

Off-Farm Investments - Are They Worthwhile?

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Introduction

Many farmers traditionally maintain most of their capital in the farming business. This seems to occur not only when all available capital is required to purchase the farm, but also later in the farming lifecycle when expansion or intensification is considered. From the investment practitioner's point of view this behaviour would appear to be sub-optimal, at least at first glance. Most investors in financial assets do not place all of their wealth in one asset, but choose to spread their wealth across a range of assets in order to limit the impact of a major loss in one of those assets. The potential benefits from this diversification process are non-controvertible when one is limited to a universe of financial assets.

That farmers remain undiversified may in part be rationally explained by the unique characteristics of the farm investment. The most obvious of these is that the farmer is required to accumulate a high level of capital in order to purchase a viable farming unit in the first place. At least for the first few years after the farm has been purchased, it is unlikely that the farmer has any surplus cash available for investment in other assets. Further, it appears that many farmers anticipate expanding their operations once the initial position has been consolidated, and this again forces the farmer to invest all of their available capital in the farm business. Thus, the ability to even contemplate off-farm investment is very dependent on the farmers current level in the farming lifecycle.

With these points in mind, it is obviously not possible to clearly demonstrate that off-farm investments are suitable for all farmers. Rather, the intention of this presentation is to provide a framework within which the general features of diversification can be discussed. This is done using some standard paradigms from the world of financial economics, and by imposing the restrictive assumption that an investment in farming can be treated just as any other asset. Such an assumption clearly contradicts the fact that the farm asset will form the cornerstone of the farmers entire investment portfolio, and that that asset is held for reasons that cannot necessarily be quantified in financial terms.

The remainder of the paper proceeds as follows. Firstly I will briefly discuss some standard ways of quantifying financial performance. Secondly I will describe the potential benefits from diversification into various other asset classes, and thirdly I will present some simple examples to demonstrate those benefits.

Measuring risk and return

Keating and Little (1991) report that the two main goals that drive the family farm business are expansion and succession. Expansion can involve either the purchase and development of a larger property or the development of the existing business, and is motivated by the need for increased profitability or by the succession goal. Succession involves the transfer of the farm business assets to the next generation upon retirement of the original owners while allowing for a comfortable retirement income. Both objectives require the annual accumulation of capital.

There are a multitude of ways to quantify the performance of the farming business. For the purposes of this discussion, I wish to compute a return that can validly be compared to the return on a standard financial asset. Returns in financial markets are typically computed as follows:

$$R_t = \frac{(P_{t+1} - P_t) + CF_t}{P_t}$$

where,

R_t = the return in period t

P_t = the value of the asset at the end of period t

P_{t+1} = the value of the asset at the end of period $t + 1$

CF_t = cashflow accruing from the asset during period t .

For comparison purposes, the return to the farming business should be computed in an equivalent manner. The starting and ending “prices” should in this case be the starting and ending values of the farm assets, and the “cashflow” should be computed in the same way as the “Economic Farm Surplus” (EFS) is typically computed for dairy farmers. Note that because the EFS does not include any debt servicing costs, the return to the farm business computed using the above formula will provide a return on the farm assets that is independent from the debt level. This is appropriate for comparison purposes because the returns to other assets are always reported without any effects of leverage. Livestock Improvement computes the returns to dairy farming on this basis as part of their “Economic Survey of Factory Supply Dairy Farmers”. Returns are available for the period of 1988/89-1997/98, and this data is used in the analysis presented in the following sections.

In most cases, actual returns are often used as the basis for estimating the future return. Importantly, this expected return is only a point estimate that is drawn from a number of

possible outcomes. The greater the number of outcomes and the greater the spread of outcomes, the less certain the investor will be of achieving the expected return. This notion of uncertainty is what is meant by the general risk of an investment, and it can easily be quantified using the past history of returns. In most cases risk is described by the standard deviation of returns (σ), which is calculated as follows:

$$\sigma = \left[\frac{1}{n} \sum_{i=1}^n (R_i - \bar{R}_i)^2 \right]^{1/2}$$

where, n = the number of periodic returns used in the calculation

R_t = the period return for period t

\bar{R}_i = the average return over the sample period.

Looking at the formula for standard deviation, it is apparent that our measure of risk is simply based on the average difference between each year's return and the mean return achieved over a particular number of years. Because the calculation is based on the history of returns in unlevered equity, it should also be apparent that the standard deviation measures the level of business risk rather than that due to the level of debt used by the farmer (financial risk).

Table 1: Average returns and standard deviations for a range of asset classes

Asset Class	Annual Average Return	Standard Deviation
NZ Shares	10%	20%
NZ Fixed Interest	7.5%	6%
NZ Cash	4.5%	3.5%
Aust. Shares	11%	20%
U.S. Shares	12%	20%
Dairying – Owner/Operator	11%	9%
Dairying – Sharemilker	5%	10%

* The average returns and standard deviations listed in this table are based on limited data, and should therefore be treated as indicative only.

Having established an approach with which to measure risk and return, it is now appropriate to consider the expected relationship between the two. For rational, risk-averse

investors, it is clear that the expected return from an investment must be positively related to the risk associated with that investment. No one would be interested in investing in a high risk asset if the promised return from the investment did not compensate them for bearing the risk.

It is easy to demonstrate this point by looking back at the past pattern of returns from a number of different asset classes. Table 1 presents the average annual returns and standard deviations for New Zealand shares, New Zealand fixed interest securities, New Zealand cash, Australian shares, and US shares. These data clearly show that the assets which are perceived to be more risky have indeed provided investors with a higher rate of return.

The potential benefits of diversification

Most investors intuitively understand why it is usually sub-optimal to hold only one or two assets. Such a strategy would obviously expose the investor to all of the business risk associated with those particular assets when some of that risk could be offset by simply investing a proportion of the investor's funds in other, unrelated businesses. Even if the investor wants to embark on a high risk - high expected return strategy, it may be possible to construct a portfolio of investments that offers the same return but with a substantially lower level of risk.

The concept of eliminating some of the risk that is unique to a particular asset by simply investing in a variety of assets is called diversification. The practice of diversifying a portfolio is motivated by the fact that by doing so an investor can reduce the risk of the portfolio without having a major impact on the overall expected return. The degree to which this diversification effect will occur is dependent on how the returns from one asset are related to another. For example, an investor will achieve little reduction in risk by combining two assets with very similar business risk because the returns from both assets will tend to move together through time. If, on the other hand, an investor combines assets from two very different industries, it is possible that the high return from one asset will offset a poor performance from the other, and vice versa.

Mathematically, the degree of association between the returns from a pair of assets is measured by the correlation coefficient (denoted by ρ). This measure can potentially vary between -1 and +1, where a low number suggests little association between the returns and a high number suggest a very strong relationship. Because the returns from almost all assets are affected by some common factors (such as the strength of the economy), it is however unusual to find any assets with a correlation coefficient lower than 0.3. The correlation coefficients for the combinations of the asset classes considered in this study are presented in Table 2.

Table 2: Pair-wise correlation coefficients for alternative asset classes

Asset Class	NZ Equity	NZ Fixed Interest	NZ Cash	Aust. Shares	US Shares	Dairying
NZ Equity	1.0					
NZ Fixed Int.	0.40	1.0				
NZ Cash	0.40	0.30	1.0			
Aust. Shares	0.70	0.50	0.25	1.0		
US Shares	0.60	0.40	0.30	0.675	1.0	
Dairying	0.55	0.30	0.20	0.40	0.10	1.0

A simple example might help to solidify the concept. Consider an investor who has the choice of the following two assets.

Asset	A	B
Expected returns	7%	15%
Standard deviation	12%	30%
Correlation coefficient	0.5	-

The investor can invest all of his funds in Asset A, Asset B, or he can split the investment between the two assets. If we assume that the investor wants a relatively safe investment but with an expected return greater than that offered by Asset A (the safer of the two investments), he might consider a portfolio that consists of 50% of asset A and 50% of asset B. That combination provides an expected return of 11% and a standard deviation of 17.5%. Note that the return is just the average of the returns from the individual assets but, due to the benefits of diversification, the portfolio standard deviation is less than the average of the individual standard deviations.

Some possible benefits of off-farm investment

Risk reduction As discussed in the previous section, the potential for reducing risk by diversifying is critically dependent on the number of different asset classes included in the portfolio, and the strength of the relationship between those asset classes.

To demonstrate the potential for risk reduction, consider the position of a farmer who has amassed surplus capital of \$500 000 and who wishes to invest the capital profitably over a planning horizon of 15 years. Also simplistically assume that the farmer has two investment options. The first involves expanding the dairying operation, while the second involves the purchase of a portfolio that potentially consists of the five asset classes listed above. To isolate the impact of diversification, the make-up of the portfolio of financial assets is determined such

that the expected return is the same as that from the farm expansion. Using the expected return and standard deviation data presented earlier, we can easily calculate and compare the following information regarding the terminal wealth for both plans.

	Farming Expansion¹	Portfolio of Financial Assets²
Expected Return (p.a.)	8%	8%
Standard Deviation (p.a.)	15%	8.5%
Expected Ending Wealth	\$1,586,000	\$1,586,000
Potential Range	\$290,000	\$160,000

¹ We have a very limited amount of historical data from which to form expectations of future risk and return. I have subjectively set the expected return to 8% and the standard deviation to 15% in an attempt to reflect the likely outlook for dairy farming.

² It can easily be shown that the combination of asset classes that provides the minimum risk portfolio, given the constraint that expected return equals 8%, is as follows: 15% NZ shares, 33% NZ fixed interest, 27% NZ cash, and 15% US shares.

The “Potential Range” measure requires the assumption that returns are normally distributed. It reflects the potential deviation in the terminal wealth from following the alternative plans and can be interpreted as follows: there is approximately a 66% chance that the terminal wealth from the farming expansion (portfolio of financial assets) will lie within \$290 000 (\$160 000) of the expected value of \$1 586 000. Because the spread of possible outcomes from investing in the portfolio is lower than that from the farming expansion, we consider the portfolio investment to have lower risk. Put another way, these figures can lead one to suggest that the chance of an adverse outcome 15 years from today is significantly lower for the portfolio alternative.

Return enhancement Consider an established farmer who does not wish to expand further, and who wishes to concentrate on accumulating capital for both retirement and to enable a smooth succession to the next generation. Further, assume that the current debt level is low enough such that the servicing requirements are likely to be safely covered by the farm cashflow under all likely future conditions; the annual constant principal repayments are \$3000 per month and the current interest rate is 8%. Like the last example, assume that the farmer can either increase his investment in dairying (this time by repaying debt) or alternatively he can use the money to invest off-farm in a number of different asset classes.

Table 3: Computed increases in terminal wealth from diverting principal repayments to off-farm investment.

Planning Horizon	Return Differential				
	1%	2%	3%	4%	5%
10	\$18 500	\$38 160	\$59 250	\$81 750	\$105 846
15	\$42 350	\$89 000	\$141 000	\$198 000	\$262 000
20	\$77 000	\$165 000	\$265 000	\$380 000	\$513 000

Assume that the monthly payment is \$3000. Alternative planning horizons are shown in the left column, and alternative return differentials are shown in the top row. The return differential is measured as the difference between the expected return from the investment portfolio and the cost of debt.

Table 3 presents a range of potential increases in terminal wealth when the off-farm investment alternative is chosen. The table gives results for planning horizons of 10, 15, and 20 years and return differentials that range between 1% and 5%. For example, assuming a 15 year planning horizon and a return differential of 3%, the farmer stands to accumulate approximately \$150 000 more by following the off-farm investment option. Although it is not explicitly accounted for in this example, it is important to note that the investment portfolio also provides a degree of asset diversification. That is, by investing in assets whose returns are not closely related to those for dairying, the terminal wealth of the farmer is less reliant on the future value of just one asset class—the value of the farming asset.

Conclusion

The preceding examples have demonstrated that off-farm investments can, in general, be clearly worthwhile. It is however not possible to unequivocally state that all farmers would benefit from pursuing an off-farm investment strategy. The optimal policy for each farmer will depend on many factors including the current stage of the farmers career, the degree of risk aversion, the amount of existing financial risk, the length of the planning horizon, and the relative degree of expertise in dairying.

Workshop Summary. Off Farm Investments - Are They Worthwhile?

Whether off farm investments (OFI) are worthwhile will depend on the stage of an individual's farming career, their attitude to risk, and the period the planning horizon is looking at.

OFI is easier to achieve now than it ever was because of the range of retail options that are available; small investment packages with little if any expertise are possible instead of the larger sums previously associated with commercial buildings, rental property, etc. There are also better options exist for controlling the sharemarket risk.

When comparing options, ensure that the measurement method is similar. It should include the cash returns and the capital appreciation (depreciation), and eliminate the impact of leverage (borrowing).

Motivation for OFI should not be simply because there is spare cash, but also to reduce risk (against uncertainty of future returns) and/or enhance returns.

Issues from the discussion sessions

- Where is the best place to get expertise to assist with OFI and not get ripped off? The Mutual Funds approach from any of the options in the market offers a range of returns and risks. Research shows that managers who charge a fee (1-2%) for their expertise on average give no better return than the retail options when the fee is deducted. The various rating systems used for Fund Managers are based on historical returns, and do not take into account the risk that their portfolios may be exposed to.
- Debt reduction is not always a good alternative investment. Using the margin between interest rate and possible safe financial portfolio's may spread the business assets across a wider range of unrelated sectors, for a greater total return over a medium to long planning horizon (10-15 years)
- Is there a base level of debt, or trigger point at which to begin investigating OFI? No - it depends entirely on successfulness/risk of present operation. This will vary as a person moves through their farming career.
- Land and scale of operation have been the security nets dairyfarmers have invested in past 20 years - values of land may not change as much in next 20 years as returns for product decline steadily. A farming business that has expanded may in fact be more exposed when risk is considered as well.

Summary

Many attendees were looking for information on specific options (eg. venture capital, share market, Government stock) to show different possible returns.

However the principles of how to evaluate options, repeated over and over at the workshops, will always mean that every case needs to be considered on its merits.