximately 40% off peak milk. This can however be achieved with a wide range of calving and milk production patterns. At 40% off peak plant utilisation can vary from as low as 60% to as much as 80%. The UDDER data represents farm simulations that have been developed for this study.

KEY FINDING 2

OFF PEAK MILK PRODUCTION HAS TWO DIMENSIONS: CALVING PATTERN & FEED

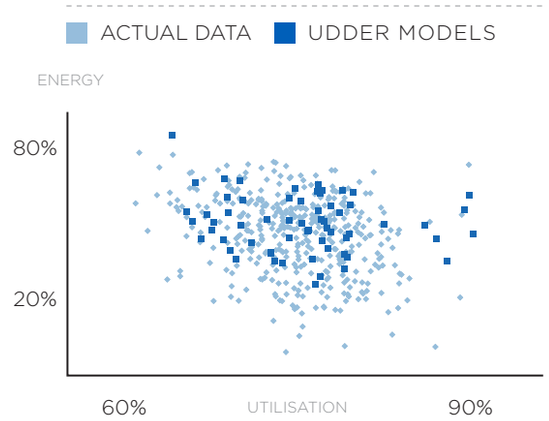
An important finding of the research was that not all farmers have used more intensive supplementary feeding systems in the shift from a highly seasonal milk production curve to more off peak milk and higher plant utilisation. Whilst the trend of increased supplementary feed does exist, there are many examples of farms that have made the transition with relatively high levels of pasture in the cow diet, and a high proportion of this pasture as feed grazed by cows (rather than cut and fed back as silage or hay).

The % of feed energy that derives from grazed pasture is a primary indicator of the farm feeding system. The charts here show the wide spread of feeding strategies for the DIFMP data. There are farms operating with plant utilisation of 80% (40–45% off peak milk) and grazed pasture consumption in excess of 60%. In other cases this level of plant utilisation has been obtained with less than 20% of grazed pasture in the diet.

A similar outcome is evident when showing the relationship between plant utilisation and the % of feed energy supplied in the form of grain and concentrates. There is a trend to higher concentrate use as plant utilisation and off peak milk increases but not all farms have followed this trend.

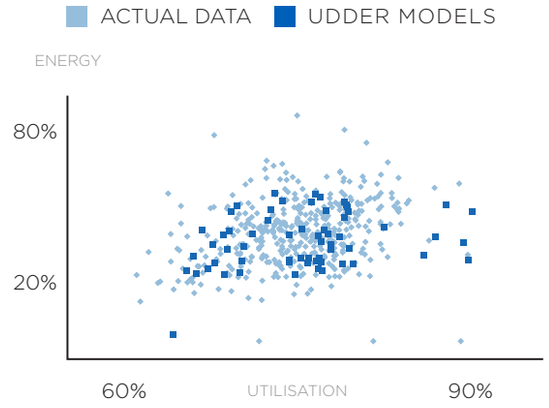
Keys to maintaining a high proportion of grazed pasture include appropriate stocking rate, calving pattern, and the type of supplementary feeds used. Irrigated farms have a distinct advantage in this regard because they can set and maintain higher levels of pasture cover during dry periods.

% ENERGY PASTURE GRAZED VS. PLANT UTILISATION: MILKING COWS



This chart shows the relationship between the % of the feed energy that comes from grazed pasture and plant utilisation for the DIFMP data. UDDER/DairyMod simulations have been developed to match this range of feed strategies.

% ENERGY AS GRAIN VS. PLANT UTILISATION: MILKING COWS



DIFMP farm data and UDDER/DairyMod simulations show the range of strategies for grain and concentrate feeding at differing levels of plant utilisation.

KEY FINDING 3

FARM OPERATING COST AND RETURN ON INVESTMENT IS POORLY CORRELATED WITH OFF PEAK MILK PRODUCTION AND PLANT UTILISATION.

This was a key finding of the research project and runs counter to the general industry view. The dairy community is somewhat divided on this issue. Supporters of seasonal pasture based farms cite New Zealand as the benchmark for farm cost and profitability. Others maintain that the seasonal pasture based model is unsuited to the Australian context. Their belief is that a better outcome is achieved by flattening the production curve and thereby accessing a higher milk price, increased milk production, and improved overhead and asset utilisation.

The tables here show the Income, Operating Cost, Total Capital Employed, and Return on Capital return for the DIFMP data across the 6 year period of the project. To remove the adverse financial effect associated with small farms, this analysis is restricted to medium to large farms (more than 120,000 kilograms of milk solids per annum). In each year the farms have been grouped according to the calculated plant utilisation as well as an estimate for the off peak milk %.

The data shows the expected effect of plant utilisation on income. Milk price increases as off peak milk % and plant utilisation increases. This is more pronounced in the last 3 years of the study because of changes to Murray Goulburn's payment system. The introduction of their Domestic Incentive payment model has given more value to suppliers with an off peak milk greater than 40%.

The more surprising outcome is that operating cost, total capital employed and return on capital do not show any particular trend as plant utilisation and off peak milk % increase. Closer examination of this data shows that there are in fact year to year variances in the performance of each farm group. In F11 and F12 Operating Cost is relatively constant for each farm group as is Total Capital Employed. In these years the advantage flowed to farms with higher plant utilisation - by virtue of their higher milk price. The reverse was true in F08 where high feed costs penalised farms with very high plant utilisation.

The major point here is that there is no clear advantage to any of the groupings of plant utilisation. The balance of cost and return shifts from year to year.

TOTAL FARM INCOME MEDIUM–LARGE FARMS ($/KG MS)

UTILISATION	OFF PEAK	F07	F08	F09	F10	F11	F12
0–60 %	0–35 %	4.11	6.56	4.81			
60–67 %	35–40 %	4.29	6.81	4.80	4.41	5.51	5.23
67–75 %	40–45 %	4.33	6.83	4.84	4.51	5.73	5.48
75–100 %	45–55 %	4.39	6.89	4.86	4.55	5.87	5.63

TOTAL OPERATING COST BEFORE FINANCE MEDIUM–LARGE FARMS ($/KG MS)

UTILISATION	OFF PEAK	F07	F08	F09	F10	F11	F12
0–60 %	0–35 %	5.10	4.33	4.54			
60–67 %	35–40 %	4.91	4.93	4.78	3.94	4.15	4.82
67–75 %	40–45 %	4.16	4.81	4.57	3.91	4.28	4.80
75–100 %	45–55 %	4.57	5.28	4.67	4.40	4.23	4.69

TOTAL CAPITAL EMPLOYED MEDIUM–LARGE FARMS ($/KG MS)

UTILISATION	OFF PEAK	F07	F08	F09	F10	F11	F12
0–60 %	0–35 %	40.64	26.39	46.30			
60–67 %	35–40 %	22.42	23.31	23.20	34.02	27.48	21.59
67–75 %	40–45 %	22.71	25.21	25.99	26.57	28.36	24.00
75–100 %	45–55 %	24.25	25.83	28.43	28.40	28.32	22.77

RETURN ON TOTAL CAPITAL MEDIUM–LARGE FARMS ($/KG MS)

UTILISATION	OFF PEAK	F07	F08	F09	F10	F11	F12
0–60 %	0–35 %	-2.4 %	8.4 %	0.6 %			
60–67 %	35–40 %	-2.7 %	8.1 %	0.0 %	1.4 %	4.9 %	1.9 %
67–75 %	40–45 %	0.7 %	8.0 %	1.1 %	2.2 %	5.1 %	2.8 %
75–100 %	45–55 %	-0.8 %	6.2 %	0.7 %	0.5 %	5.8 %	4.1 %

KEY FINDING 4

THE MOST SIGNIFICANT FACTOR CORRELATING WITH FARM INCOME, COST AND CAPITAL INVESTMENT IS THE PROPORTION OF DIRECTLY GRAZED PASTURE

This study showed that, regardless of off-peak percentage or plant utilisation levels, the most significant correlating factor with farm income, operating cost and capital investment is the is the proportion of directly grazed pasture in the diet.

The chart series to right shows the DIFMP data for the income, operating costs, and margin of medium to large farms from F09–F12. It is important to note that the income and margin in this chart series is based on a calculation of the average milk price across the 4 year period. In this calculation only the base milk price payment has been averaged. Seasonal and production payment incentives are very similar in each year and have been applied to each farm data set according to the production volume and pattern of supply. This maintains the relationship between milk price and farm size and supply pattern. This average calculation removes the effect of year to year variation in milk price and shows more clearly the effect of grazed pasture % on cost and margin.

The first chart shows that average milk income does increase marginally as grazed pasture % decreases. This is because of the tendency towards flatter milk production on farms with more intensive feed systems.

It is also interesting to note the split in the income data at higher levels of grazed pasture %. This occurs because of the incremental step in milk price at 40% off peak milk.

Generally speaking the variation in income and fixed cost is small when compared with variable operating cost. The charts show a very strong correlation between variable operating cost and the % of grazed pasture in the diet. As a result Total Operating Cost and Operating Margin are dominated by the changes in variable cost.

This group of charts is based on the 4 years from 2009–2012 and medium to large farms (more than 120,000 kilograms of milk solids). Across this period purchased feed and other costs were relatively stable and we can see very clearly the relationship between variable operating costs and grazed pasture %.

The much lower cost of grazed pasture delivers a significant advantage not only in in the level of variable cost but also in the stability of cost over time. Operating cost is however only part of the equation for profit and investment return. There is downside cost associated with farms with a high percentage of pasture consumption and it comes in the form of the capital investment requirements.

This second series of charts shows the capital cost and investment return corresponding to the income, cost and margin series. These charts show that the lower variable cost associated with pasture based farms is offset by higher capital investment cost. This cost is associated with the land that is used to grow the pasture. In the case of irrigated farms it is the combination of land and water rights.

Taking both operation and investment costs into consideration, there is a remarkable similarity in the net investment return across the wide range of farm systems represented in this study. For farms with more than 40% grazed pasture consumption, the average Return on Capital from 2009–2012 is close to 4%. The data shows no clear advantage for any group of farms above this level grazed pasture consumption.

There is some evidence that farms with grazed pasture consumption below 40% have a lower average capital return. This is shown more clearly in the next series of charts.

This group of charts shows the total farm capital, owner assets, and owner equity corresponding to the previous income and cost series for 2009–2012. Again, capital return has been calculated using the average milk price across the period.

The previous chart series showed the very high operating costs for farms with less than 40% grazed pasture consumption. The capital cost is however lower on these farms and so the net effect in investment return is somewhat inconclusive.

This chart series shows grazed pasture % plotted against the added dimension of plant utilisation and off peak %. As expected, the first two charts show that farms with low grazed pasture are on the high side of average for operating cost and the low side of average for capital investment.

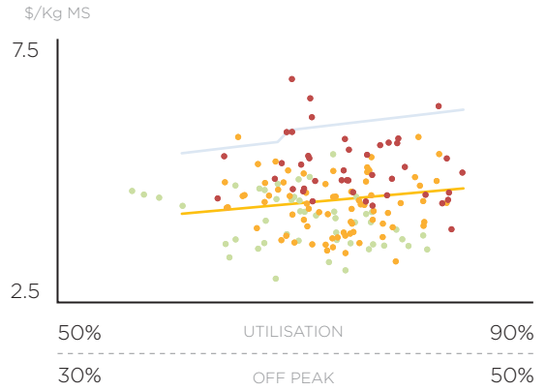
The third chart shows that, despite the lower capital requirements, the operating cost burden puts farms with low grazed pasture consumption below average in terms of Return on Capital. Very few low pasture consumption farms make it above the line of average. In relation to this data it also needs to be said that with the possible exception of 08/09, feed prices were not exceptionally high during this period.

This chart series also shows the differing cost and investment behaviour for farms with medium and high grazed pasture strategies. For these farm groups the net effect in capital return is however very similar.

This group of charts shows how the choice of feeding system relates to decisions on calving pattern and off peak milk production. Farms have been grouped into high, medium and low levels of pasture grazed—corresponding to <40%, 40–60%, and > 60 % of feed energy from grazed pasture. The results for operating cost, capital investment and investment return are then plotted against plant utilisation. An estimate of the corresponding off peak milk % is also shown. The income line on the first chart represents the average income over the 4 year period. It is important to note that both low and high pasture consumption farms are spread across the full range of plant utilisation and off peak milk %.

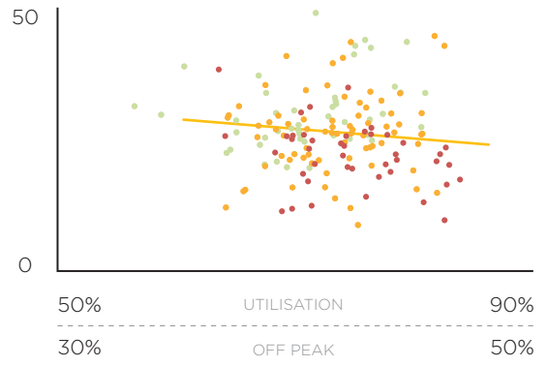
INCOME & OPERATING COST

- AVERAGE INCOME
- AVERAGE OPERATING COST
- COP HIGH GRAZED PASTURE
- COP MEDIUM GRAZED PASTURE
- COP LOW GRAZED PASTURE



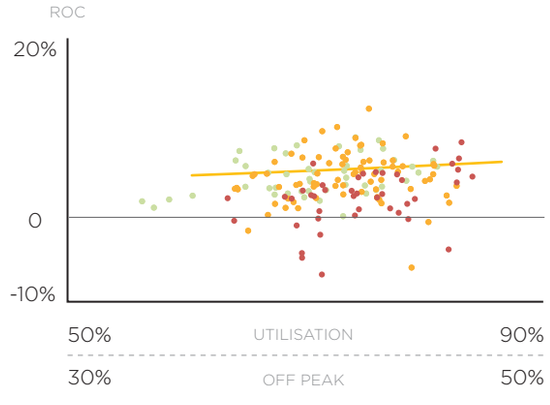
TOTAL CAPITAL EMPLOYED

- AVERAGE TOTAL CAPITAL
- TCE HIGH GRAZED PASTURE
- TCE MEDIUM GRAZED PASTURE
- TCE LOW GRAZED PASTURE



RETURN ON CAPITAL

- AVERAGE ROC
- ROC HIGH GRAZED PASTURE
- ROC MEDIUM GRAZED PASTURE
- ROC LOW GRAZED PASTURE



KEY FINDING 5

INTENSIFICATION OF FEED SYSTEM INCREASES EXPOSURE TO MILK AND FEED PRICE RISK

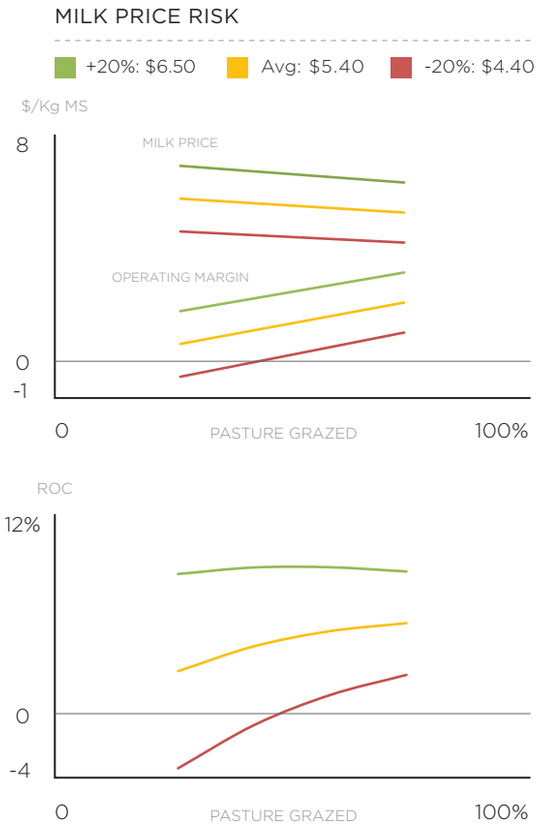
This study has found that the % of grazed pasture in the cow diet is strongly correlated with operating cost. The effect on investment return is more subtle but there is none-the-less strong evidence to suggest that farms with high levels of intensive feeding are less profitable.

Further insight into the cost and risk associated with intensive feed systems can be gained from an examination of the economic response to variation in factors such as milk price and feed price.

The charts to right show how the DIFMP farms operating margin and capital return responds when a % increase or decrease is applied to the key economic drivers of income and feed price. The calculations are based on the data for medium–large farms across the period from F09-F12. In these charts the lines shown represent the line of best fit through the data for income, variable cost, operating margin and Return on Capital, after applying a change to price.

What this data shows is that capital return on farms with highly intensive feed systems is extremely sensitive to milk price and feed price. This is a consequence of their very low operating margins. When milk price is high and feed price low, these farms can generate a very good capital return. In an Australian context, the historical average milk price has been too low to support this type of farm.

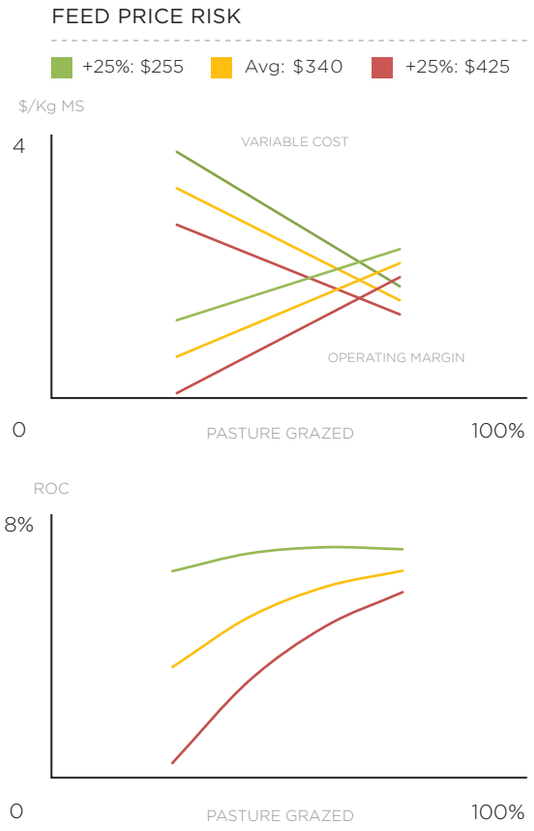
MILK PRICE RISK



Farms with a low % of grazed pasture get significant benefit from a milk price rise, because of their low capital cost per kilogram of milk solids produced. At the other end of the income range, capital return falls away sharply because these farms work on very low operating margins.

The Return on Capital of farms with high grazed pasture consumption is less affected by income variation because of the lower variable cost and higher operating margins. The risk for these farms is primarily climate and debt.

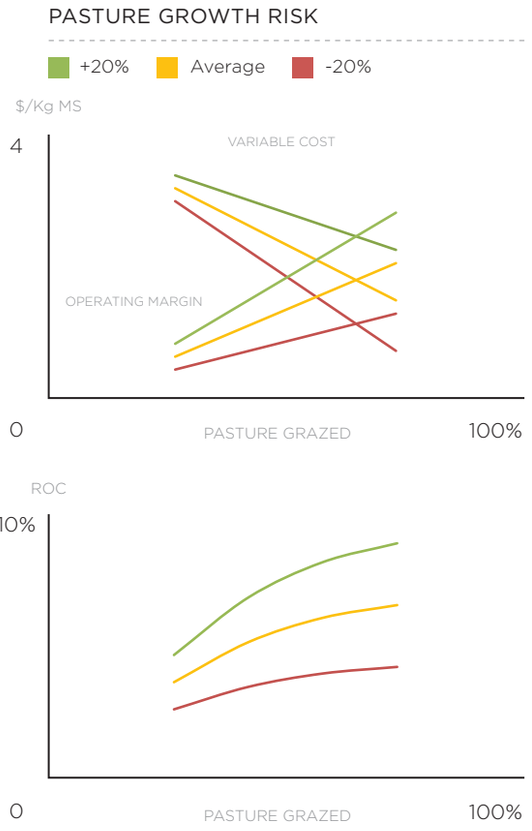
FEED PRICE RISK



Feed price is also a primary risk issue for dairy farms with intensive feed systems. As is the case with milk price, small changes in feed cost and operating margin can have a very significant effect on investment return.

As expected, farms with high grazed pasture consumption are relatively immune to feed price changes.

PASTURE GROWTH RISK



The effect of climate variation on pasture growth has been estimated on the assumption that the energy lost is substituted with purchased feed and energy gained in a good year reduces the purchase of supplements.

These calculations can only be considered a crude approximation. Farmers can adopt a variety of strategies for milk production, feeding and milk production if pasture growth is high or low.

KEY FINDING 6

VICTORIAN REGIONS VARY IN CHOICE OF FARM SYSTEM BUT NOT IN THE FIT TO THE OVERALL ECONOMIC TRENDS

The analysis in this study draws on farm data from all three Victorian regions. There is significant diversity of climatic conditions and farm system choice across these regions. This is illustrated in the charts to right.

Most of the Gippsland farms are located in areas of medium to high annual rainfall. There is also a small grouping of farms that benefit from reasonably reliable irrigation water supply within the Macalister Irrigation District. The reliability of water supply predisposes these farms to higher grazed pasture consumption. The counterbalancing factor is that land is more expensive.

Most of Northern Victoria has low rainfall and is reliant on irrigation from the Murray and Goulburn river catchments. More intensive feeding and lower grazed pasture is now a common feature of this region. This sets up a higher operating cost with the offset of a lower capital investment per kilogram of milk solids produced.

South West Victoria farms provide a bridge between the typical characteristics of Gippsland and Northern Victoria. In this region pasture growth and grazing is optimal during winter and spring. Summers tend to be drier and, in the absence of irrigation supplies, farmers have increased supplementary feeding. Capital investment patterns in the Western District mirror the other Victorian regions. The primary asset investment, land, is priced according to the average rainfall and the reliability of that rain.

A feature of the regional data is the degree of overlap in the trends for operating cost, capital investment and capital return. Whilst each region has its general characteristics, we can find the full range of feeding systems and capital values across each region. One way to think about this is that the investment market for dairy farms is working in an orderly manner across Victoria. Farms have been valued according to their production opportunity and profitability. This includes the anticipated cost of operation. The other conclusion is that there appear to be limited "pockets of opportunity" for investment. Each region delivers a comparable return, albeit from different farm systems.

REGIONAL ANALYSIS

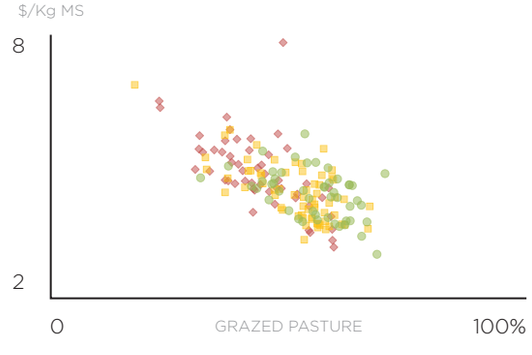
North Victoria West Victoria Gippsland

This group of charts shows the trends in operating cost, total capital investment and return for the key Victorian regions. The DIFMP data has been filtered according to the same criteria as the previous charts: medium to large farms from F09 – F12.

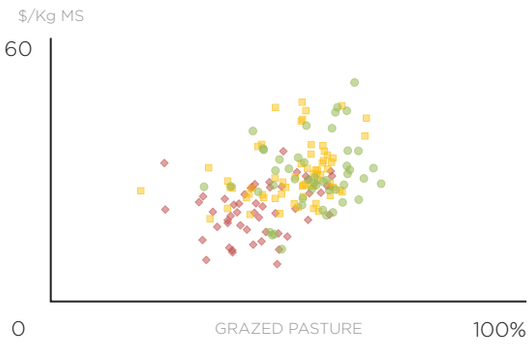
Whereas Gippsland and Western Victoria are quite similar in the type and range of farm systems, the tendency of Northern Victoria towards more intensive feeding systems stands out in these charts. That however was not always the case.

The milk supply curve shown on page 2 of this report shows Northern Victoria's dramatic shift away from more seasonal pasture based dairy farming to intensive feeding and flatter milk supply. This was of course driven by drought and the availability of and cost of irrigation water. With the return of water supply and lower water price, the opportunity exists for a return to grazed pasture systems and the lower associated operating cost. It will be interesting to see if this occurs in 2012 / 13 given a lower milk price and higher feed prices.

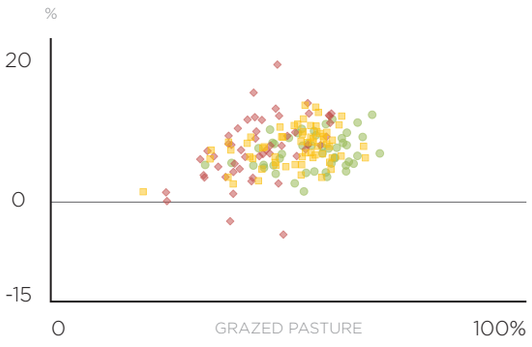
OPERATING COST



TOTAL CAPITAL EMPLOYED



RETURN ON CAPITAL



REFERENCE
NOTES TO THE ANALYSIS

THE INFLUENCE OF FARM SIZE

The DIFMP data includes farms with cow numbers ranging from 70 to more than 1000. Analysis of the farms with lower cow numbers shows distinct economic disadvantages in income, operating cost and capital efficiency.

Labour cost is the most significant issue affecting small farms and this is illustrated in the charts below. The industry standard for labour sits at around one person per 100 cows or $1 per kg milk solids. The rise in staff numbers and cost for farms with 200 cows or less reflects the difficulty of operating a dairy farm with less than two people.

To illustrate this further, the table to right gives the average 2011/2012 financial results for small, medium and large farms from the DIFMP data. Fixed cost, and particularly labour, is the main driver of the Operating Margin difference between small and medium to large farms. These costs are 25-30% higher for small farms.

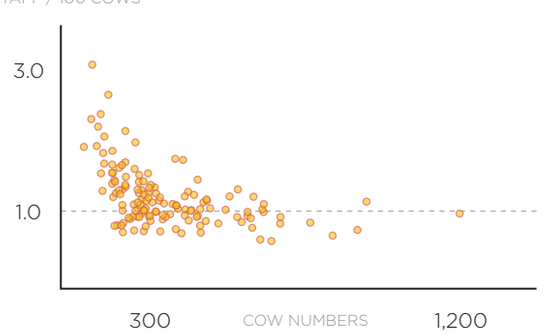
The income differential between the farm size groups is somewhat misleading as it reflects the tendency for larger farms to have more off peak milk. The premium for scale is much smaller than is shown in this table. Likewise, the higher variable cost for larger farms is a reflection of higher use of supplementary feed rather than an inefficiency of scale.

Capital investment per kilogram of milk solids produced is also 25% higher for small farms. Owner equity is however higher - providing some offset by reducing interest cost.

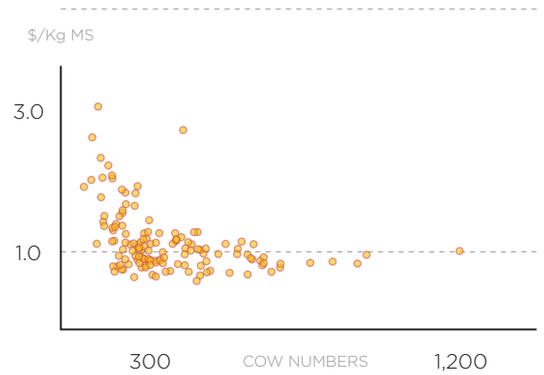
The lower return on capital investment is clearly evident for the small farm group. The Return on Equity for small farms was negative in 4 years out of the 6 years of the DIFMP.

Most of the data analysis shown in this report has been restricted to medium and large farms as defined in the adjacent table. We can however say that the same general trends and findings apply to small farms – the % grazed pasture is strongly correlated with operating cost and capital investment. The net benefit in investment return is relatively constant for farms with more than 40% grazed pasture.

STAFF NUMBERS VS. COW NUMBERS



LABOUR COST VS. COW NUMBERS



	SMALL	MEDIUM	LARGE
$/Kg MS	<120,000	120,000–240,000	>240,000
Number of Farms	27	35	12
Average No. Cows	180	310	730
Kg Milk Solids	84,000	162,000	380,000
Milk Income	5.28	5.57	5.90
Other Income	0.45	0.41	0.47
Total Income	**5.74**	**5.98**	**6.37**
Variable Cost	2.33	2.39	2.74
Fixed Cost	2.91	2.30	2.22
Operating Cost	**5.23**	**4.69**	**4.96**
Operating Margin	**0.50**	**1.29**	**1.41**
Lease Cost	0.11	0.15	0.12
Interest Cost	0.56	0.57	0.66
Net Farm Income	**-0.17**	**0.57**	**0.63**
Total Capital Employed	29.50	23.55	22.86
Owner Non-Financial Assets	24.31	19.52	19.26
Owner Equity	17.06	12.68	10.84
Return on Capital	1.7%	5.5%	6.2%
Return on Assets	1.6%	5.9%	6.7%
Return on Equity	-1.0%	4.5%	5.8%
Leased Assets (% Total Capital)	18%	17%	16%
Owner Equity (% Owner Capital)	70%	65%	56%

MILK INCOME AND PAYMENT SYSTEMS

Milk price has historically been quoted as dollars per kilogram of butterfat or cents per litre (cpl). For the most part, current milk price systems are however based on separate payments for the milk components fat and protein. This can result in substantial differences when comparing the cpl price for milk from Friesian / Holstein cows with that from Jersey cows. For this reason it is now more common for milk price to be quoted as **dollars per kilogram of milksolids ($/Kg MS)**. Milksolids is defined as the sum of the fat and protein composition. By way of example, for a milk composition of 4.1% butterfat and 3.2% protein, 40 cpl is equivalent to $5.48/Kg MS. Reference to $/Kg MS removes most of the price variation that is due to differences in milk composition.

Milk payment systems in Victoria have evolved over many years. This evolution has been driven by market and processor economics as well as competition for supply. This has resulted in a wide variation in payment systems between processors as well as multiple payment options from the same processor. There are however common components in most milk payment systems, they being:

Base price – this is the base payment for all milk supplied across the year. The value of the base price is determined by the composite value of both domestic and export markets. The value varies significantly from year to year with export market value being the primary diver of this variation.

Seasonal incentives – these are premiums paid for particular months of the year – typically July, August and January to June. Seasonal incentives vary by month with the maximum payment typically in winter. At this time the premium is of the order of $1.50/kg milk solids or 10-12 cents/litre.

Off peak incentives – this is a type of seasonal incentive where a premium is paid for milk delivered during the period defined by a processor as “off peak”. The peak period is typically defined as August to January and off peak as July plus February to June. The payment is based on the ratio or percentage of off peak milk production. The premium is of the order of $0.80/Kg MS for an even split of 50% peak and 50% off peak milk.

Production incentives – this is a premium based on the quantity of milk delivered. The maximum premium paid for very large farms is of the order of $0.20/Kg MS.

Volume charges – these are charges levied for pickup of the milk. The charge is typically based on milk volume and of the order of 2-3 cents per litre.

Quality adjustments – these are price premiums or deductions based on milk quality. Quality is normally assessed against parameters such as bulk milk cell count, bacterial count, temperature and sediment. The discount for lower quality milk typically ranges from 5 – 25% of the maximum milk payment.

Other milk income – farmers can also receive income or deductions in the form of share deductions, dividend payments, year on year production growth incentives, as well as other private contract arrangements between processors and farmers.

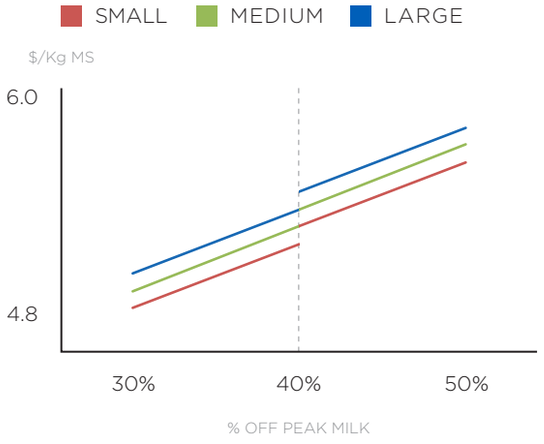
The variations in milk payment system make it very difficult to identify whether the economic performance of an individual farm is due to a premium milk price from a particular processor or the investment structure, operating system and management performance of the farm.

This issue was dealt with by calculating a **Standard Milk Price** for each farm. This was based on the milk payment system set by the dominant processor Murray Goulburn (MG). MG is also a farmer cooperative and has a responsibility to maximise the milk price for their farmer members. All other processors use the MG milk payment system and annual base price as a benchmark for their own offer to farmers.

An additional issue to be resolved in analysis of the data was the substantial variation in milk price from year to year. This research was seeking to understand the economic performance of farms after removal this annual price movement. To this end the **Average Milk Price** was determined for each farm. This calculation uses an average of the base milk price across the 6 years of the DIFMP study. The other elements of the Standard Milk Price calculation are however preserved, thus providing an understanding of the income variation due to factors such as farm size and the monthly milk supply curve.

An indication of Murray Goulburn’s benchmark milk price for the 2011 / 2012 season is provided in the chart below. Also shown is the approximate relationship between milk price, farm size and off peak milk percentage.

INDUSTRY BENCHMARK MILK PRICE
2011–2012



The relationship between Actual, Standard and Average milk price is shown in the table below. In an overall sense the Standard milk price is $0.12 / Kg MS below the Actual average of the farm data. Most of this difference is accounted for by the low milk price paid by MG in F09. The global financial crisis forced Murray Goulburn step down their base payment during this year. Many of the other processors followed MG down but others were locked into pre-existing supply contracts that could not be changed.

The Average milk price calculation gives an overall result that falls between the Actual and Standard. The small rise in price from F07 to F12 is a consequence of general increases in off peak milk production across all farms.

DIFMP AVERAGE MILK PRICE - ALL FARMS $ / KG MS

	ACTUAL	STANDARD	AVERAGE
F07	4.46	4.24	5.20
F08	6.54	6.77	5.24
F09	5.40	4.78	5.20
F10	4.46	4.43	5.28
F11	5.64	5.67	5.32
F12	5.52	5.42	5.32

DEFINITIONS OF PROFIT AND INVESTMENT RETURN

The financial definitions used in this report can be found in the Glossary. These were defined according to the detail of data available and their relevance to dairy farm analysis - rather than strict adherence to formal accounting standards.

A key deviation to note is the exclusion of Tax from the Return on Equity calculation. This is because farm tax structures vary widely with many farms set up as family trusts rather than companies. This problem, along with the volatility of farm profit, makes the determination of the tax effect almost impossible.

The separation of operating and finance charges within leases is also unknown. For the most part lease charges are associated with land and water leases. On this basis the expense has been excluded from Operating Cost and considered a finance charge.

Capital appreciation and depreciation due to land valuation is a further exclusion from the analysis. In the DIFMP data there is some evidence of capital appreciation from 2006 - 2009 and capital depreciation from 2010 - 2012. This however varies from farm to farm. The time period of the data is considered too short for proper analysis of average long term capital appreciation.

This report places a heavy emphasis on Operating Margin and Return on Capital (ROC) ahead of other measures of profit and investment return. ROC is measure of the financial performance and health of the industry as a whole - the capacity of the industry to generate an acceptable return for farm owners and the capacity support debt and lease finance arrangements. For individual farmers the more important issue is their profit margin before and after debt servicing. This relates to Return on Assets (ROA) and Return on Equity (ROE).

The study showed that the data trend for ROA was very similar to but slightly higher than ROC. This is because average lease rates are low relative to the capital value of leased assets. Leases on land are typically 2 – 4 % which compares favourably with the average capital return calculated via ROC.

ROE shows much more farm to farm variation than ROC or ROA. This is because of the very broad range of ownership and finance structures across the industry.

It is notable that the farms with low levels of grazed pasture are also having most difficulty achieving an acceptable ROE (page 15). In the view of the authors this is a reflection of the sensitivity of these farm systems to milk and feed price risk.

REFERENCE
GLOSSARY

DIFMP	Dairy Industry Farm Monitoring Project
UDDER	A computer program that calculates milk production, pasture production and other relevant production data for pasture based dairy farms. The primary inputs to the program are the cow numbers and calving pattern and supplementary feeding amounts.
DairyMod	A computer program that calculates pasture production and energy level from parameters such as soil type, temperature, water application and grazing management practice.
Milk supply curve	The pattern of monthly milk supply. In Australia milk supply is typically reported for the period from July to June of the following year.
Off Peak Milk %	The percentage of annual milk supply produced during the period from February to July.
Plant Utilisation	The average monthly milk production expressed as a percentage of the value for the maximum month of production.
Split calving	Calving during two distinct periods of the year. Typically these are during winter or early spring and autumn
Extended calving	Calving over 6 – 10 months of the year
Stocking rate	Number of cows per hectare of farmland. Normally this is based on the area where milking cows are grazed rather than the whole farm area.
Directly grazed	Standing pasture and crops that are eaten directly by cows.
Supplementary feed	All feed supplied to cows other than directly grazed feed. This includes feed that is grown and mechanically harvested on the farm.
Actual Milk Income	The cash income received for milk in any given year.
Standard Milk Income	The calculated milk income based on the industry benchmark payment system set by the farmer co-operative Murray Goulburn.
Average Milk Income	The calculated average milk income across several years based on an average of the base price for the benchmark payment system set by Murray Goulburn.
Other Income	Farm income from sources other than milk payments. This is typically from livestock sales but can include dividend payments for co-operative milk shares.

Total Income	Milk Income + Other Income
Variable Cost	Farm expenses that vary significantly from year to year including: purchased feed, movements in the value of feed stock, pasture and crop planting and harvesting, fertiliser, fuel, and irrigation water purchases.
Fixed Cost	Farm expenses that are relatively static from year to year including: Animal heath, breeding, herd testing, shed power, dairy supplies, rages, insurance, registrations, accountancy charges, depreciation, employed labour, and the imputed cost of owner labour.
Operating Cost	Variable Cost plus Fixed Cost
Operating margin	Total Income minus Operating Cost
Interest Cost	Interest charges for bank and other cash loans
Lease Cost	Interest charges for leases on land and other assets
Finance Cost	Interest Cost plus Lease Cost
Net Farm Income	Operating margin minus Finance Cost. This is equivalent to Profit Before Tax.
Total Capital Employed	Total value of farm assets including owned and leased land, water rights, buildings, plant and equipment, livestock, feed in storage.
Owner Total Assets	Total Capital Employed minus the value of leased assets.
Owner Total Liabilities	Liabilities for debt and other payables. This excludes Lease Costs.
Owner Equity	Owner Total Assets minus Owner Total Liabilities.
Return on Capital	Operating Margin divided by Total Capital Employed, expressed as a percentage. ROC = 100 × Operating Margin ÷ Total Capital Employed %
Return on Assets	The value of Operating Margin minus Lease Cost divided by Owner Total Assets, expressed as a percentage. ROA = 100 × (Operating Margin – Lease Cost) ÷ Owner Total Assets %
Return on Equity	The value of Net Farm Income divided by Owner Total Assets, expressed as a percentage. ROE = 100 × Net Farm Income ÷ Owner Equity %

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