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Indiana Farmland Value & Cash Rent Continue Sharp Upward Climb

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State-wide Farmland Values

With the sharp increase in grain prices, it probably is no surprise that the 2008 Purdue Farmland Value and Cash Rent Survey found farmland value and cash rent moving higher. On a state-wide basis, the average value of bare Indiana cropland ranged from $3,408 per acre for poor quality land to $5,003 per acre for top quality land (Table 1). Average quality Indiana cropland had an estimated average value of $4,240 per acre. For the 12-month period ending in June 2008, this was an increase of 13.9%, 15.0%, and 13.5%, respectively for poor, average, and top quality land. These double-digit increases are less than those reported last year, but still signal a strong farmland market. Since June 2006, Indiana farmland values have increased by about one-third (32.7%, 34.1% & 35.8% for poor, average, and top quality farmland).

The value of farmland is influenced by many factors. One often cited reason for differences in the value of farmland is soil productivity. To assess the productivity of the various land qualities, survey respondents were asked to provide an estimate of the long-term corn yield for poor, average, and top quality land. These estimates are averaged to provide a measure of the productivity for each land type. For the state, the average of the reported yields was 115, 148, and 179 bushels per acre, respectively for poor, average, and top quality land. State-wide, the value per bushel of corn for different land qualities ranged from $28.00 to $29.58 per bushel. On a per bushel basis, the most expensive land is the poor quality land with a value of $29.58 per bushel. Top quality land was the least expensive at $28.00 per bushel.

The average value of transitional land, farmland moving out of agriculture, declined slightly this year. The average value of transitional land in June 2008 was $9,415 per acre. This was a decline of 1.1% when compared to the average value in 2007. Given all the news about slow growth in the general economy and difficulties in the housing industry, some softening of this market would be expected. However, the value of transitional land is strongly influenced by what the land is transitioning into and its location. In June 2008, transitional land values ranged from $2,500 to $55,000 per acre. Because of the wide variation in values of transitional land, the median value* may give a more meaningful picture than the arithmetic average. The median value of transitional land increased from $7,500 per acre in June 2007 to $8,000 in June 2008.

The state-wide average value of rural recreational land, land used for hunting and other recreational uses, is $3,952 per acre. As with

* *The median is the middle observation in data that have been arranged in ascending or descending numerical order.*

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Table 1. Average estimated Indiana land value per acre (tillable, bare land) and per bushel of corn yield, percentage change by geographical area and land class, selected time periods, Purdue Land Values Survey, June 2008[1]

			Land Value					Land Value/Bu			Projected Land Value	
			Dollars Per Acre			% Change				% Change		% Change
Area	Land Class	Corn bu/A	June 2007 $/A	Dec 2007 $/A	June 2008 $/A	6/07-6/08 %	12/07-6/08 %	Amount 2007 $	Amount 2008 $	6/07-6/08 %	Dec. 2008 $	6/08-12/08 %
North	Top	189	4,438	4,922	5,324	20.0%	8.2%	24.57	28.19	14.7%	5,516	3.6%
	Average	151	3,623	4,044	4,358	20.3%	7.8%	25.04	28.79	15.0%	4,533	4.0%
	Poor	116	2,971	3,137	3,373	13.5%	7.5%	26.41	29.20	10.6%	3,480	3.2%
Northeast	Top	174	4,396	4,566	4,839	10.1%	6.0%	25.36	28.82	13.6%	5,002	3.4%
	Average	144	3,696	3,858	4,142	12.1%	7.4%	25.84	28.85	11.6%	4,299	3.8%
	Poor	113	3,089	3,222	3,399	10.0%	5.5%	28.06	30.16	7.5%	3,542	4.2%
W. Central	Top	181	4,663	4,972	5,236	12.3%	5.3%	26.39	28.88	9.4%	5,428	3.7%
	Average	153	4,006	4,275	4,547	13.5%	6.4%	27.27	29.74	9.1%	4,662	2.5%
	Poor	121	3,215	3,484	3,706	15.3%	6.4%	28.24	30.55	8.2%	3,819	3.0%
Central	Top	180	4,723	5,084	5,392	14.2%	6.1%	26.69	29.90	12.0%	5,536	2.7%
	Average	151	3,966	4,333	4,581	15.5%	5.7%	26.93	30.44	13.0%	4,689	2.4%
	Poor	120	3,219	3,590	3,753	16.6%	4.5%	27.50	31.40	14.2%	3,838	2.3%
Southwest	Top	181	4,161	4,412	4,815	15.7%	9.1%	23.51	26.62	13.2%	4,857	0.9%
	Average	145	3,296	3,587	3,841	16.5%	7.1%	22.79	26.49	16.2%	3,893	1.4%
	Poor	108	2,429	2,572	2,718	11.9%	5.7%	21.93	25.14	14.6%	2,741	0.8%
Southeast	Top	163	3,404	3,538	3,747	10.1%	5.9%	21.02	23.01	9.5%	3,767	0.5%
	Average	136	2,910	3,084	3,304	13.5%	7.1%	22.05	24.27	10.1%	3,289	-0.5%
	Poor	105	2,522	2,583	2,820	11.8%	9.2%	25.36	26.89	6.0%	2,769	-1.8%
Indiana	Top	179	4,407	4,696	5,003	13.5%	6.5%	25.15	28.00	11.3%	5,155	3.0%
	Average	148	3,688	3,988	4,240	15.0%	6.3%	25.61	28.70	12.1%	4,358	2.8%
	Poor	115	2,991	3,208	3,408	13.9%	6.2%	26.80	29.58	10.4%	3,499	2.7%
	Transition[2]		9,520	9,266	9,415	-1.1%	1.6%				9,748	3.5%
	Recreation[3]		3,873	3,764	3,952	2.0%	5.0%				3,907	-1.1%

1 The land values contained in this summary represent averages over several different locations and soil types. The value for a specific property can be determined by a professional appraiser.

2 Transition land is land moving out of production agriculture.

3 Recreation land is land located in rural areas used for hunting and other recreational uses.

transitional land, there is a wide range of values for rural recreational land. The June values reported for recreational land varied from $1,100 to $15,000 per acre. The median value for rural recreational land in June 2008 was unchanged from June 2007 at $3,500 per acre.

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State-wide Rents

One important contributor to the value of farmland is the annual rent that can be obtained from ownership. State-wide, cash rents increased $13 to $23 per acre (Table 2). The largest dollar increase in rent was for top quality land. The smallest dollar increase in rent was for poor quality land. The average estimated cash rent was $194 per acre on top quality land, $157 per acre on average quality land, and $123 per acre on poor quality land. This was an increase in rental rates of 11.8% for poor quality land, 12.9% for average quality land, and 13.5% for top quality land. State-wide, rent per bushel of estimated corn yield increased to $1.06 to $1.09 per bushel.

For top quality farmland, cash rent as a percentage of farmland value was 3.9%. For average and poor quality farmland, cash rent as a percentage of farmland value was 3.7% and 3.6%, respectively. These percentage values were either the same or only slightly less than those reported in 2007, indicating a possible pause in the downward trend in this percentage. Over the 34-year history of the survey, rent as a percentage of farmland value has averaged about 6.0%.

Area Land Values

Survey responses were organized into six geographic regions (Figure 1). As in the past years, there are geographic differences in land value changes. This year, the North region reported the strongest percentage increase in farmland values. Bare farmland in this area was estimated to have increased 13.5% to 20.3% (Table 1). The increase in value for the West Central, Central, and Southwest region was also strong with increases ranging from 11.9% to 16.6%. The increases in value for the Northeast and Southeast were more modest, ranging from 10% to13.5%.

The highest value per acre for top, average, and poor quality farmland is in Central Indiana. However, the dollar value of top, average and poor quality farmland is very similar in the Central, West Central and North regions. The lowest farmland values continue to be in the Southeast.

Land value per bushel of estimated long-term corn yield (land value divided by bushels) is the highest in the North, Central and West Central regions, ranging from $28.19 to $31.40 per bushel. This is followed by the Northeast and Southwest, ranging from $25.14 to $30.16 per bushel. The Southeast had the lowest land values per bushel, ranging from $23.01 to $26.89 per bushel. The most expensive farmland per bushel of corn yield in all regions except the Southwest was poor quality land.

Area Cash Rents

There were strong increases in cash rents in all areas of the state. The strongest percentage increases were in the North, Northeast and Southeast, with increases between 13.2% and 17.2% (Table 2). There were only three percentage increases in cash rent that were not in double digits. These were for poor quality land in central Indiana at 9.0%, and average and poor quality land in Southwest Indiana at 9.0% and 5.0%, respectively.

For the first time, cash rents for top quality land in the North, West Central, and Central regions have all broken the $200 per acre mark. Another first is the highest cash rent has shifted from the West Central region to the North region. The highest cash rents are found in the North, West Central, and Central regions of the state. This is followed by cash rents in the Northeast and the Southwest. Cash rents are the lowest in the Southeast.

Differences in productivity have a strong influence on per acre rents. To adjust for productivity differences, cash rent per acre was divided by the estimated corn yield. Rent per bushel of corn yield for the North, West Central, and Central regions are similar, ranging from $1.10 to $1.17 per bushel. In the Northeast and Southwest regions, cash rent per bushel ranged from $0.97 to $1.08. Per bushel cash rent in the Southeast ranged from $0.86 to $0.90 per bushel.

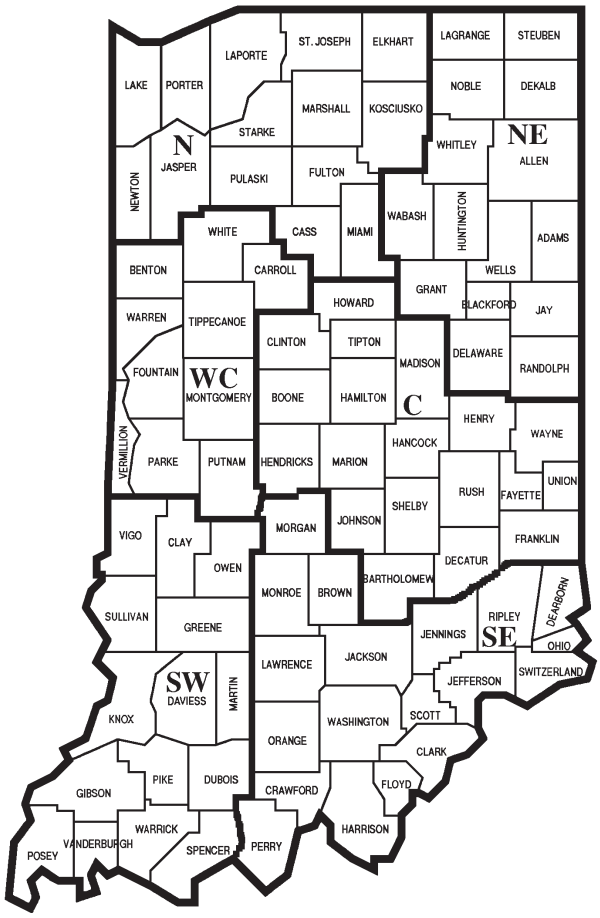
Dispersion of Responses

The data contained in Tables 1 and 2 provides information about the average of the responses received in the survey. Another important aspect of these responses is the dispersion

Table 2. Average estimated Indiana cash rent per acre, (tillable, bare land) 2007 and 2008, Purdue Land Value Survey, June 2008

			Rent/Acre		Change	Rent/bu. of Corn		Rent as % of June Land Value	
Area	Land Class	Corn bu/A	2007 $/A	2008 $/A	'07-'08 %	2007 $/bu.	2008 $/bu.	2007 %	2008 %
North	Top	189	180	211	17.2%	1.00	1.12	4.1	4.0
	Average	151	145	167	15.2%	1.00	1.10	4.0	3.8
	Poor	116	114	129	13.2%	1.02	1.12	3.8	3.8
Northeast	Top	174	162	188	16.0%	0.93	1.08	3.7	3.9
	Average	144	128	148	15.6%	0.89	1.03	3.5	3.6
	Poor	113	100	114	14.0%	0.91	1.01	3.2	3.4
W. Central	Top	181	187	207	10.7%	1.06	1.14	4.0	4.0
	Average	153	157	173	10.2%	1.07	1.13	3.9	3.8
	Poor	121	127	142	11.8%	1.12	1.17	4.0	3.8
Central	Top	180	181	201	11.0%	1.02	1.12	3.8	3.7
	Average	151	149	165	10.7%	1.01	1.10	3.8	3.6
	Poor	120	122	133	9.0%	1.04	1.11	3.8	3.5
Southwest	Top	181	168	189	12.5%	0.95	1.04	4.0	3.9
	Average	145	134	146	9.0%	0.93	1.01	4.1	3.8
	Poor	108	100	105	5.0%	0.90	0.97	4.1	3.9
Southeast	Top	163	128	147	14.8%	0.79	0.90	3.8	3.9
	Average	136	102	117	14.7%	0.77	0.87	3.5	3.5
	Poor	105	78	90	15.4%	0.78	0.86	3.1	3.2
Indiana	Top	179	171	194	13.5%	0.98	1.09	3.9	3.9
	Average	148	139	157	12.9%	0.97	1.06	3.8	3.7
	Poor	115	110	123	11.8%	0.99	1.07	3.7	3.6

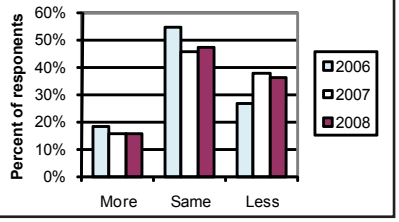
Figure 1. Purdue Land Value Survey Geographic Regions



of the responses around the average. One measure of dispersion is the standard deviation. Why is the dispersion of the responses important? It is possible to have the same average but have a difference in the range of data or dispersion. From a statistical perspective, there is more confidence in an average of a data sample if the dispersion around the sample average is small. Information about the dispersion of responses for corn yields, June farmland values, and cash rent is provided in Table 3.

To illustrate the use of this information, note that the June value of top quality land in the Northeast and the Southwest is similar, $4,839 in the Northeast and $4,815 in the Southwest. The standard deviation for the average is $759 in the Northeast and $1,031 in the Southwest. The larger standard deviation indicates that while the average is about the same the range of estimates was larger in the Southwest. The greater dispersion is also indicated by the range. The range in Table 3 indicates the value that is one standard deviation above and below the average. If it is assumed that the data is normally distributed, then 66% of the values would fall in this range. Assuming that estimates are normally distributed, 66% of the responses providing the Northeast average of $4,839 would be between $4,080 and $5,598. For the Southwest, 66% of the responses providing the average of $4,815 would be from a wider range of $3,784 to $5,846.

Figure 2. Percentage of respondents indicating more, the same, or less land on the market compared to previous year.



Rural Home Sites

Respondents were asked to estimate the value of rural home sites with no accessible gas line or city utilities and located on a black top or well-maintained gravel road. The median value for five-acre home sites ranged from $7,000 to $10,000 per acre (Table 4). The median values in the North, Northeast, West Central, and Southeast regions declined. Estimated per acre median values of the larger tracts (10 acres) ranged from $7,000 to $10,000 per acre. The median values in the North, Northeast, and West Central regions declined. The decline in these values indicate that at least in some areas of the state the demand for rural home sites is not as strong as it once was and probably is a reflection of the weaker residential housing market in general.

Farmland Supply & Demand

To assess the supply of land on the market, respondents were asked to provide their opinion of the amount of farmland on the market now compared to a year earlier. The respondents indicated either more, the same, or less land was on the market than one year ago. Only 16% of the 2008 respondents indicated more land was on the market now compared to year-ago levels (Figure 2). The remaining 84% of the respondents indicated the amount of land on the market at the current time was the same or less than a year ago. Compared to 2006 and 2007, there has been little

Table 3. Average value, standard deviation, and range for estimated long-term corn yield, farmland value, and cash rent.

		Productivity			Land Values			Cash Rent		
Area	Land Class	Average Corn Yield bu/A	Standard Deviation bu/A[4]	66% Range bu/A[5]	June 2008 Average $/A	Standard Deviation $/A[4]	66% Range $/A[5]	2008 Average $/A	Standard Deviation $/A[4]	66% Range $/A[5]
North	Top	189	15	174-204	5,324	871	4,453-6,195	211	36	175-247
	Average	151	13	138-164	4,358	629	3,729-4,987	167	26	141-193
	Poor	116	14	102-130	3,373	467	2,906-3,840	129	23	106-152
Northeast	Top	174	19	155-193	4,839	759	4,080-5,598	188	34	154-222
	Average	144	15	129-159	4,142	709	3,433-4,851	148	23	125-171
	Poor	113	14	99-127	3,399	619	2,780-4,018	114	22	92-136
W. Central	Top	181	15	166-196	5,236	688	4,548-5,924	207	26	181-233
	Average	153	14	139-167	4,547	628	3,919-5,175	173	21	152-194
	Poor	121	19	102-140	3,706	694	3,012-4,400	142	22	120-164
Central	Top	180	16	164-196	5,392	762	4,630-6,154	201	28	173-229
	Average	151	15	136-166	4,581	722	3,859-5,303	165	24	141-189
	Poor	120	19	101-139	3,753	768	2,985-4,521	133	24	109-157
Southwest	Top	181	14	167-195	4,815	1,031	3,784-5,846	189	37	152-226
	Average	145	13	132-158	3,841	733	3,108-4,574	146	23	123-169
	Poor	108	17	91-125	2,718	611	2,107-3,329	105	22	83-127
Southeast	Top	163	14	149-177	3,747	667	3,080-4,414	147	24	123-171
	Average	136	13	123-149	3,304	631	2,673-3,935	117	22	95-139
	Poor	105	14	91-119	2,820	668	2,152-3,488	90	19	71-109
Indiana	Top	179	17	162-196	5,003	925	4,078-5,928	194	36	158-230
	Average	148	15	133-163	4,240	787	3,453-5,027	157	28	129-185
	Poor	115	18	97-133	3,408	753	2,655-4,161	123	28	95-151

4 The standard deviation is a measure of how the individual estimates are dispersed around the average value. If many of the responses are close to the average, then the standard deviation is small; if many of the responses are far from the average, then the standard deviation is large.

5 The range indicates values that are one standard deviation below and one standard deviation above the average. If the data is normally distributed, 66% of the responses will be in this range.

change in the number of respondents indicating more land was on the market. For 2007 and 2008 several respondents shifted from indicating the same amount of land was on the market to indicating there was less.

Respondents were also asked to provide their perception of changes in demand for farmland. One source of farmland demand is farmers seeking to expand the size of their businesses. Respondents were asked to indicate if the demand from farmers had increased, remained the same, or decreased when compared to a year earlier. The number of respondents indicating an increased demand from farmers increased significantly in 2007 and was nearly as high in this year's survey (Figure 3). This year, 71.4% of the respondents indicated increased farmer demand. Only 2.6% indicated a decrease in demand from farmers. The remaining 26% of the respondents indicated that farmer demand remained the same.

Figure 3. Percentage of respondents indicating increased, the same, or decreased demand from farmers.

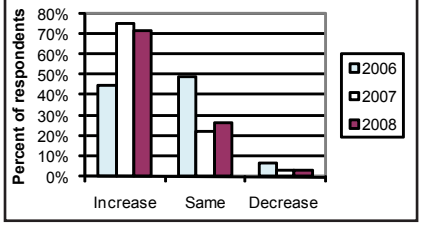


Table 4. Median value of five-acre and ten-acre home sites

	Median value, $ per acre							
	5 Acres or less for home site				10 Acres & over for subdivision			
Area	2005 $/A	2006 $/A	2007 $/A	2008 $/A	2005 $/A	2006 $/A	2007 $/A	2008 $/A
North	7,250	7,000	8,100	8,000	6,000	7,000	8,000	7,000
Northeast	6,500	7,000	8,000	7,500	5,000	6,000	9,000	7,000
West Central	6,000	7,500	8,000	7,500	6,000	7,500	8,000	7,000
Central	10,000	10,000	10,000	10,000	8,500	10,000	9,000	10,000
Southwest	5,000	5,000	7,000	8,000	5,250	7,000	6,000	8,250
Southeast	7,000	7,000	9,000	7,000	6,000	6,250	6,750	7,000

Figure 4. Percentage of respondents indicating increased, the same, or decreased demand for rural residences.

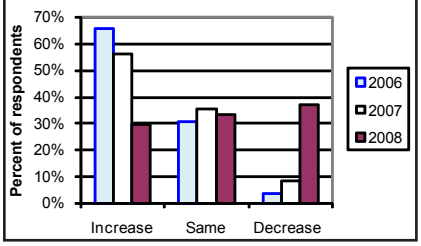


Table 5. Projected five-year average corn and soybean prices, mortgage interest, and inflation

	Prices, $ per bu.		Rate, % per year	
Year	Corn	Beans	Interest	Inflation
1999	2.31	5.57	8.4%	2.9%
2000	2.28	5.56	9.1%	3.2%
2001	2.12	5.07	8.1%	2.9%
2002	2.10	4.97	7.6%	2.7%
2003	2.27	5.42	6.5%	2.3%
2004	2.54	6.40	6.9%	2.8%
2005	2.36	6.25	7.0%	2.9%
2006	2.48	6.11	7.6%	3.2%
2007	3.43	7.31	7.6%	3.3%
2008	5.06	10.86	7.2%	3.9%
Average	$2.70	$6.35	7.6%	3.0%

Rural home sites are another use of farmland. This has been a strong source of demand for the past several years. Over the last year there has been a lot of discussion of the difficulties in the housing market. These difficulties appear to be influencing the demand for rural residences. This year, less than 30% of the respondents indicated that there was increased demand for rural residences (Figure 4). The number of respondents indicating a decrease in demand for rural residences was 37%. The remaining 33% of the respondents indicated no change.

Nonfarm investors are another group that contributes to the demand for farmland. Respondents were asked to indicate if they perceived an increase, the same, or a decrease in demand from individual investors as well as organized investment efforts such as pension funds. This year there were more respondents indicating a decrease in demand from these two sources. However, the changes were modest.

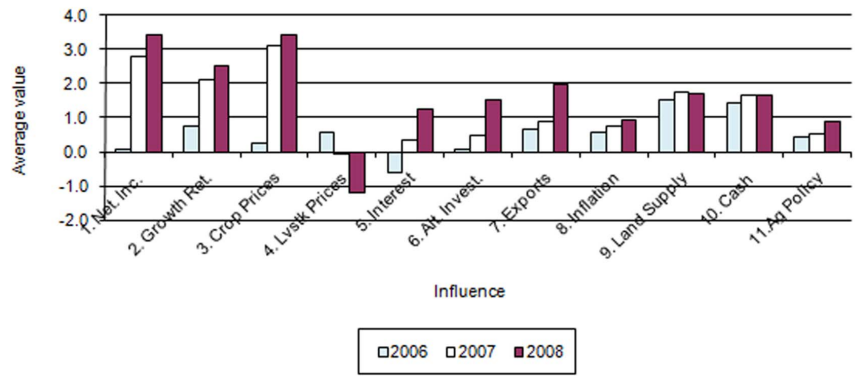
Expected Grain Prices, Interest Rates, & Inflation

Making a farmland purchase is a long term commitment. As a result, expectations regarding crop prices over the next few years can have a strong influence on farmland values. Given the record high prices for corn and soybeans, it is likely that these expectations have sharply changed. In order to gain insight into crop price expectations, respondents were asked to estimate the annual average on-farm price of corn and soybeans for the period 2008 to 2012. This year saw another large increase in the expected five-year average price of corn and soybeans. On average, survey participants expect corn prices to be $5.06 per bushel and soybean prices to be $10.86 per bushel, estimates that are well above the 10-year average (Table 5).

Mortgage interest rates have important implications for real estate markets. While mortgage interest rates have increased from their lows of a few years ago, they continue to be modest. Survey respondents don't seem to be expecting much change in mortgage interest rates. The average estimate of 7.2% in 2008 is below the 10-year average of 7.6%.

Inflation rate expectations continue to increase. On average, survey respondents estimate annual inflation over the next five years will be 3.9%. This is almost 1% above the average for the 10-year period and is the highest expected inflation rate for the 1999 to 2008 period.

Figure 5. Influence of selected factors on Indiana farmland values.



Market Influences

To obtain a more complete picture of the strength that various influences exert on farmland values, survey respondents were asked

to assess the influence of 11 different items on farmland values. These items included:

1. Current net farm income
2. Expected growth in returns to land
3. Crop price level and outlook
4. Livestock price level and outlook
5. Current & expected interest rates
6. Returns on competing investments
7. Outlook for U.S. agricultural export sales
8. U.S. inflation/deflation rate
9. Current inventory of land for sale
10. Current cash liquidity of buyers
11. Current U.S. agricultural policy

Respondents were asked to use a scale from -5 to +5 to indicate the effect of each item on farmland values. A negative influence would be given a value from -1 to -5, with a -5 representing the strongest negative influence. A positive influence was indicated by assigning a value between 1 and 5 to the item, with 5 representing the strongest. An average for each item was calculated.

In order to provide a perspective on the changes in these influences, data from 2006, 2007 and 2008 are presented in Figure 5. The horizontal axis of the chart indicates the item in the list above. For this three year period, most of the items have a positive influence. In 2006, the current and expected interest rate had a negative influence. In 2007, the livestock price level and outlook was slightly negative and became more negative in 2008. As in 2007, the major positive influences in 2008 included current net farm income, expected growth rate in return to land, and crop price level and outlook. This year these items were even stronger than in 2007 and a sharp contrast to 2006 when current net farm income and crop prices and outlook provided only a small positive influence.

Other important influences in the current market include the outlook for agricultural exports, the supply of land for sale, and the cash position of buyers. The influence of the quantity of land for sale and cash position of buyers has been fairly consistent during this three year period. The influence of exports, interest rate expectations, and the return on competing investments has become more positive

Pasture Rent, Irrigated Farmland, & Grain Storage Rent

The information on pasture rent, rental of irrigated farm land, and rental of on-farm grain storage was updated in this survey. The 2008 averages for pasture rent, the value and cash rent of irrigated farmland, and the rental of on-farm grain storage are presented in Tables 6, 7 and 8, respectively.

Table 6. Pastureland: Number of Responses, Annual Cash Rent, and Carrying Capacity

Region	Number of responses	Annual rent ($ per acre)	Carrying Capacity (acres per cow)
North	14	$72	1.4
Northeast	15	$72	1.6
West Central	23	$59	1.8
Central	32	$59	1.7
Southwest	16	$51	2.0
Southeast	34	$44	1.9
State	134	$57	1.8

Table 7. Irrigated Farmland: Number of Responses, Estimated Market Value, and Annual Cash Rent

Region[1]	Number of responses	Corn Yield (bu per acre)	Market Value ($ per acre)	Cash Rent ($ per acre)
North	30	208	$5,238	$273
Northeast	10	205	$5,118	$243
Southwest	10	203	$4,150	$236
State	65	206	$4,994	$253

1 There was an insufficient number of responses for the West Central, Central, and Southeast regions to report values for these regions.

Table 8. On-farm Grain Storage: Number of responses and annual per bushel rent

Region	Number of responses	Rent ($/bu)
North	33	$0.18
Northeast	31	$0.18
West Central	50	$0.19
Central	42	$0.18
Southwest	19	$0.18
Southeast	33	$0.16
State	208	$0.18

over the last three years. The only negative influence for the farmland market in 2008 is livestock price level and outlook.

Expected Future Land Values

The increase in crop prices has led to several other changes. As an industry, markets are sorting through how the increased margin from crop production will be shared among market participants. Expectations about corn and soybean prices, interest rates, and the other influences impacting the land market indicate that there will be future increases in farmland values. Increased farmland values are also reflected in the projected land values for December 2008 and the five year estimates provided by survey respondents.

On a state-wide basis, Table 1 indicates that for the six-month period from June to December 2008, survey respondents expect farmland values to increase 2.7% to 3.0%. Generally survey respondents in the North, Northeast, and West Central regions expect increases larger than the state-wide average. Respondents in the Central, Southwest, and Southeast regions are expecting increases smaller than the state average. Respondents in the Southeast expect to see a slight decline in land values for average and poor quality farmland. If these expectations are used to project an annual increase in land values, they indicate a much lower rate of increase than has occurred during the past two years.

Respondents were also asked to project farmland values five years from now. Seventy-two percent of the respondents expect farmland values to be higher, 16% percent expect farmland values to be the same as in 2008, and 12% expect farmland values to be lower. For those expecting land values to increase, the average expected increase for the five year period was 14%. This would translate into an average annual increase of 2.66%. For those expecting land values to decline over the next five years, the average decline was also 14%. Combining all responses provided an expected total increase in farmland value for the next five years of 8.6%. These projections indicate that survey respondents expect the increase in farmland values to slow significantly.

Final Comment

The 2008 Purdue Farmland Value and Cash Rent Survey indicates both Indiana farmland values and cash rents made a significant increase over the past year. There is a limited supply of land for sale or rent. There is a bright outlook regarding grain prices. The liquidity of buyers appears strong. If borrowed funds are needed, favorable interest rates are anticipated by survey respondents. In addition, most respondents expect farmland values to continue to increase.

While there are several positive factors contributing to a strong demand for land from farmers and investors. There are a few items that could create some unease in the farmland market.

- Increasing production costs. Fuel prices have increased substantially since last year and seem

Purdue Land Value and Cash Rent Survey

The Purdue Land Value and Cash Rent Survey is conducted each June. The survey was made possible through the cooperation of numerous professionals that are knowledgeable of Indiana's farmland market. These professionals include farm managers, appraisers, land brokers, agricultural loan officers, Purdue Extension educators, farmers, and persons representing the Farm Credit System, the Farm Service Agency (FSA) county offices, and insurance companies. Their daily work requires that they stay well informed about land values and cash rents in Indiana.

These professionals are asked to provide an estimate of the market value for bare poor, average, and top quality farmland in December 2007, June 2008, and the expected value for December 2008. They are also asked to provide an estimate of the current cash rent for each land quality. To assess the productivity of the land, respondents provide an estimate of long-term corn yields. Respondents are also asked to provide a market value estimate for land transitioning out of agriculture.

Responses from 327 professionals are contained in this year's survey representing all but one Indiana county. There were 47 responses from the North region, 54 responses from the Northeast region, 77 responses from the W. Central region, 76 responses from the Central region, 36 responses from the Southwest region, and 37 responses from the Southeast region. Figure 1 illustrates the counties in each region.

Appraisers accounted for 18% of the responses, farm loan professionals represented 62% of the responses, farm managers or farm operators provided 11% of the responses, and other professionals provided 9% of the responses.

The data reported here provide general guidelines regarding farmland values and cash rent. To obtain a more precise value for an individual tract, contact a professional in your area that has a good understanding of the local situation.

We express appreciation to Marsha Slopsema of the Department of Agricultural Economics for her help in conducting the survey.

to continue to rise. Input suppliers are signaling that there will be substantial increases in seed, fertilizer, and chemical prices associated with the 2009 crop. These rising input prices are eroding the increased margin provided by higher grain prices.

- A decline in crop prices. We have seen how quickly prices can rise. It is important to remember that they can also decline rapidly. While futures prices indicate grain prices are likely to remain strong for the next few years, it is important to recognize that prices do not need to return to their pre-boom level to create a cost-price squeeze. Higher input prices and higher cash rent have significantly increased the cost of crop production. The government program that depends on target prices of $2.63 per bushel for corn and $5.80 per bushel for soybeans no longer provides enough revenue to cover purchased inputs and cash rent.
- Tight supplies of corn and soybeans will continue to mean more volatile commodity prices and thus volatile margins. The use of fixed cash rent leases has shielded the nonfarming farmland owner from the income variability associated with a farmland investment, but there is an effort on the part of some landowners and tenants to shift to flexible cash rent. It is unclear how the increased margin variability and change to a flexible cash rent lease may cause land market participants to adjust their risk premiums.

These items are not likely to stop farmland values and cash rents from continuing their strong march upward in the year ahead. If you participate in the farmland market in this new environment, it may be helpful to prepare a list of what could go right and what could go wrong, estimate the consequences associated with each outcome, ask yourself the likelihood of each outcome occurring, and evaluate the financial impacts.

Forecasting the Likely Impacts of Climate Change on Indiana Agriculture

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Editor's note: This article is excerpted from a larger reported entitled *Climate Change in Indiana: Initial Analyses of Impacts and Opportunities*. The report was released to the Indiana Congressional delegation on February 5, 2008 by the Purdue Climate Change Research Center.

Overview

Indiana is among the top US producers of corn and soybeans. Under all likely climate scenarios, the corn belt will remain the best area in the United States for corn and soybean production and Indiana will maintain its position as a top producer of these crops. The state also has important production of other crops, and also of poultry and livestock. Predicting the impact of climate change on these systems is somewhat more difficult because less research attention has been focused on these parts of the agricultural industry.

The major climate-related drivers of agricultural outcomes will be changes in (i) atmospheric CO2 and nitrogen, (ii) temperature, (iii) precipitation, (iv) pests and pathogens, and (v) extreme events.

- Projected increases in temperature will increase the length of Indiana's growing season. This, combined with increases in atmospheric CO2 and nitrogen will increase the productivity of most annual crops, including corn and soybeans. Livestock populations may be stressed due to higher temperatures, especially during warmer summer months.

- The distribution of precipitation across the year is expected to shift, leading to wetter winters and dryer summers. In addition, the inability of rainfall to compensate for increased heat may lead to more drying. This is likely to be most pronounced in summer, leading to dryer soils and more drought-like conditions. To the extent the agricultural industry is unable to compensate through the development of improved genetic varieties that exhibit drought tolerance, productivity will decline. Although one might expect irrigation to fill water needs, given current crop genetics, and associated rates of crop evapotranspiration, investments in irrigation infrastructure are not likely to compensate for the combined forces of greater heat and less moisture. As a result, the key adaptation mechanisms for farmers will be to shift planting dates and adopt crop varieties with shorter growing seasons so as to avoid the hottest parts of the growing season. Farmers will have to avoid the deleterious effects of climate change and take advantage of climate conditions that are more conducive to crop growth. Heavier rainfall and periodic flooding during planting and harvest periods may lead to crop losses.

- Climate changes are likely to allow more successful overwintering of several pests and diseases, and to also allow for the expansion of pests and pathogens. Heat and moisture stress can make crops and animals more susceptible to pests and diseases. To some extent, improvements in crop and animal genetics may compensate.

- Increases in extreme rainfall and heat events are likely. These will stress crop and livestock systems above and beyond the impacts listed above. Extreme rainfall events may lead to greater soil erosion and agricultural runoff, with concomitant increases in off-site damages associated with sediment, nutrient, chemical, and pathogen loads.

- Although perennial systems (e.g. fruit trees and grape production) are not a large part of Indiana agriculture, they are locally important in some areas. By virtue of their permanent nature, producers may find it more problematic to adjust their production practices. As a result, these systems may be more vulnerable to the stresses outlined above.

- Technology responses, especially development of new crop genetics, will be key factors shaping the future of Indiana agriculture. The pace of climate change relative to the rate of technological change will be an important determinant of agricultural impacts and outcomes.

Crop Phenology

To study crop growth we used a crop simulation model combined with climate scenarios from the well-know Hadley climate simulation model. This simple crop growth model is used to assess changes in earliest planting date and growing degree days. Earliest planting dates are based on when air temperature has been greater than 50°F (10°C) for 5 or more days, soil temperature has been greater than 12°F (12.8°C) for 3 or more days, and soil moisture has been less than field capacity for 3 or more days. Additionally, rain cannot occur on the date of planting. Growing degree days are based on accumulated temperatures in excess of 50°F, and must exceed 1250 for typical corn crops.

Changes are best interpreted relative to the model base climatology; in general there is little difference between alternative climate change scenarios by mid-century. Planting dates show the greatest change in the northern part of the state, probably due to changes in soil moisture. Possible planting dates move forward by about 1 week by mid-century and by 1-2 weeks by century's end. Changes in crop maturity dates follow the patterns and magnitudes of planting changes: by mid-century maturity advances by 5-10 days.

Total growing season length (gdd10, accumulated until soil frost) increases by 200-400 degree-days by mid-century and 400 degree-days by century end.

Besides some problems with the model predicting crops not getting planted in some years, these preliminary simulations also had difficulty triggering harvest in almost all years for all periods. This suggests that hydrometeorological prediction of harvest needs significant work, but may also indicate potential problems with adequate drying of crops under future climate scenarios. Additionally, these simulations did not account for changes in hybrids or crop types that might result from adaptation to climate changes.

Effects of Temperature Extremes

Changes in the distribution of daily temperature and precipitation events can lead to widespread changes in the exceedance of critical thresholds (White et al. 2006, Diffenbaugh et al. 2007, Trapp et al. 2007). Indeed, recent modeling of the effects of 21st-century climate change on agriculture suggest that changes in the occurrence of severe events could be the primary driver of crop response, with agricultural yields showing little sensitivity to projected changes in mean growing season temperature and heat accumulation but dramatic sensitivity to the coincident changes in temperature extremes (White et al. 2006).

Agricultural Pests

Many of the most important agricultural pests are insects, along with many species that pollinate crops, increase soil fertility through decomposition, and prey upon crop pests. Insect pests reduce US crop production by 13% for an annual loss of $33 billion (USBC 1998). The increase in plant stress predicted with climate change will lead to reduced plant resistance to insect herbivores and an increase in crop loss. Because different aspects of the climate are not expected to shift in the same way (Williams et al. 2007), the impact on agriculture can not be easily forecast (Paine et al. 1998). For example, increased CO2 levels can increase the losses of soybean to the invasive Japanese beetle (Hamilton et al. 2005). The large majority of our crop pest insects are invasive species. The exotic insects such as soybean aphid and the emerald ash borer that successfully invade the Midwest are those that come from similar climates. An altered climate regime in Indiana could invite an entirely new suite of invasive insects that we currently have no knowledge of. Forest insect pests, such as the gypsy moth, defoliate trees during the early summer. When combined with the stress of drought, trees are known to die (Pijanowski 1994). Warmer winter temperatures can also decrease forest pest over-wintering morality in turn increasing the pest population levels during the summer (Sharov et al. 1999). In Indiana, loss of trees on private forest lands could have a large economic impact.

We have quantified the potential impacts of future climate change on a suite of Indiana corn pests (Diffenbaugh, Krupke, et al., in preparation). We find that the distribution of these pests expands in Indiana for those pests that are not already prevalent throughout Indiana. In particular, the migratory taxa – armyworm and corn earworm – become substantially more prevalent in the future climate, transitioning from rarely or never present to commonly present. This expansion is driven by decreases in the occurrence of severe cold events, allowing these taxa to overwinter in Indiana. These migratory taxa happen to be the most cosmopolitan in their infestations, raising the possibility that the risk of infestation would likely increase for other crops in addition to corn should greenhouse gas concentrations continue to rise.

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Indiana's 2008 Property Tax Reforms Part 2

Larry DeBoer, Professor

During the 2008 short session the General Assembly passed and the Governor signed the most sweeping reform of property taxes and local government finance in at least 35 years. This article is part 2 (part 1 appeared in the May PAER) of a description of these reforms, as well as a look at some of the potential consequences.

The new "circuit breaker" is a simple idea with complicated consequences. It limits tax bills to a fixed percentage of assessed value before deductions. By 2010, if a house is assessed at $120,000, its tax bill cannot exceed $1,200—a 1% circuit breaker limit. Other residential property and farm land have a 2% limit, and all other property has a 3% limit. The state will not pay for these credits, so what taxpayers don't pay, local governments don't

receive. Circuit breakers also imply that local budgets are interdependent. When one government changes its tax rate, the revenues of other governments are affected.

The circuit breaker interacts with other new features of HEA1001. Bigger capital projects will now be subject to voter referenda. With circuit breakers, the referendum decisions of one government could affect revenues of other governments. Most property assessments now will be done by counties, not townships. The circuit breakers mean that all governments have an interest in assessment quality.

Homeowner property taxes will fall. The sales tax rate has already increased. Will households pay more or less overall? And, since taxes paid by landlords and businesses will change too, will these taxes be passed along to tenants and customers? The last section of this article addresses these questions.

Property tax stability.
The circuit breakers have consequences which will be new to Indiana local governments (and taxpayers). The property tax has been the most stable revenue source for local governments. This was partly due to the ability of local governments to adjust the tax rate to deliver a particular tax levy, whatever happened to assessed value. If assessed value dropped (or grew more slowly) due to recession, tax rates could increase to compensate. Revenues would continue to grow.

With the circuit breakers, property tax revenues may be more vulnerable to recession. Suppose that property values decline during a recession. Trending will reflect this in lower assessed values after a couple of years. Tax rates could rise to compensate. But lower assessed values mean lower circuit breaker tax bill limits. With the compensating tax rate increases, more property owners would be eligible for more circuit breaker credits. Local governments would lose more revenue from the circuit breakers. A decline in assessed value will produce a decline in property tax revenue in jurisdictions with significant circuit breaker credits. Local governments may have to cut their budgets in years following recessions, because property tax revenues will respond to recessions.

From the taxpayer's point of view, this is an advantage, not a problem. The property tax achieved stability by ignoring fluctuations in property values. If property values fell, the rate would rise, regardless of the recession's effect on the taxpayer's ability to pay. Now, the circuit breaker will put an upper limit on the tax bill, and that limit will tighten if property values fall.

Local income taxes.
In 2007 the General Assembly created three new local income taxes. HEA 1001 left these taxes mostly unchanged. One of the taxes allows a freeze of the property tax levy for non-school operating funds. The annual increases in these revenues are funded by an income tax rate. The upper limit on this tax is one percent. A second tax can be adopted to replace existing property taxes. The relief can be distributed as property tax credits to all property owners, just to homeowners, or just to homeowners and rental housing owners. The maximum income tax rate is one percent. A third local income tax can be used to add revenues for public safety, at a rate up to 0.25%. One of the other taxes must be adopted before the public safety tax can be adopted. (This is a change. Before, both had to be adopted.) Fourteen counties adopted versions of these taxes in 2007, effective for 2008.

These income taxes cannot be used to directly fund circuit breaker revenue losses. However, adopting these taxes can reduce losses from circuit breakers. Consider again the $120,000 homeowner at the $3 rate, with a circuit breaker credit of $173. Suppose the county adopts a local income tax, and decides to provide a property tax credit to all taxpayers. This might work out to a 20% credit. Taxpayers would see a 20% credit on their tax bills. The new local income tax would replace the lost property tax revenue from this credit for local governments.

This 20% credit would reduce the pre-circuit breaker tax bill of the homeowner by $275, from $1,373 to $1,098. The new tax bill is less than the $1,200 circuit breaker limit, so the homeowner would not receive the circuit breaker credit. The homeowner's post-circuit breaker tax bill drops from $1,200 to $1,098, which is $102. The local governments gain $275 in new income tax revenue, but lose only $102 in property tax revenue. The net of $173 is new revenue for local governments.

There may be a strategic decision here for local governments. The three methods of distributing tax relief—to all property owners, to homeowners only, or to homeowners and rental housing owners only—will produce different combinations of tax relief and revenue gains. For example, suppose most of the local governments' circuit breaker losses are from credits to rental housing owners. Distributing tax relief to homeowners and rental housing owners will reduce rental housing property tax bills the most, and so eliminate more circuit breaker losses. This may be why HEA1001 requires local officials to hold a hearing to explain why a particular income tax relief distribution is chosen, if it's not given entirely to homeowners.

Will the circuit breaker limits cause more counties to adopt local income taxes? If so, Indiana's tax base will shift even further away from property taxes. Widespread adoption would also change the calculation of tax changes for households. Households in adopting counties would pay higher income taxes. Those households without circuit breaker credits could see larger additional property tax reductions, and could pay less overall. Those households who have circuit breaker credits would see smaller additional property tax reductions, and could pay more overall. The effect on taxpayers depends as well on how the tax relief is distributed. If relief goes to all taxpayers, most homeowners would see higher taxes overall. If it goes just to homeowners, most would see lower taxes overall.

Capital Projects Referenda.
Most states use referenda for capital projects; until now, Indiana has not. In most states, local governments must put their large capital projects to a vote of their citizens. If the voters approve, the money is borrowed, the project is built, and the taxpayers commit to repay the principle and interest. If the voters do not approve, the project does not move forward.

HEA1001 creates a new referendum process for Indiana to partially replace the state's unique petition-remonstrance process. Larger projects will be eligible for referenda: high schools costing more than $20 million, elementary schools, middle schools and junior high schools costing more than $10 million, and all other school or non-school projects costing more than $12 million. In smaller jurisdictions lower thresholds may apply. These larger projects are subject to referenda if 100 or more voters or property owners sign a petition requesting one. Smaller projects are still subject to the petition-remonstrance process.

Projects passed by referenda are not subject to the circuit breaker limits. The added debt service tax rate will be fully paid by all taxpayers. This exemption was created because voters whose property is already taxed at the circuit breaker maximum would not have to pay extra taxes if a project was subject to the circuit breakers. The project would be free to these voters, who would likely vote in favor. Taxpayers under their circuit breaker limits would pay the whole added tax. The referendum process could promote *more* capital spending in such jurisdictions. With capital projects outside the circuit breaker limits, voter approval implies a willingness to pay for the project. Smaller projects subject to petition-remonstrance are inside the circuit breaker limits.

It seems likely that the referendum process will reduce the number of capital projects built by Indiana local governments. During the past twelve years there have been only 94 remonstrance challenges to capital projects. In about half the opponents won; in half the proponents won. We have no count, but there must have been hundreds of capital projects that moved forward without a remonstrance challenge. In Illinois, where most capital projects are subject to referenda, about 65% of 730 bond referenda passed during this period. Since so few projects are challenged by remonstrance, the approval rate for projects is likely much greater in Indiana than it is in Illinois. If Indiana voters are like those in Illinois, the referendum process will produce more rejected projects.

This creates a choice for those who favor and those who oppose capital projects. A smaller project is more certain to move forward, under the petition-remonstrance process. It may not provide all the benefits that proponents want, but it raises the tax rate less. It is subject to the circuit breaker limits, so it could reduce revenues to other funds, and for overlapping governments. A larger project is less certain to pass, under the referendum process. It may provide more benefits, while raising the tax rate more. It is not subject to the circuit breaker limits, so it will not reduce other revenues. Which will proponents and opponents prefer? Take the more certain lower spending, lower tax project? Or risk the project with higher spending and higher taxes if it passes, and no added spending or taxes if it is defeated?

Assessment Reform.
Most states base their assessment administration with counties. Until now, Indiana has based assessment administration with townships and counties. HEA1001 transfers the assessing duties of the township-trustees to the county assessor. It eliminates the office of elected township assessors in townships with fewer than 15,000 real property parcels, and transfers their duties to the county assessor. Elected township assessors in bigger townships will face a referendum in November 2008 to decide whether their positions will continue. In addition, certification requirements for assessors and their staffs will increase.

Studies have found that assessment quality is improved by full-time assessors using modern assessment tools. Most Indiana townships are too small to occupy a full-time assessor, so most township-trustee assessors are part-time. Moving assessment duties to the counties will put that function in the hands of a full time assessor, so consolidating to counties may promote quality indirectly. Research has not found strong evidence that county-level assessment itself promotes quality, however. Most

elected township assessors are full-time, because only larger townships qualify for such a post. Consolidation to counties may not improve assessment quality in those townships.

There is evidence of economies of scale in assessing. Larger units can assess property more cheaply per parcel than smaller units. However, it seems unlikely that Indiana's consolidation to counties will result in much cost savings. Trustee-assessors are part-time officials who receive little pay. County assessors will have to hire additional certified staff in order to take on their duties. Consolidation may improve quality, but it is unlikely to save much money.

The circuit breakers may interact with assessment practice to improve quality in a different way. Without the circuit breakers, underassessment of property could be made up with higher tax rates. With the circuit breakers, the combination of lower assessed values and higher tax rates is likely to increase circuit breaker credits. Underassessment costs local governments revenue, so local officials have a reason to oppose underassessment. Taxpayers, as always, oppose overassessment. The squeeze from above and below may encourage greater assessment accuracy.

Household tax changes. Property taxes will fall. Sales taxes have increased. Will taxpayers pay more or less overall?

Table 1 runs the numbers for the median Indiana homeowner and the median Indiana renter. The medians come from the U.S. Bureau of Census' *American Community Survey*. Data are for 2006. The median home in Indiana is valued at $120,700, and the median household income of a homeowner is $55,634. The median household income for a renter is $24,992. Each household is assumed to have three people, two adults and one child. Spending on sales taxable products was estimated by income and household size using the U.S. Bureau of Labor Statistics' *Consumer Expenditure Survey*.

Taxes are calculated based on Indiana's current system and on the changes when the new system is fully phased in as of 2010. The state average property tax reduction for a homeowner who is not eligible for the circuit breaker is 32%, as shown in Table 1. That's a property tax reduction of $420 at the state average rate. This amount reflects the decline in the tax rate due to the state takeover of property tax funds, the increase in the homestead deduction, and the elimination of property tax credits.

The homeowner pays an added $192 in sales taxes, a 16% increase due to the one point rise in the sales tax from 6% to 7%. The median homeowner household itemizes its income taxes, so Federal, state and county income taxes increase. The lower property tax bill means a smaller property tax deduction, a higher taxable income, and so higher income tax payments. Excise taxes rise slightly. With a higher after-tax income the household spends more on tobacco, alcohol and gasoline, which are subject to excise taxes.

The household's circuit breaker limit is 1% of $120,700, which is $1,207. The homeowner pays $906 in property taxes. The median homeowner at state average tax rates does not qualify for a circuit breaker credit.

Overall, the homeowner household saves $209 in Indiana taxes, and $149 in total taxes. For the median homeowner, the property tax reduction exceeds the increases in sales and income taxes.

The median renter household, of course, receives no direct property tax cut. The household pays $140 more in sales taxes, because of the sales tax rate increase. State income taxes decrease by $71, $22 because of the $500 increase in the cap on the renter's deduction, and $49 because of the increase in the

Table 1. Effects of Policy Changes on Median Homeowner and Renter Households

	Median Homeowner				Median Renter			
Income	**55,634**				**24,992**			
Home Value	**120,700**				**-**			
	Before	**After**	**Dollar Change**	**Percent Change**	**Before**	**After**	**Dollar Change**	**Percent Change**
Property Tax	1,326	906	(420)	32%	-	-	-	
Sales Tax	1,200	1,392	192	16%	894	1,034	140	16%
Income Tax	2,192	2,210	18	1%	693	622	(71)	-10%
State Excise Taxes	717	718	1	0%	567	567	-	0%
Federal Income Tax	3,149	3,209	60	2%	(1,638)	(1,638)	-	0%
Federal Other Taxes	4,661	4,661	-	0%	2,246	2,246	-	0%
Total Indiana Taxes	5,434	5,226	(209)	-4%	2,154	2,224	69	3%
Total Taxes	13,244	13,095	(149)	-1%	2,762	2,831	69	3%

Policy changes based on HEA1001, the 2008 Indiana tax reform.

Indiana earned income credit from 6% to 9% of the Federal credit.

Overall, the renter pays $69 more in Indiana taxes and total taxes. For the median renter, sales tax increases exceed state and local income tax cuts.

Economic Incidence.

Taxes on businesses may be paid by business owners, reducing profits. Or, they may be passed forward to customers in higher prices, backwards to employees in lower wages and benefits, or backwards to other input suppliers in lower land, material or machinery prices. The above analysis of the effect of HEA1001 on households is "statutory incidence," meaning the effect on tax payments by those who receive the tax bills. If business taxes change wages and prices, however, the "economic incidence" may show different household tax changes.

Owners of rental property are expected to see significant property tax reductions due to the circuit breakers (see part 1 of this article). This will make owning rental property in Indiana more profitable, and these added profits may attract new investors to rental housing. New apartments would be built, and owners would likely reduce rents to attract tenants to their new buildings. The increase in the supply of rental housing would reduce rents below what they would have been without the property tax cuts. In this way part of the property tax reduction for landlords would ultimately reduce rents for tenants.

Research on this topic shows that property taxes do influence rents. Evidence varies, of course, but one careful study by Carroll and Yinger found that each one dollar change in landlord property taxes changes rents by 15 cents. The Indiana Legislative Services Agency estimates that property taxes on rental housing will decline $173 million by 2010. If 15% of this cut is passed on in lower rents, rents will fall by $26 million. The gross rent paid by all Indiana renters is about $5.1 billion per year, according to the *American Community Survey*. The property tax cut would reduce rents by about 0.5%.

The median renter in Table 1 pays $6,615 per year in rent. The property tax cut would reduce this rent by 0.5%, or $33 a year. This would cut the renter's tax increase by almost half, from $69 to $36.

Part of the sales tax is a tax on business. Between 20% and 40% of Indiana's sales tax is paid on business-to-business sales. These sales are made in the course of producing the products that businesses provide. The added sales tax makes these products less profitable, and that may cause businesses to produce less. If so, the decrease in the supply of products will raise prices for consumers. The business-to-business sales taxes may be passed on in higher prices to households.

How much added sales tax might Indiana consumers pay in these higher prices? Suppose that all of the tax is passed forward to consumers. Poterba finds this to be true for retail sales taxes. Suppose that by the time the taxes reach consumers in price increases, they are spread across all the products that consumers buy, so that the added tax is proportional to consumer spending. Suppose that 30% of Indiana sales taxes are on business-to-business sales, which splits the high and low estimates. And, suppose that half of all of business-to-business sales taxes are passed on to Indiana consumers. The rest would be exported to consumers elsewhere.

Indiana consumers spent about $170 billion on goods and services in 2006, estimated from the Gross Domestic Product accounts. The 6% sales tax raised $5.3 billion in that year. Thirty percent of this figure is $1.6 billion. That's the estimate of business-to-business sales taxes. A one percent increase in this tax would generate about $270 million in added business-to-business tax revenue. If half this amount was passed on in higher prices to Indiana consumers, proportional to household spending, consumers would have paid about 0.08% of spending in extra sales taxes.

The median homeowner household spends $48,700. An added 0.08% is $39. The median renter household spends $32,444. (This is more than the renter household's income, implying that it is drawing upon savings or going into debt.) An added 0.08% is $26. For the homeowner, the added business-to-business sales tax is not enough to erase the overall tax reduction. For the renter, the added sales tax adds to the tax hike.

There's a good deal of uncertainty in these estimates. If the business share of sales taxes is smaller, if businesses do not pass all of the sales tax to customers, or if we assume that Indiana businesses sell more to customers outside Indiana, the added tax figures will be smaller. If the business share of sales taxes is larger, if sales to consumers outside Indiana are less, or if we use the smaller estimate of Indiana consumer sales implied by the *Consumer Expenditure Survey*, the added tax figures will be larger.

Still, allowing for economic incidence does not appear to change the statutory incidence results: the median homeowner pays less as a result of HEA1001, and the median renter pays more.

Conclusion.

Indiana has passed a major property tax reform, HEA1001. Some of its provisions have already taken effect, such as the increase in the sale tax rate. Other provisions will take effect later this year, such as the new referendum requirement for capital projects. The state levy takeovers will be effective in 2009, and the full circuit breaker limits

will take effect in 2010. Some of the assessor certification requirements won't kick in until the early part of next decade.

That means we will come to appreciate the full effects of HEA1001 only gradually. New, unexpected benefits and costs will arise. It may take many years to fully understand what we've done.

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For more information, see the Indiana Local Government Information website, www.agecon.purdue.edu/crd/Localgov .

What's Happening to the Assessed Value of Farm Land? July 2008

Larry DeBoer, Professor

Most owners of farm land have received notice of their new assessed values for property taxes in 2008. Many have received their property tax bills. And most will have noticed that both the assessment and the tax bill are a lot higher in 2008 than they were in 2007. Here's what's going on.

Like most states, Indiana assesses farm land based on its "use value." That means a farm acre is valued based on what it earns from agricultural use, not on its potential value for development.

Use value starts with a "base rate" per acre set by the state's Department of Local Government Finance (DLGF). The same value is used for all farm land in the state. This base rate is multiplied by a soil productivity factor, which measures the productivity of the soil for growing corn. The factor ranges from 0.5 to 1.28, and varies by soil type. Some ground also is adjusted by an "influence factor," which reduces the value because of features like flooding or forest cover.

This base rate changes every year, as part of the annual trending of assessed values. It's calculated with a capitalization formula, which divides the estimated net income earned from growing crops on an acre, by an interest rate. This is the amount someone would have to invest at that interest rate to earn that net income. For example, if an investor had $1,481 invested at 8.10% per year, he or she would earn $120. So, an investor would be unlikely to pay more than $1,481 for an acre that earned $120. If the acre cost more, the investor might as well invest at the interest rate.

Table 1 shows the numbers that have been used in recent years to calculate the base rate. In the numerator of the capitalization

Table 1. Data Used to Calculate the Base Rate of a Farm Land Acre

	Net Incomes		Capitalization	Capitalized Values		Average
Year	Cash Rent	Operating	Rate	Cash Rent	Operating	Capital Value
1999	99	36	8.77%	1,129	410	770
2000	101	60	9.56%	1,056	628	842
2001	102	61	8.00%	1,275	763	1,019
2002	105	20	7.02%	1,496	285	890
2003	106	71	6.29%	1,685	1,129	1,407
2004	104	135	6.35%	1,638	2,126	1,882
2005	110	60	7.22%	1,524	831	1,177
2006	110	73	8.17%	1,346	894	1,120
2007	120	141	8.10%	1,481	1,741	1,611

formula are the net income figures, one based on cash rent, one on a calculation using yields, commodity prices, and costs reflecting farm operations. In the denominator is the capitalization rate, which is based on real estate and operating loan interest rates. The data come from various Purdue, USDA and Federal Reserve sources. The Department of Local Government Finance provides documentation for all of this data. The capitalized values are calculated separately for cash rent and operating net incomes, then averaged together.

The single-year results bounce up and down quite a bit. To iron out these fluctuations, DLGF uses a six-year rolling average, which is mandated by legislation. The base rate for taxes in 2008 used data from 1999 through 2004. Table 2 shows the results of the rolling average calculations, which produces the base rate used for assessments.

DLGF used a four-year average through 2006. That was the first year that the state intended to use annual trending of assessed values. The farm base rate was set to drop 16%. Assessors weren't ready to trend other kinds of property, though, so the General Assembly delayed trending for everything but farm land. They mandated that the base rate remain at $880 for two years, then that the DLGF adopt a six-year average starting with taxes in 2008.

This was a substantial tax break for farm land owners in 2007. Had the base rate been calculated with the four-year formula, it would have been $1,040 instead of $880. That's one reason why the jump this year was so large. It includes two years of base rate increases.

There's a four year lag between the tax year and the data used to calculate the base rate. Data for 2007 won't enter the tax bill calculation until 2011. That means future changes in the base rate can be estimated using data that have already been recorded. Table 2 shows the results. The base rate will rise to $1,200 for 2009 taxes—the DLGF has already made that official. For 2010 taxes the base rate will be about $1,250, and for 2011, $1,350. These last two figures are estimates based on the current six-year formula and the 2006 and 2007 data.

The base rate is going up. The reason has to do with the data that are added and dropped from the six-year average each year. The base rate for taxes in 2008 used data from 1999 through 2004. The base rate for taxes in 2009 drops the data from 1999 and adds data from 2005. So, the increase in the base rate from $1,140 to $1,200 results from differences between the numbers in 1999 and 2005.

In 1999 the interest rate was 8.77%. In 2005 it was 7.22%. Dividing by a smaller number increases the formula's result. In 1999 average gross cash rent was $110 per acre. In 2005 it was $126. Rent is one measure of net income used in the numerator of the capitalization formula. In 1999 the average corn yield was 132 bushels per acre. In 2005 it was 154 bushels. Yield is part of the calculation of operating net income, also in the numerator. So are soybean yields and prices, which also went up. Costs are subtracted from net income in the numerator, and they went up too. That kept the base rate from increasing even more.

For 2010 taxes, DLGF will replace the 2000 numbers with 2006 numbers in the base rate calculation. For 2011 taxes, they will replace the 2001 numbers with 2007 numbers. The interest rate was lower in 2006 than it was in 2000, about the same in 2001 and 2007. Rents were up in both years. Corn yields were up a little in both years, but soybean yields were lower in 2007 than in 2001. Corn and soybean prices are much higher in 2007 than they were in 2001. That's the main reason for the big jump in operating net income in 2007 (Table 1).

The base rate of farm land is likely to continue to rise after 2011. In 2012, for example, 2008 data will be added, and 2002 data will be dropped. The corn price used in the capitalization formula in 2002 was $2.20 per bushel; the soybean price was $5.00. Operating net income in 2002 was only $20 per acre. Figures in 2008 are likely to be much higher, so the base rate likely will rise again.

Remember though, an increase in farm land assessed value will not necessarily result in an equal increase in the farm land tax bill.

Table 2. Base Rate Calculations

	Data Range			
Pay-Year	**First Year**	**Last Year**	**Base Rate**	**Percent Change**
2006	1999	2002	880	-16.2%
2007	none	none	880	0.0%
2008	1999	2004	1,140	29.5%
2009	2000	2005	1,200	5.3%
2010	2001	2006	1,250	4.2%
2011	2002	2007	1,350	8.0%

Notes:

2006: Base rate reduced from $1,050; First year of annual trending; last use of 4-year average.

2007: Base rate set by statute, not formula; 4-year average would have been $1,040, a 18.2% increase.

2008: First use of 6-year average; increase from $1,040 would have been 9.6%.

2009: Base rate of $1,200 has been set by DLGF

2010-11: Estimated based on 2006 and 2007 data; not official.

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In rural areas, an increase in the assessed value of farm land can raise total assessed value so that tax rates fall. The increase in tax bills would be less than the increase in farm land assessed value. In urban areas, though, farm land is a small share of total assessed value, and the increase in farm land assessments would have little effect on tax rates. The increase in tax bills would be equivalent to the increase in farm land assessed value.

Changes in the tax bills are also affected by local government spending, by changes in the assessed values of other property in the county, and by changes in state policy. And it's a pretty safe prediction that agricultural interests will be looking for a change in policies as farm land assessments rise in coming years.

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