



# Impact of Crop Insurance and Indemnity Payments on Cash Rent and Land Values

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# Background

- The magnitude of the impact of crop insurance indemnity payments on cash rents and land values often comes up as an open question in extension and research settings.
- For several reasons this question is not easy to answer. Crop insurance helps mitigate downside risk, but in many instances, has a negative impact on net return per acre because, as expected with any insurance product, the average insurance cost is larger than the average revenue received from the product.

# Background

- The primary question therefore is whether the risk-adjusted net return (i.e., certainty equivalent of net return) is significantly impacted by purchasing a crop insurance product.
- If the difference in risk-adjusted net return between scenarios that include and exclude crop insurance is positive, purchasing the crop insurance product puts upward pressure on both cash rents and land values.

# Primary Objective

- The objective of this paper is to examine the impact of a yield protection crop insurance product on cash rents and land values for a representative farm in Indiana.
- Specifically, the impact of the purchase of a yield protection product is explored using net returns for a representative farm, and cash rent and land value equations.

# Data and Methods

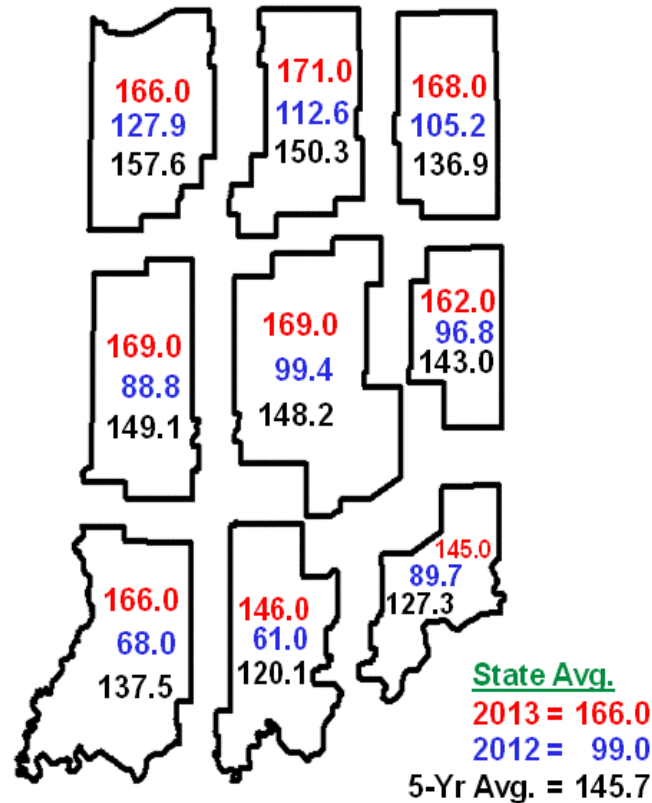
# Representative Farm

- A representative farm in northwest Indiana has been developed for extension and research purposes.
- This farm produces corn and soybeans in a corn/soybean rotation.
- For the crop insurance scenario, the representative farm was assumed to purchase the 75 percent yield protection product for full-season corn and soybeans.

# Representative Farm

- Cost estimates for 2012 were based on Purdue crop budgets.
- USDA input price indices were used to estimate historical costs.
- Yield information for White county was utilized.

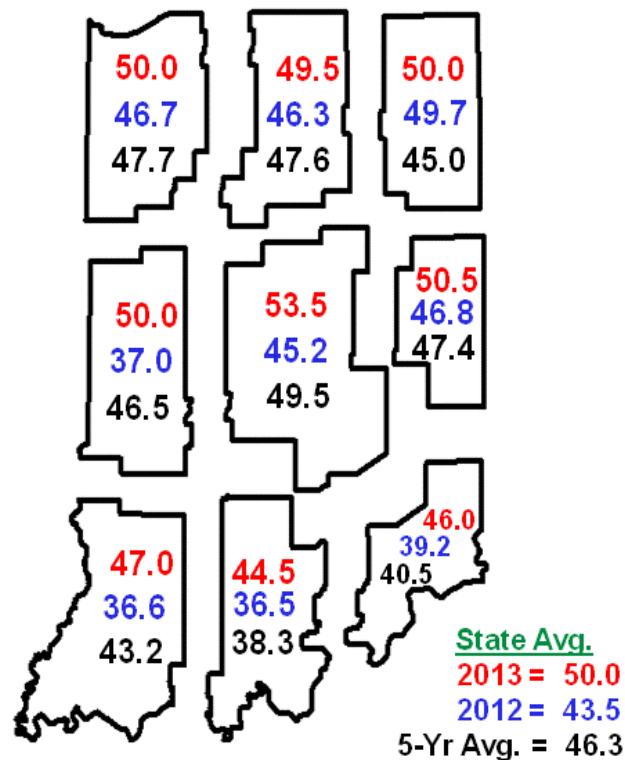
## Indiana District Corn Yields September 1, 2012-2013



Source: USDA, NASS, Great Lakes Region, Indiana Field Office



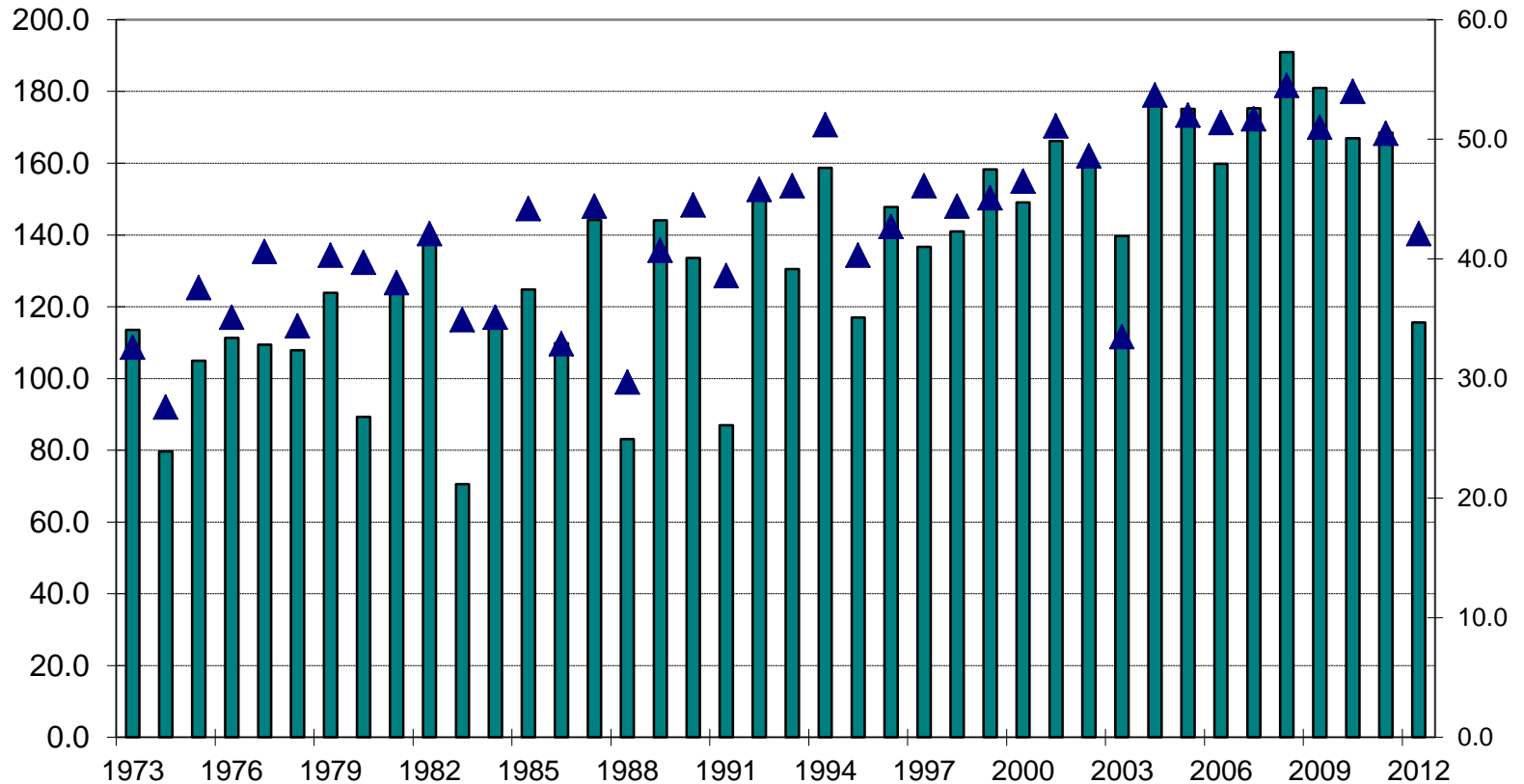
## Indiana District Soybean Yields August 1, 2012-2013



Source: USDA, NASS, Great Lakes Region, Indiana Field Office

# Historical Corn and Soybean Yields, Northwest Indiana

■ Corn Yields ▲ Soybean Yields

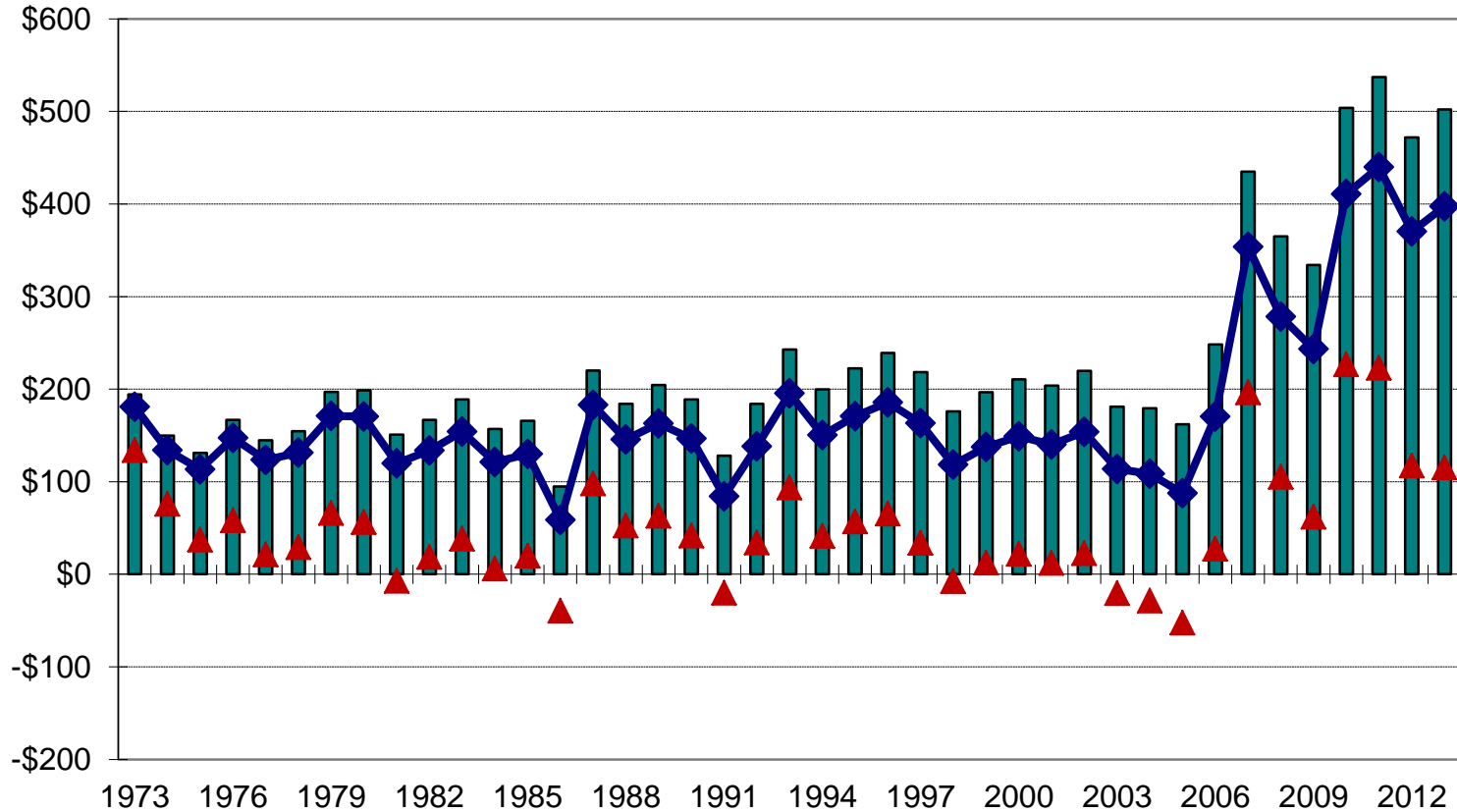


# Averages, Northwest Indiana Representative Farm, 1973 to 2013

<b>Item</b>	<b>Nominal Dollars</b>	<b>Real 2012 Dollars</b>
<b>Net Return to Land and Management without Crop Insurance</b>	<b>177.86</b>	<b>289.74</b>
<b>Net Return to Land and Management with Crop Insurance</b>	<b>177.76</b>	<b>289.23</b>
<b>Cash Rent</b>	<b>126.27</b>	<b>200.18</b>
<b>Land Values</b>	<b>2,528</b>	<b>3,771</b>

# Historical Net Returns, Northwest Indiana

■ Contribution Margin    ◆ Net Return to Land    ▲ Earnings



# Crop Insurance Indemnity Payments

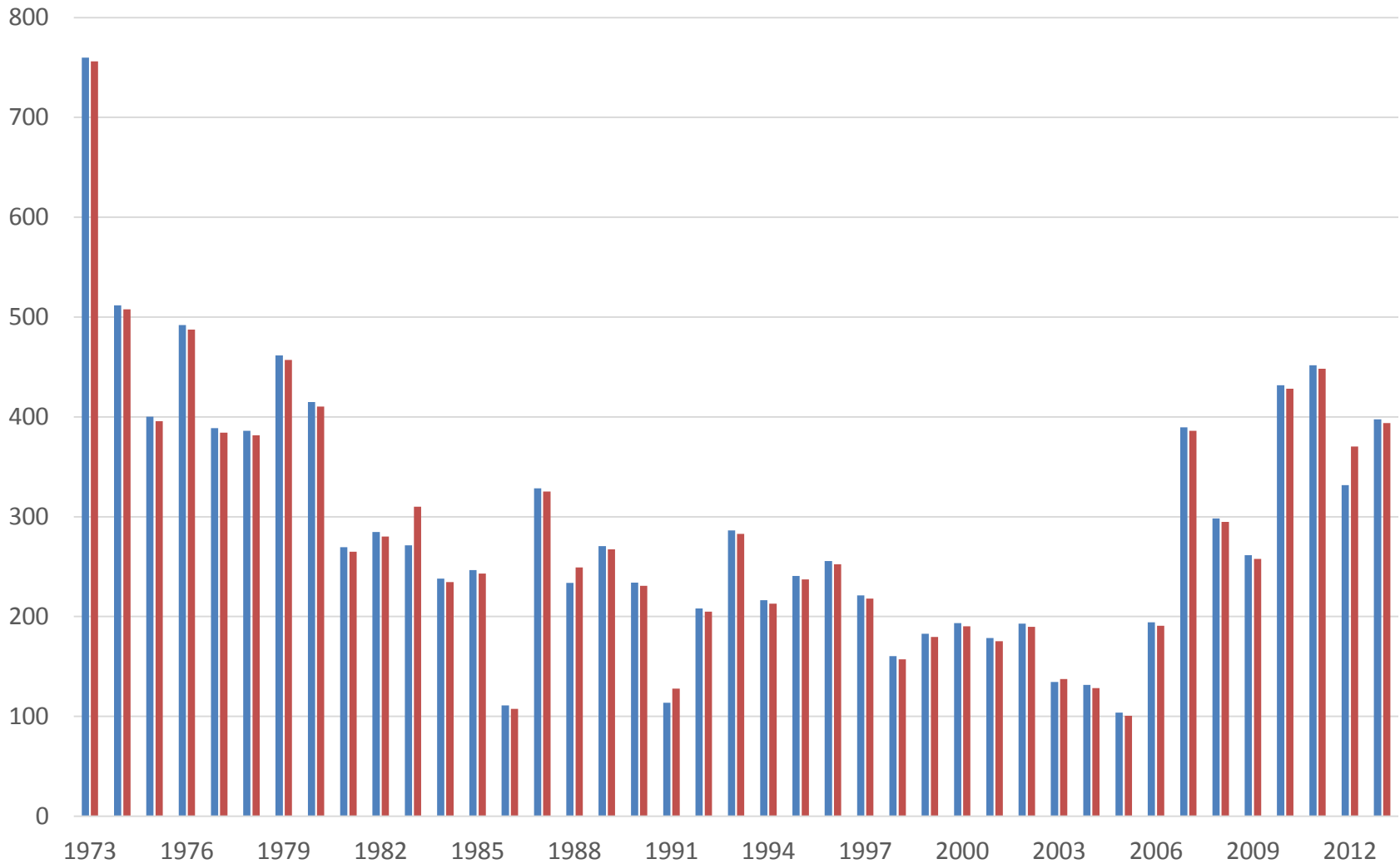
- Crop insurance indemnity payments were incurred for corn in 1983, 1988, 1991, and 2012; and for soybeans in 1988 and 2003.
- In nominal dollars, the average crop insurance indemnity payments for corn and soybeans were \$4.11 and \$0.33 per acre. In contrast, the average government payment per acre, in nominal dollars, was approximately \$23 per acre and average market revenue for corn and soybeans was approximately \$397 and \$303 per acre, respectively.

# Crop Insurance Indemnity Payments

- Obviously, crop insurance indemnity payments were on average a very small percentage of revenue for the representative farm.
- It is also interesting to note that in two of the three years (1986, 1991, and 2005) with the lowest net returns, crop insurance indemnity payments for corn and soybeans were zero. In 1991, the corn indemnity payment was only \$23 per acre. The primary reason for low net returns in 1986 and 2005 was low crop prices.

# Real Net Return to Land, Northwest Indiana

■ Without Crop Insurance   ■ With Crop Insurance



# Methods

- The net return information with and without crop insurance was used to compute the certainty equivalent of net return to land and management.
- Stochastic dominance was also used to compare the net return to land and management with and without the inclusion of crop insurance.
- Net return to land and management was incorporated into cash rent and land value regressions to examine the impact of crop insurance on cash rents and land values.



# Results and Discussion

# Certainty Equivalent of Net Return to Land and Management

<b>Item</b>	<b>Without Crop Insurance</b>	<b>With Crop Insurance</b>
<b>Risk Neutral</b>	<b>289.74</b>	<b>289.23</b>
<b>Slightly Risk Averse</b>	<b>262.70</b>	<b>262.26</b>
<b>Moderately Risk Averse</b>	<b>215.19</b>	<b>214.81</b>
<b>Strongly Risk Averse</b>	<b>181.23</b>	<b>180.80</b>

# Stochastic Dominance Results

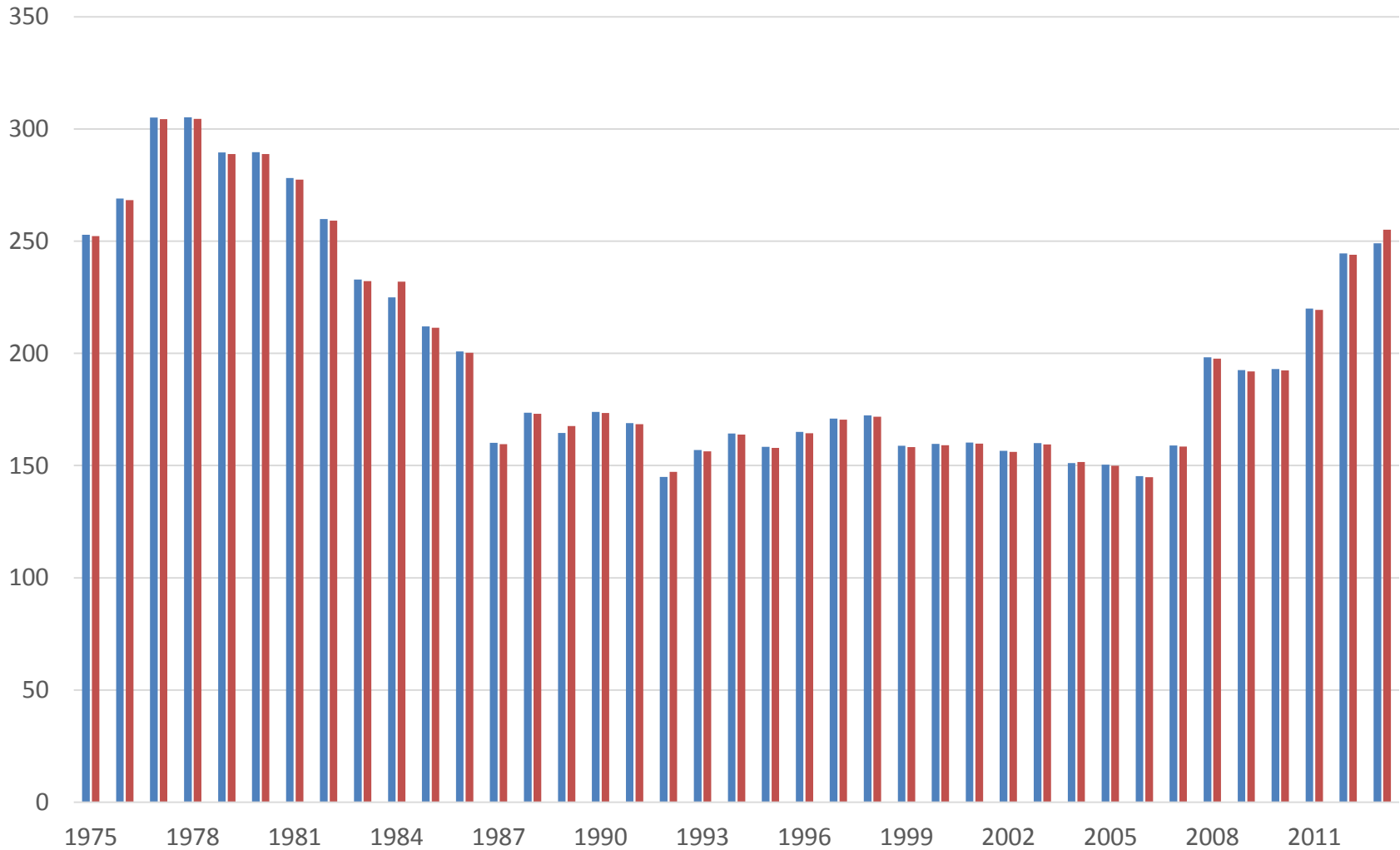
- Both crop insurance scenarios were part of the first degree and second degree stochastic efficient sets.
- The stochastic dominance with respect to a function results indicated that the net return scenario without crop insurance dominated for a range of risk aversion representing slightly risk averse preferences.
- For the range of risk aversion representing moderately and strongly risk averse preferences, both net return scenarios were in the stochastic dominance efficient sets.

# Cash Rent and Land Value Results

- The figures on the next two pages illustrate the predicted cash rents and land values for the two net return scenarios.
- There is very little difference in cash rents or land values between the two net return scenarios.
- Differences in cash rents ranged from \$0.48 in 2004 to \$6.48 in 1984 while differences in land values ranged from \$1.20 in 1990 and 2000 to \$16.52 in 1984.

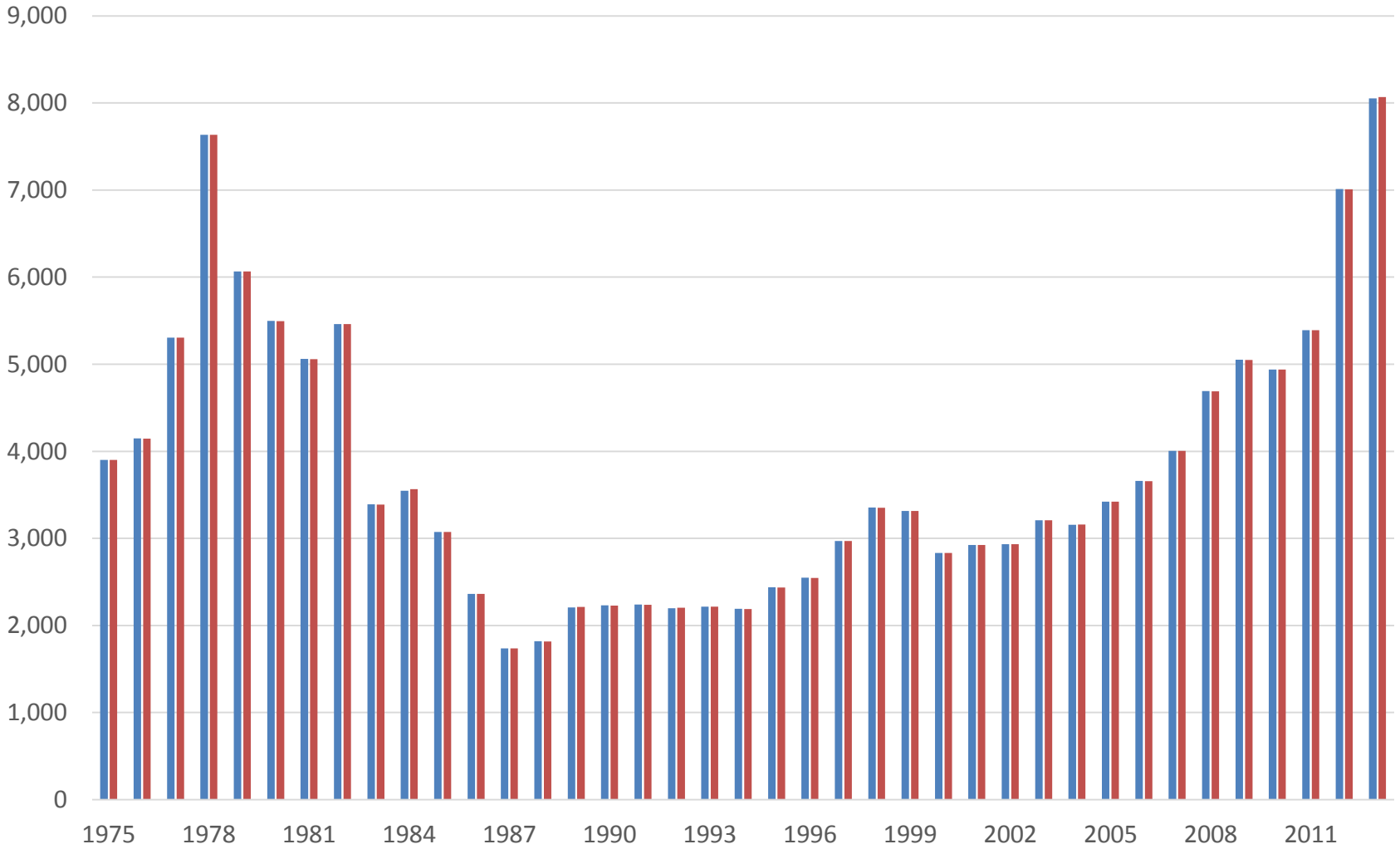
# Real Cash Rent, Northwest Indiana

■ Without Crop Insurance   ■ With Crop Insurance



# Real Land Values, Northwest Indiana

■ Without Crop Insurance   ■ With Crop Insurance



# Concluding Comments

# Summary

- Net return to land and management, cash rents, and land values for a representative farm in northwest Indiana were used to examine the linkage between crop insurance products, cash rents, and land values.
- Two primary results were found:
  - The net return to land and management for scenarios that included crop insurance and excluded crop insurance were very similar.
  - Predicted cash rents and land values for the two net return to land scenarios were not significantly different.



# Future Work

- Examine impact of revenue protection crop insurance on the northwest Indiana representative farm.
- Examine impact of crop insurance on representative farms in north central and southwest Indiana.