

Dairy Directions — Analysing Farm Systems for the Future

Providing robust analysis of the impact of on-farm changes and innovation on the profitability of dairy farm systems

Expanding a dairy business affects business risk and financial risk

Key messages

- ◆ Business risk is the variability in cash flow that results from production risk; for example, seasonal factors, price risk and personal risk. Business risk is inherent to the operation of the farm and is independent of the way the business is financed.
- ◆ Financial risk is the risk that cash flow will be insufficient to service debt; it is the impact of debt on equity.
- ◆ Financial risk is important – it can become a greater source of variability than price and yield risk.
- ◆ Before committing to a decision to expand, dairy farmers can control the amount they borrow, thus they have some control over the exposure of their businesses to additional financial risk.

Over a long period, Australia's dairy farmers have expanded the size of their businesses in response to rising costs and falling prices. More than 95% of dairy farm businesses are family owned and operated, meaning farm expansion and improvement rely either on retained earnings, or borrowed funds, with most coming from new borrowings.

We all know that expanding a farm business can increase wealth and increase risk, but what is the source of that increased risk and does it matter? In agricultural economics, risk is categorized as business or financial.

Business risk is often included in analyses of changes to farm systems, but financial risk matters too. Dairy farmers have limited control over their exposure to key business risk factors, such as the price of milk or seasonal conditions. In contrast, before committing to the decision to expand their business, dairy farmers have control over the amount they borrow and thus some control over the exposure of their business to additional financial risk.

The aim of this research was to consider three different expansion paths and compare the wealth, efficiency of capital use and riskiness of each option with the current situation. In particular, this research set out to understand the sources of risk for each of the different options.

The question considered was does it matter what the source of risk (variability) is?



Approach

A representative dairy farm was used as the basis for the analysis. A steering committee consisting of farmers, farm economists, consultants and industry representatives developed the approach, research questions, data, key assumptions and validated the results.

Representative case study dairy farm

The farm analysed:

- ◆ Had 300 milking cows with an average annual milk production of 6,500 litres/cow and 503 kg of milk fat and protein/cow.
- ◆ Had 133 hectares of perennial pasture that was grazed by the milking herd.
- ◆ Had feed supplied through predominately grazed pasture, with 1.5 t/cow of grain fed in the dairy.
- ◆ Had 2.3 full time labour units employed in the business.
- ◆ Was well-managed and currently profitable.
- ◆ Was owned and operated by a young couple keen to expand their farm business.

Development options

The potential performance of three options to expand the business was compared with the current farm system. The key differences between each of the expansion options is summarised in Figure 1 with assumptions given in Table 1.

The analysis used a ten-year planning horizon. When analysing the performance of the base farm and expansion options, each year of the ten-year budget was run with different prices, costs and yields to reflect the variability farmers experience. This was done 10,000 times to generate 10,000 ten year runs (in Table 2 below, the average result for each option is shown).

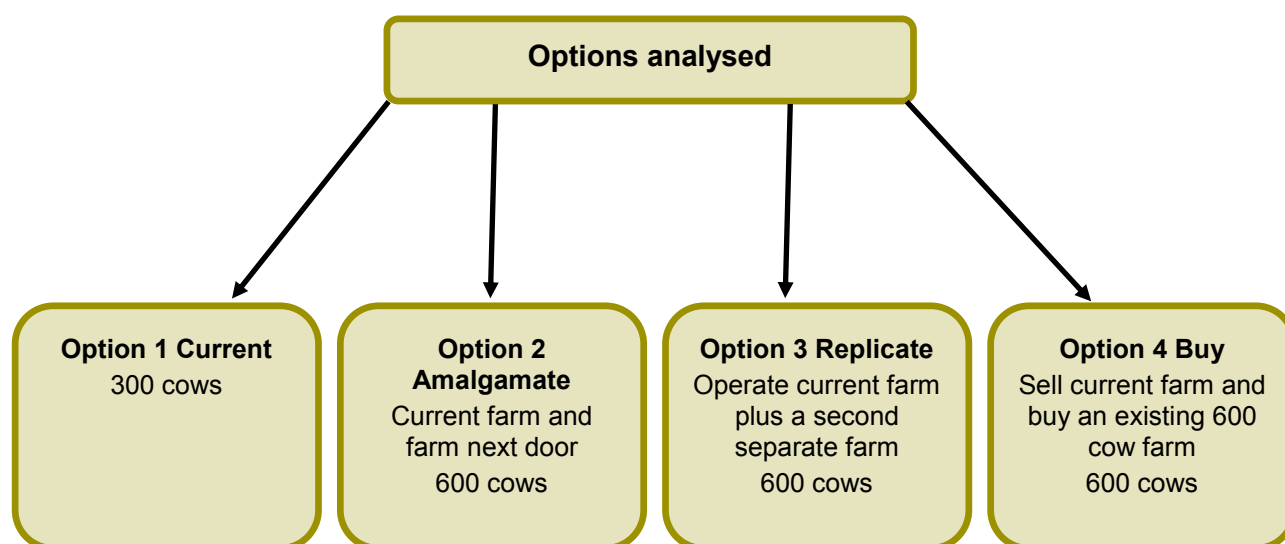


Figure 1. Key assumptions of the current farm and development options.

Table 1. Assumptions for the current farm and alternate options.

	Option 1 Current home farm	Option 2 Amalgamate home farm and next door	Option 3 Replicate: Two 300 cow dairy farms	Option 4: Buy: Sell home farm, buy an existing 600 cow farm
Cows (number)	300	600	600	600
Land area (ha)	133	253	253	253
Capital investment (\$ million)	3	6.76	5.36	5.36
Equity capital (\$ million)	2.4	2.4	2.4	2.4
Debt (\$ million)	0.6	4.36	2.96	2.96
Debt to equity ratio	0.25	1.82	1.23	1.23
Labour (full time equivalents)	2.8	5.6	5.6	5.6
Labour cost* (\$)	185,000	325,400	356,400	325,400

*Based on cost estimates from the People in Dairy website (<http://www.thepeopleindairy.org.au/>)

These options were assessed for:

- ◆ **Wealth:** how much additional wealth are the farm owners expected to generate from the investment?
- ◆ **Profit:** whether the capital is being used efficiently.
- ◆ **Risk:** what is total risk and what is the contribution of financial risk and business risk to total risk?
- ◆ **Finance:** How likely is it that debt can be serviced each year?

How did each option compare?

The average results of the analyses are presented in Tables 2 to 4. Based on these average results – what can we learn?

- ◆ Expanding the business could increase wealth and use capital more efficiently compared with the current system (Table 2). However total risk increases (Table 3).
- ◆ Total risk increased for all three options that involved expansion. The source of this increased risk is from borrowing (financial risk) (Table 3).
- ◆ Increased financial risk is then reflected in the decreased chance of cash flows exceeding debt repayments (Table 4).

Based on the assumptions used in the analysis, the option where the current farm is sold and a larger 600 cow is purchased (option 4), will generate the greatest wealth and highest return.

In Table 3, total risk reflects the coefficient of variation (standard deviation divided by expected net cash flow after debt servicing). The coefficient of variation is often described as an indicator of the risk relative to the return. The higher the coefficient of variation, the greater the spread of results.

What are the implications of increased financial risk on wealth?

The impact of increased borrowings (and the principle of increasing risk) is shown in Table 5. When a positive 10% annual return on assets was generated, the three farm expansion options, all involving more debt than the current farm, increased the wealth of the farmers more than the current farm.

However, in years when return on assets is negative 10%, the three expansion options that involved higher debt levels, eroded wealth faster than the current farm. This is because, even in years when the business makes a loss, fixed debt servicing obligations still need to be met. Thus, when a farmer chooses to take on a higher debt relative to equity they are taking a risk. They are gambling that annual earnings will generally exceed costs and annual debt servicing payments (enabling their equity to grow more rapidly than otherwise would occur).

Table 2. Wealth and capital efficiency of the current farm and different options.

	Option 1 Current	Option 2 Amalgamate	Option 3 Replicate	Option 4: Buy
Mean Net Present Value (at 6% discount rate)	\$500,000	\$970,000	\$1.2 million	\$1.4 million
Mean Modified Internal Rate of Return	8%	9%	10%	11%



Table 3. Riskiness of the different options (based on stream of net cash flows).

	Option 1 Current	Option 2 Amalgamate	Option 3 Replicate	Option 4: Buy
Business Risk	19%	17%	20%	18%
Financial Risk	7%	77%	35%	27%
Total risk	26%	94%	55%	45%

Table 4. Likelihood of cashflows being sufficient to service debt.

	Option 1 Current	Option 2 Amalgamate	Option 3 Replicate	Option 4: Buy
Likelihood of cash flows exceeding debt repayments (principle and interest) in a steady state year with 8% interest rate	91%	52%	68%	74%

Table 5 The impact on wealth from a positive 10% return on assets and a negative 10% return on assets, when interest on debt is 8% for the current farm and different expansion options.

	Total assets	Proportion of equity in total assets	Return on equity when there is a 10% return on assets	Return on equity when there is a -10% return on assets
Option 1: Current	\$3 million	80%	11%	-15%
Option 2: Amalgamate	\$6.8 million	36%	14%	-43%
Option 3: Replicate	\$5.4 million	45%	12%	-32%
Option 4: Buy	\$5.4 million	45%	12%	-32%

Financial risk does matter

This study has provided reasons why financial risk matters. With business expansion, financial risk can be a source of greater risk to a dairy business than price or seasonal risk. When things go as planned, expanding the farm business is likely to result in greater wealth being accumulated compared with continuing to operate the current sized farm. But this research has also shown that expansion increases total risk.

If a farmer wants to decrease their exposure to risk, they can limit the amount they borrow and reduce the extent of expansion. Ultimately, financial risk will be one of the greatest barriers to business expansion and the greatest determinant of farm size.

The impacts of financial risk change over the life of the project. In early years when the business is being developed to become a larger business, annual cash flow is expected to be lower than in steady state years. Consequently, the ability of annual cash flows to meet early debt servicing payments is reduced.

Immediately after a major expansion involving new investment, businesses are often also under increased pressure because the farmer and their staff need to adjust to new roles and responsibilities. The findings of this research shows that financial risk adds further pressure on the business to perform in the early stages of development.

Ultimately, the financial risk associated with expanding a dairy business will differ for each farm and will depend on the equity available, the terms of the loan, how well the borrowed capital is used, a farmer's management ability, the detail of the operation of the farm system and the labour available.



Final thoughts

Expanding a medium sized dairy farm can potentially increase wealth, but there is also increased risk. Dairy farmers considering expanding their farm businesses should consider the economic impact, financial impact, impact of risk, impact on them and their staff and the impact on the technical aspects of the farm. Multi-dimensional questions and problems need multi-dimensional investigations, with each dimension contributing a share of understanding.

Further information

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Australian Government
Department of Agriculture, Fisheries and Forestry



Published by the Department of Environment and Primary Industries, **November 2014**

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Authorised by the Victorian Government, 1 Spring Street, Melbourne 3000

ISSN: 2201-4764

ISBN: 978-1-74146-240-1 (online)

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