Reducing the business risk in expanding grain farm businesses

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Contributed presentation at the 60th AARES Annual Conference, Canberra, ACT, 2-5 February 2016
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Project funded by DAFWR, DAFWA and UWA
Business Expansion is risky

Increasing scale provides for efficiency gains and larger profit potential….essential for long term survival

BUT, it usually requires

- More land
- More working capital
- New technology
- More labour and training
- Better information systems and management skills
Financing farm expansion

- Conventional: Buy up the neighbours using bank finance.
- Pragmatic: Short term lease additional area.
- Emerging: Lease from foreign pension fund acquisition – Westchester model.
- Potential for broadacre: Equity Partnerships – as in NZ dairy
- Exceptional: Collaborative farming SA example.

All these strategies involve more financial risk in a changing climate….SO how can the risks be managed?
Can expansion risk be reduced by cost control strategies and clever financing?
How much did the low-cost strategy reduce business risk?

- We modelled the effect of radically lower fertiliser application over historical and future seasons to better understand the
Location of the case study farm in Western Australia

- The Tammin Farm is in the medium rainfall zone (320mm)
- Australian grain cropping areas
Is lowering fertiliser cost likely to be an effective strategy to lower seasonal risk?

- Added Nitrogen is about 25% of variable operating costs
- Reduce applied N rates to around 8 Kg N/ha. for a breakeven yield of 1.3 tonne/ha. and .7 tonne per ha. operating.
- BUT.. Profit from nitrogen fertiliser application has been a main difference between farms. Typically in M3 region between 35 and 45 units /ha.
Outline of the Modelling approach

CLIMATE MODEL f
Seasonal rainfall and temperature 1980-2010 and 2010-2040

APSIM
Generates Wheat yield from seasonal rainfall and temperature by daily growth simulation

Whole Farm Business Profit- and variability
Generates whole farm profit and distribution for 40 seasons incorporating crop yields, rotations and soil types
Results - Input Strategy

Average Profit Based on APSIM Yields

Historical Climate

- N0
- N20
- N50
The difference function between two rates of applied N and zero for previous seasons

CDF of Annual Profits Relative to N0 using Current Climate Data

-2,000,000 -1,000,000 0 $1,000,000 $2,000,000 $3,000,000 $4,000,000

% of years

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Annual profit

N20 N50
Observations

- The low cost strategy with lower N rates appears to be a very effective part of the low cost approach to managing the business expansion risk in a changing climate.
- There are many elements to lowering costs and making it work.
- The next area of inquiry is whether farm expansion in a different climatic location can be a less risky option than buying the farm next door.
Can Novel Business structures reduce Farm expansion risk?
Climate Sites in WA Wheatbelt
Possible Farm Business expansion structures

- Adjacent property with consolidation
- Remote purchase
- Joint venture
Problems in identifying opportunities

- Climate correlation may not match potential yield due to variation in the yield gap across rainfall zones.

- Actual land prices in different locations can diverge from efficient risk/reward valuations.
Remote combinations were ranked on combined value

- although there are opportunities for farm expansion that are less risky, identifying those opportunities is not a simple task

- \( \text{Var}[A+B] = \text{Var}[A] + \text{Var}[B] + 2r \text{Var}[A]^{0.5} \text{Var}[B]^{0.5} \) (where \(-1 \leq r \leq 1\))
- We expect that uncorrelated climates will result in more valuable combinations
Main Finding

Offsetting season is not the main driver of combined value

Expected returns

\[ r = -1 \]

\[ r = 0 \]

\[ r = 1 \]

\[ \text{Expected returns} \]

\[ \text{Standard deviation of returns} \]

\[ (\text{Var}[A])^{0.5} \quad (\text{Var}[B])^{0.5} \]
• Expansion with a farm of similar seasonal risk was shown to have a large influence on the value of expansion which was enhanced by the difference in climate.

• Combining assets with different riskiness may not reduce overall variability, because climate correlation is minimal in these situations.
Other considerations

- The conventional approach of adjoining expansion can also be segmented into contributions from economies of scale-reduced overhead costs and bulk-purchasing discounts.
Some big questions

- Question the economies of size or scope on offer?
- Evaluate enterprise complementarities that increase expected returns or lessen the variance of returns.
- Expected returns and the variance of returns may be affected by the nature of the topography, soils, enterprises and physical assets of the farm about to be purchased?
- Question additional travel or management costs associated with the expansion?