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

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A FRAMEWORK FOR MODELLING WHOLE-FARM FINANCIAL RISK

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

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GRDC

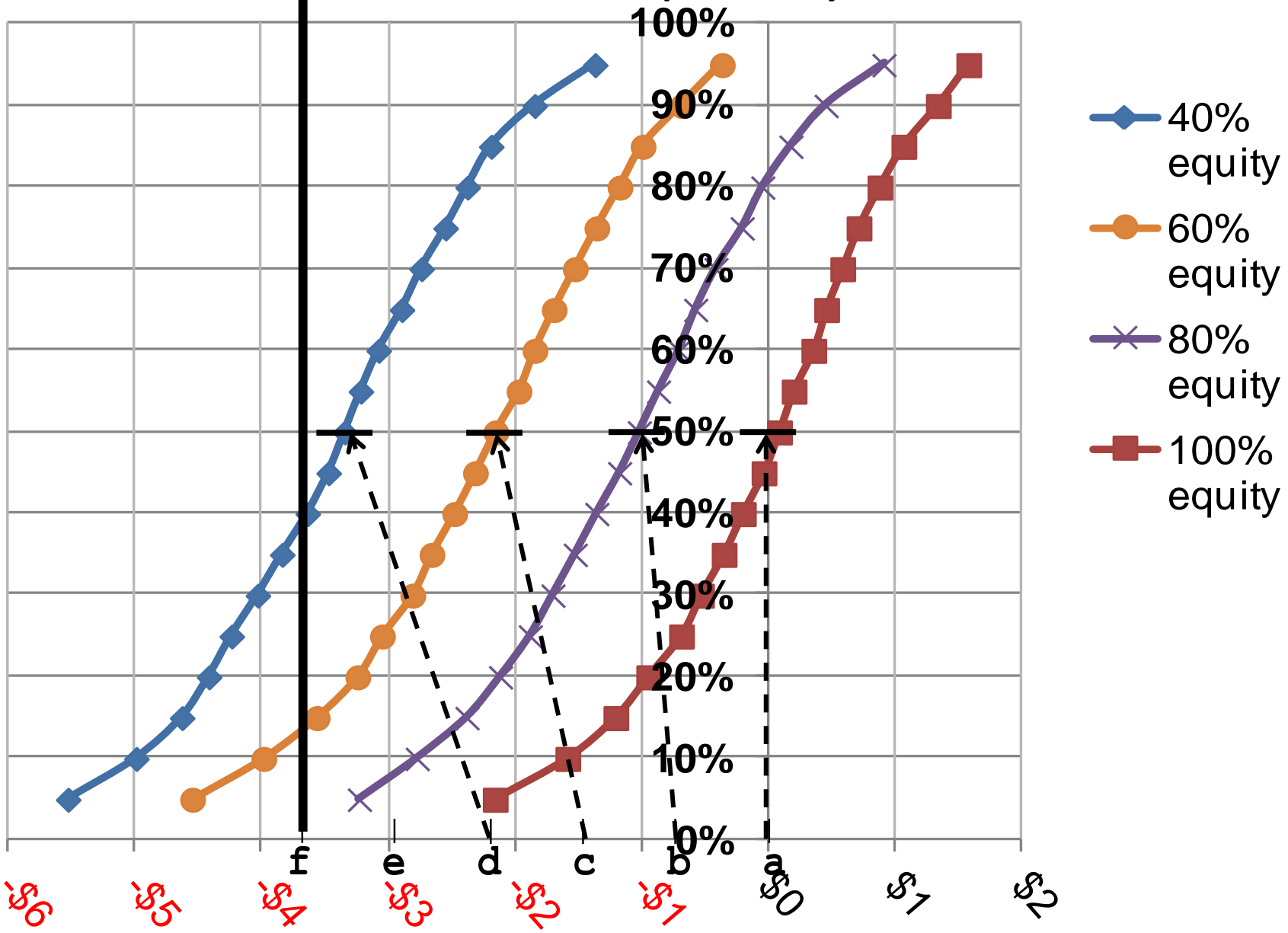
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Final slide first: effects of starting equity given combined price and weather risks

Cumulative probability




Decadal cash margin (\$ millions)

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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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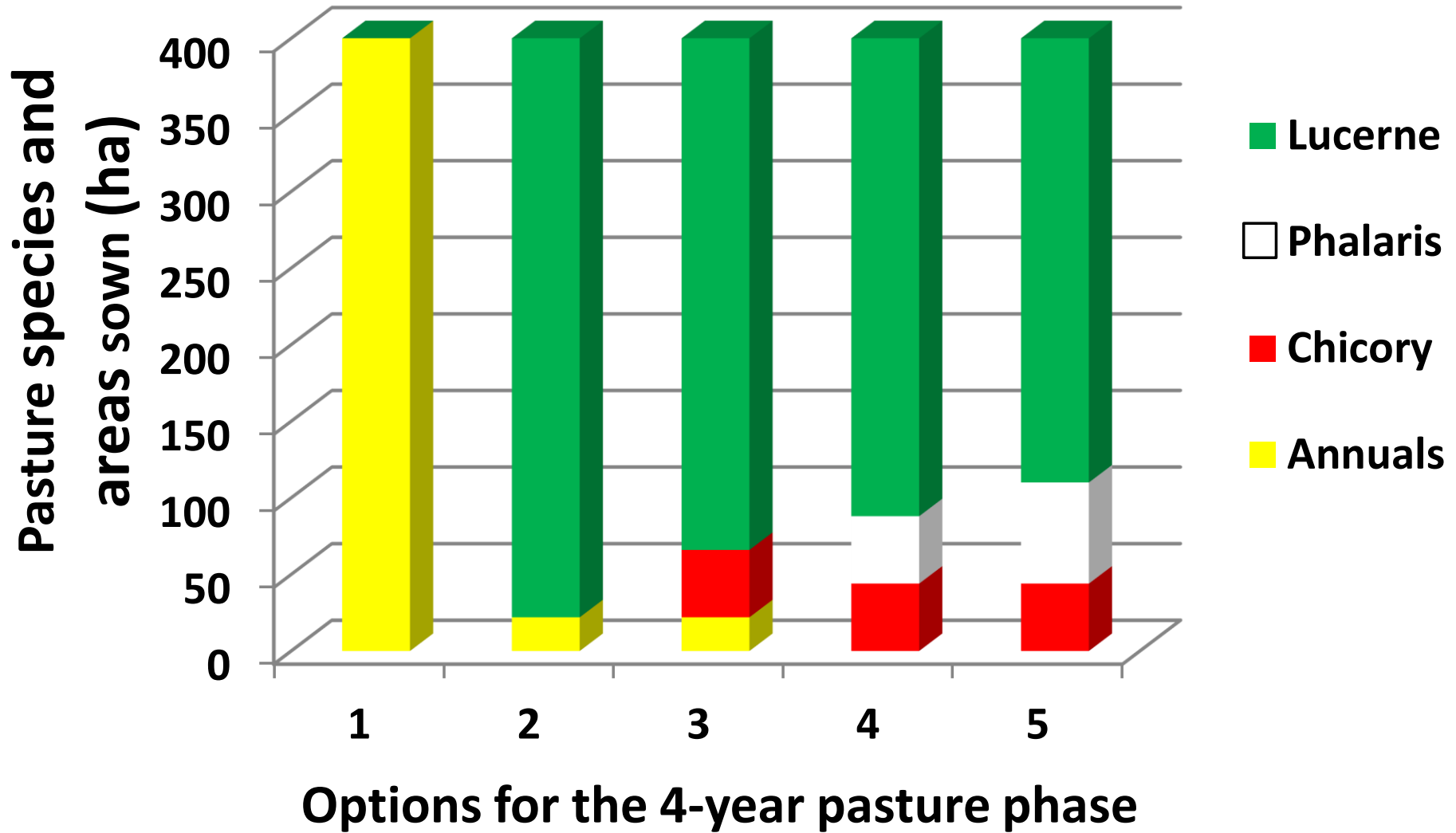
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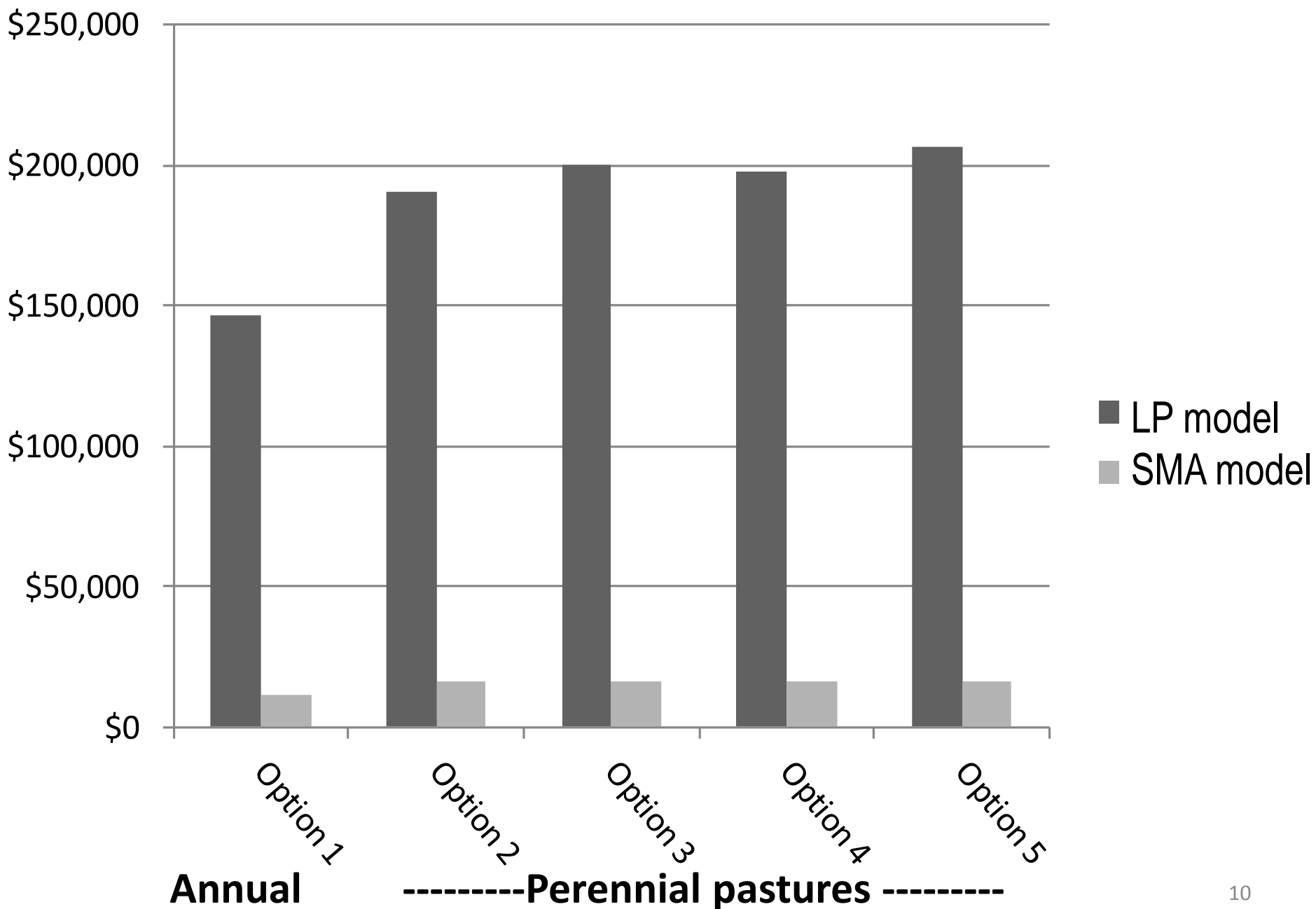
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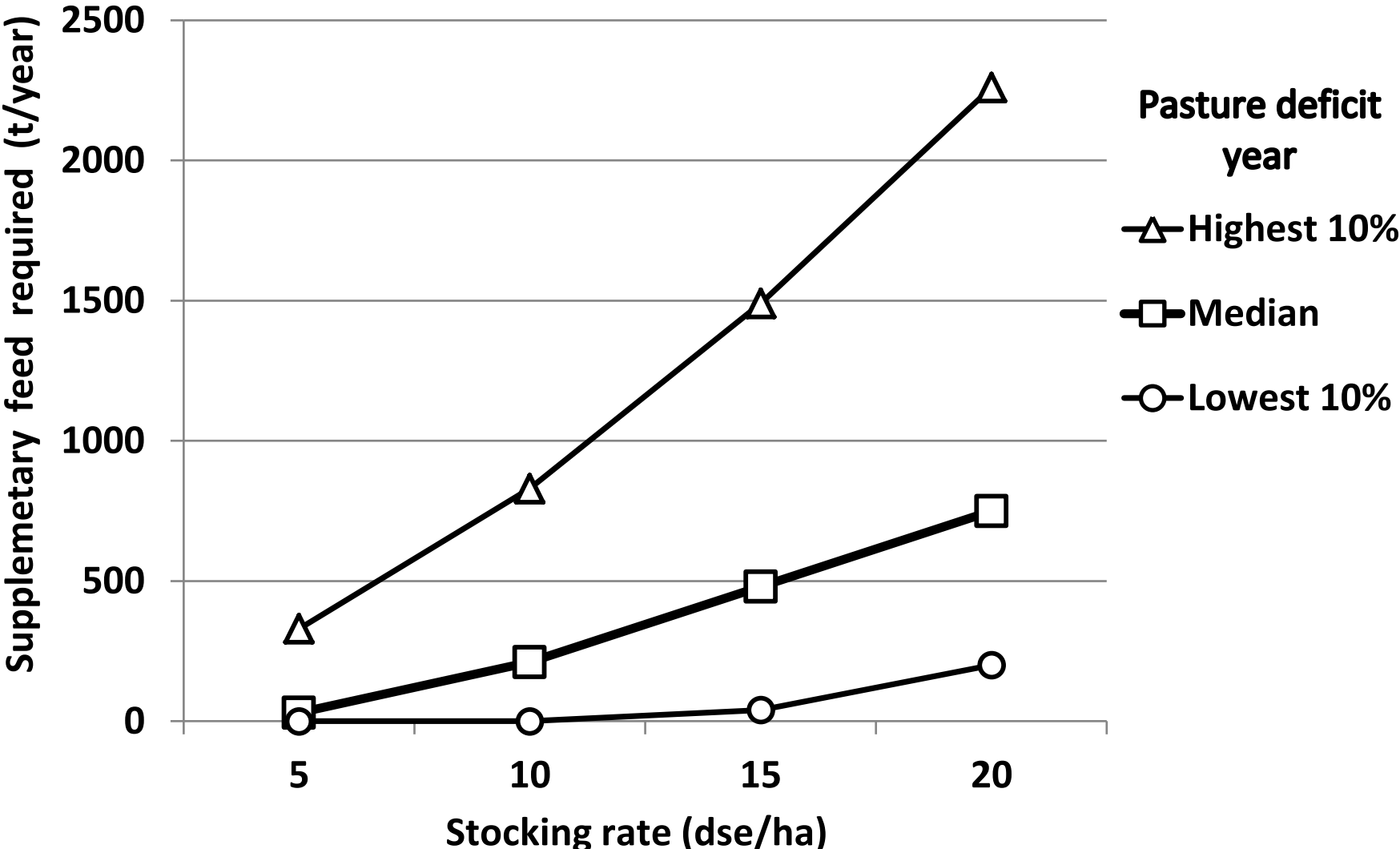
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- Case study is a rainfed mixed-farm in Coolamon
- ➔ • Different farm practices (pasture species & stocking rates) are considered in both analyses



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)**

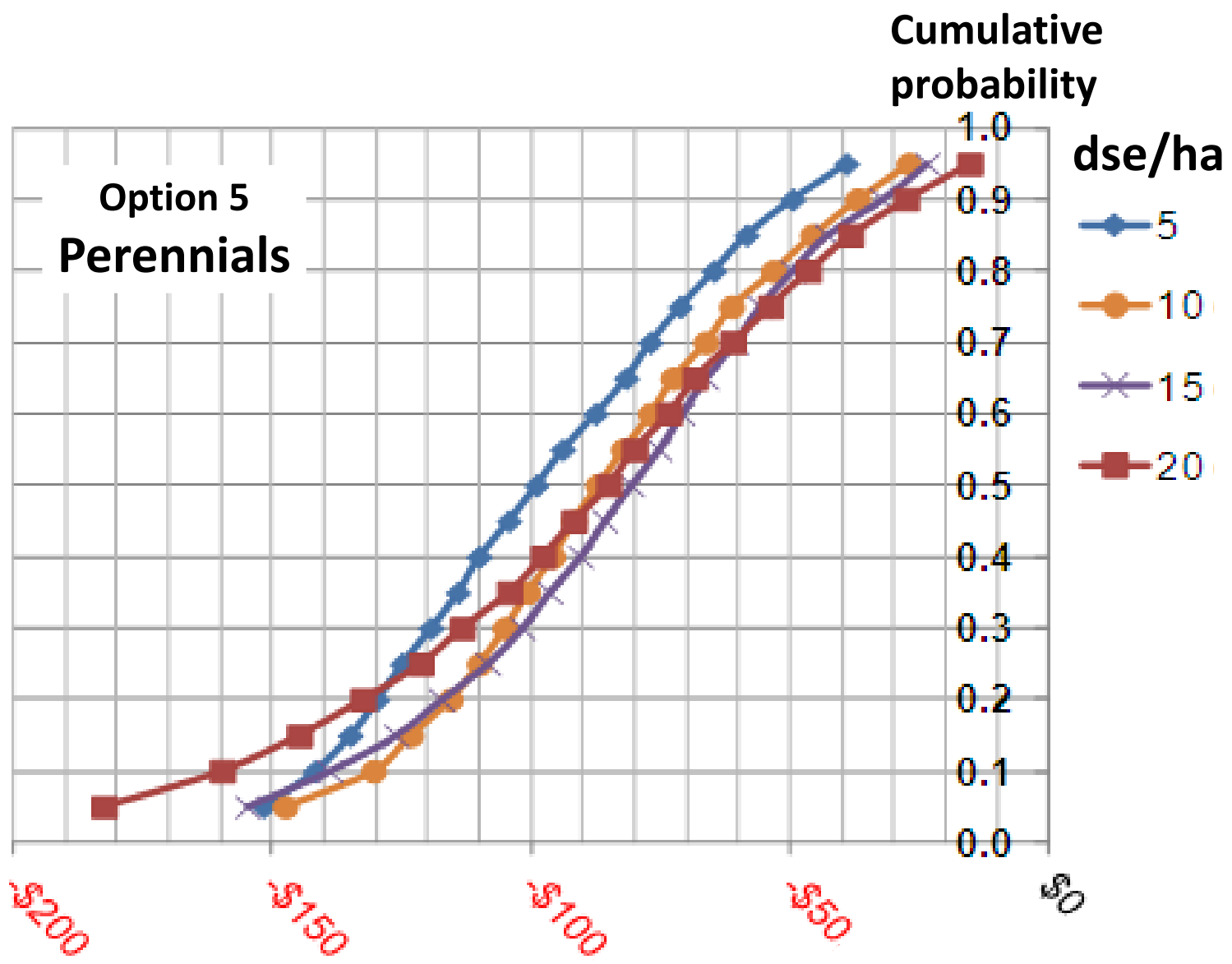
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Expressed as **CDFs**
(cumulative distribution functions)



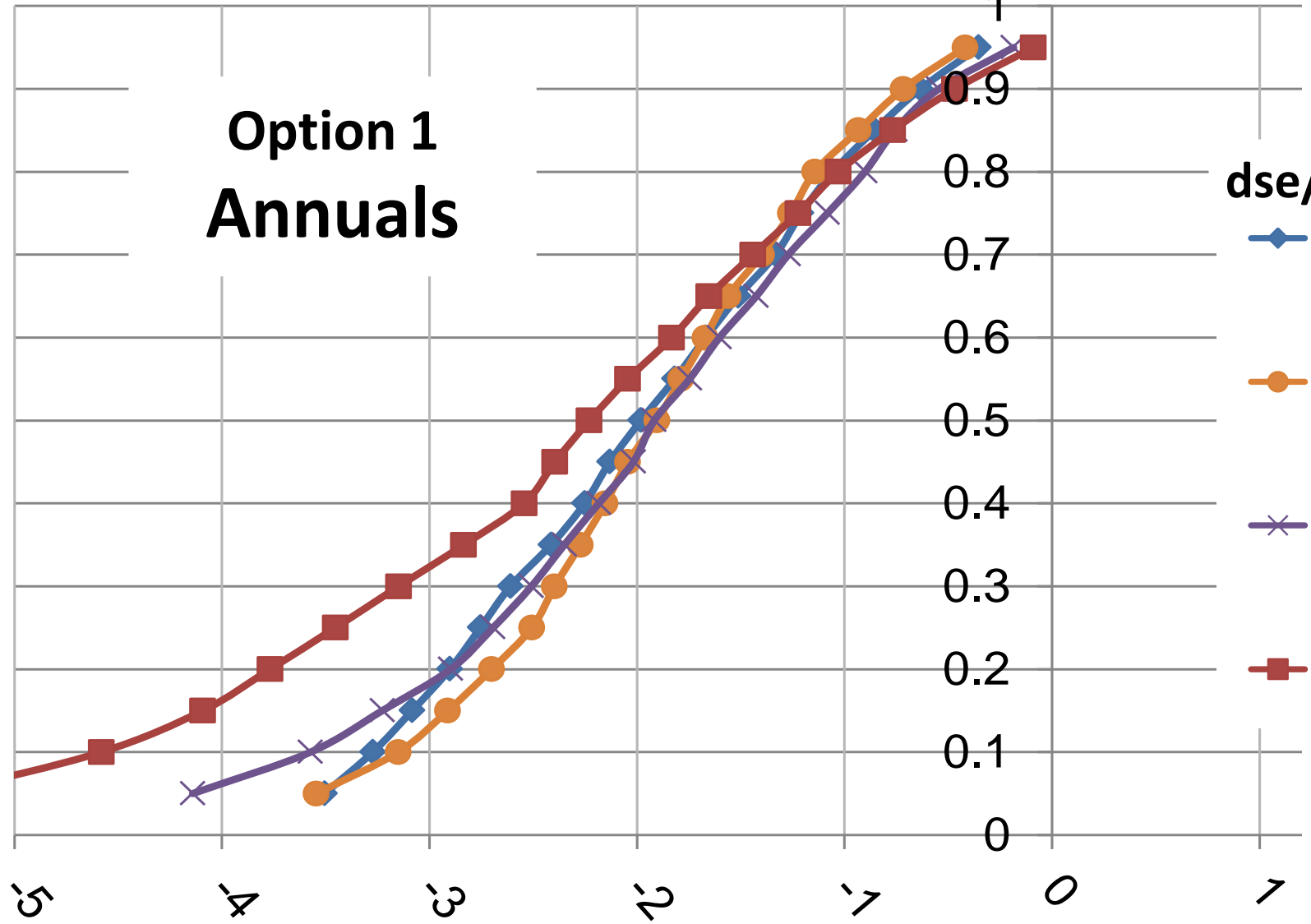
Annualised decadal cash-flow reductions due to interest (\$'000)

Option 1 Annuals

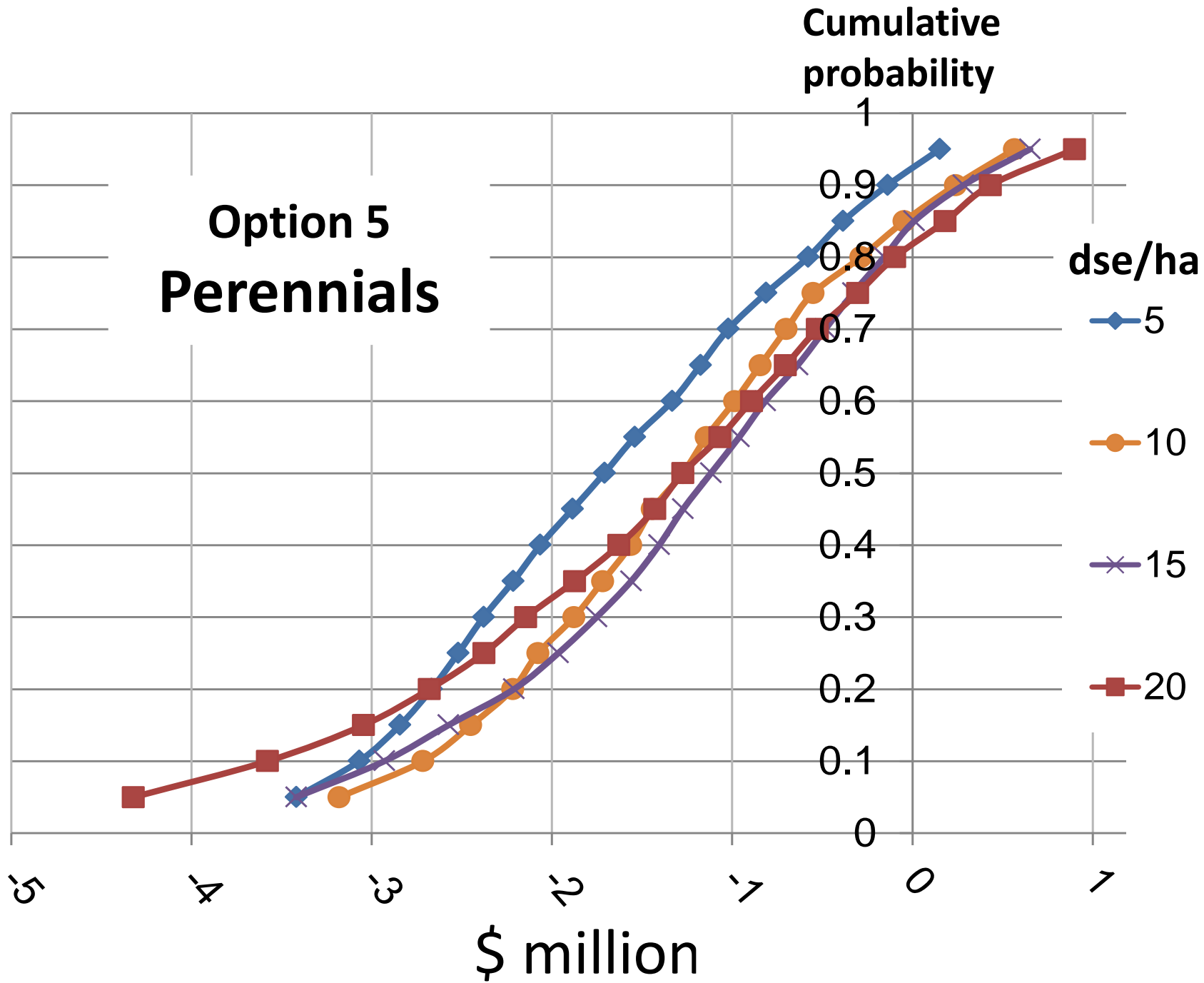
Cumulative
probability

\$ million

- dse/ha
- 5
 - 10
 - 15
 - 20



Option 5 Perennials



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

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

0

5

10

15

20

dse/ha

Annuals

Cumulative Probability

Decile 9 decades

0.9

Best

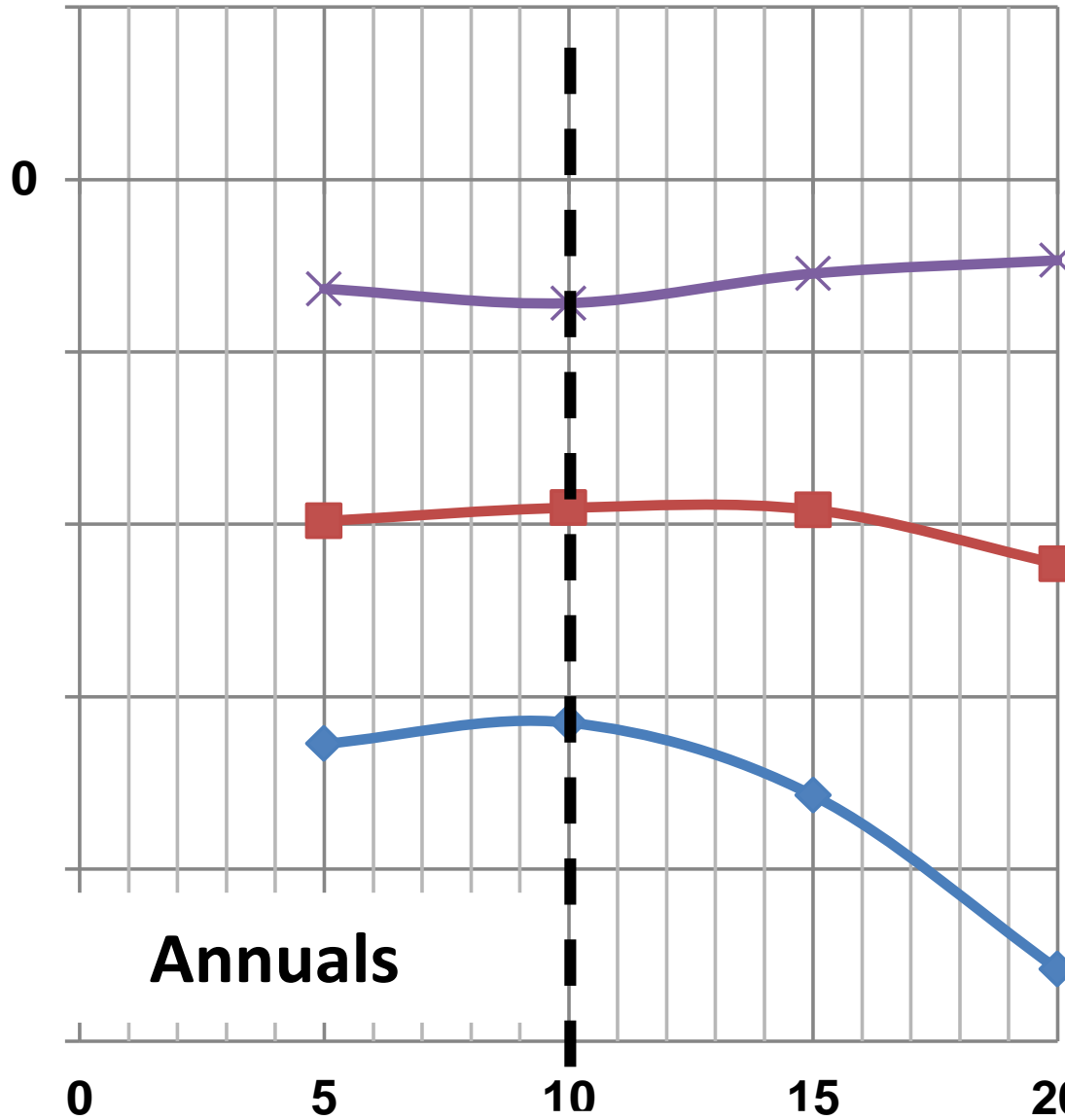
median decades

0.5

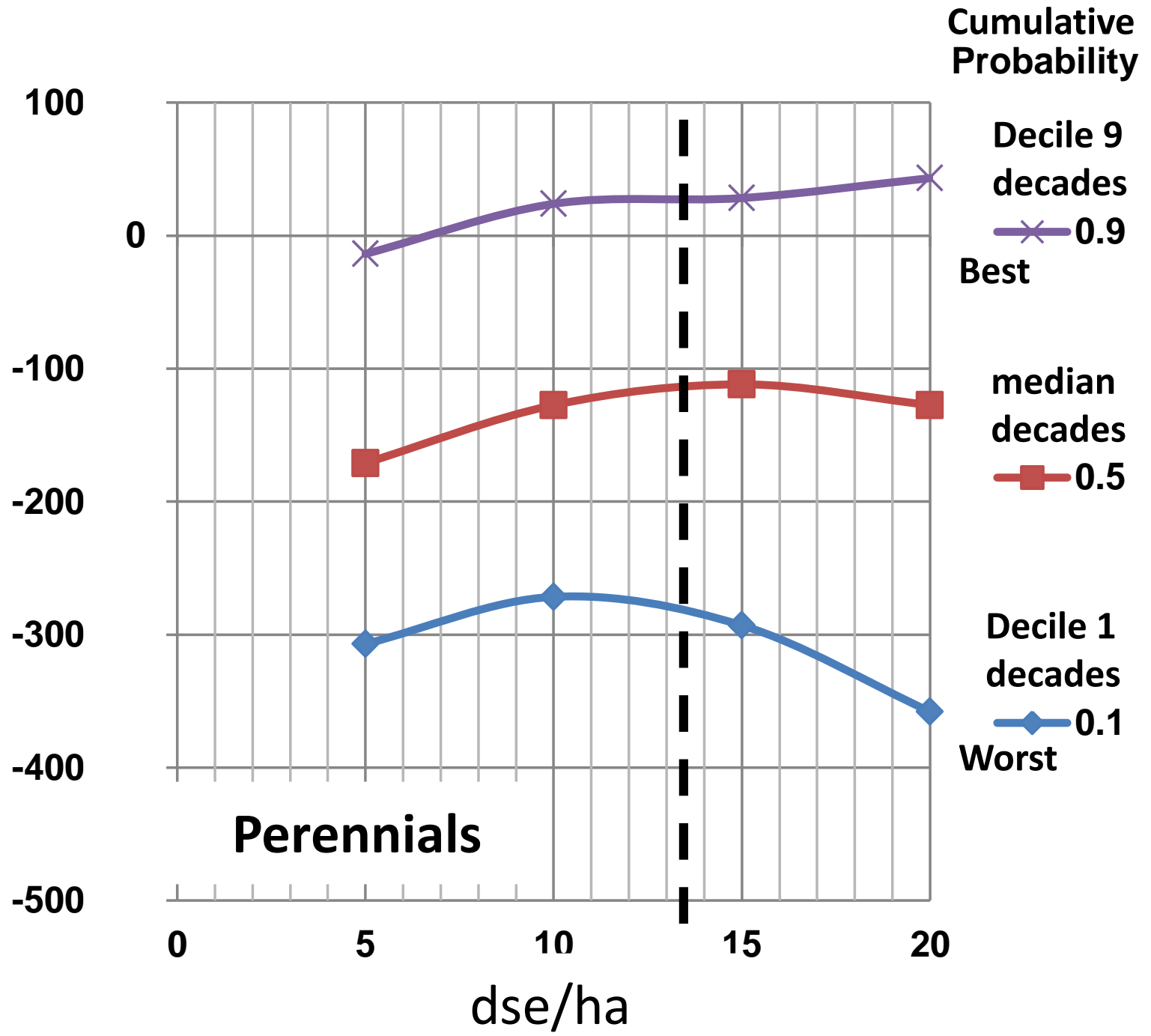
Decile 1 decades

0.1

Worst



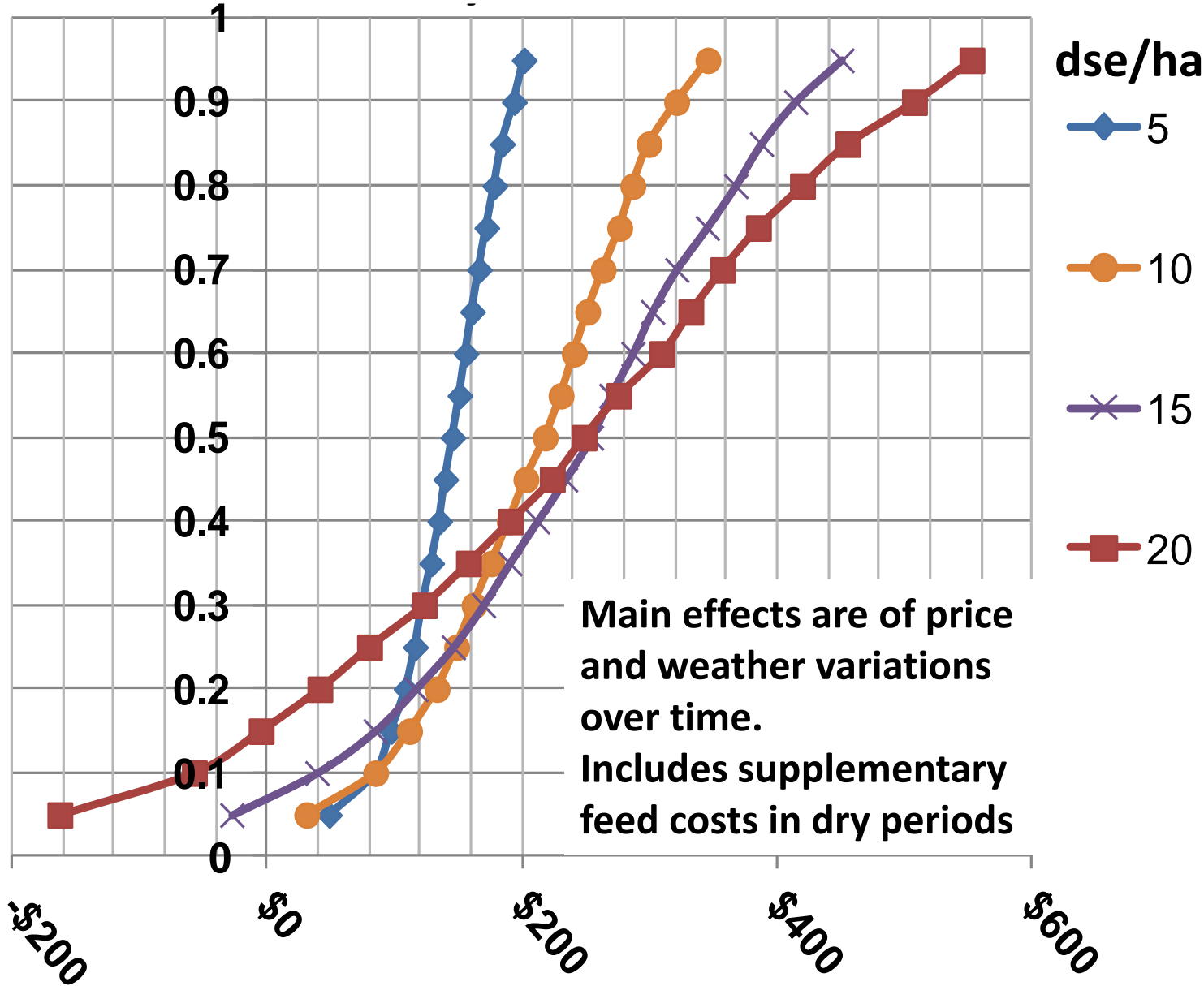
Annualised whole-farm decadal cash margins (\$ thousands)



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).

Cumulative probability

Sheep-pasture enterprise, no debt or interest



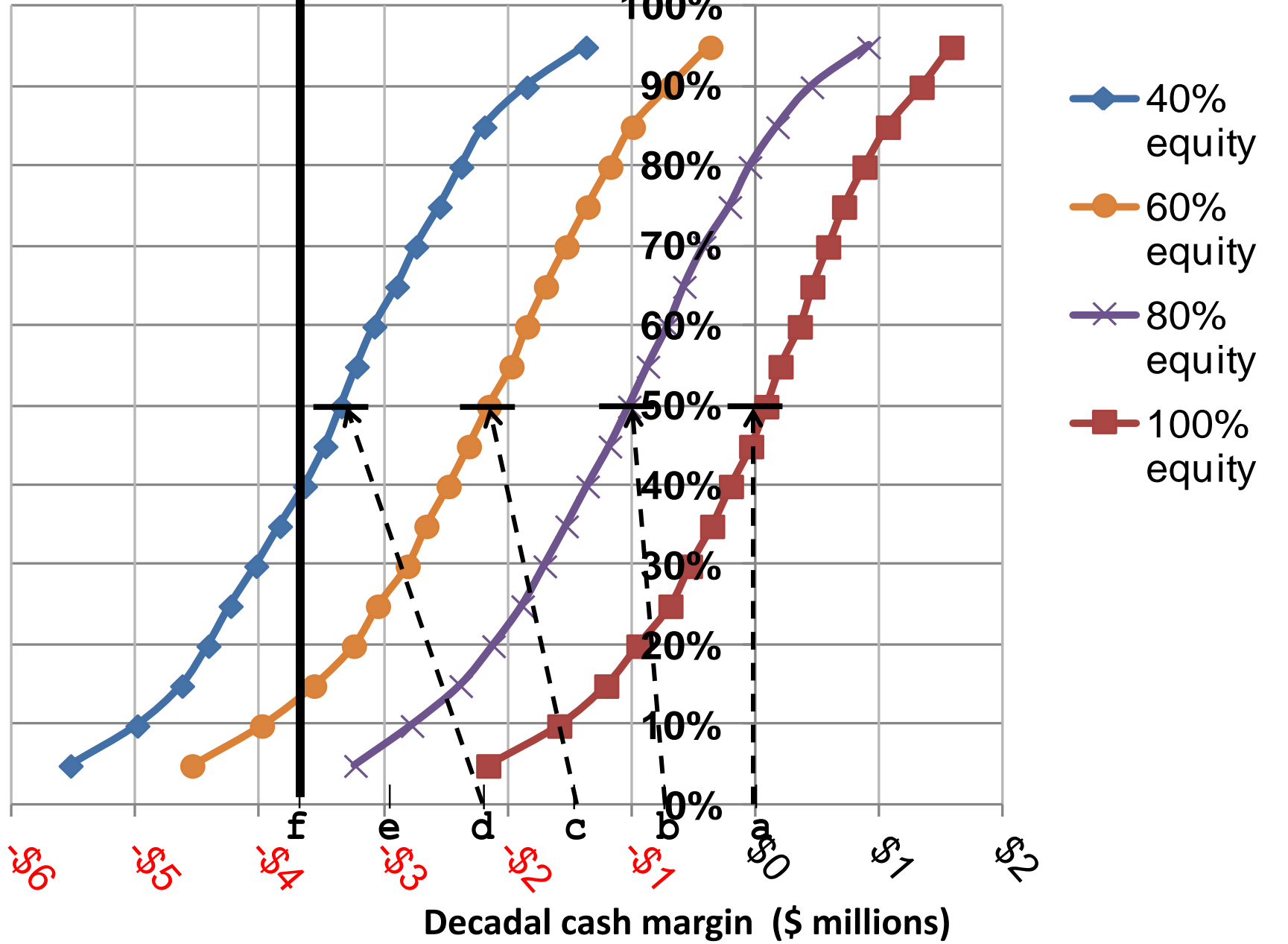
dse/ha

- 5
- 10
- 15
- 20

Main effects are of price and weather variations over time.
Includes supplementary feed costs in dry periods

Gross margin, \$/ha/year

Cumulative probability




- ◆ 40% equity
- 60% equity
- × 80% equity
- 100% equity

-\$6 -\$5 -\$4 -\$3 -\$2 -\$1 \$0 \$1 \$2

Decadal cash margin (\$ millions)

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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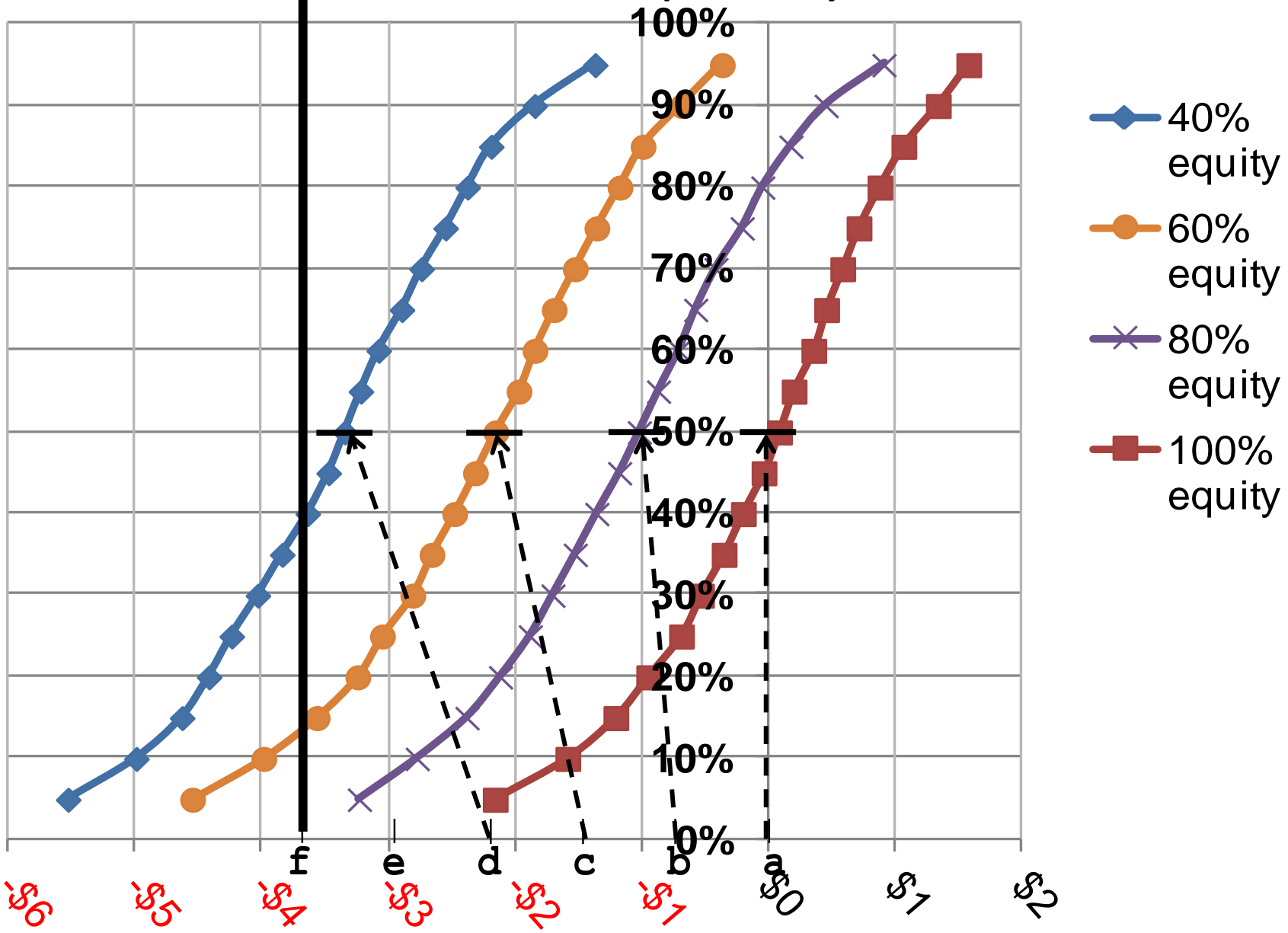
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- ➔ • Advice based only on partial budgeting (e.g., LP) can be misleading

CONCLUSIONS

- 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

Cumulative probability



Decadal cash margin (\$ millions)

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