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A Framework for Modelling Whole-Farm Financial Risk (PowerPoint)

Tom Nordblom^{1,2} Tim Hutchings² (Economics & Finance)
Richard Hayes^{2,3} Guangdi Li^{2,3} (Pasture Agronomy)

1. Economic Research, Strategic Policy & Economics, NSW Trade & Investment, Wagga Wagga Agricultural Institute
2. Graham Centre for Agricultural Innovation (alliance between Charles Sturt University & NSW Department of Primary Industries), Wagga Wagga Agricultural Institute
3. NSW Department of Primary Industries, Wagga Wagga Agricultural Institute

Contributed presentation at the 59th AARES Annual Conference,
Rotorua, New Zealand, February 10-13, 2015

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A FRAMEWORK FOR MODELLING WHOLE-FARM FINANCIAL RISK

Tom Nordblom ^{1,2} **Tim Hutchings** ² (Economics & Finance)
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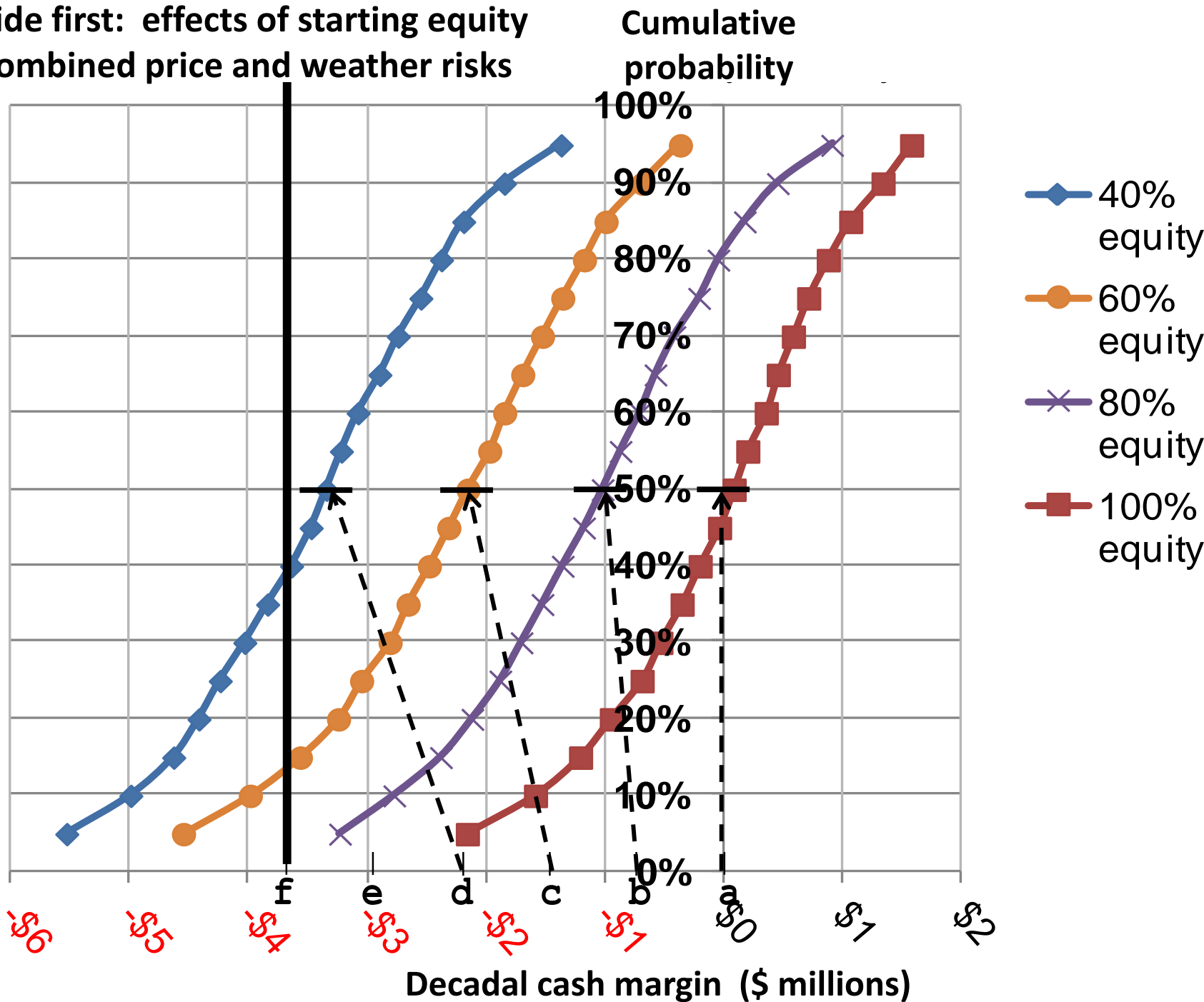
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Final slide first: effects of starting equity
given combined price and weather risks




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- ➔ • SMA is a whole-farm multi-period approach, which considers all costs, price & weather variations and equity, over random decades to generate risk profiles of decadal cash balances

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- SMA is a whole-farm multi-period approach, which considers all costs, price & weather variations & equity, over random decades to generate risk profiles of decadal cash balances
- Case study is a rainfed mixed-farm in Coolamon
- ➡ • Different farm practices (pasture species & stocking rates) are considered in both analyses

Case study farm rainfed mixed-cropping Coolamon area of NSW

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Prices	↑	↓	→	→	↑	↓	↓	↑	→	→
Weather	→	↑	↓	→	↑	↑	→	↓	↓	↑

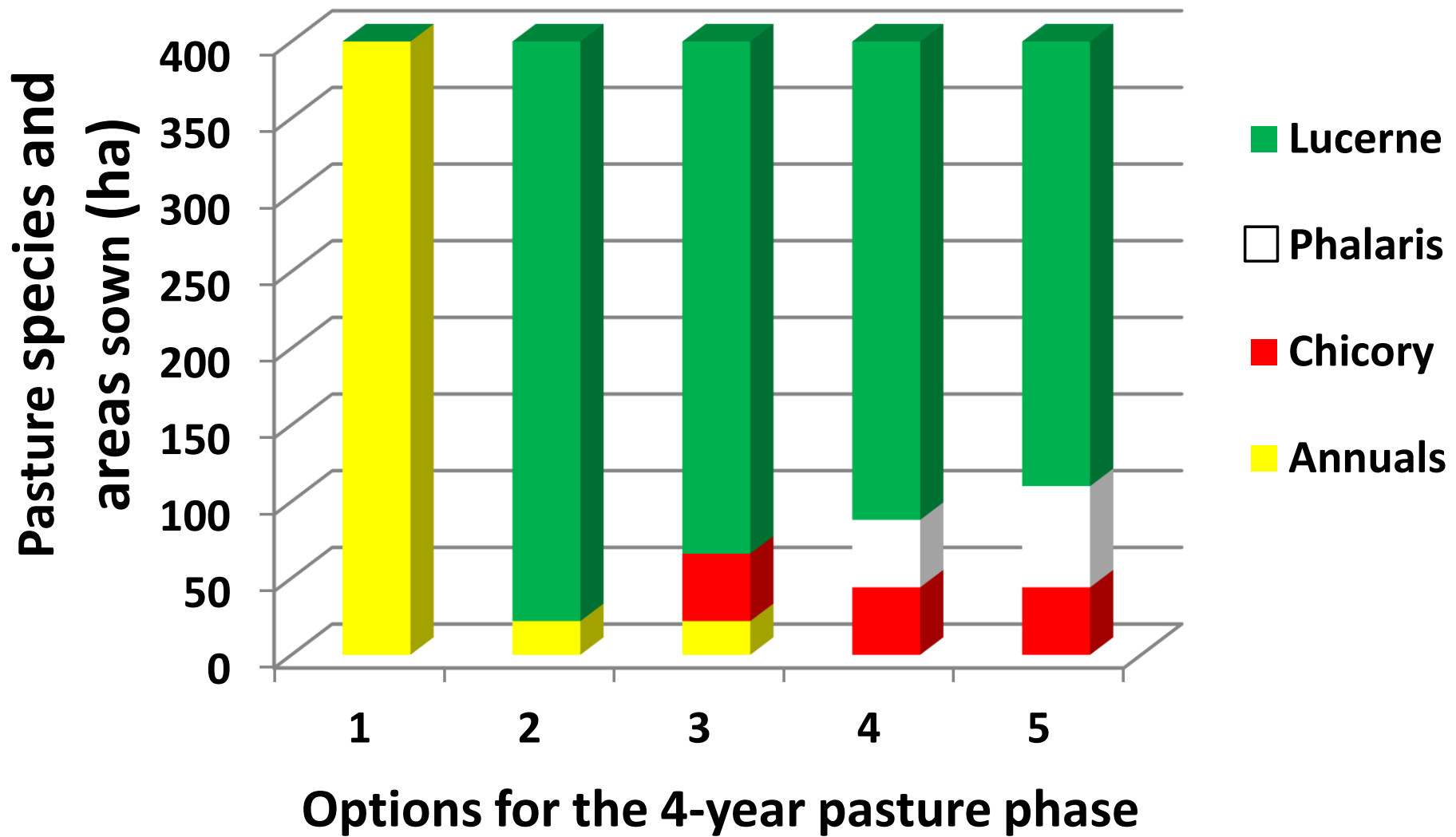
Paddock area

No. (ha)

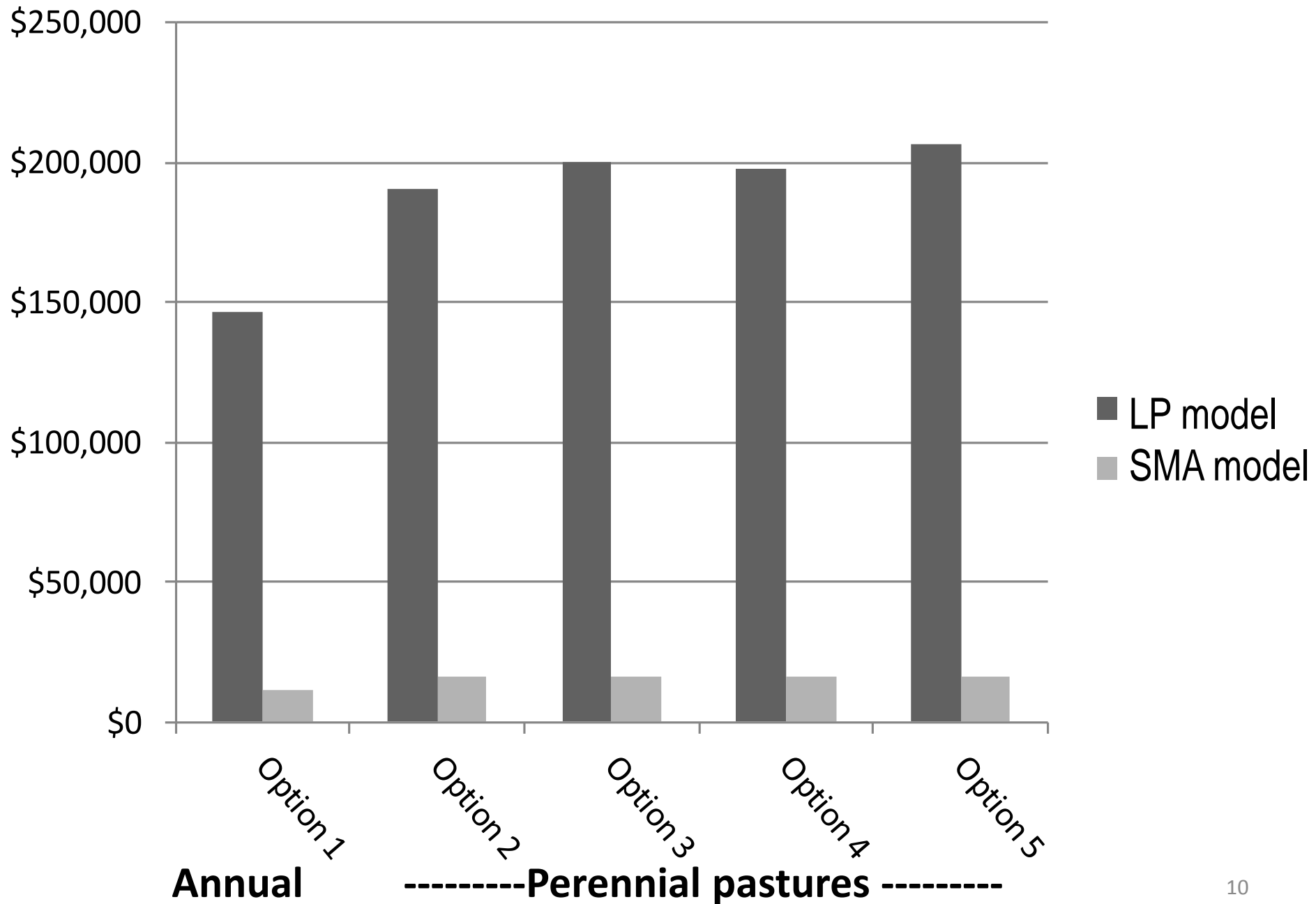
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10. 100

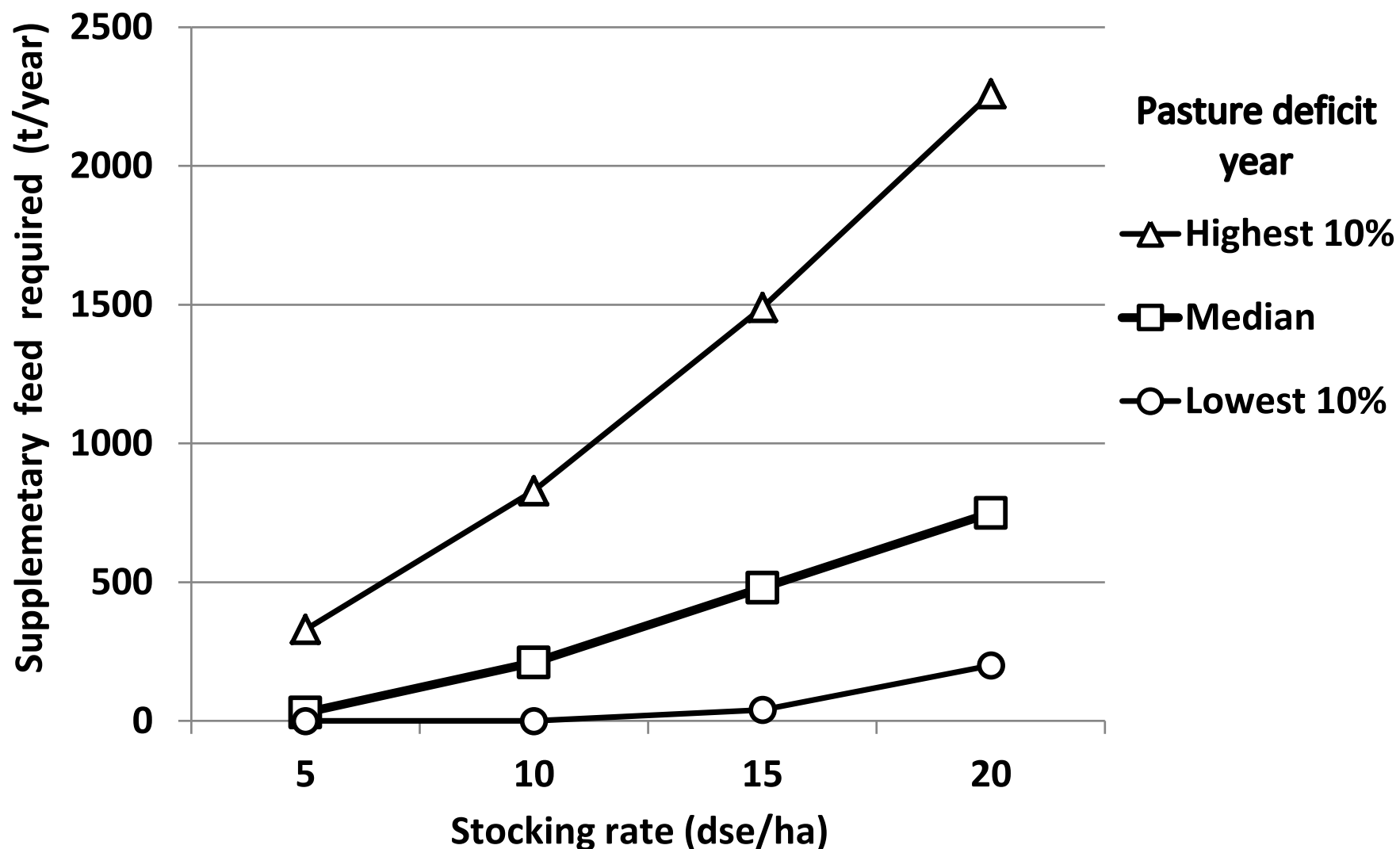
Total 1,000



Average profits, by partial budget (LP) and by SMA considering price & Wx risks



Feed requirements increase with stocking rates and dry conditions



**The slides that follow give results from
Sequential multivariate analysis (SMA)
(Hutchings PhD, 2013)**

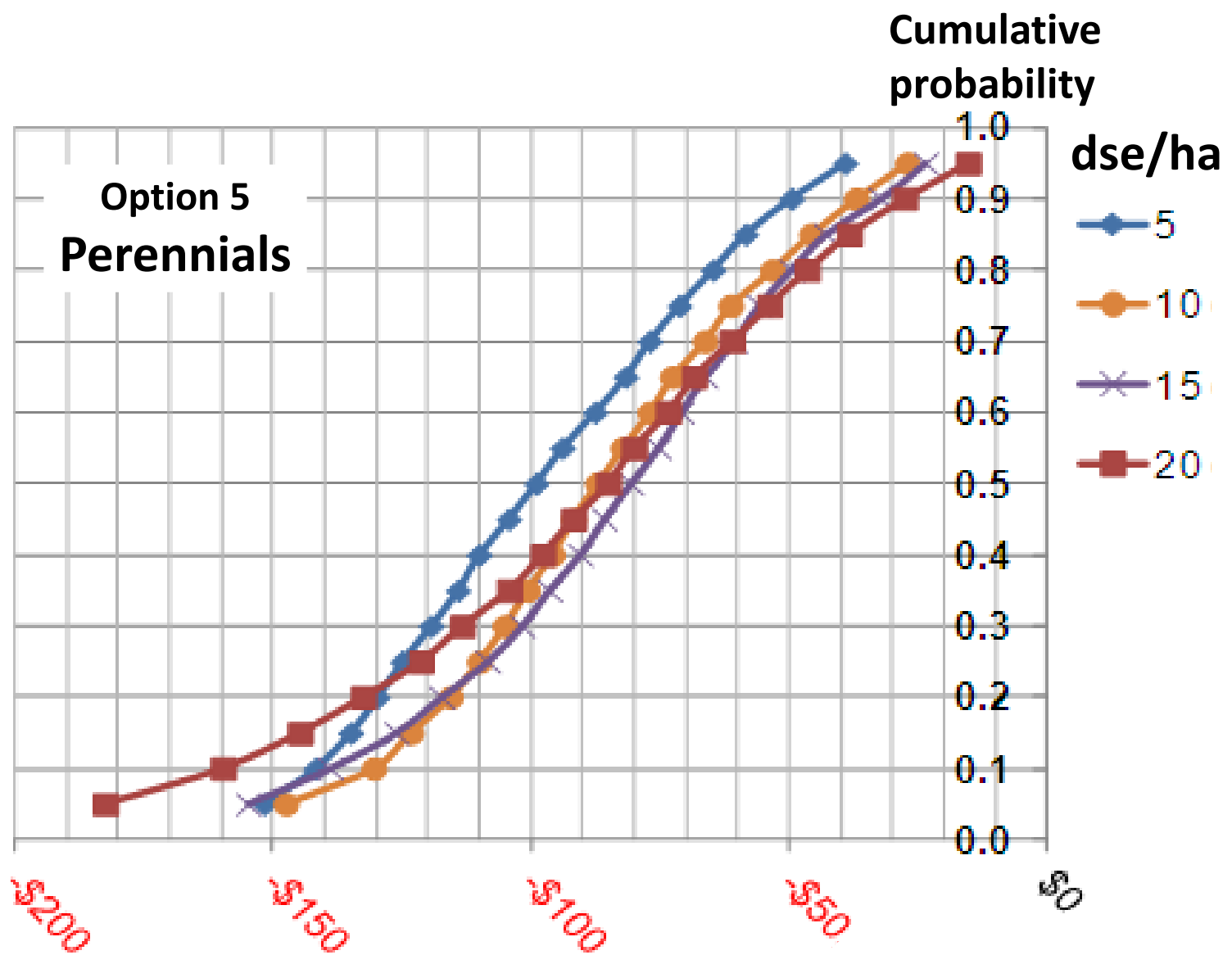
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These are in terms of probability distributions of **decadal changes in whole-farm cash balances**, over 1,000 ten-year samples of variable weather and prices.

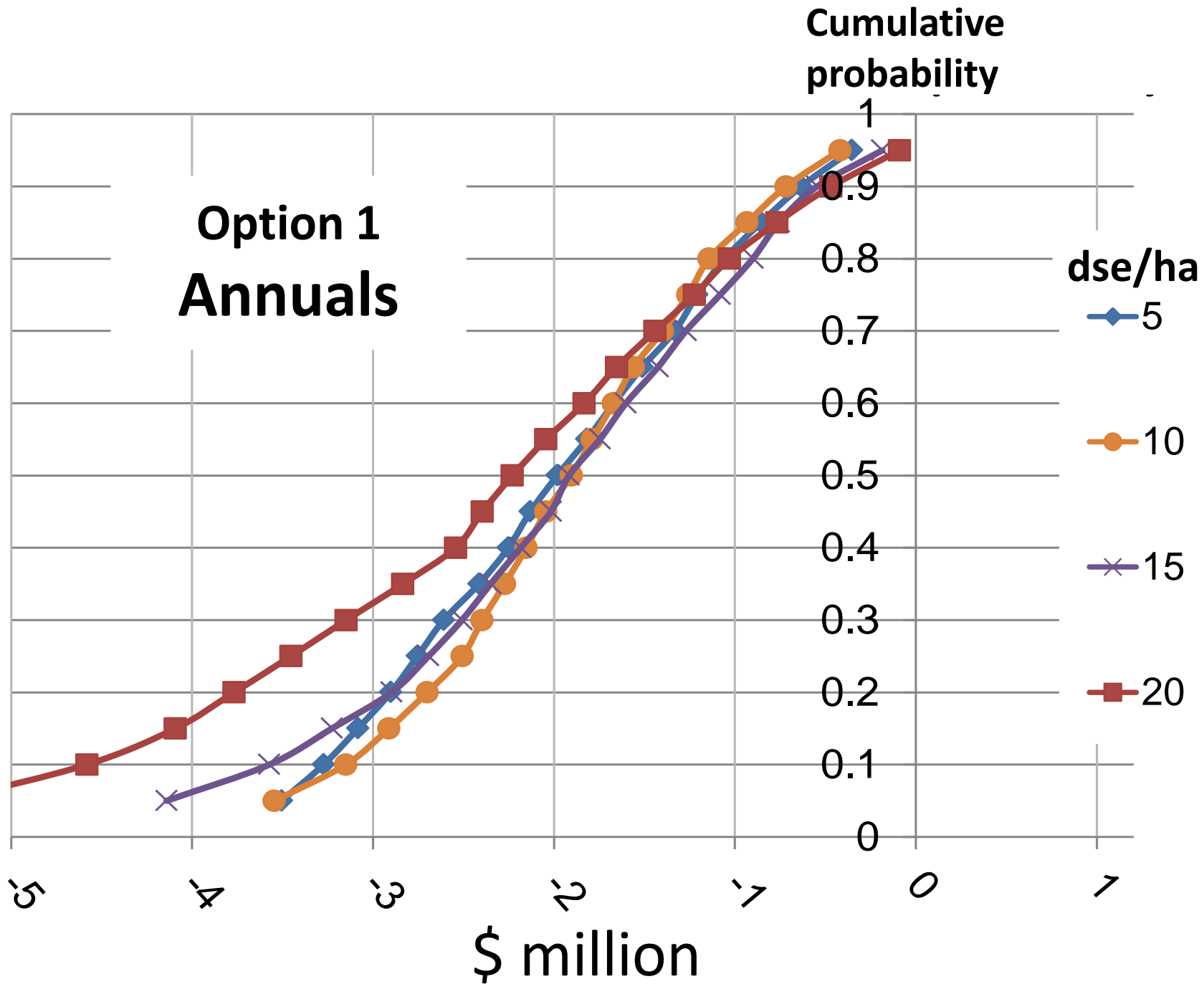
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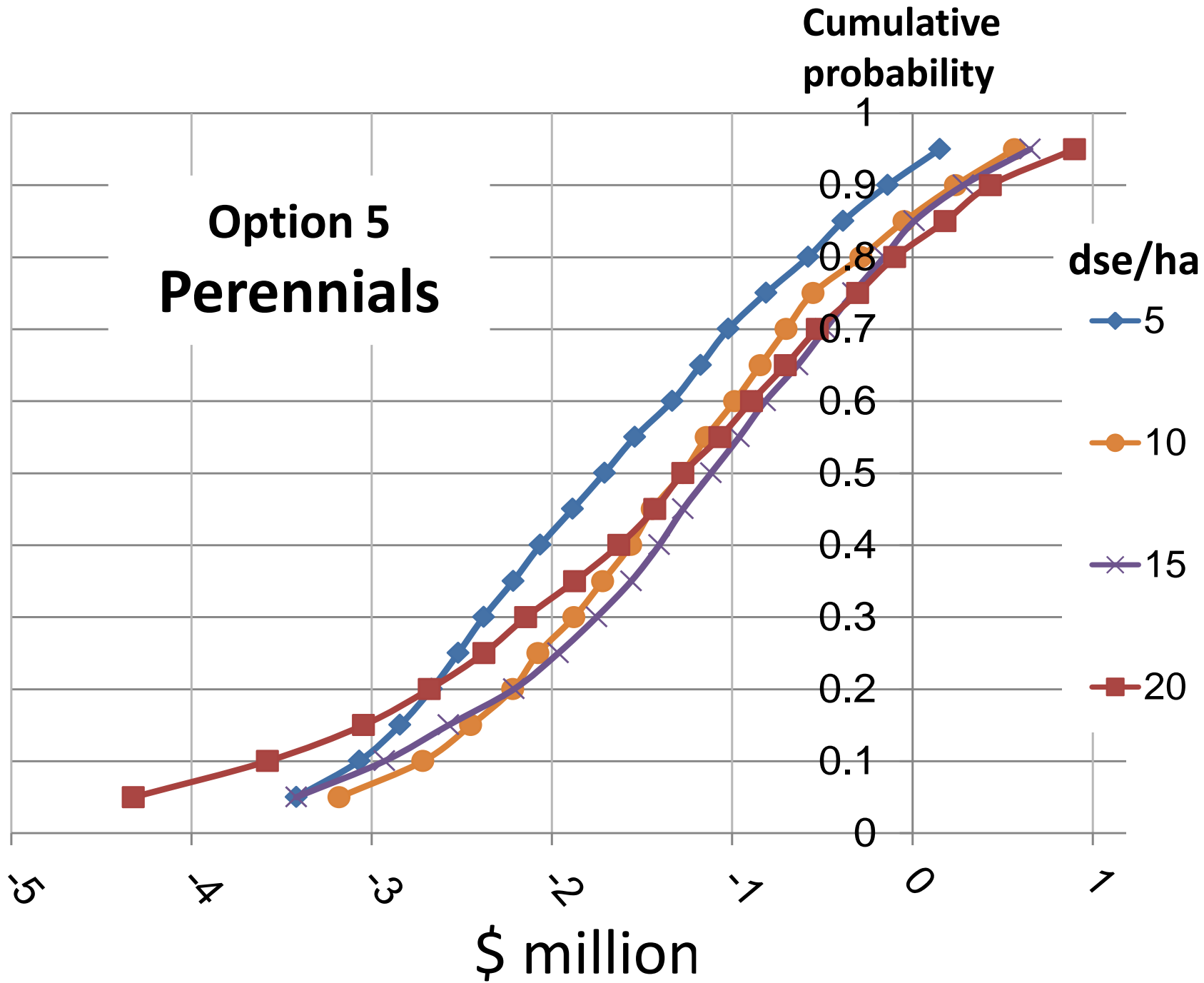
Expressed as **CDFs**
(cumulative distribution functions)



Annualised decadal cash-flow reductions
due to interest (\$'000)



Option 5 Perennials



Annualised whole-farm decadal cash
margins (\$ thousands)

100
0
-100
-200
-300
-400
-500

0

5

10

15

20

dse/ha

Annals

Cumulative
Probability

Decile 9
decades

0.9

Best

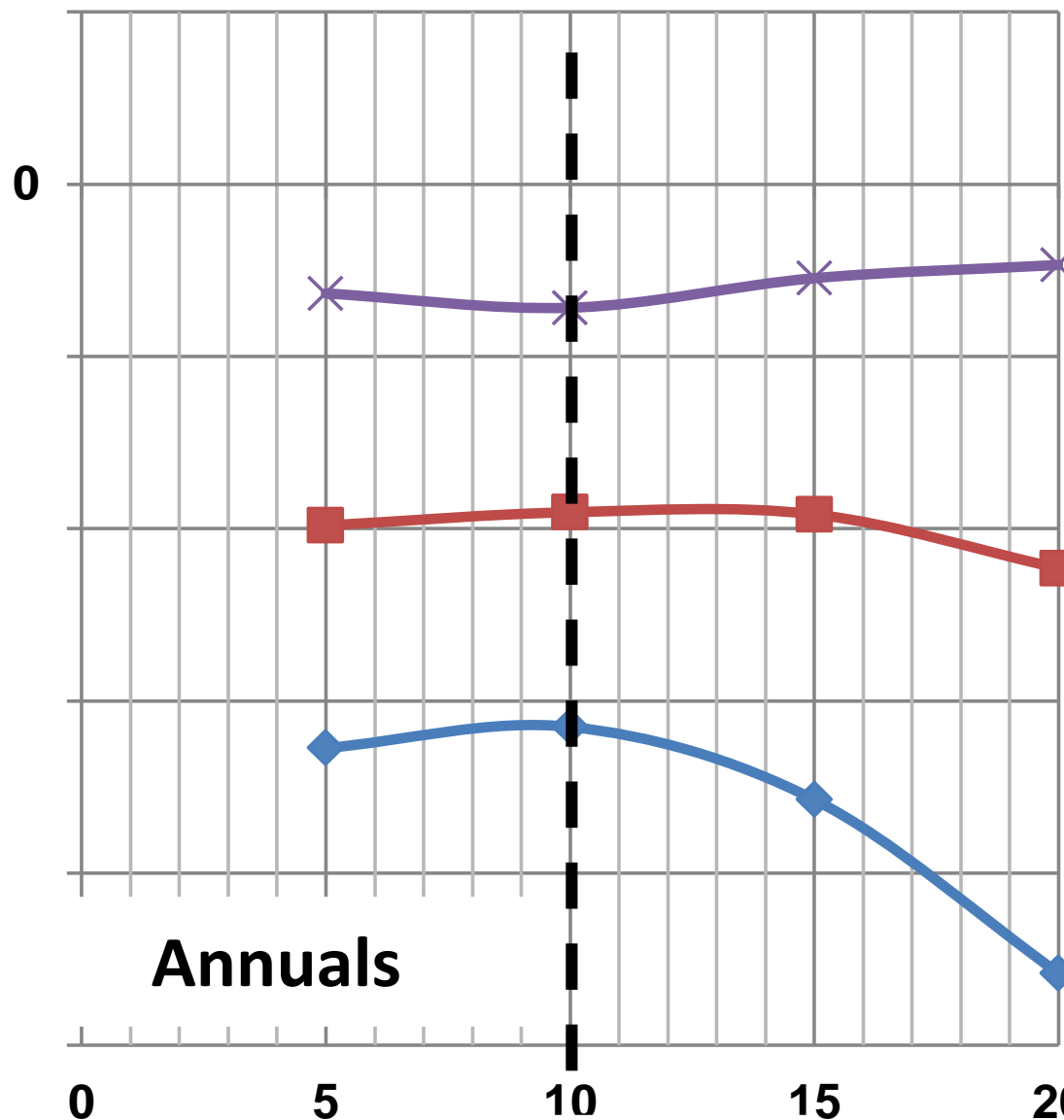
median
decades

0.5

Decile 1
decades

0.1

Worst



Annualised whole-farm decadal cash
margins (\$ thousands)

100

0

-100

-200

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-400

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dse/ha

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Best

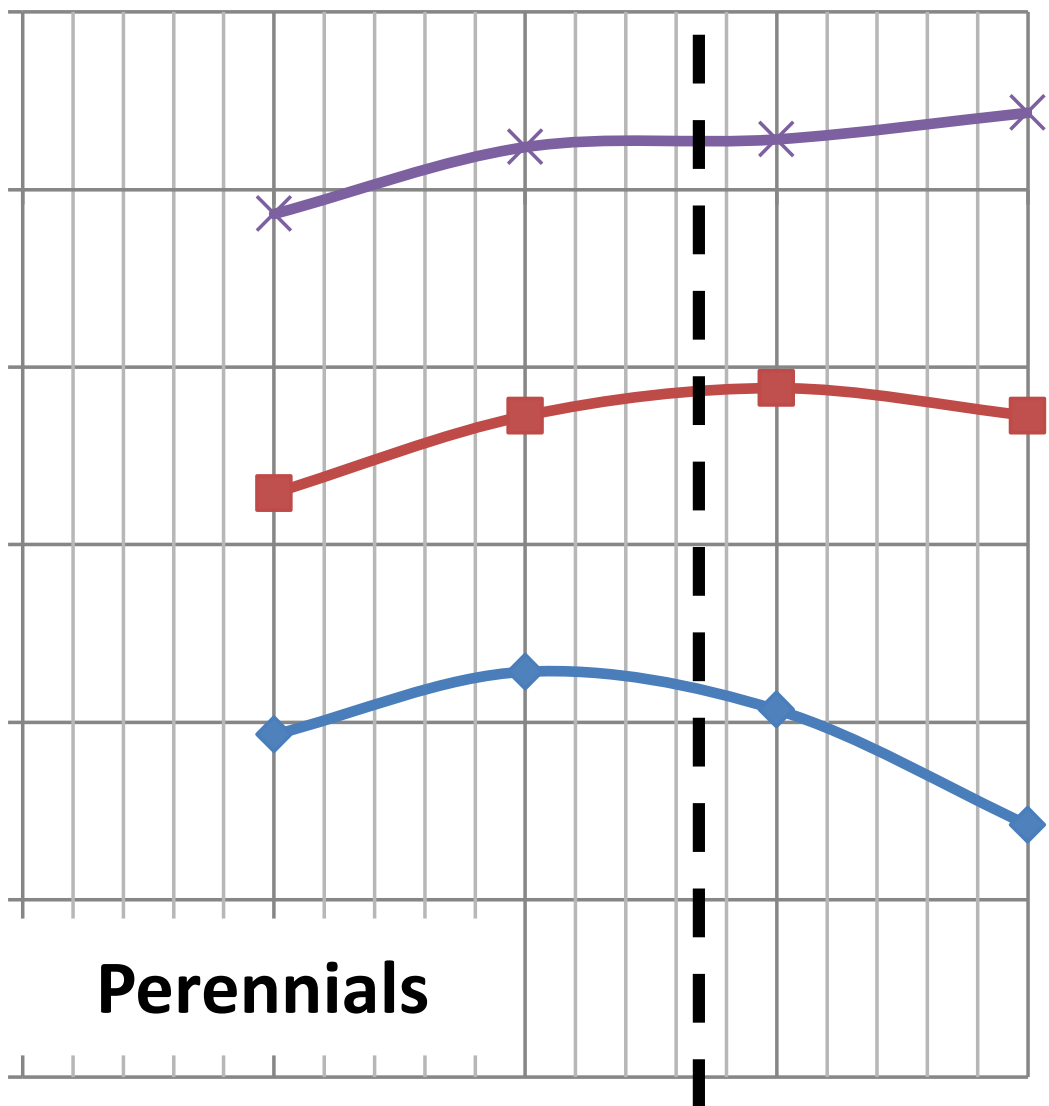
median
decades

0.5

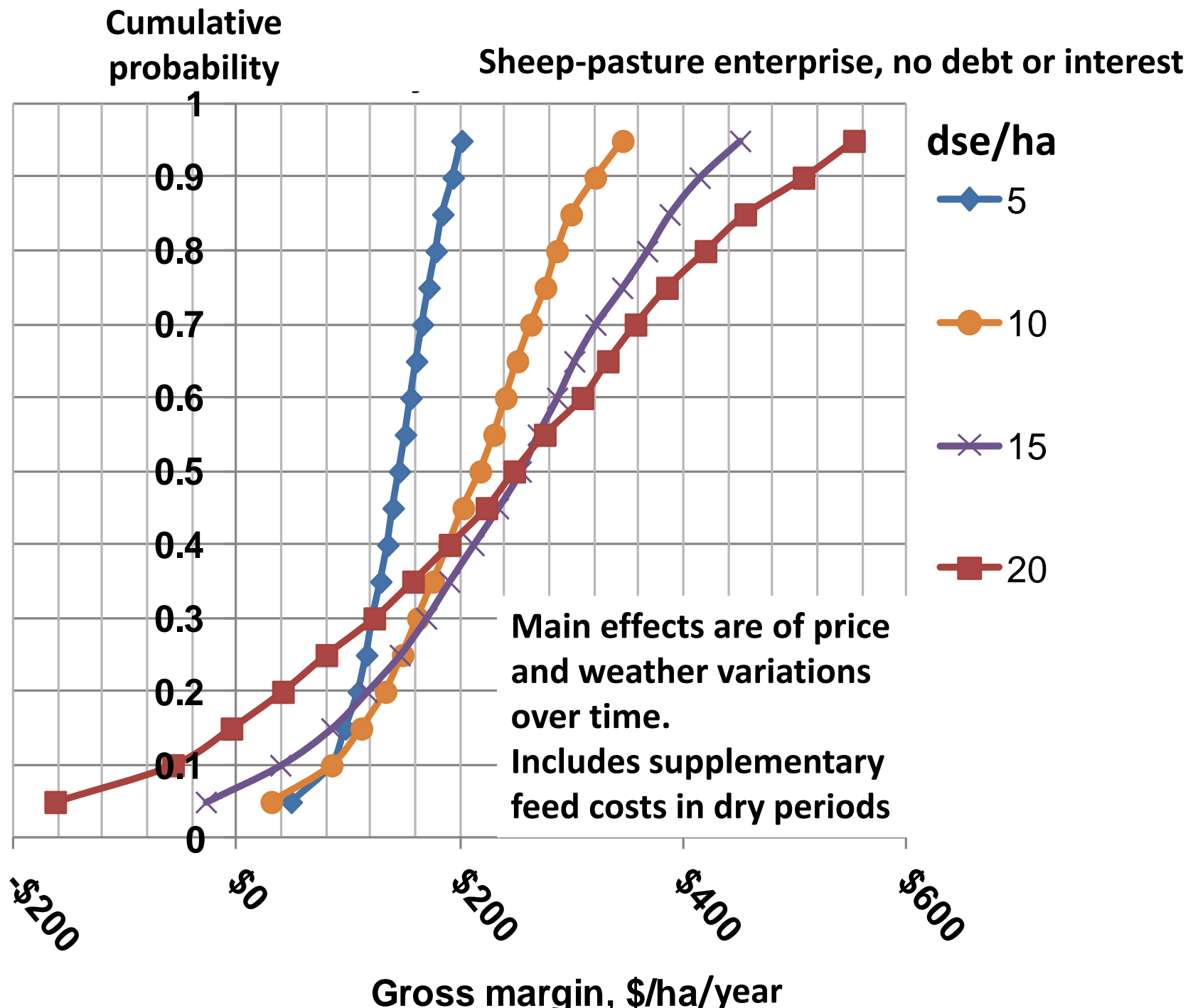
Decile 1
decades

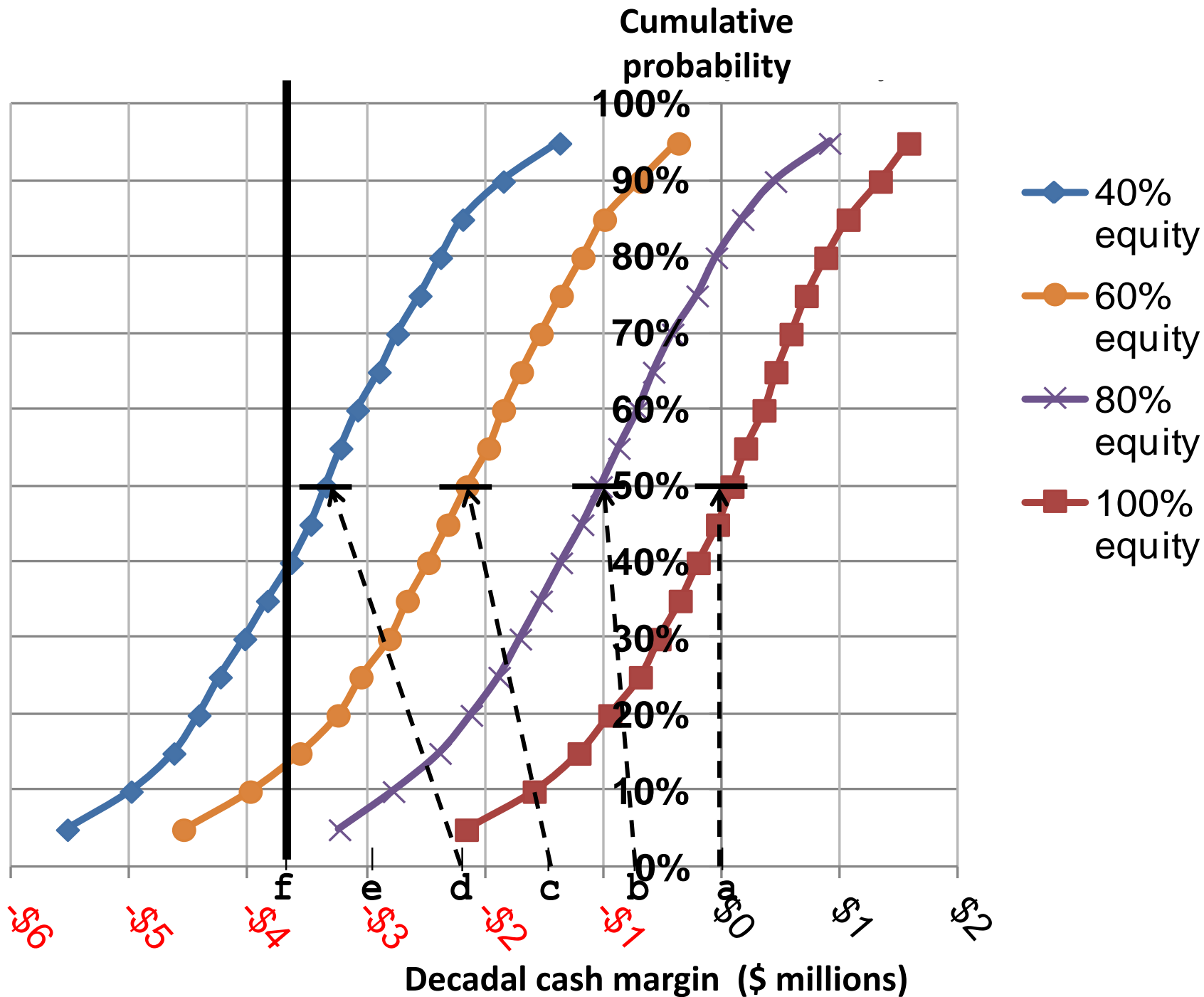
0.1

Worst



Because the whole-farm SMA results with perennial pasture options (all mainly lucerne) appear to dominate those for annual pastures, we simplify the remaining discussion by focusing only on perennial Option 5 (75% lucerne).





CONCLUSIONS

- ➔ • We have shown how whole-farm modelling with SMA , considering all costs, price & weather variations and equity, can generate risk profiles of decadal cash balances for different farm practices (e.g., pasture species & stocking rates)

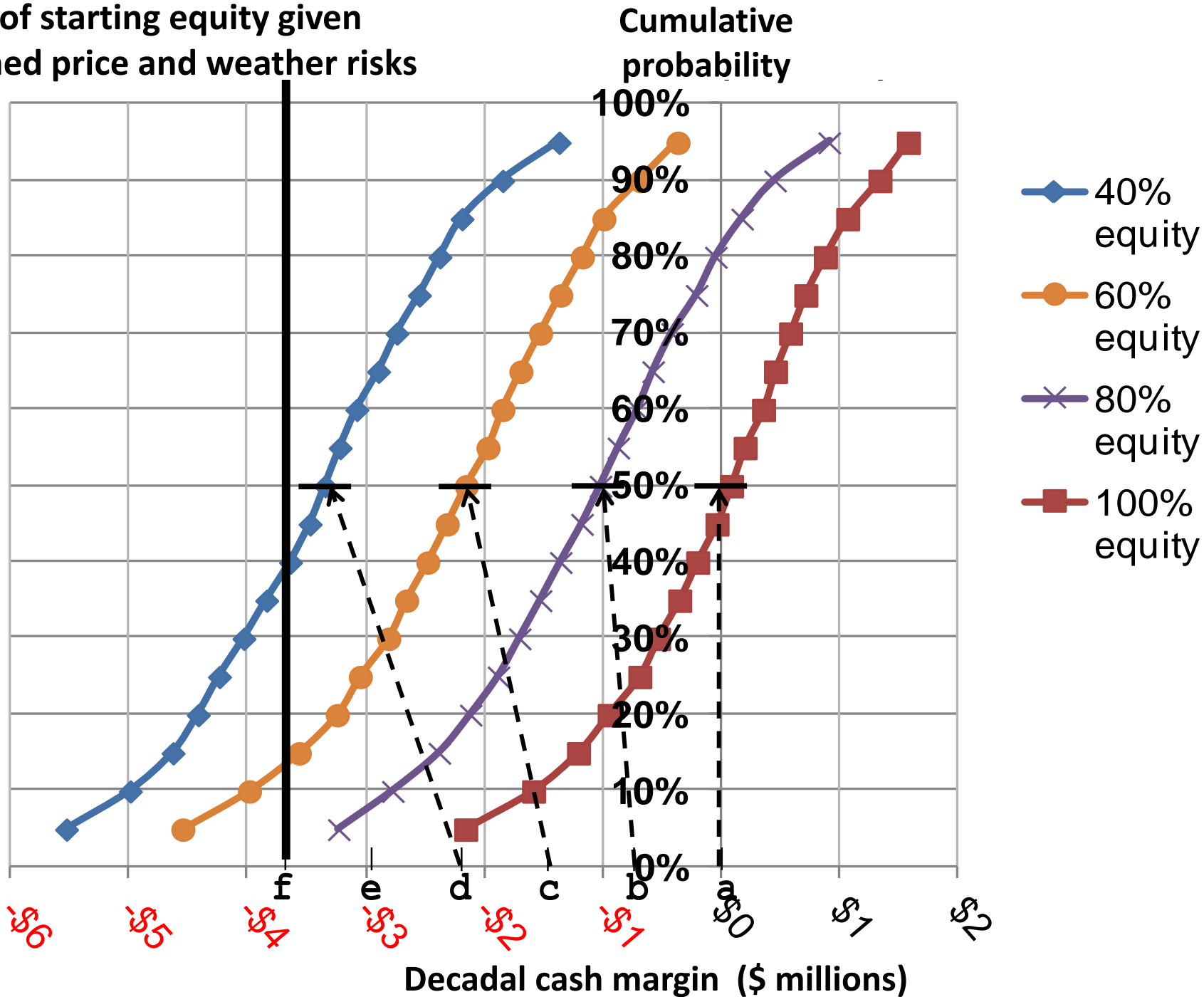
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- We have shown how whole-farm modelling with SMA , considering all costs, price & weather variations & equity, can generate risk profiles of decadal cash balances for different farm practices (e.g., pasture species & stocking rates)
- Advice based only on partial budgeting (e.g., LP) can be misleading
- ➡ • Farm debt can accumulate rapidly by following advice to increase income based simply on gross margins under average conditions, without regard for price and weather variability.

Effects of starting equity given
combined price and weather risks



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