

Effects of Crop Insurance and Government Payments on Annual Financial Risk

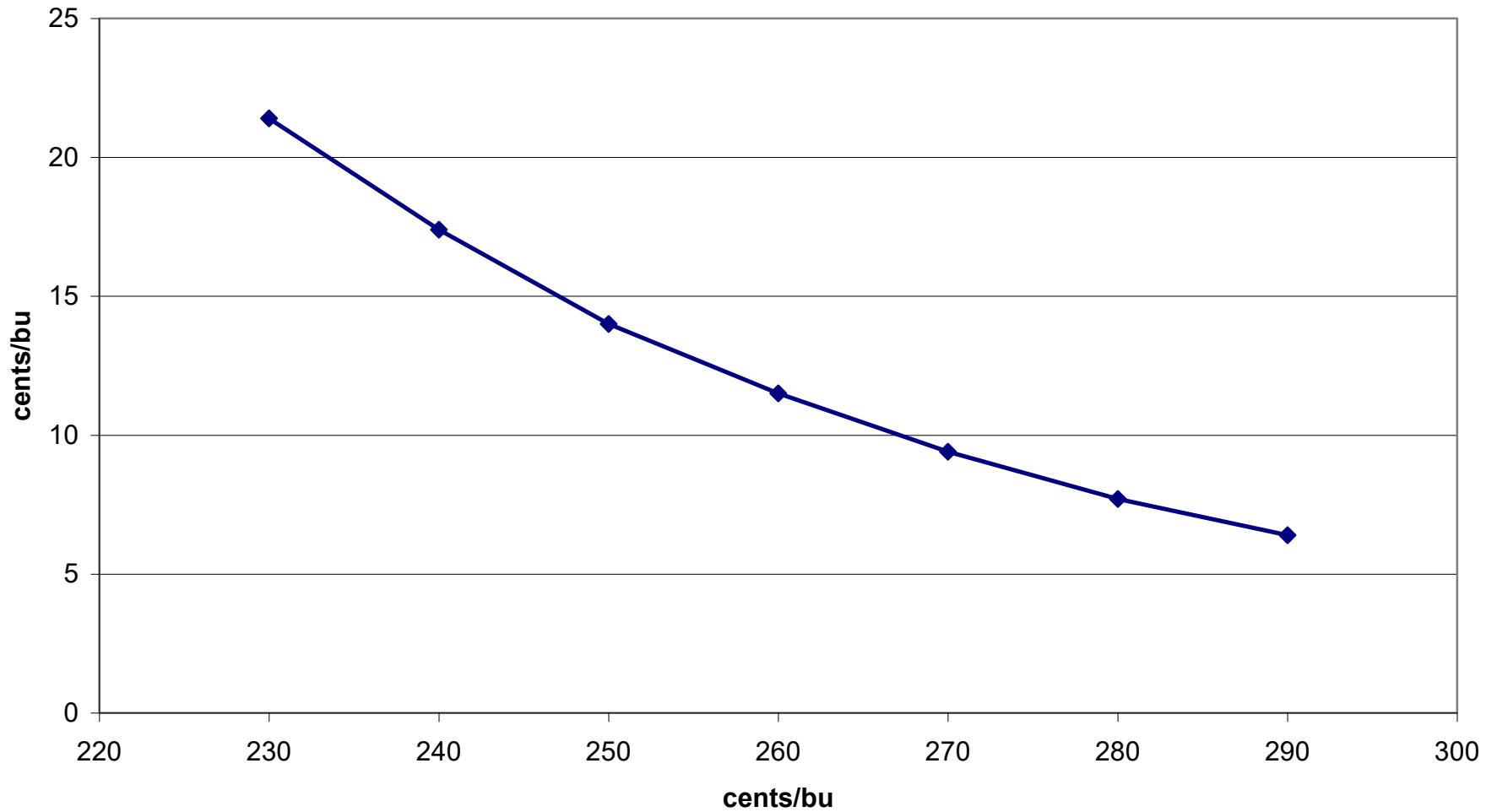
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Presented March 8, 2005

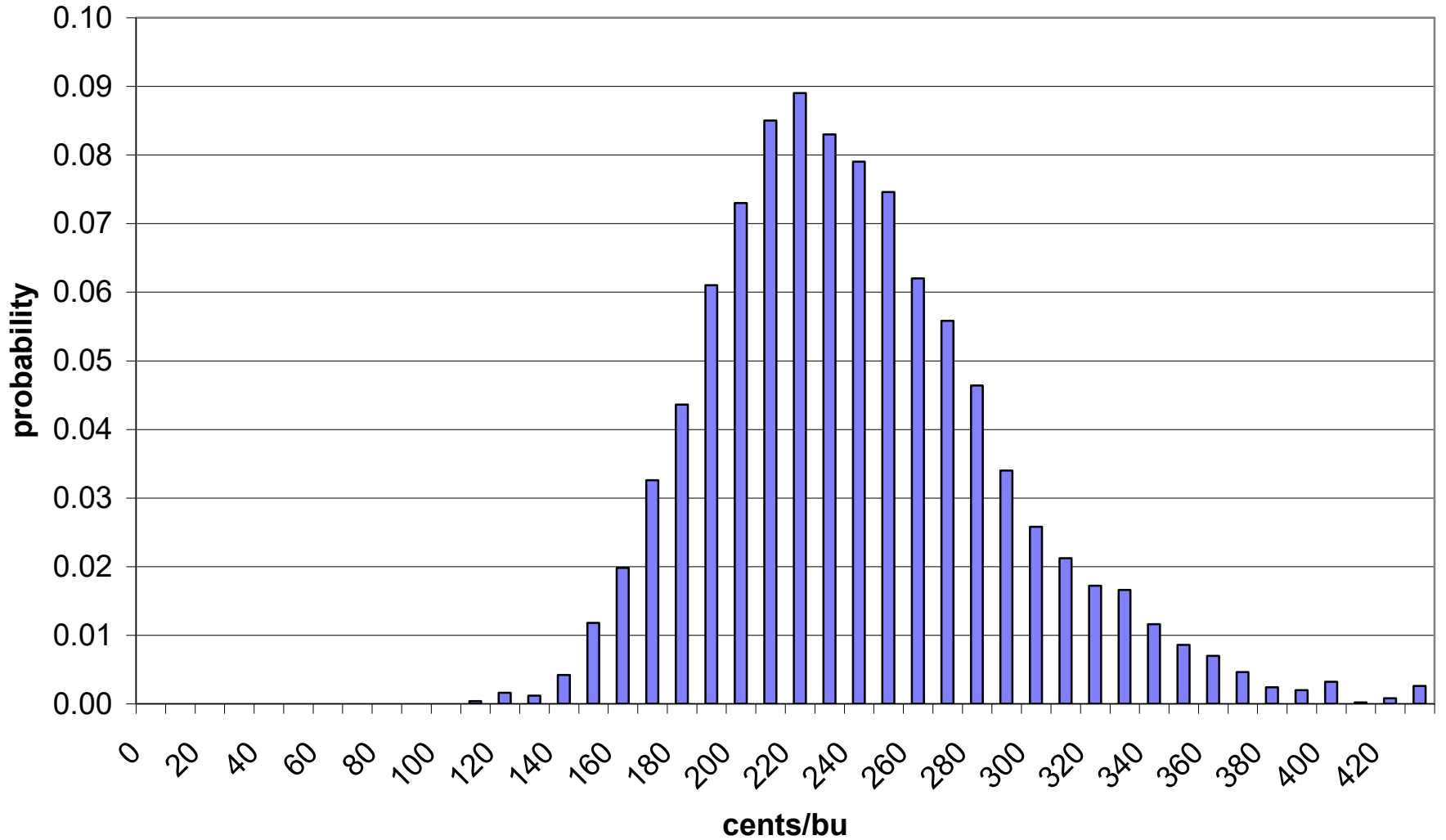
Talk Outline

- How are option premiums determined?
- Effects of hedges, puts, and insurance on risk
- How do commodity programs affect risk?
- How much risk is left over to reward management?
- Discussion

Per-Bushel Cost of a Call Option on December Corn Futures (Futures price = 234.75)

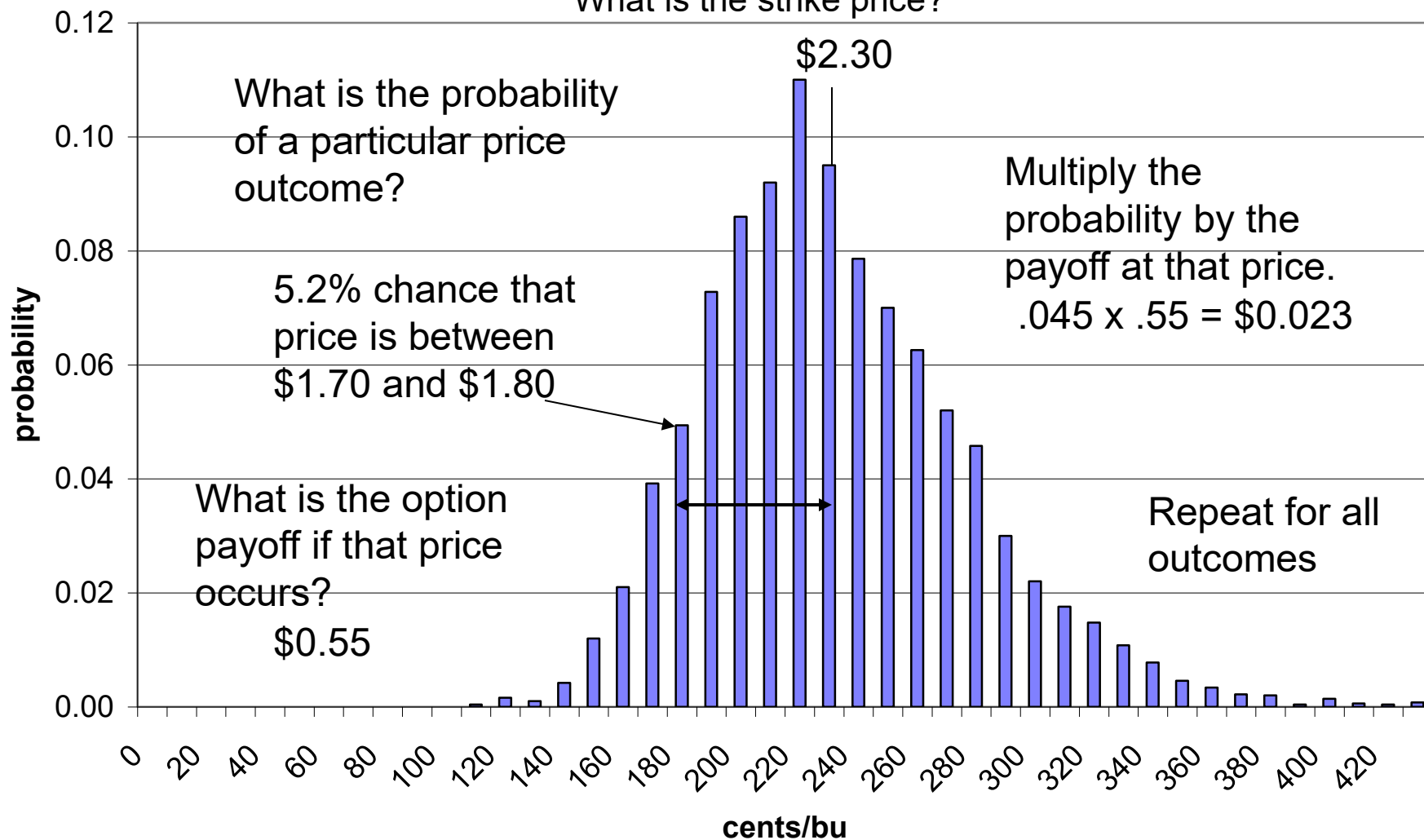


Distribution of December Futures Prices as of March 7, 2005

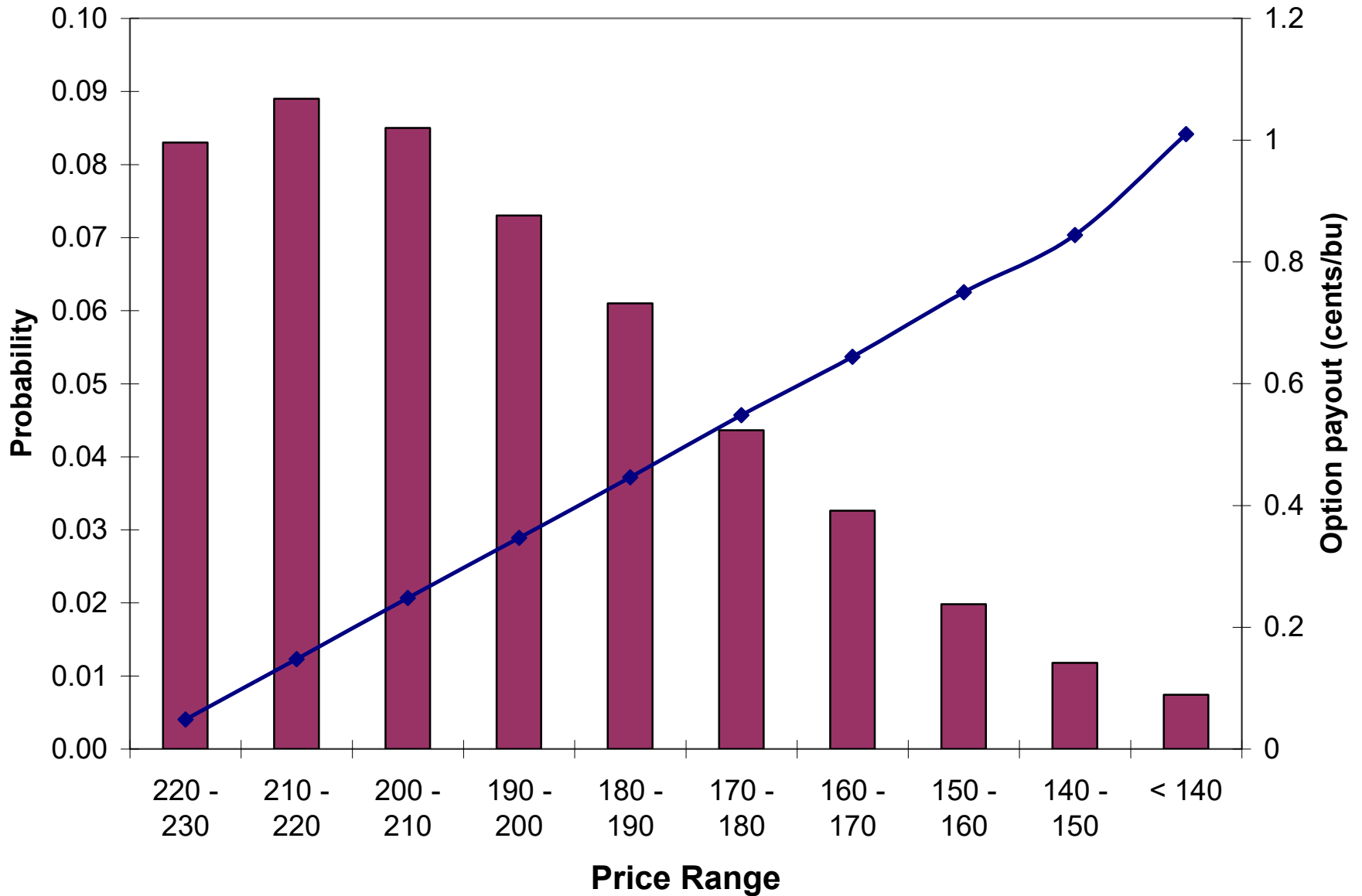


Determining a Put Option Premium

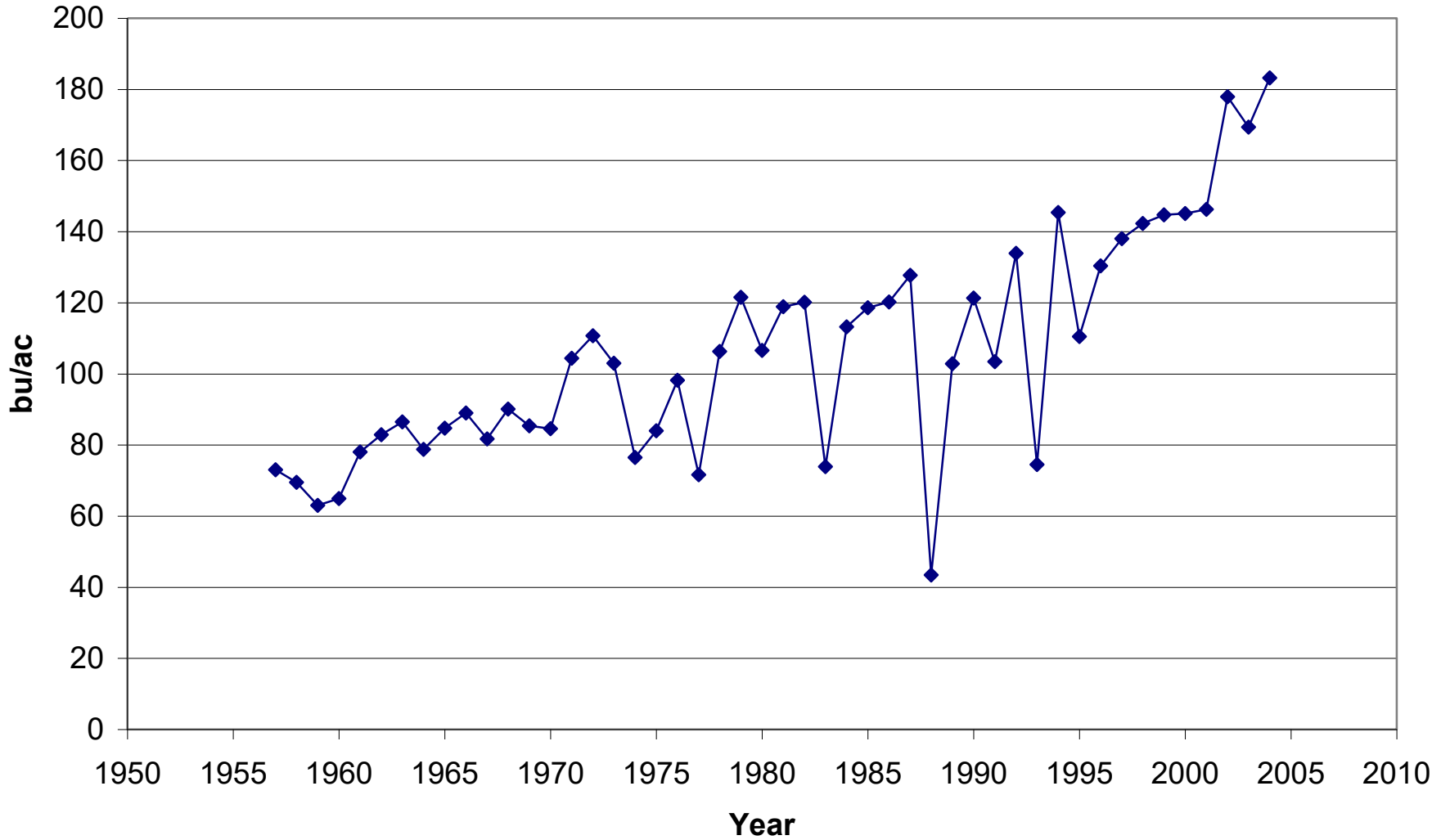
What is the strike price?



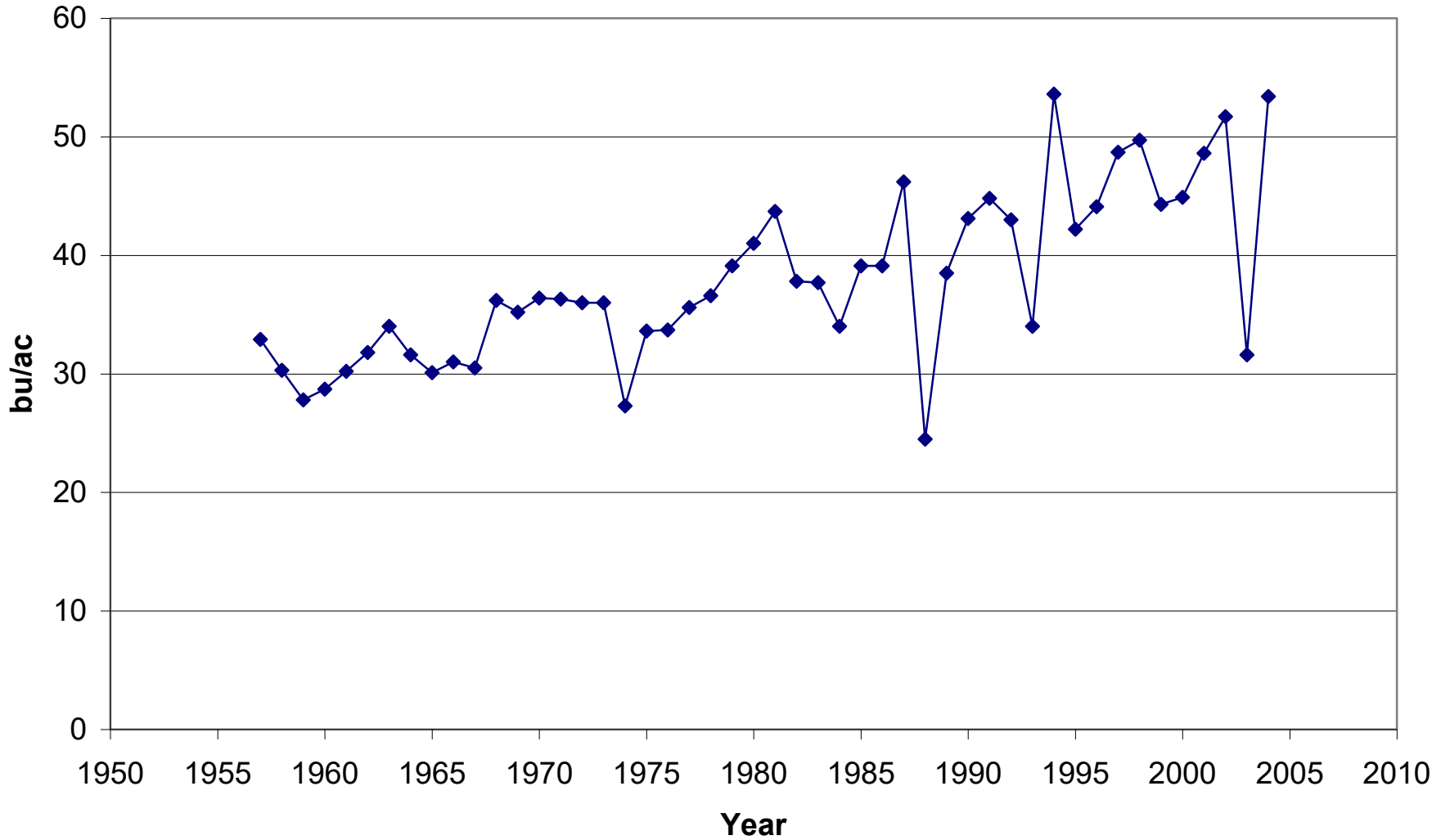
Summing up all outcomes: \$0.17 for a \$2.30 put option



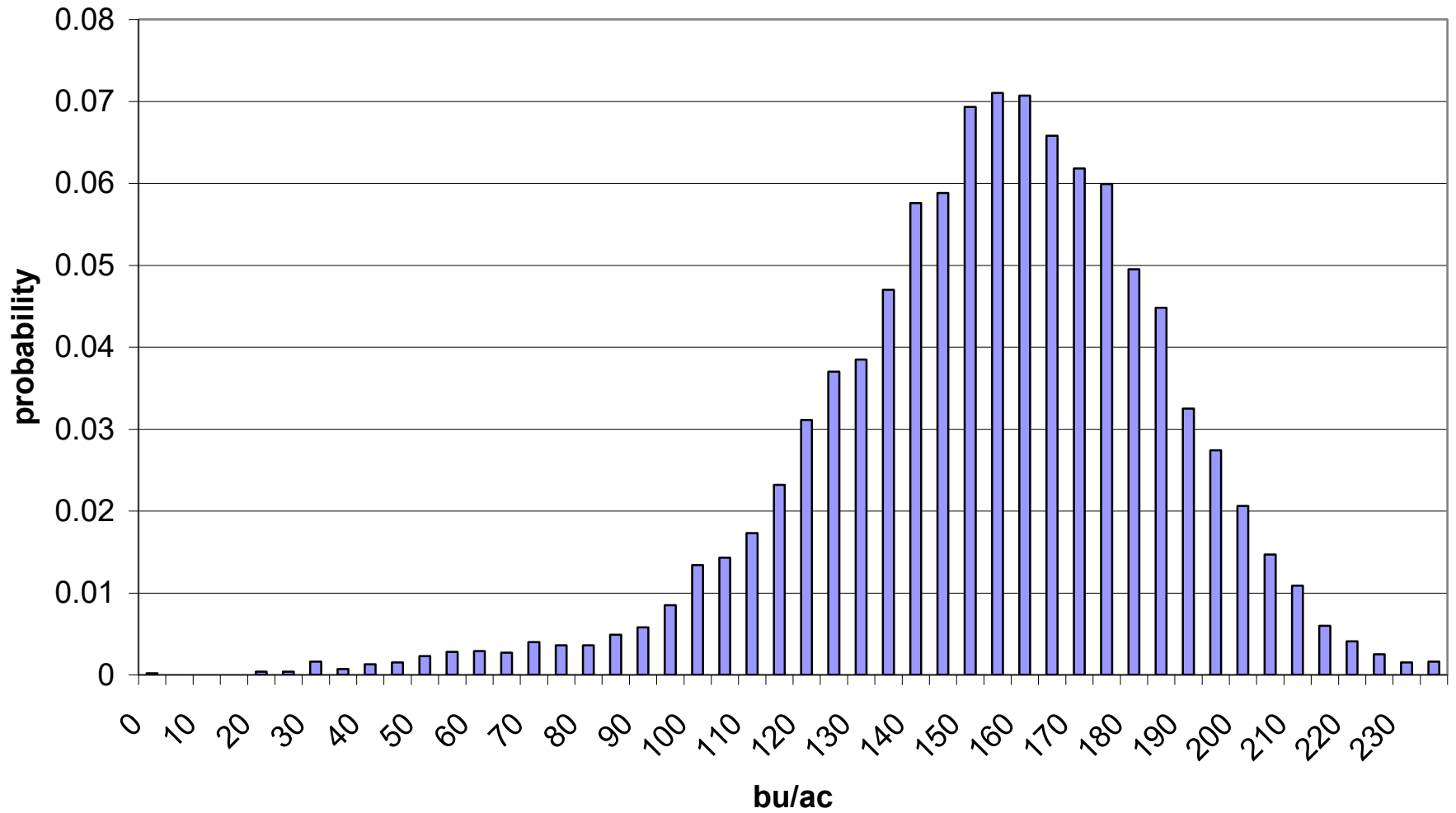
Powesheik County Corn Yields: 1957 to 2004



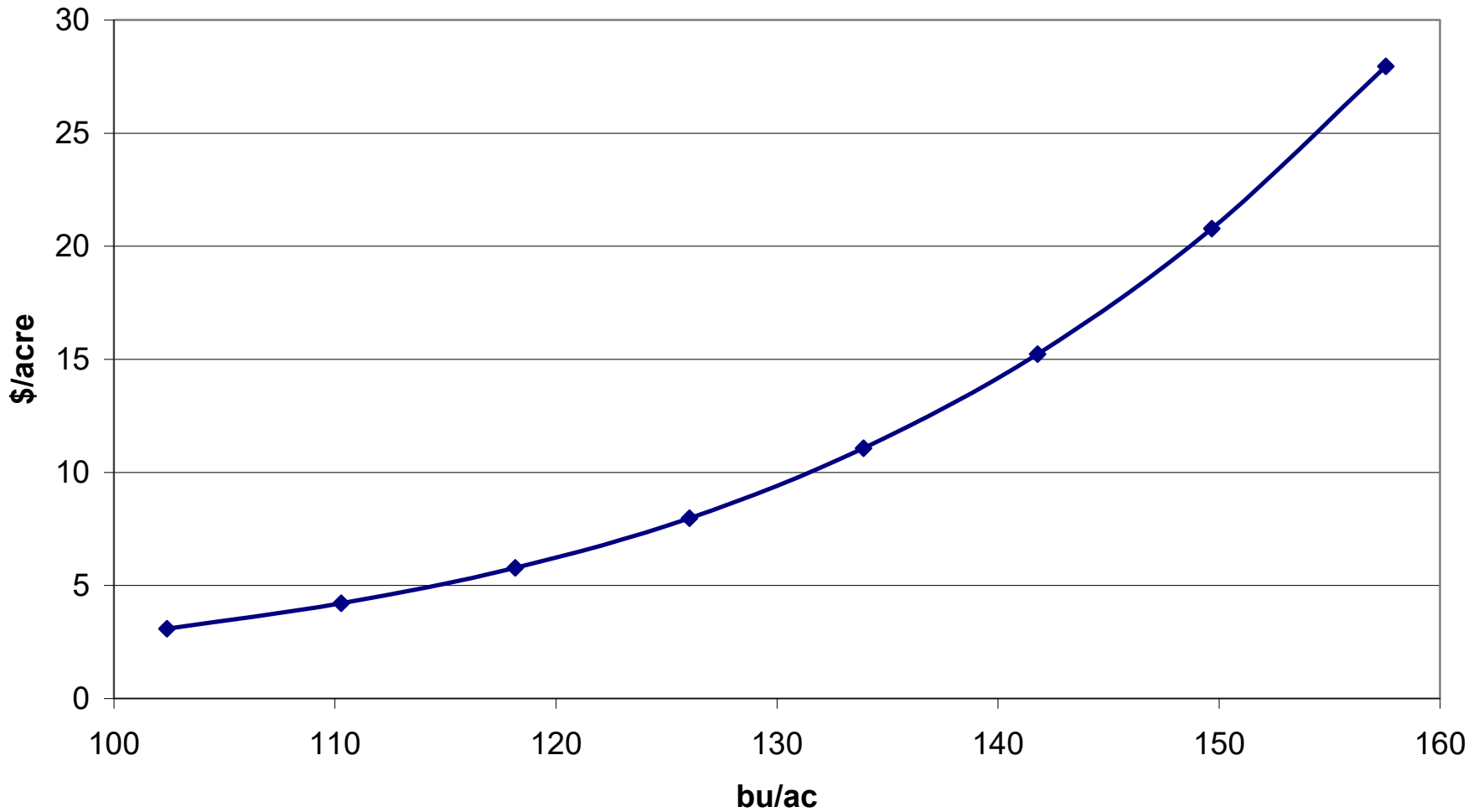
Powesheik County Soybean Yields: 1957 to 2004



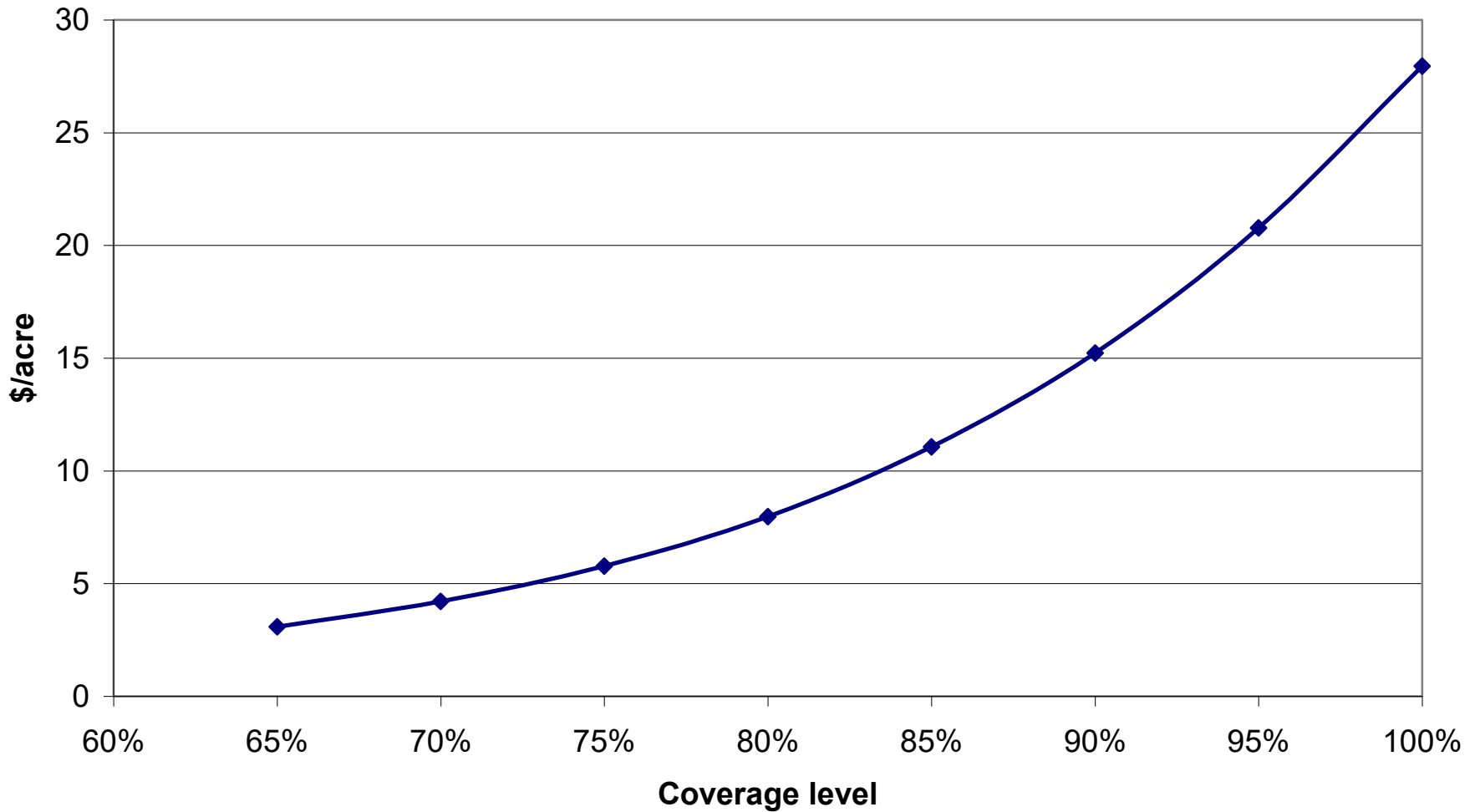
Distribution of Farm (not field) Yields for an Average Powesheik County Farmer



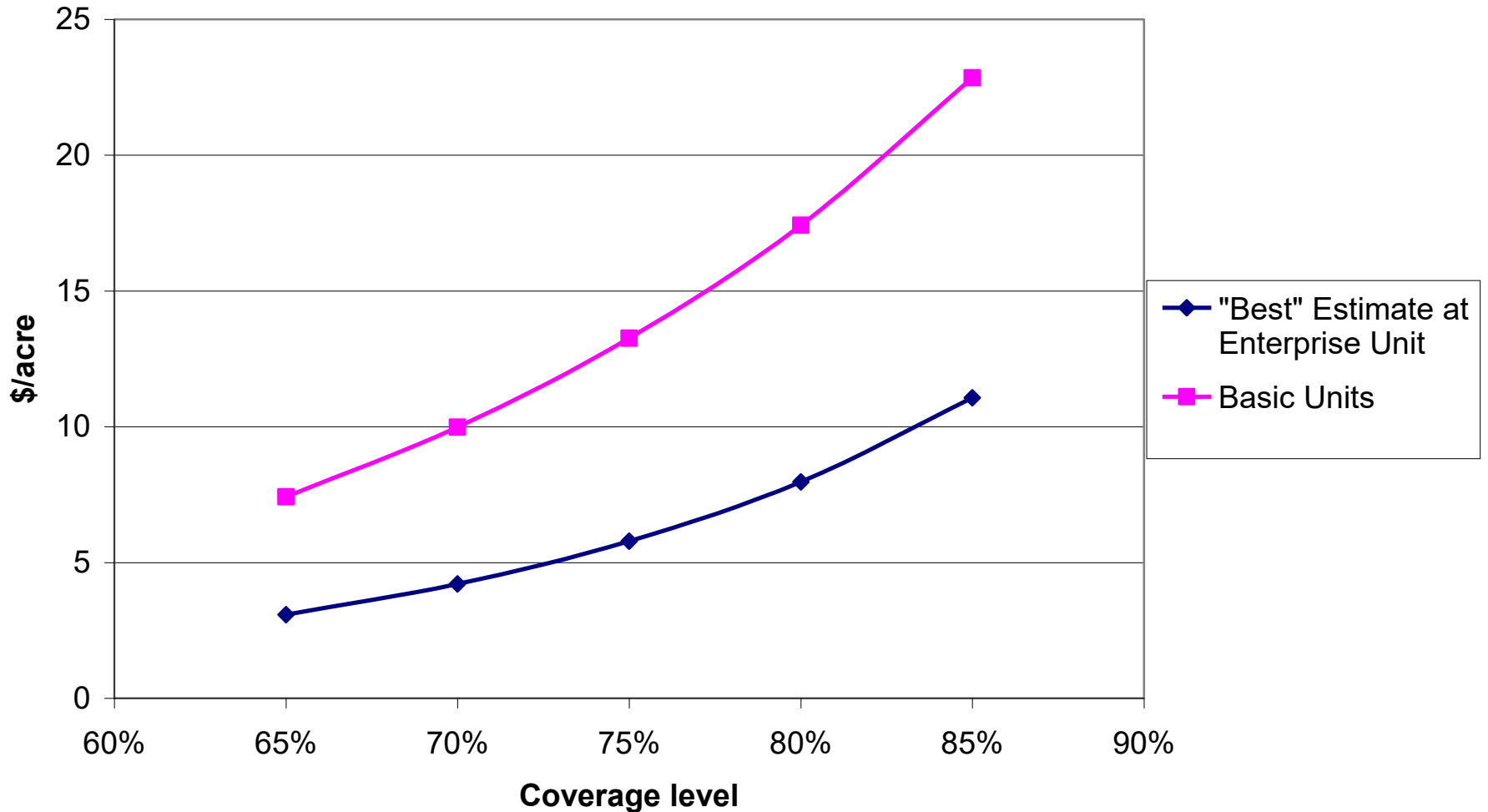
Per-Acre Yield Option Premiums for Alternative Strike Yield Amounts (Price = \$2.30/bu)



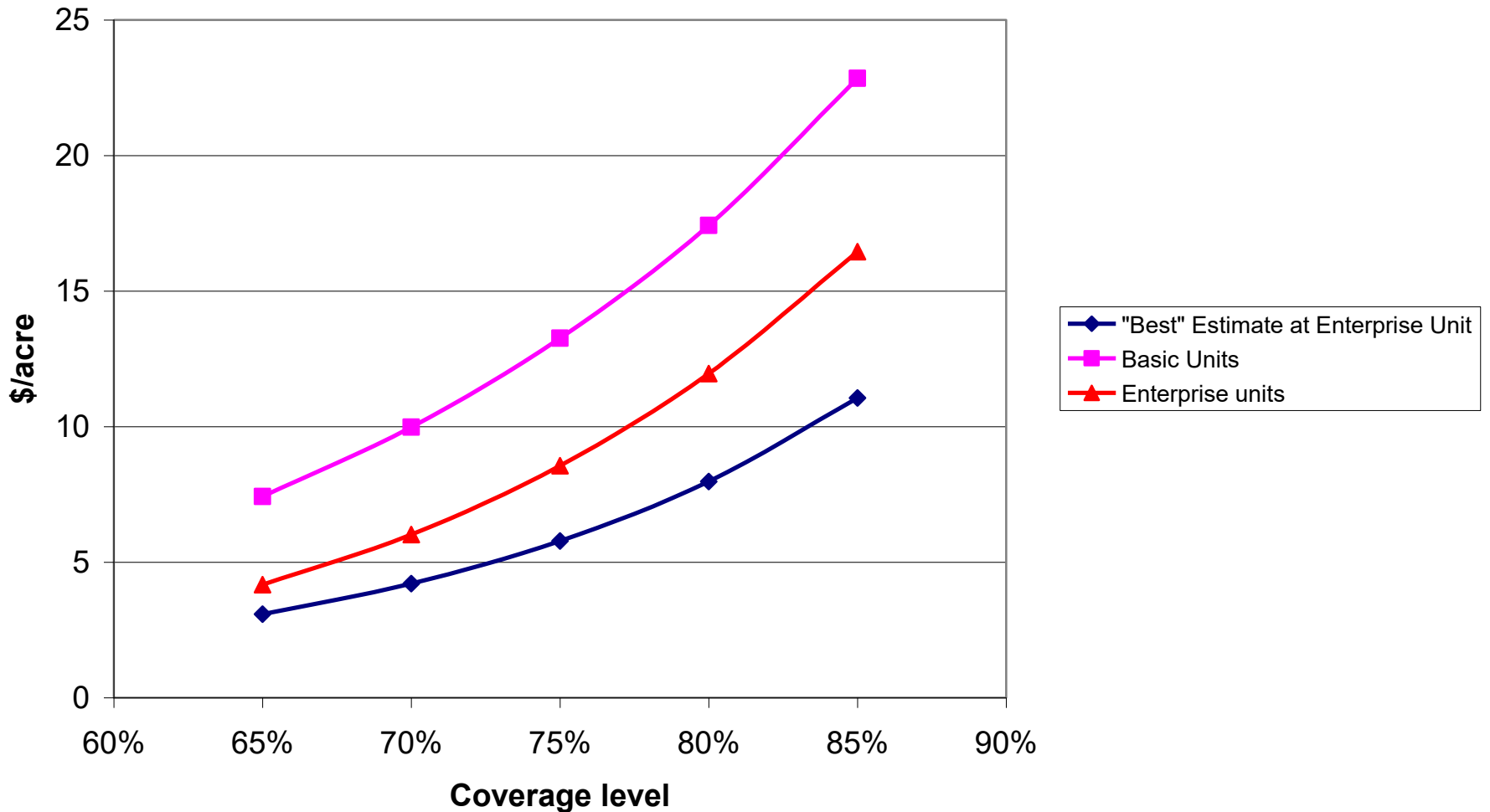
Crop Insurance Premiums for Different Coverage Levels (Price = \$2.30/bu)



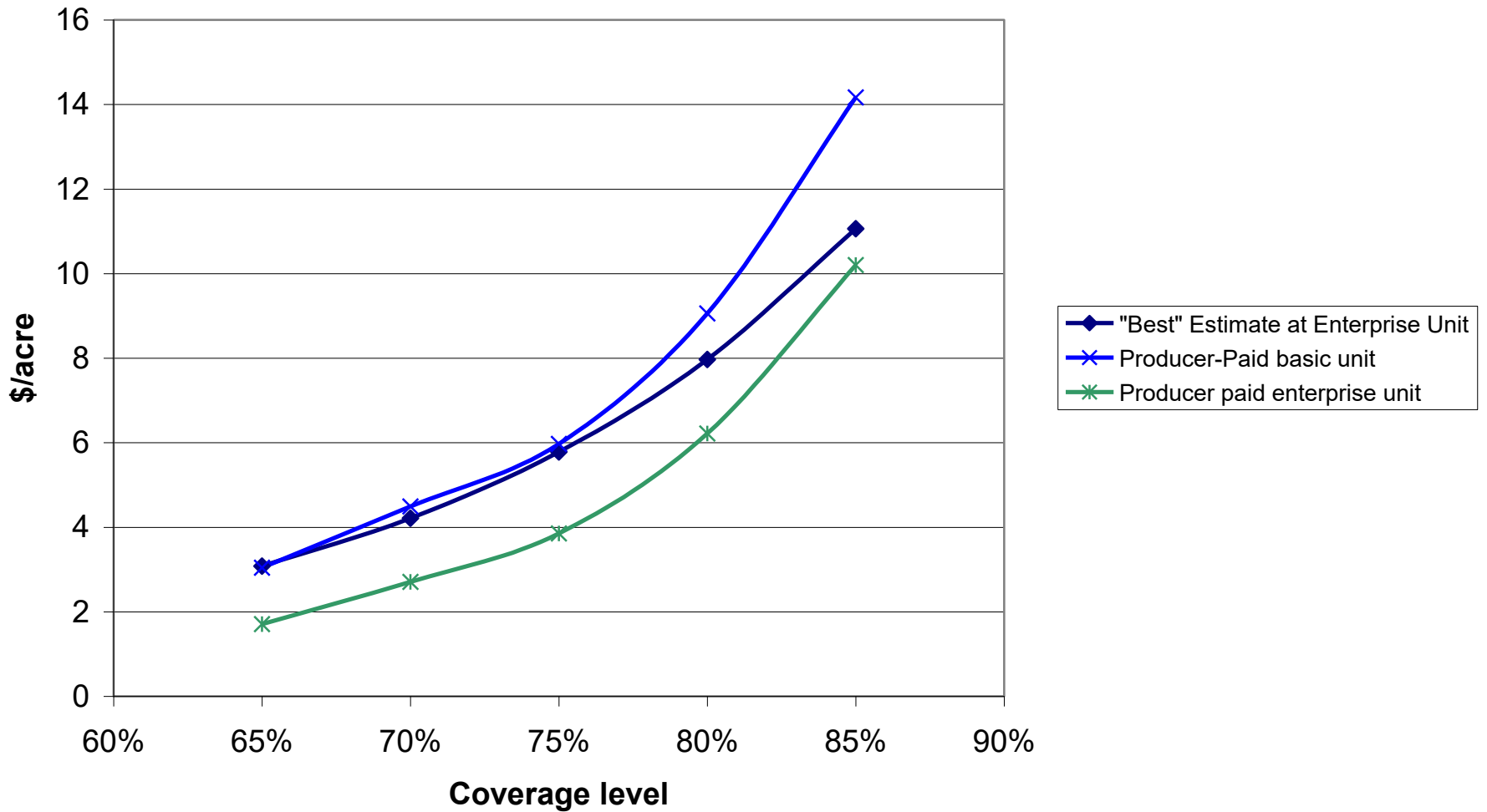
Unsubsidized Crop Insurance Premiums for Different Coverage Levels (Price = \$2.30/bu)



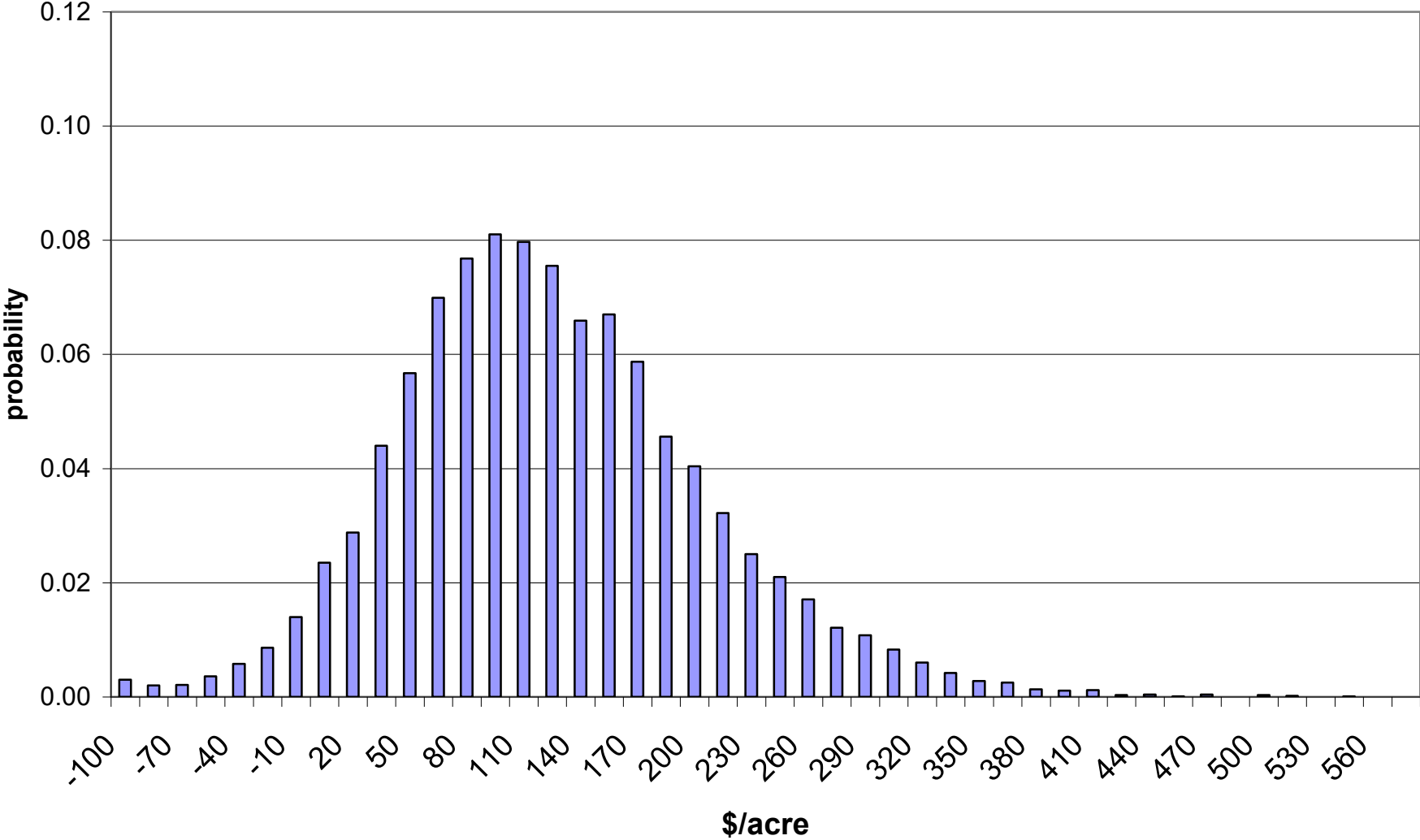
Crop Insurance Premiums for Different Coverage Levels (Price = \$2.30/bu)



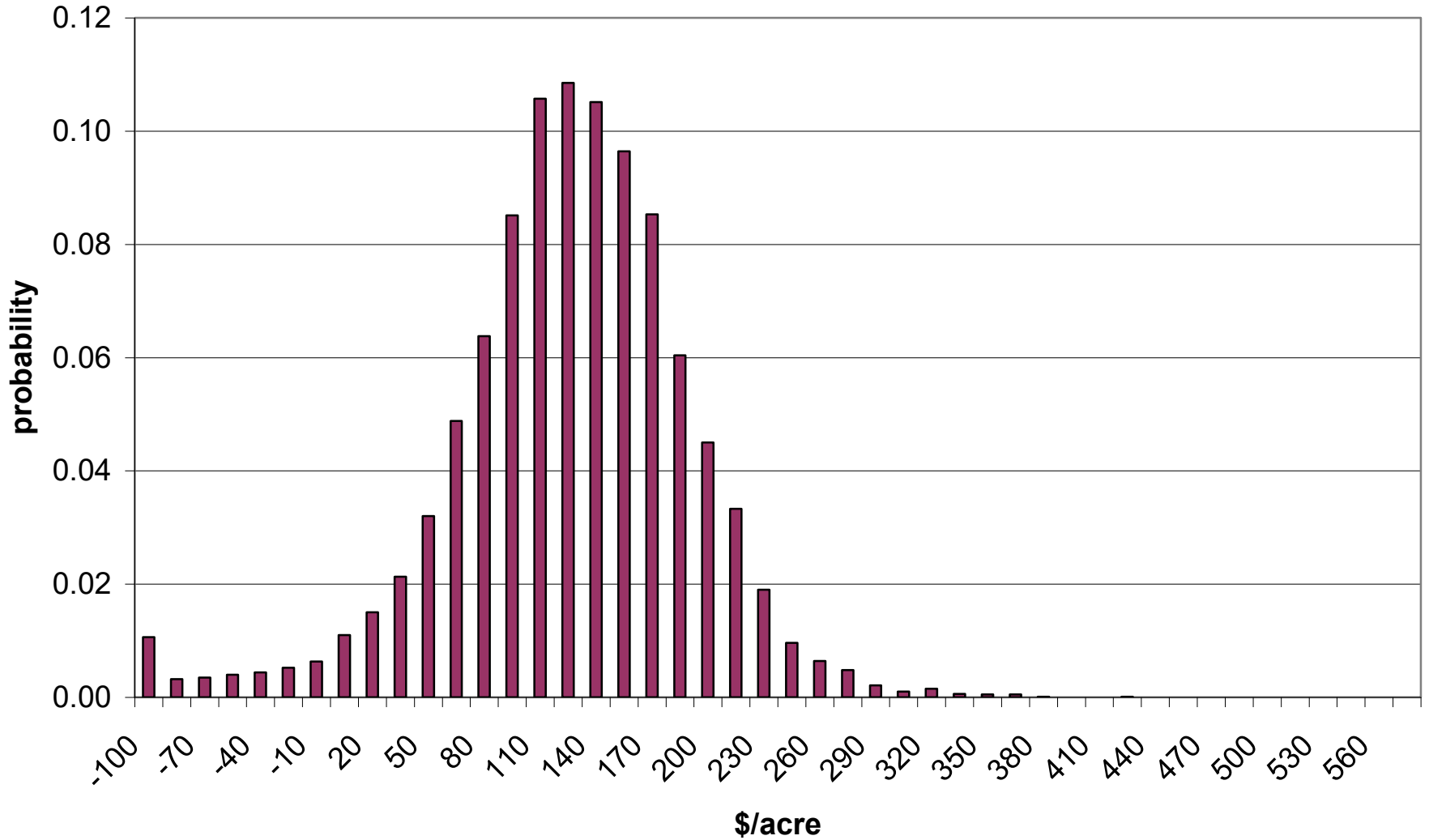
Crop Insurance Premiums for Different Coverage Levels (Price = \$2.30/bu)



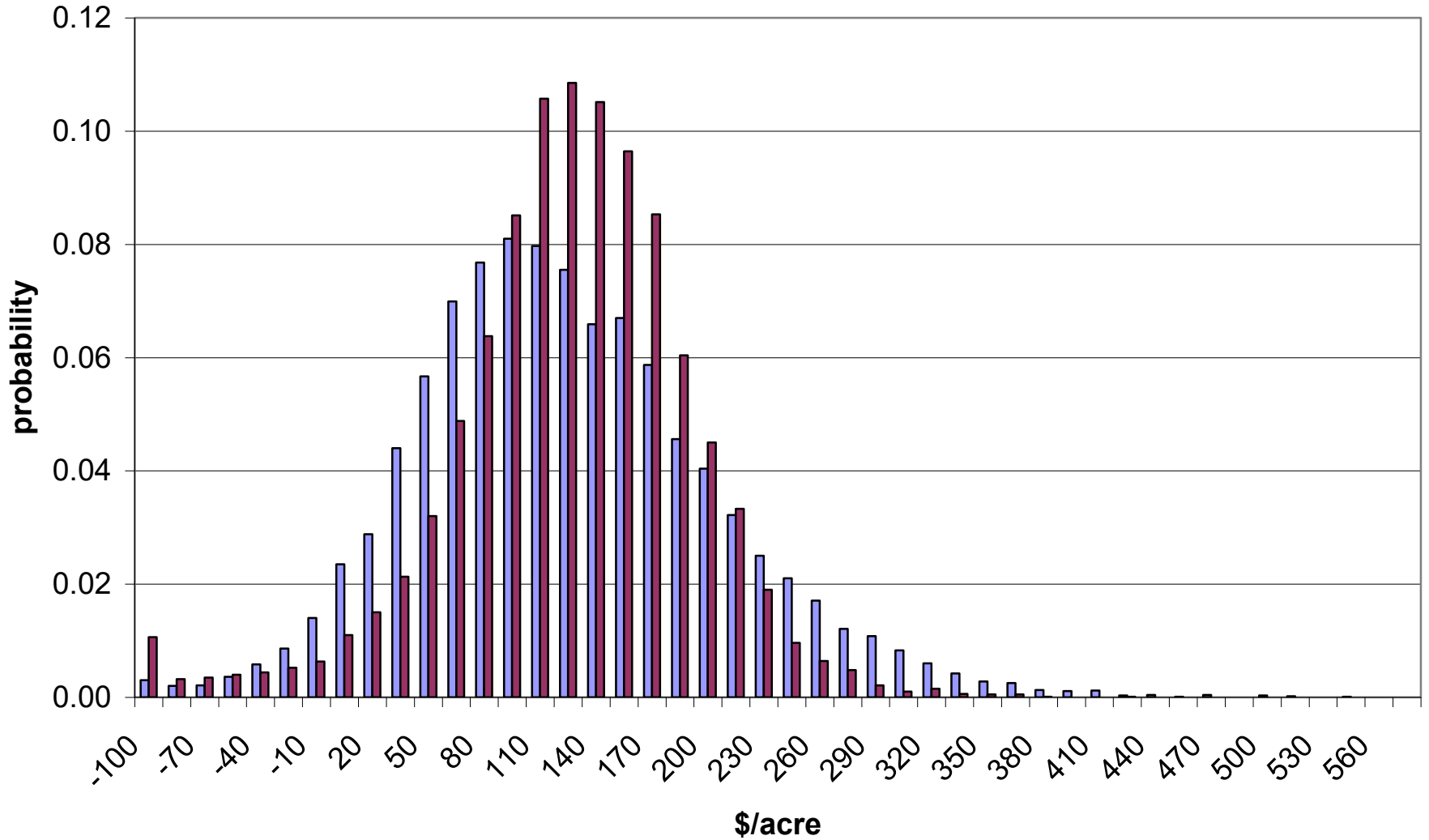
Distribution of Corn Harvest Revenue Less \$180 Variable Cost



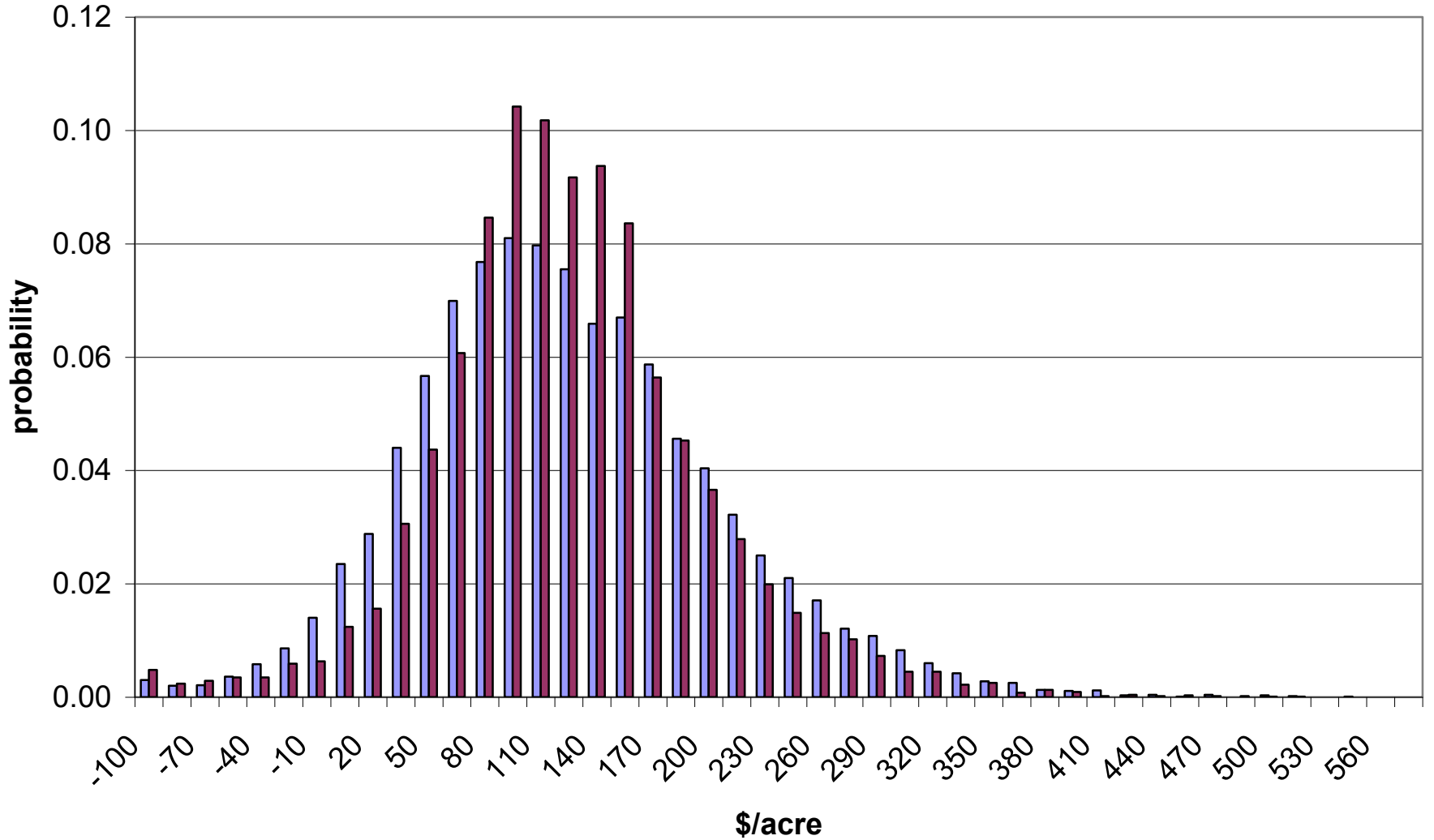
Distribution of Net Revenue Hedging 75% of Expected Production



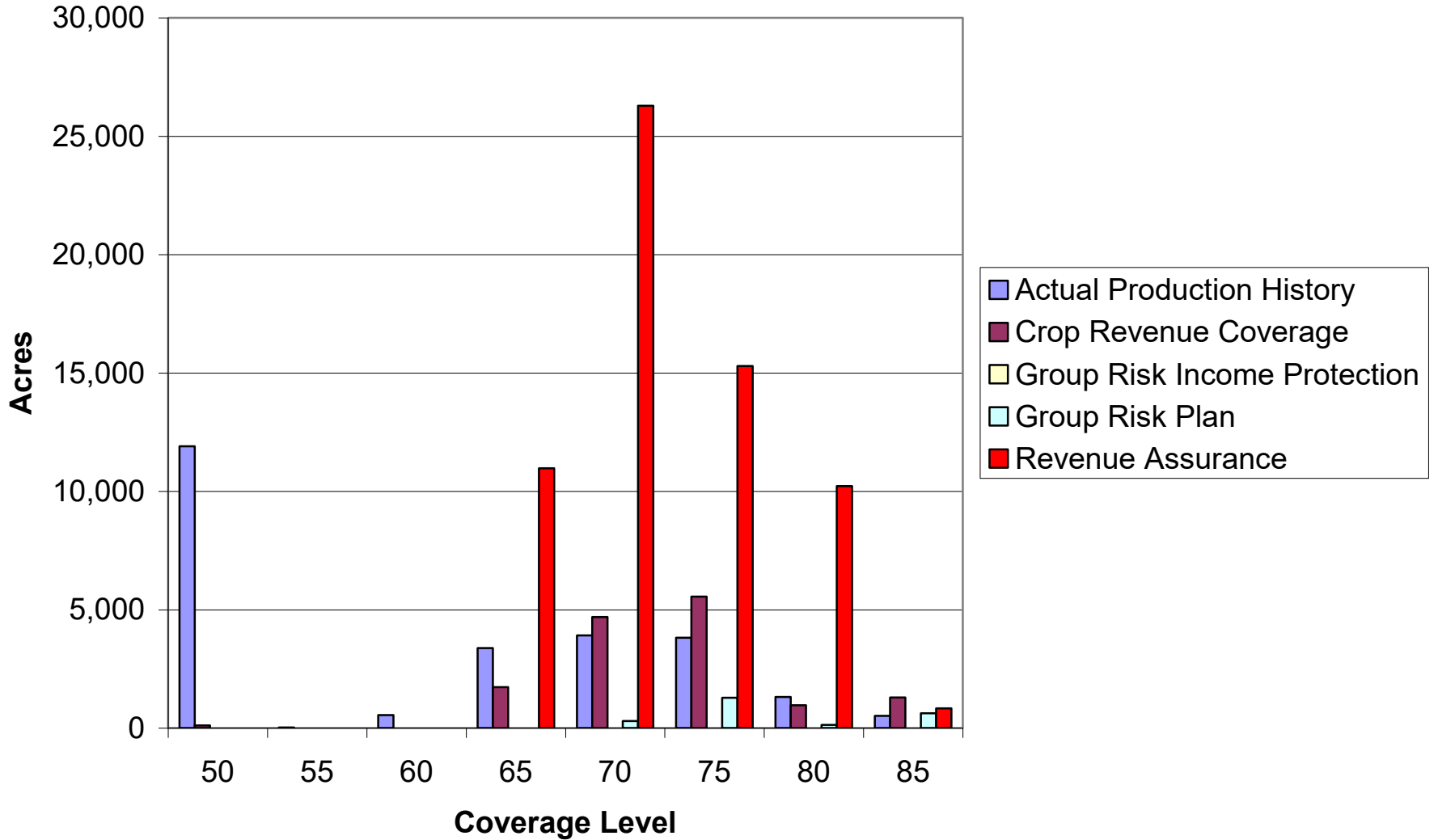
Distribution of Net Revenue Hedging 75% of Expected Production



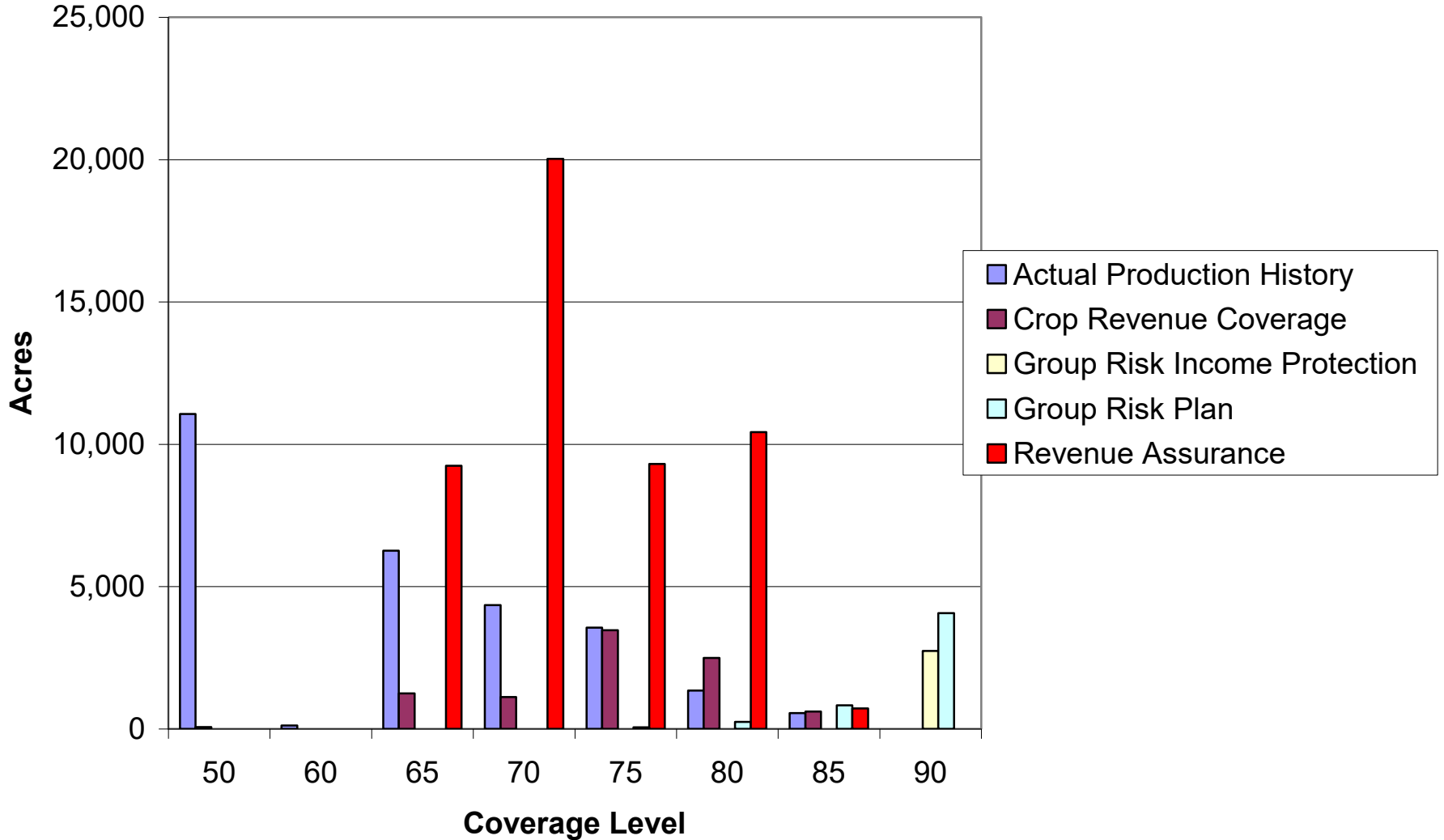
Distribution Hedging 75% of Expected Production with Put options



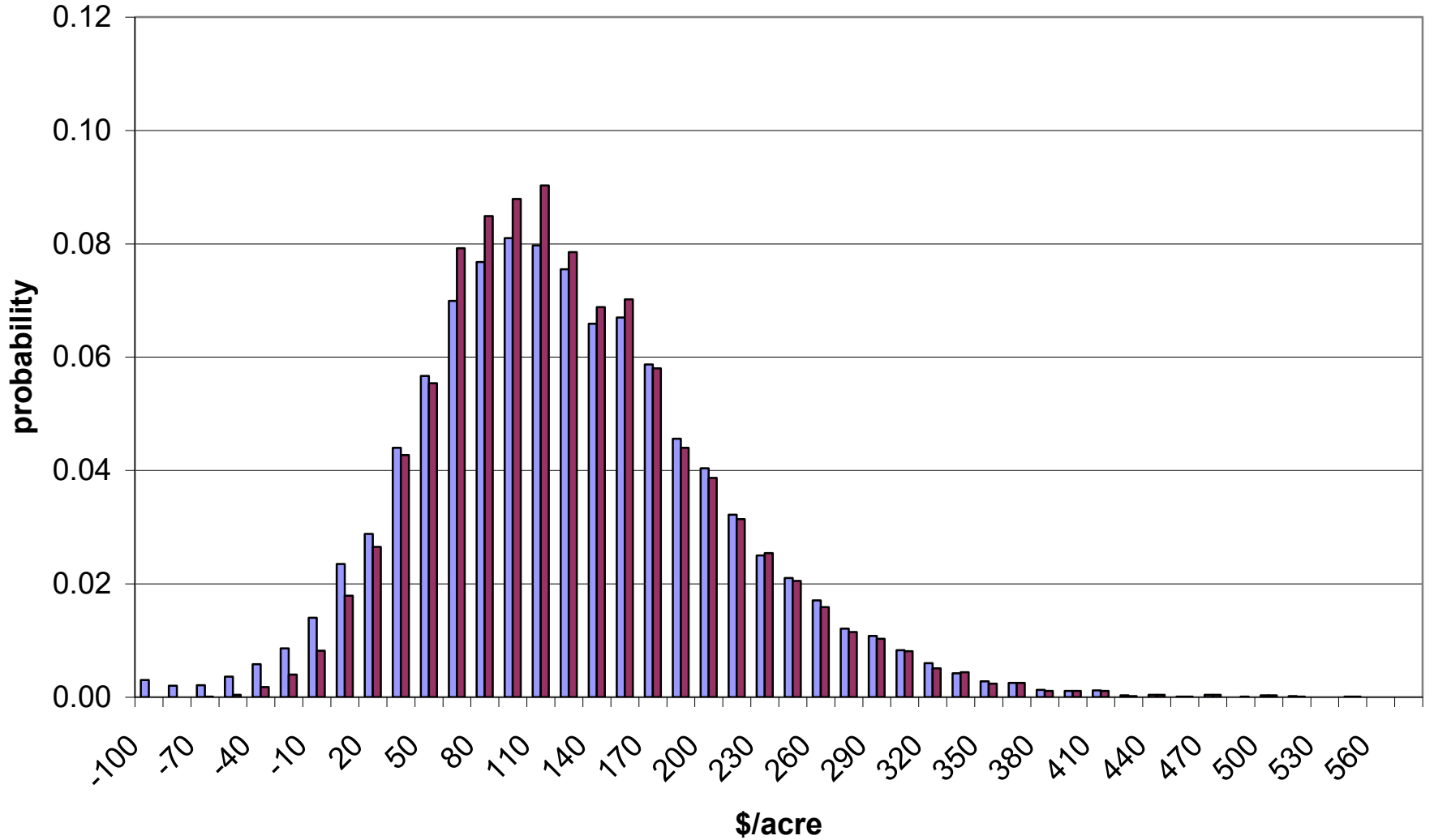
Corn Acres Insured in Powesheik County in 2004



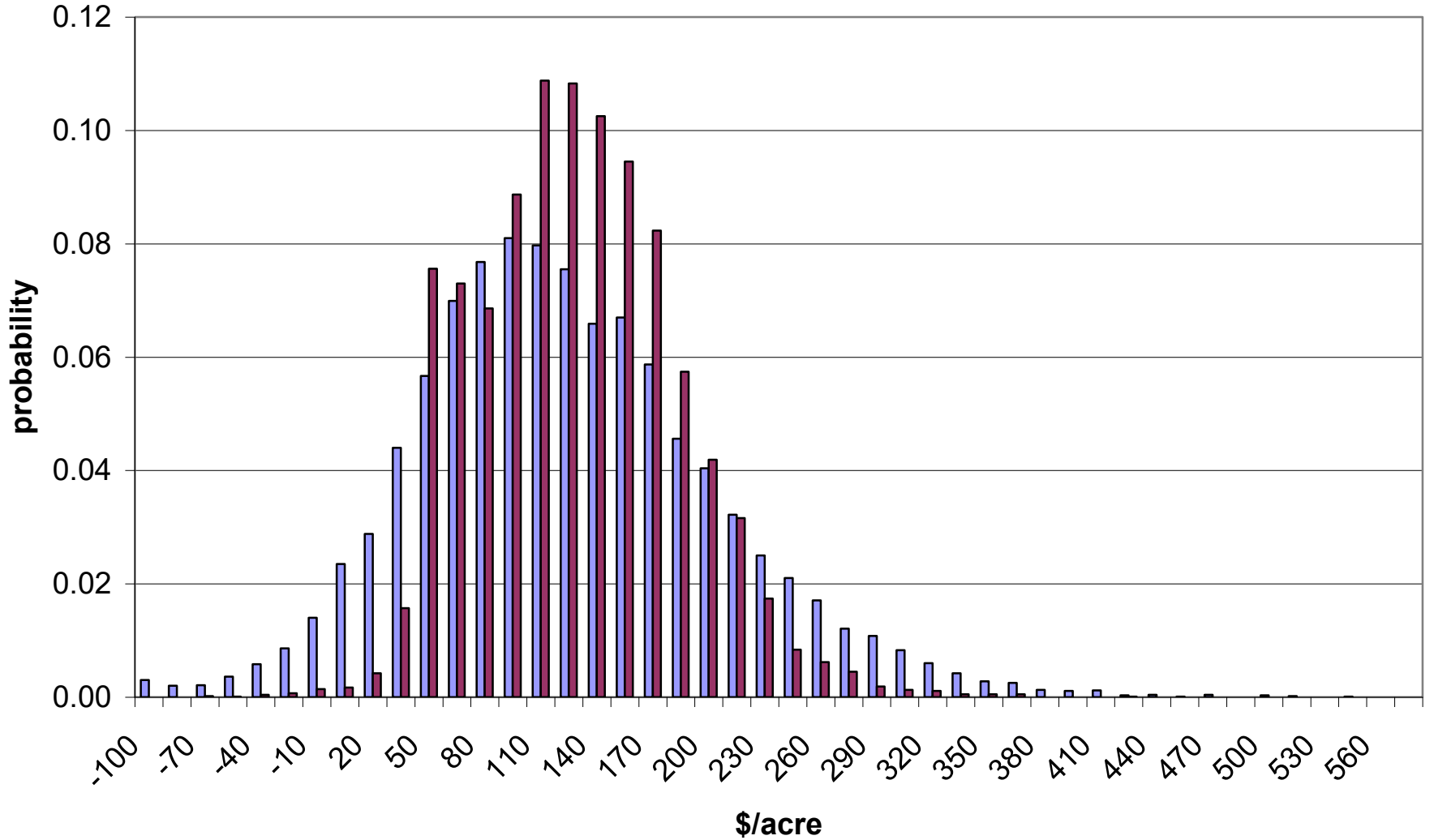
Soybean Acres Insured in Powesheik County in 2004



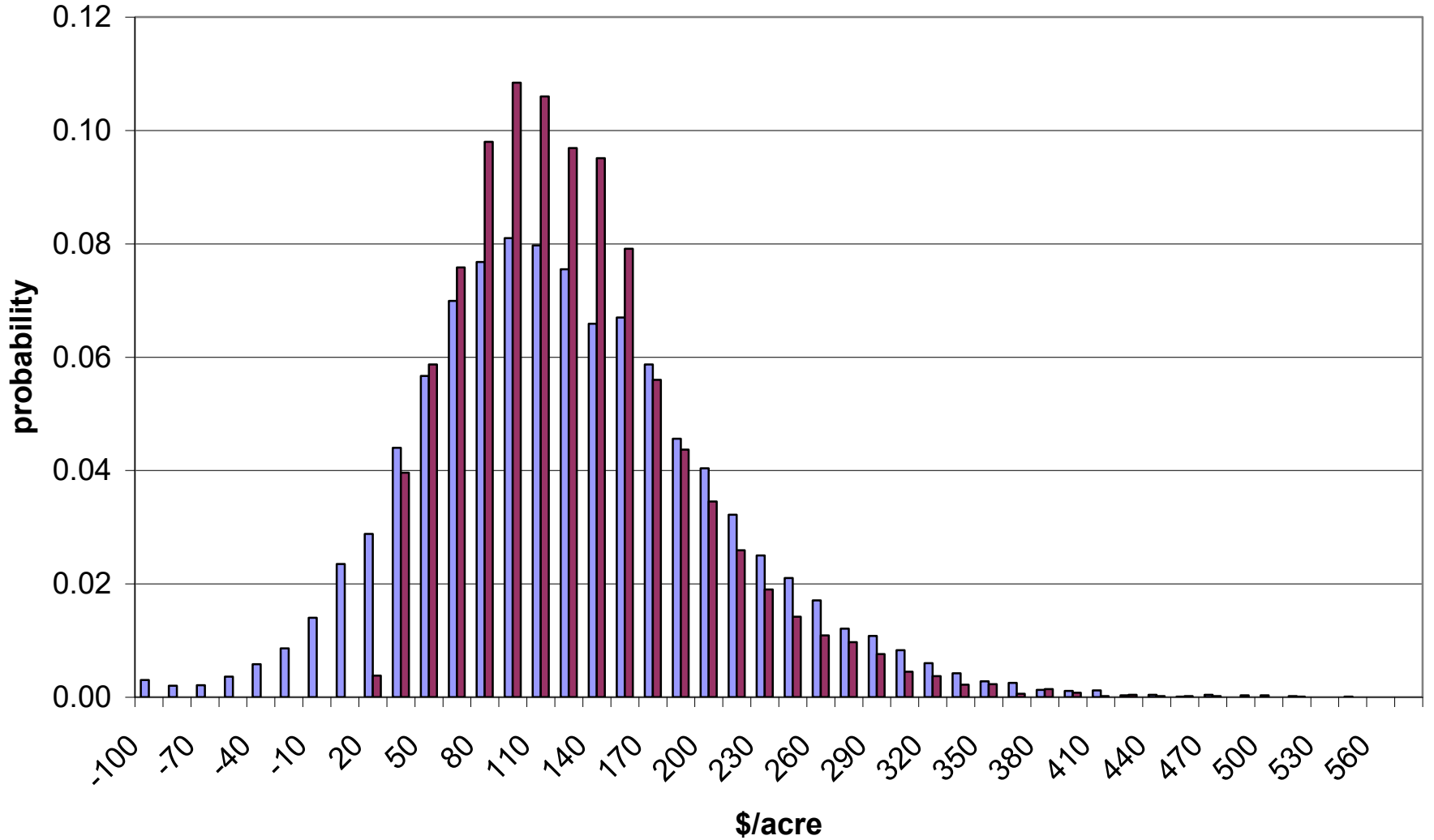
Distribution of Net Revenue with 75% Yield Insurance (APH)



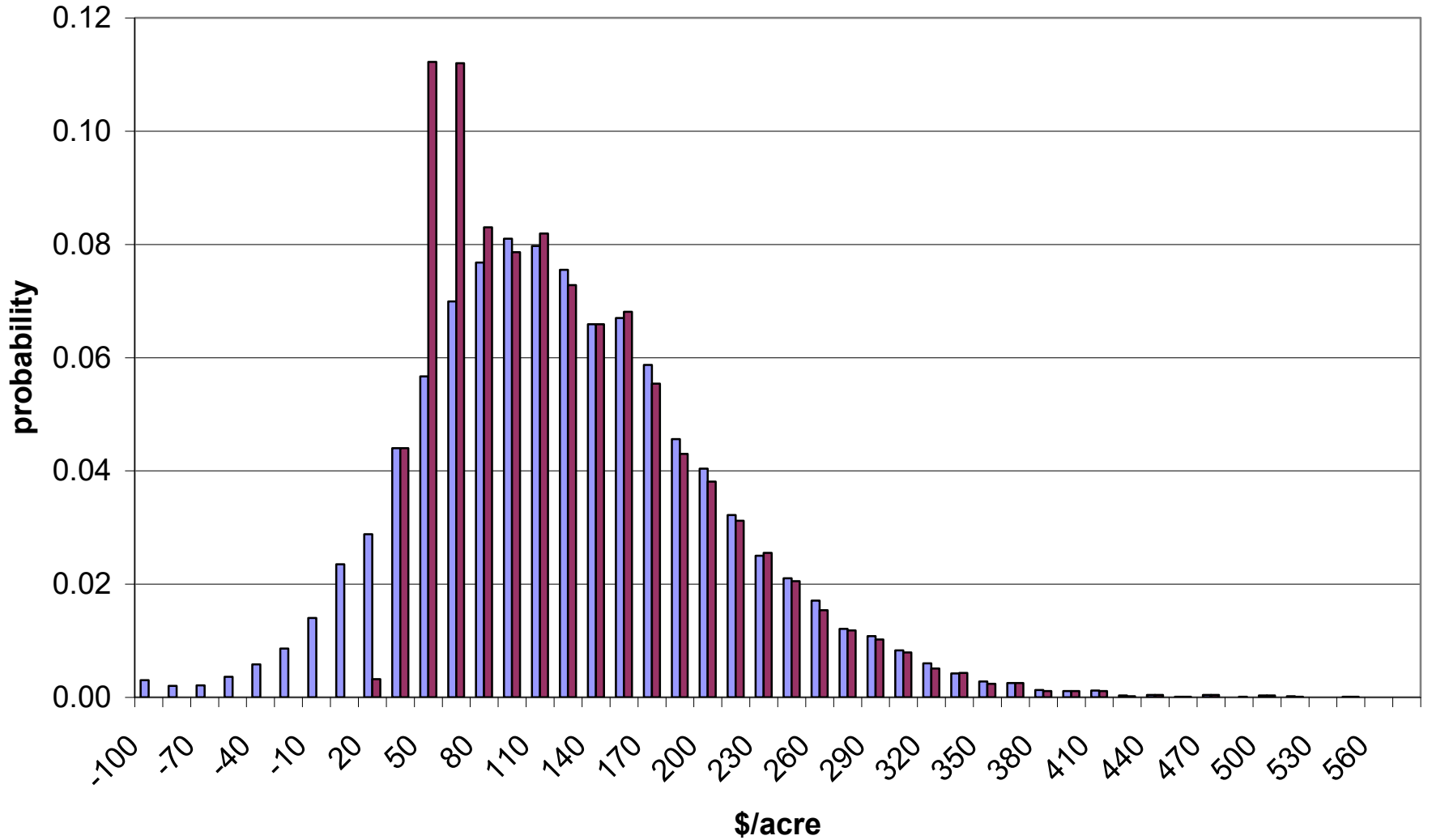
Distribution with Yield Insurance and 75% Hedge



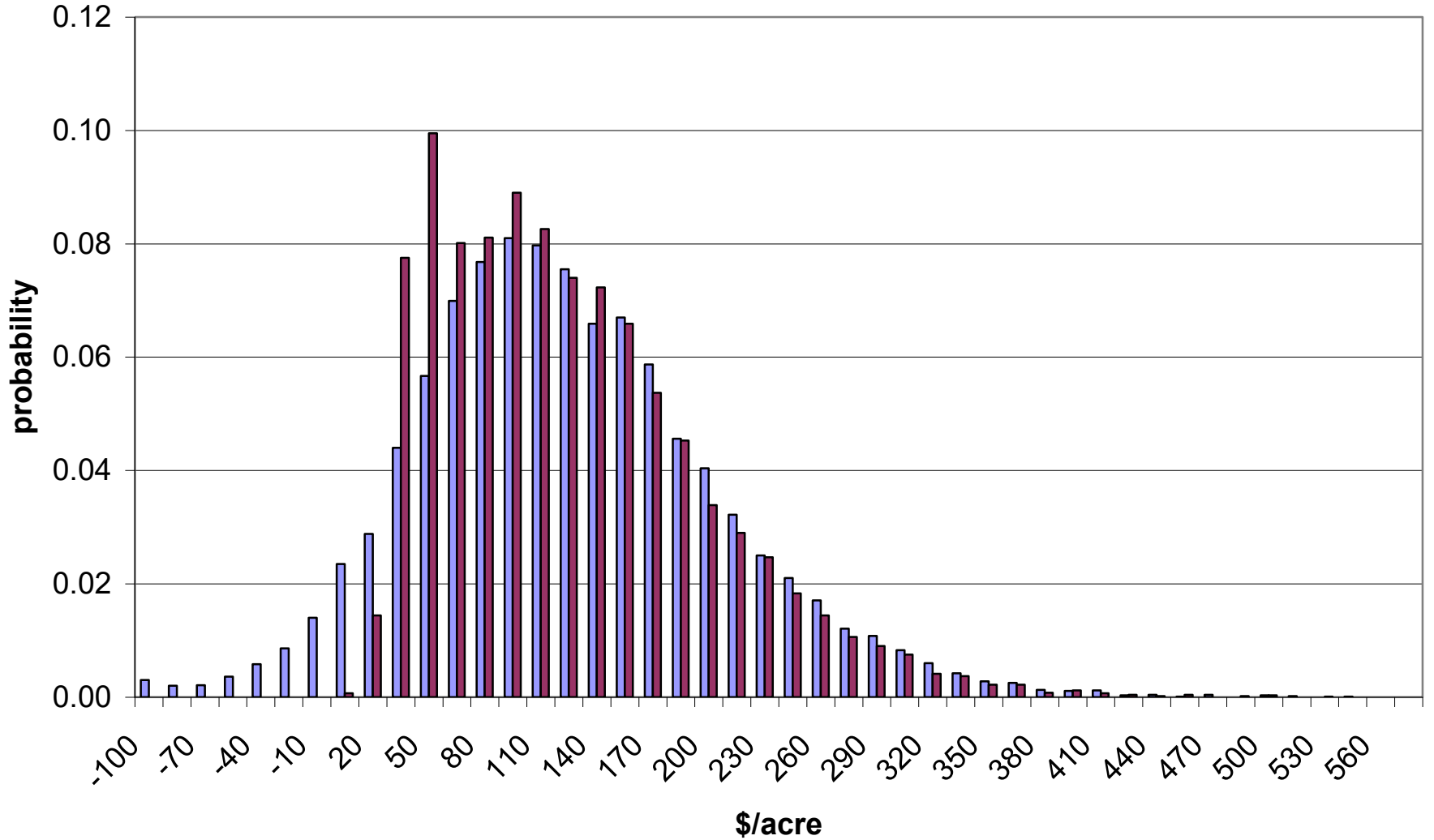
Distribution Using Yield Insurance and Put Options



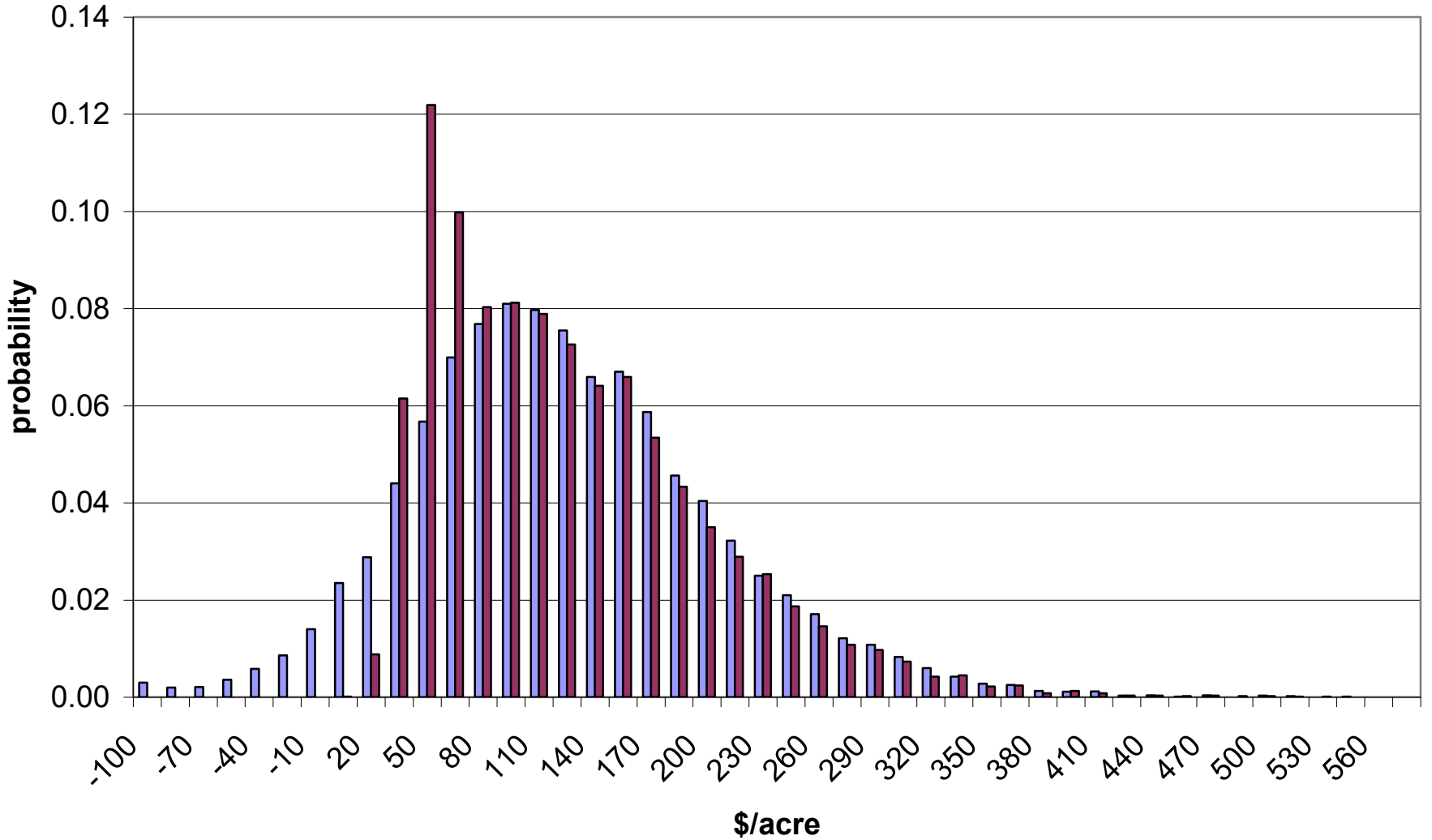
Distribution of Net Revenue with 75% RA



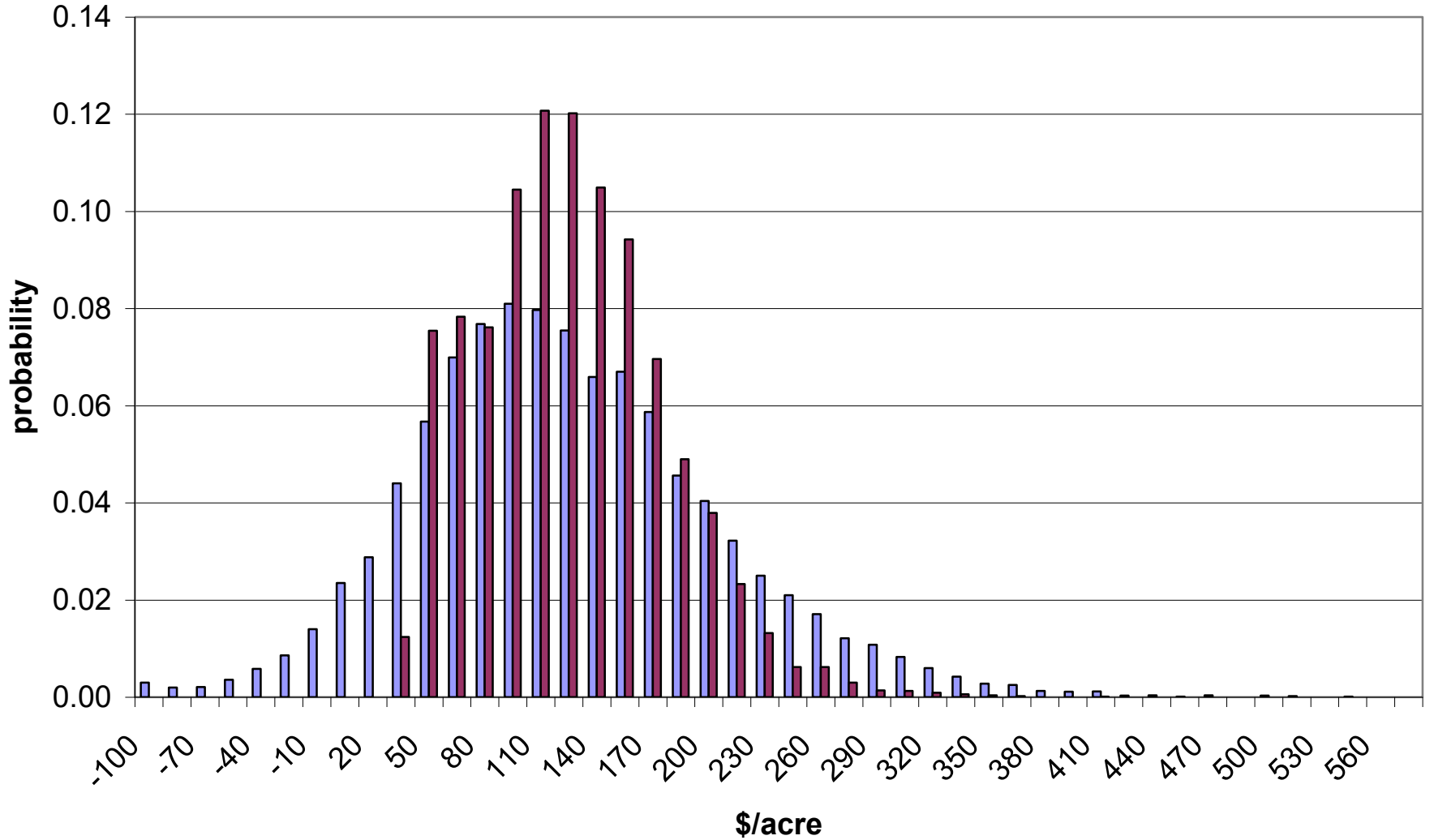
Distribution with 75% RA-HPO



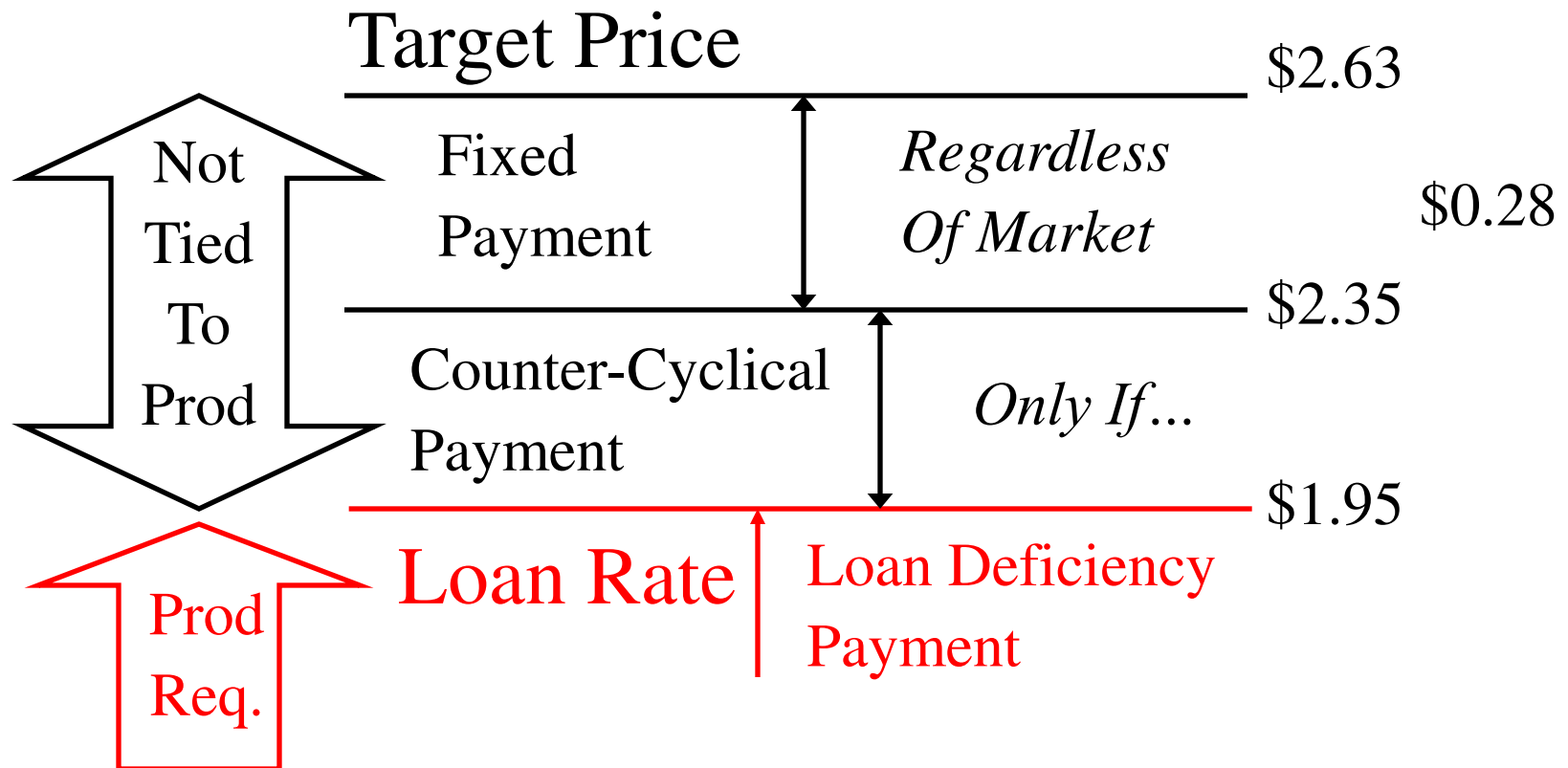
Distribution with 75% RA and Hedge



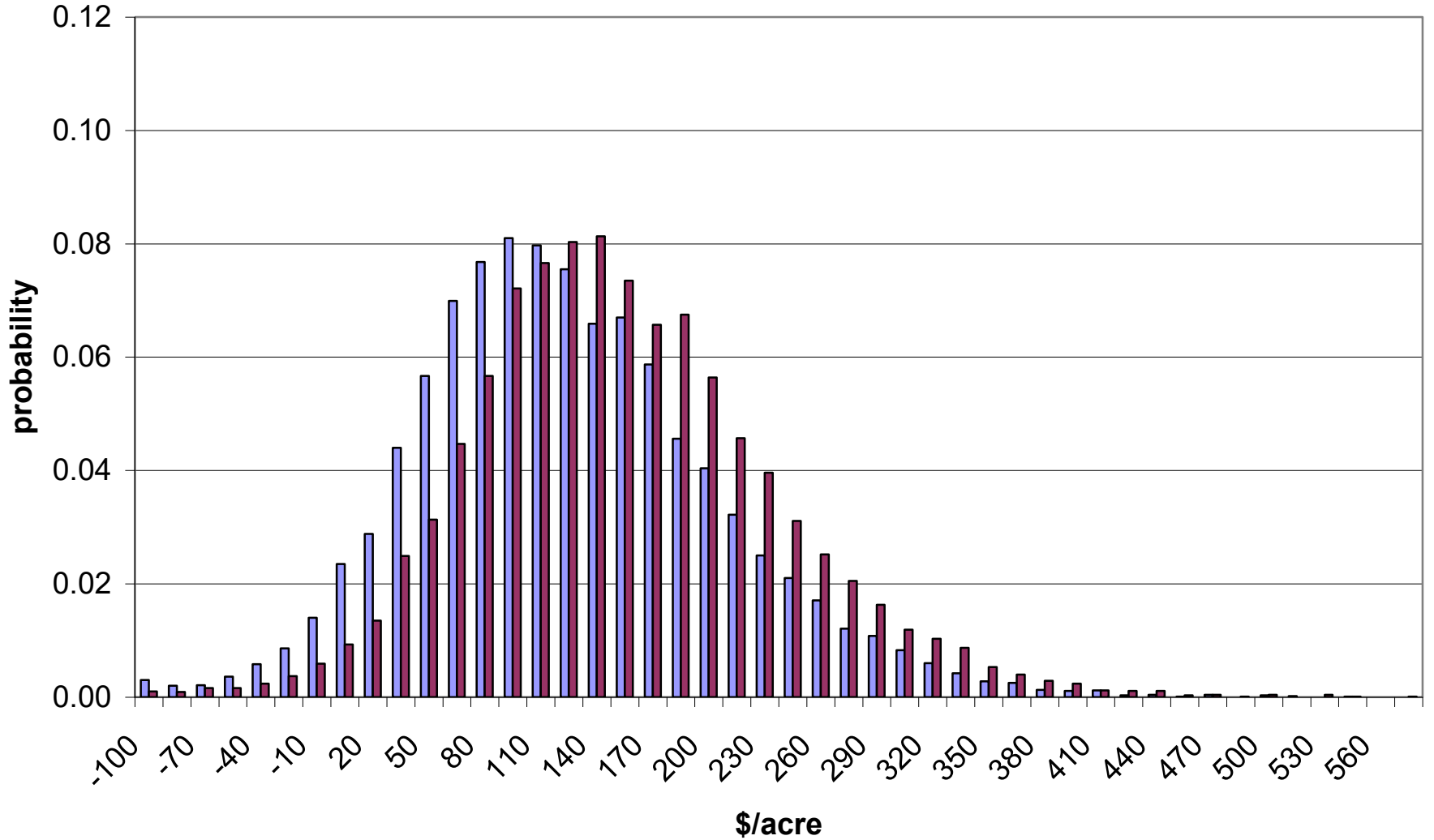
Distribution with 75% RA-HPO and Hedge



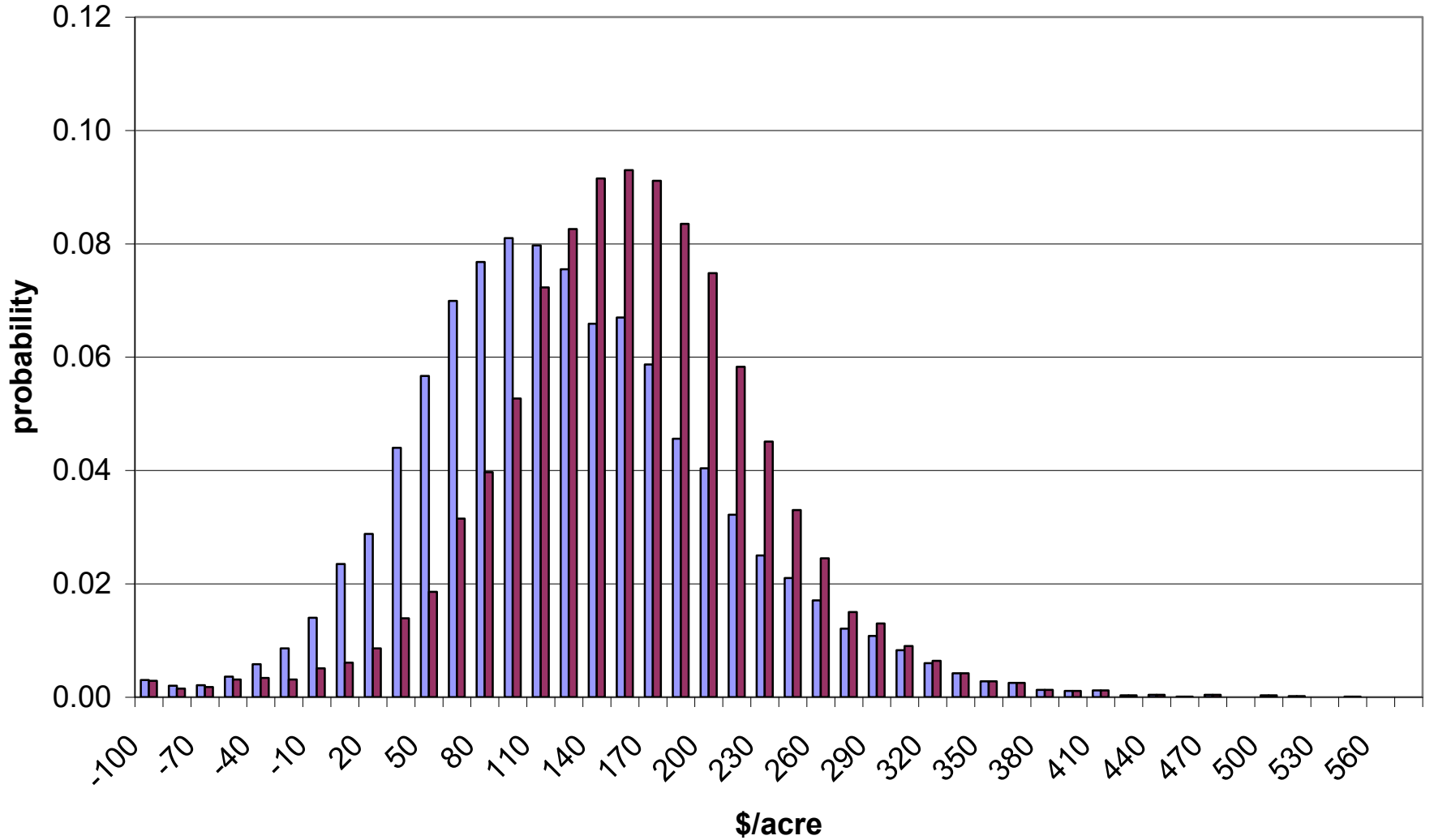
Structure of Program Payments for Corn



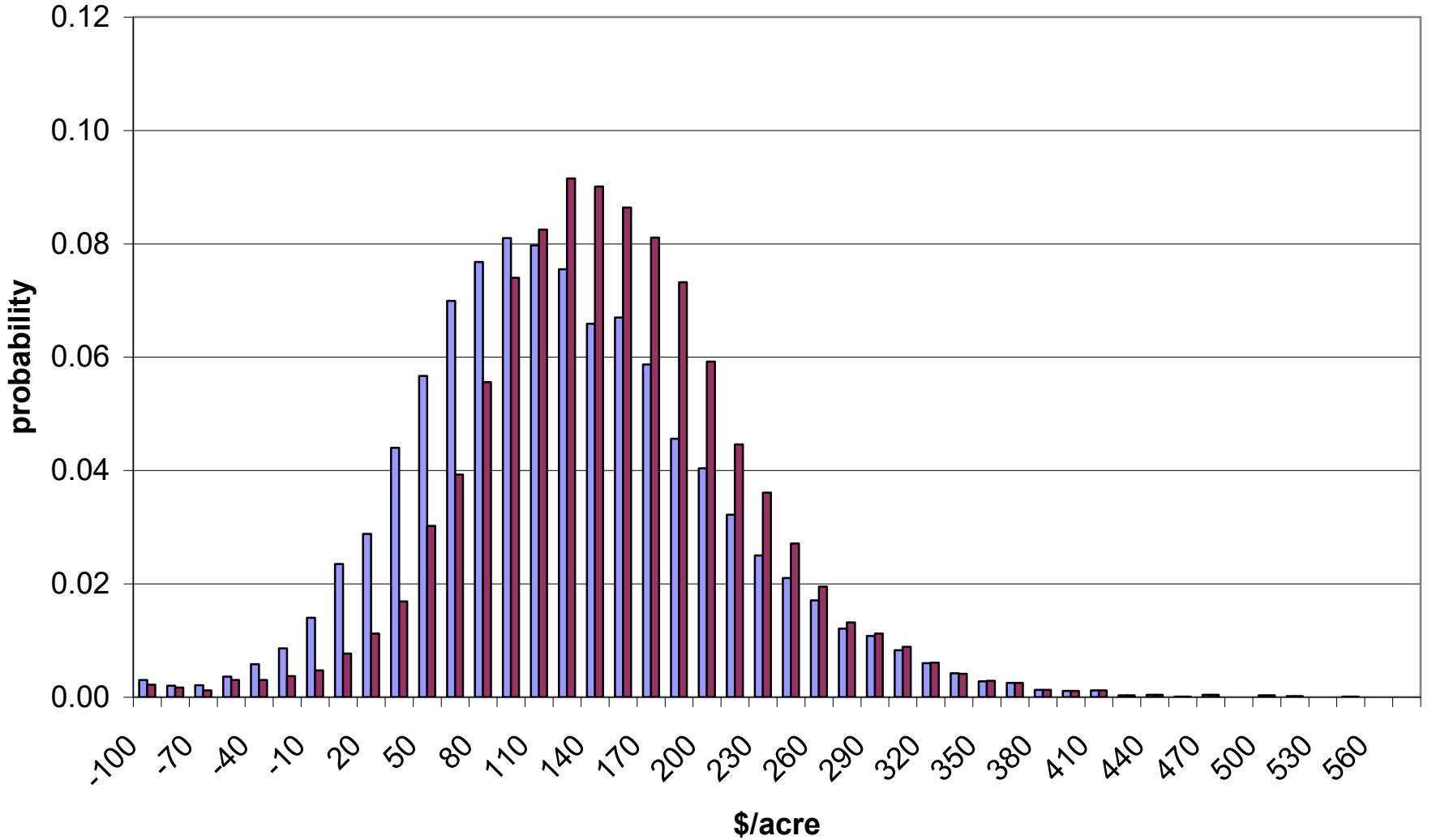
Distribution of Net Revenue Plus Direct Payments



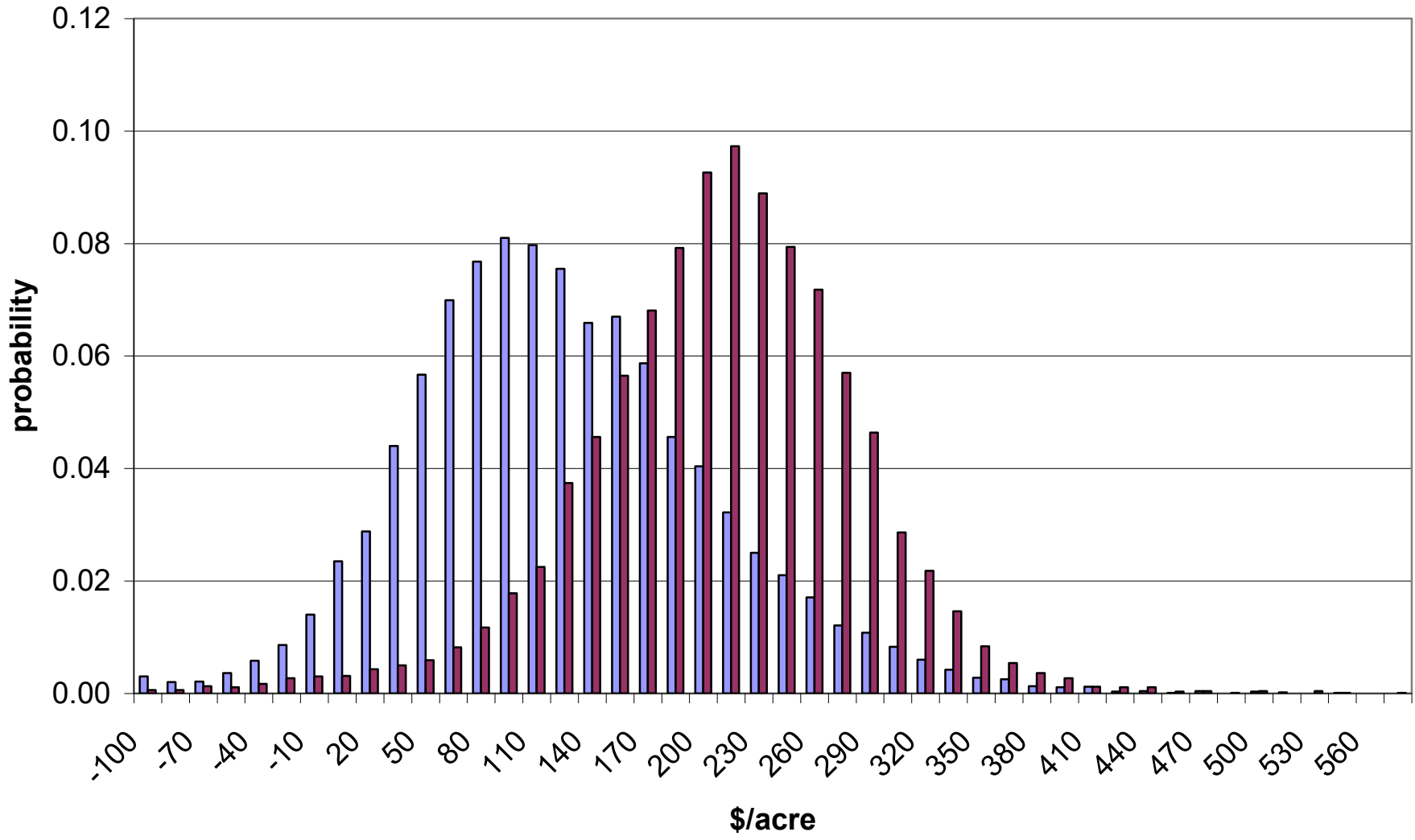
Distribution of Net Revenue Plus LDPs



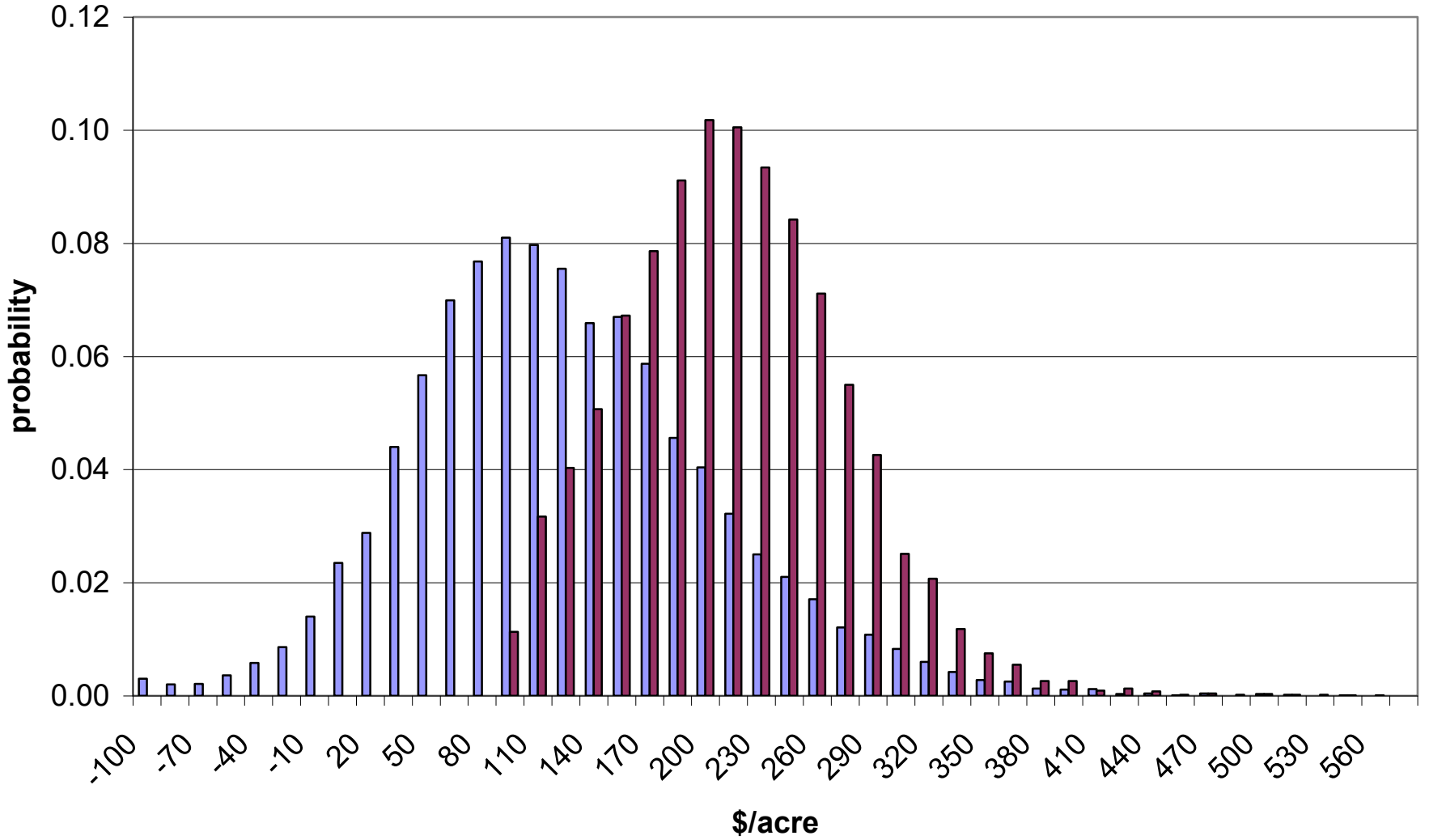
Distribution of Net Revenue Plus CCPs



Distribution with DP, LDP, CCP



Risk Free Farming?



Reduced Risk

- With no insurance or government programs:
 - Average return over variable cost = \$117/ac
 - 5.2% probability of not covering \$180 variable cost
- With all government programs and insurance:
 - Average returns over variable cost = \$207/ac
 - 5.9% probability that returns are less than \$117/ac

Costs of Benefits of Crop Insurance Decisions

- What product to buy?
 - APH, RA, RA-HPO, CRC, GRP, GRIP, GRIP-HRO
- What coverage level to buy?
 - CAT, 65%, 70%, 75%, 80%, 85%
- What unit structure to use?
 - (optional, basic, enterprise, whole-farm)

Effects of Coverage and Unit Structure on Premium

	Coverage Level		
	65%	75%	85%
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Total Premium			
Optional	6,749	16,594	32,478
Enterprise	4,545	12,425	24,610
Whole-Farm	2,440	10,270	21,870
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Producer Premium			
Optional	2,767	7,452	20,136
Enterprise	1,863	5,591	15,258
Whole-Farm	1,000	4,621	13,559
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Change in Expected Indemnity

	<i>65% to 75%</i>	<i>75% to 85%</i>
Optional	9,845	15,884
Enterprise	7,880	12,185
Whole-Farm	7,830	11,600

Change in Producer Premium

Optional	4,685	12,684
Enterprise	3,728	9,667
Whole-Farm	3,621	8,938

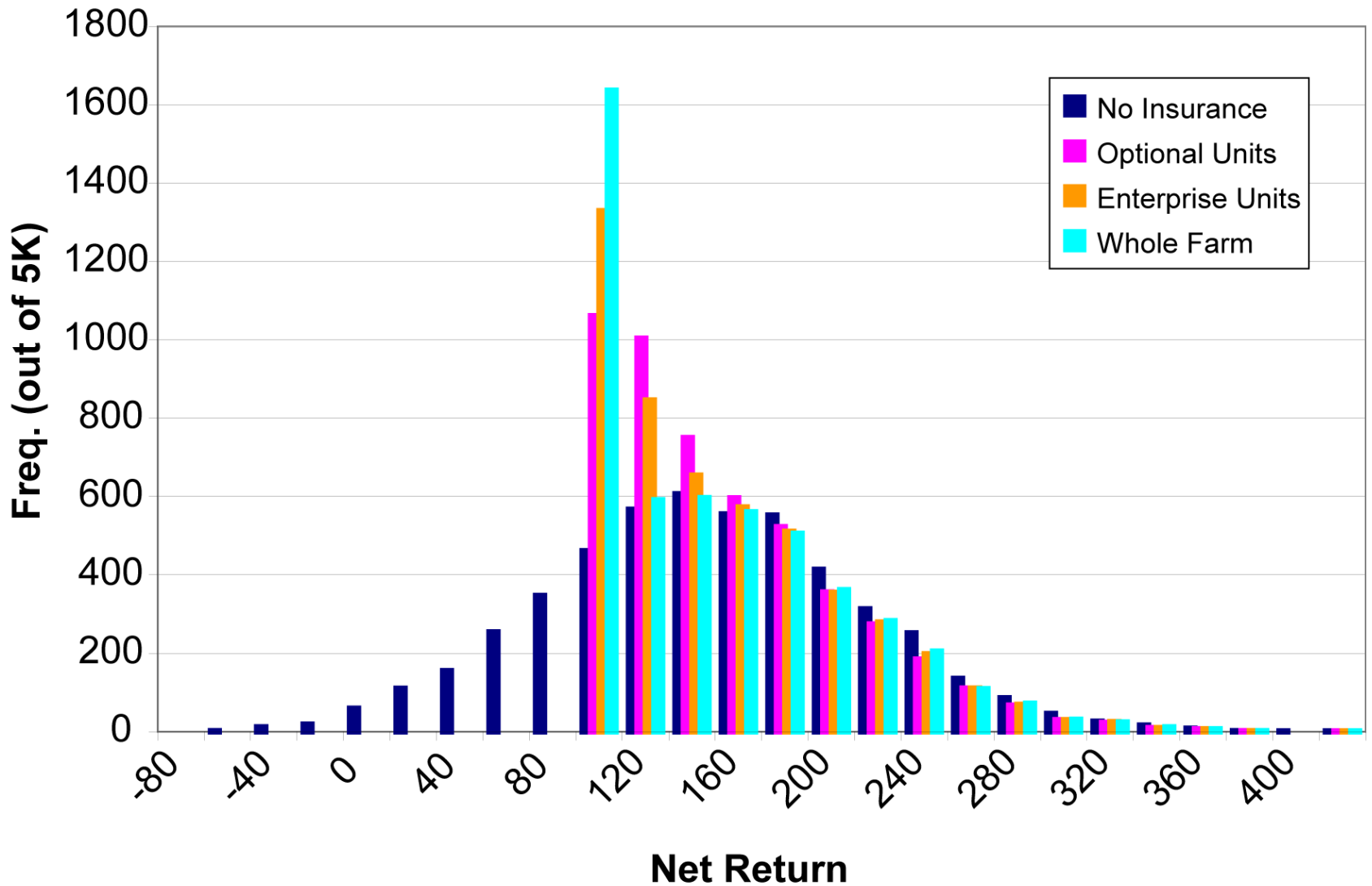
Expected rate of return from increasing coverage

	<i>65% to 75%</i>	<i>75% to 85%</i>
Optional	110%	25%
Enterprise	111%	26%
Whole-Farm	116%	30%

Expected rate of return to changing unit structure

	Whole-Farm to Enterprise	Enterprise to Optional
65%	144%	144%
75%	122%	124%
85%	61%	61%

Distribution of Returns by Unit Structure



GRIP and GRIP-HRO

- GRIP guarantee =
Factor*CBOT Springtime Price*Expected
County Yield
- GRIP-HRO guarantee =
Factor*CBOT Fall or Spring Price*Expected
County Yield

Factor lies between 0.6 and 1.5.

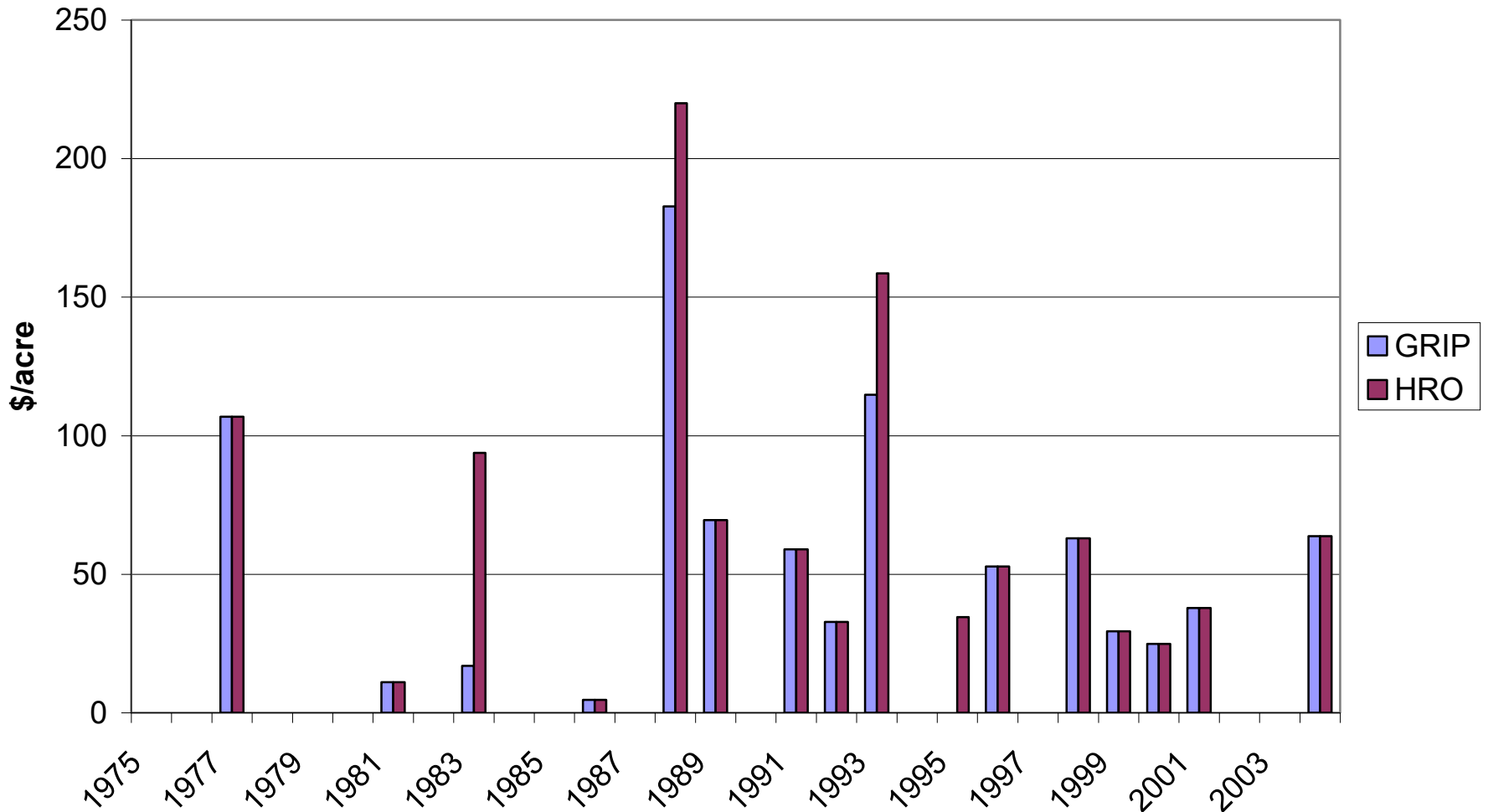
Who Should Buy GRIP?

- Farmers who do not have a representative APH yield
- Farmers who are lower risk than that assumed in APH program
- Farmers with yields that are highly correlated with county yields

GRIP and GRIP-HRO in
Poweshiek County
(Expected Yield = 154.9 bu/ac)

	Maximum Coverage Per Acre (\$/acre)	Total Premium (\$/acre)	Producer Premium (\$/acre)
GRIP	\$553	\$32.30	\$14.53
HRO	\$553	\$47.28	\$21.28

Historical Indemnities that Would Have Been Paid Out Under GRIP and GRIP-HRO in Powsheik County



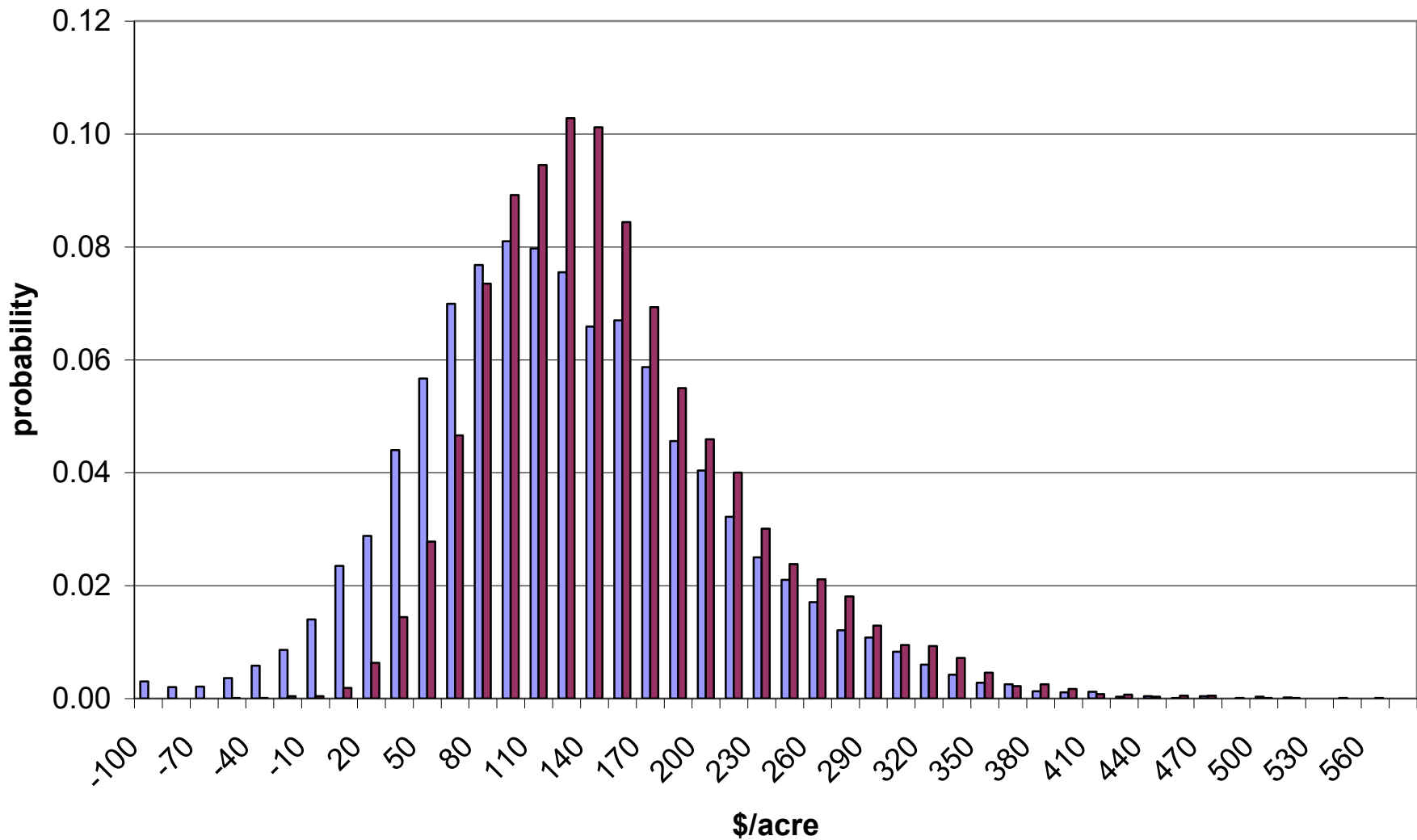
Payoff from GRIP and GRIP-HRO

- Total payout = 6.2% of liability for GRIP and 7.6% of liability for HRO from 1975 to 2004.
- Premium rate = 5.84% of liability from GRIP and 8.55% of liability from GRIP-HRO.
- Since 1975, rate of return = 6% for GRIP and -12% for HRO.

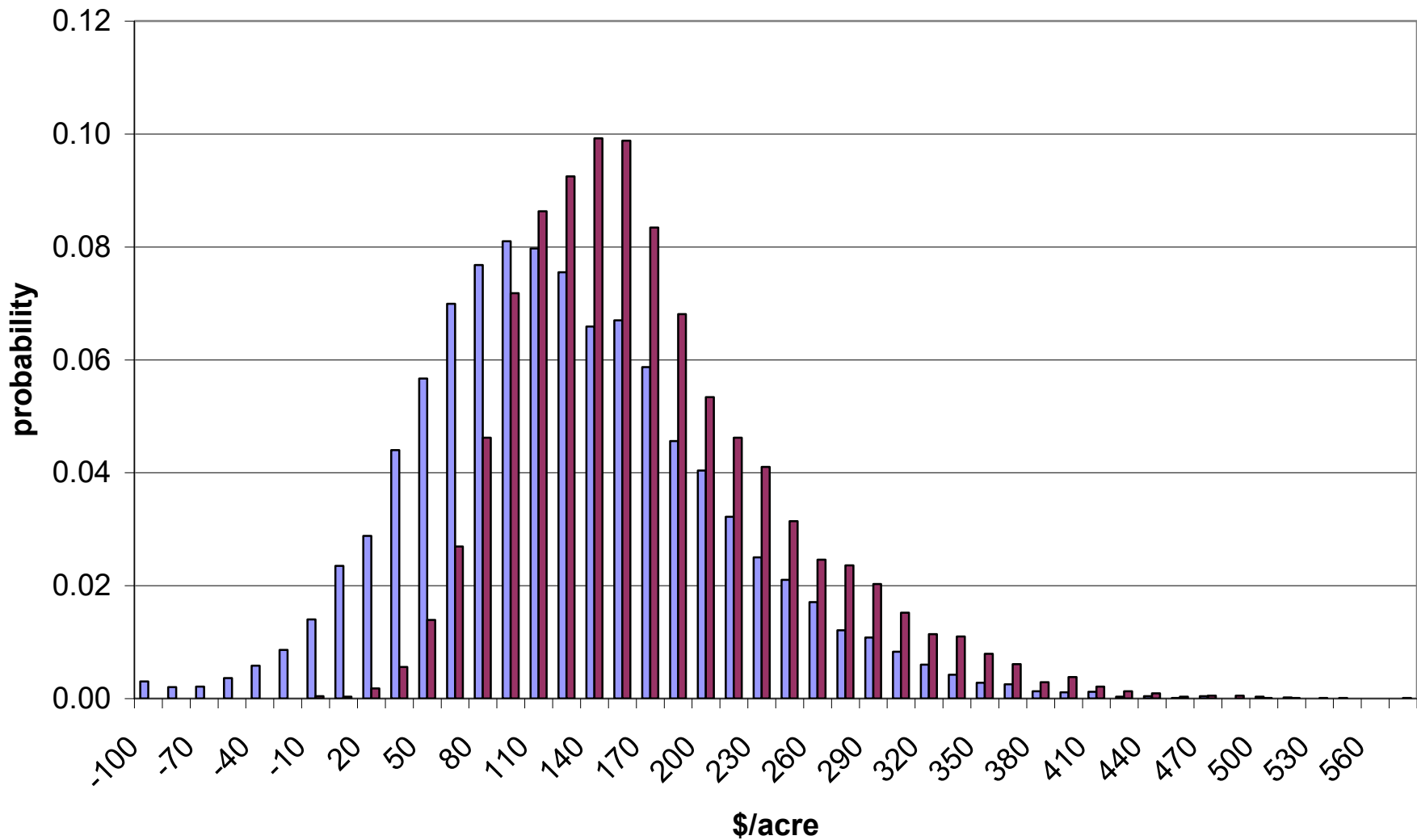
Subsidized rate of return for GRIP and GRIP-HRO

- 2005 Premium = \$14/acre for GRIP and \$21 for GRIP-HRO
- Expected Payout from 1975 to 2004: \$34 for GRIP and \$42 for HRO
- Expected Payout from 1957 to 2004: \$27 and \$39.
- Expected return = \$20 or \$13 per acre for GRIP, \$21 or \$18 per acre for HRO.

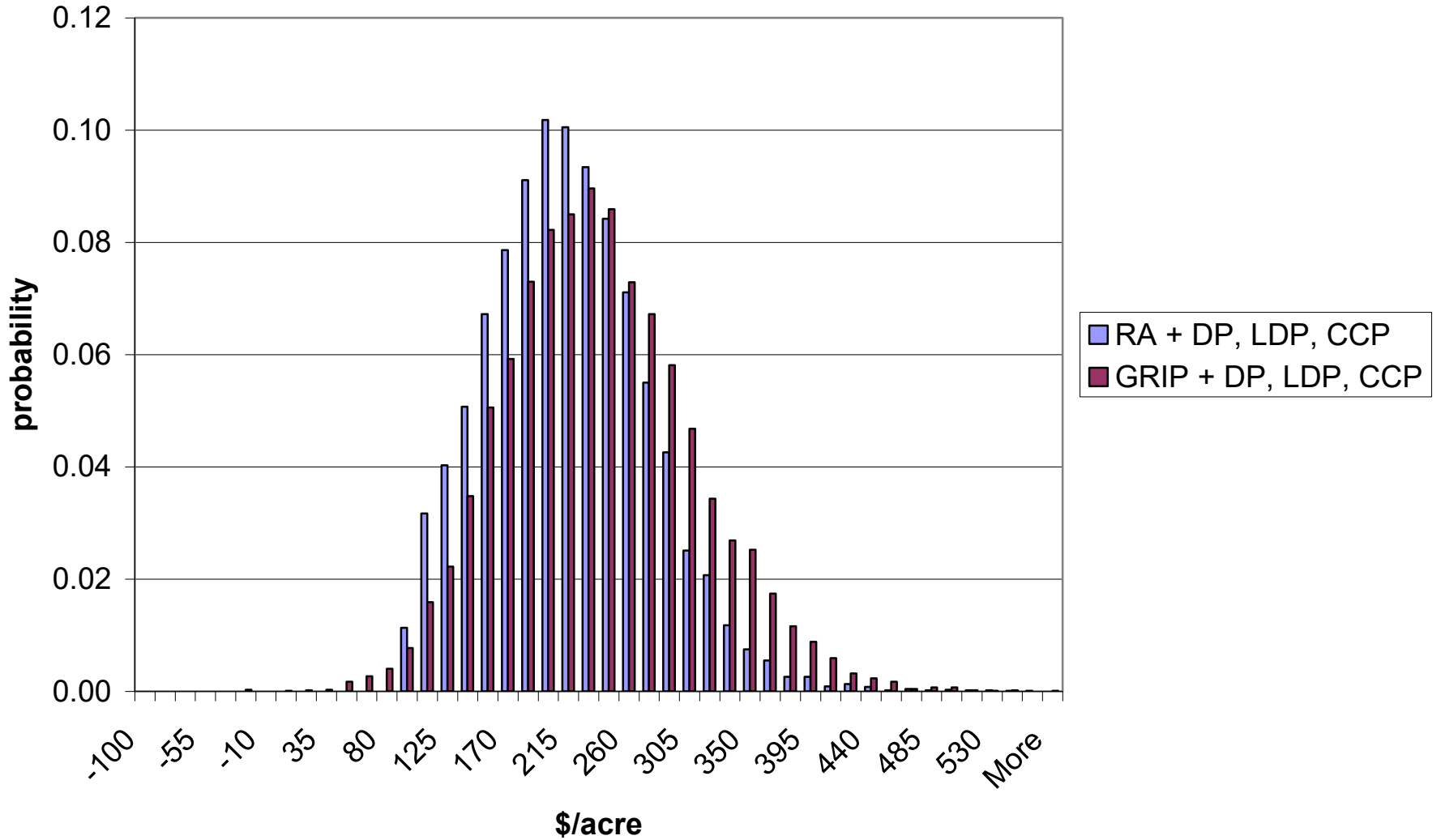
Distribution with 90% GRIP



Distribution with 90% GRIP-HRO



How Does GRIP-HRO Perform Relative to the Gold Standard?



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- Discussion