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A Time of Change? Indiana's Farmland Market in 2014

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The boom that has characterized crop agriculture for the past several years seems to be waning. Prospects for above normal yields and growing stocks have resulted in a downward trend in grain and soybean prices. The current speculation is about how low prices will go and what will be the new normal? USDA has forecast net farm income to be down about 27% in 2014. But, even with this decline the forecast net farm income will remain \$8 billion above the previous 10-year average.

While income prospects associated with crop farming have declined other factors that influence the farmland market remain strong. Interest rates continue to remain favorable, the farmland demand may have softened but there continues to be a limited supply of farmland for sale, farmland continues to be an attractive investment, and buyers still seem to be in a strong cash position.

The June 2014 Purdue Farmland Value Survey¹, indicates the statewide increase in farmland values ranged from 6.4% to 7.1%. This was only half as much as in 2013. For the state as a whole, average and poor quality land increased 7.1% while top quality land increased 6.4% (Table 1). In June of 2014,

top, average, and poor quality farmland had a value of \$9,765, \$7,976, and \$6,160 per acre respectively.

Statewide the change in cash rents ranged from a decline of 0.7% to an increase of 2.9% (Table 2). Much less than the 9% to 10% increase reported in 2013. Top, average, and poor quality farmland had a cash rent of \$292, \$232, and \$179 per acre, respectively.

To assess farmland productivity, survey respondents estimated long-term corn yields for poor, average, and top quality land. For the state, the average long-term corn yields for poor, average, and top quality land were 132, 163, and 196 bushels per acre, respectively.

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¹ The individuals surveyed include rural appraisers, agricultural loan officers, FSA personnel, farm managers, and farmers.

The results of the survey provide information about the general level and trend in farmland values.

The transitional land market that represents farmland moving out of agriculture, continues to move strongly higher. The survey indicated a 22.6% increase in its average value, increasing from \$10,581 to 12,976 per acre. This is a specialized market with transitional land value strongly influenced by the planned use and location. The estimated value in this market has a very wide range. In June 2014, transitional land value estimates ranged from \$1,600 to \$35,000 per acre. Because of the wide variation in transitional land values, the median value² may give a more meaningful picture than the arithmetic average. The median value of transitional land in June 2014 was \$10,000 per acre, \$500 per acre more than in 2013.

The June 2013 state-wide average value of rural recreational land, land used for hunting and other recreational activities, was \$4,542 per acre, an increase of 19.9% when compared to June 2013. As with transitional land, there is a wide range of values for rural recreational land, again making the median value a more meaningful indicator than the arithmetic average. The median value for rural recreational land in June 2014 was \$3,875 per acre, \$725 more than in 2013, a 23% increase.

State-wide Rents

The increases in average state-wide cash rents were also moderate in 2014 when compared to the previous two years. The largest change in 2014 was for poor quality land, \$5 per acre, or 2.9%. Rents for average quality land increased \$3 (1.3%). Rent on top quality farmland decreased \$2 or 0.7% per acre. The estimated cash rent was \$292 per acre on top quality land, \$232 per acre on average quality land, and \$179 per acre on poor quality land (Table 2). These cash rent

² The median is the middle observation in data arranged in ascending or descending numerical order

Table 1. Average estimated Indiana land value per acre (tillable, bare land), per bushel of corn yield, and percentage change by geographical area and land class, selected time periods, Purdue Land Value Survey, June 2014¹

Area	Land Class	Corn bu/A	Land Value				Land Value/Bu			Projected Land Value		
			Dollars Per Acre			% Change	Amount	Amount	% Change	Dec.	% Change	
			June	Dec	June							6/13-6/14
			2013 \$/A	2013 \$/A	2014 \$/A	%	%	\$	\$	%	\$	%
North	Top	194	9,336	9,976	9,856	5.6%	-1.2%	46.22	50.80	9.9%	9,718	-1.4%
	Average	162	7,372	8,049	7,919	7.4%	-1.6%	45.23	48.88	8.1%	7,831	-1.1%
	Poor	130	5,424	6,108	5,888	8.6%	-3.6%	43.05	45.29	5.2%	5,660	-3.9%
Northeast	Top	189	8,946	9,280	9,310	4.1%	0.3%	48.62	49.26	1.3%	9,191	-1.3%
	Average	160	7,157	7,832	7,753	8.3%	-1.0%	47.40	48.46	2.2%	7,676	-1.0%
	Poor	132	5,668	5,935	6,013	6.1%	1.3%	46.46	45.55	-2.0%	5,916	-1.6%
W. Central	Top	206	10,948	12,108	11,726	7.1%	-3.2%	54.20	56.92	5.0%	11,714	-0.1%
	Average	175	8,955	10,078	9,616	7.4%	-4.6%	52.37	54.95	4.9%	9,575	-0.4%
	Poor	147	7,206	8,015	7,611	5.6%	-5.0%	51.11	51.78	1.3%	7,582	-0.4%
Central	Top	200	9,633	10,602	10,528	9.3%	-0.7%	49.65	52.64	6.0%	10,239	-2.7%
	Average	170	8,170	8,779	8,640	5.8%	-1.6%	50.43	50.82	0.8%	8,403	-2.7%
	Poor	142	6,459	7,003	6,861	6.2%	-2.0%	48.20	48.32	0.2%	6,672	-2.8%
Southwest	Top	189	9,252	9,119	9,041	-2.3%	-0.9%	49.19	47.84	-2.7%	9,028	-0.1%
	Average	151	7,085	7,088	7,006	-1.1%	-1.2%	46.31	46.40	0.2%	6,756	-3.6%
	Poor	112	4,908	4,593	4,513	-8.0%	-1.7%	42.31	40.29	-4.8%	4,377	-3.0%
Southeast	Top	181	4,873	5,246	5,212	7.0%	-0.6%	27.85	28.80	3.4%	5,217	0.1%
	Average	141	3,904	4,431	4,368	11.9%	-1.4%	27.11	30.98	14.3%	4,369	0.0%
	Poor	100	3,065	3,494	3,350	9.3%	-4.1%	28.38	33.50	18.0%	3,365	0.4%
Indiana	Top	196	9,177	9,855	9,765	6.4%	-0.9%	47.55	49.82	4.8%	9,680	-0.9%
	Average	163	7,446	8,129	7,976	7.1%	-1.9%	46.54	48.93	5.1%	7,884	-1.2%
	Poor	132	5,750	6,303	6,160	7.1%	-2.3%	45.28	46.67	3.1%	6,057	-1.7%
	Transition ²	XXX	10,581	12,714	12,976	22.6%	2.1%				12,899	-0.6%
Recreation ³	XXX	3,788	4,466	4,542	19.9%	1.7%				4,525	-0.4%	

¹ The land values contained in this summary represent averages over several different locations and soil types. The value for a specific property requires more information and should include an evaluation 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.

Table 2. Average estimated Indiana cash rent per acre, (tillable, bare land) 2013 and 2014, Purdue Land Value Survey, June 2014

Area	Land Class	Corn bu/A	Rent/Acre		Change %	Rent/bu. of Corn		Rent as % of June Land Value	
			2013 \$/A	2014 \$/A		2013 \$/bu.	2014 \$/bu.	2013 %	2014 %
			North	Top	194	310	297	-4.2%	1.53
	Average	162	228	228	0.0%	1.40	1.41	3.1	2.9
	Poor	130	165	166	0.6%	1.31	1.28	3.0	2.8
Northeast	Top	189	259	261	0.8%	1.41	1.38	2.9	2.8
	Average	160	204	205	0.5%	1.35	1.28	2.9	2.6
	Poor	132	154	159	3.2%	1.26	1.20	2.7	2.6
W. Central	Top	206	350	352	0.6%	1.73	1.71	3.2	3.0
	Average	175	282	291	3.2%	1.65	1.66	3.1	3.0
	Poor	147	222	233	5.0%	1.57	1.59	3.1	3.1
Central	Top	200	294	305	3.7%	1.52	1.53	3.1	2.9
	Average	170	238	248	4.2%	1.47	1.46	2.9	2.9
	Poor	142	188	197	4.8%	1.40	1.39	2.9	2.9
Southwest	Top	189	294	277	-5.8%	1.53	1.47	3.2	3.1
	Average	151	216	204	-5.6%	1.41	1.35	3.0	2.9
	Poor	112	155	143	-7.7%	1.34	1.28	3.2	3.2
Southeast	Top	181	199	186	-6.5%	1.14	1.03	4.1	3.6
	Average	141	152	141	-7.2%	1.06	1.00	3.9	3.2
	Poor	100	110	98	-10.9%	1.02	0.98	3.6	2.9
Indiana	Top	196	294	292	-0.7%	1.52	1.49	3.2	3.0
	Average	163	229	232	1.3%	1.43	1.42	3.1	2.9
	Poor	132	174	179	2.9%	1.37	1.36	3.0	2.9



Figure 1. County clusters used in Purdue Land Value Survey to create geographic regions

poor quality farmland was \$11,726, \$9,616, and \$7,611 per acre, respectively. The lowest farmland values are in the Southeast where top, average and poor quality farmland have values of \$5,212, \$4,368, and \$3,350 per acre, respectively.

Land value per bushel of estimated long-term corn yield (land value divided by bushels) is the highest in the West Central region, ranging from \$51.78 to \$56.92 per bushel. The per bushel values for the North, Northeast, Central, and Southwest are quite similar, ranging from \$40.29 to \$52.64. The lowest per bushel values are in the Southeast, ranging from \$28.80 to \$33.50 per bushel.

Area Cash Rents

The largest percentage increase in cash rent was for poor quality land in Central Indiana, increasing 5.0% (Table 2). Across all three land qualities cash rent increases in the Northeast, West Central, and Central regions were similar, ranging from 0.5% to 5.0%. The strongest increases were in the Central region. The North region had a 4.2% decline in top quality land with average and poor quality land remaining steady. The Southwest and the Southeast regions saw reductions in cash rent ranging from 5.6% to 10.9%

The highest per acre cash rent is \$352 per acre for top quality land in the West Central region. Rents across land qualities in this region ranged from \$233 to \$352. This region has the highest cash rents for all land qualities. Cash rents continue

estimates represent gross rent. To arrive at a net return for the landowner, expenses such as real estate taxes, drainage assessments, insurance, and maintenance expenses would need to be subtracted. Per bushel of corn cash rent ranged from \$1.36 to \$1.49 per bushel.

For top quality farmland, cash rent as a percentage of farmland value was 3.0%. For average and poor quality farmland, cash rent as a percentage of farmland value was 2.9%. All three values declined when compared to 2013. These percentage values are the lowest in the 40-year history of the survey and continues the downward trend that started in 1986.

Area Land Values

Survey responses were organized into six geographic regions (Figure 1). As in the past, there are geographic differences. This year, regional farmland values increased in all areas except for the Southwest region. (Table 1). The percentage changes in the North, Northeast, West Central, Central, and Southeast were similar.

The West Central region continues to have the highest per acre farmland values. The value for top, average, and

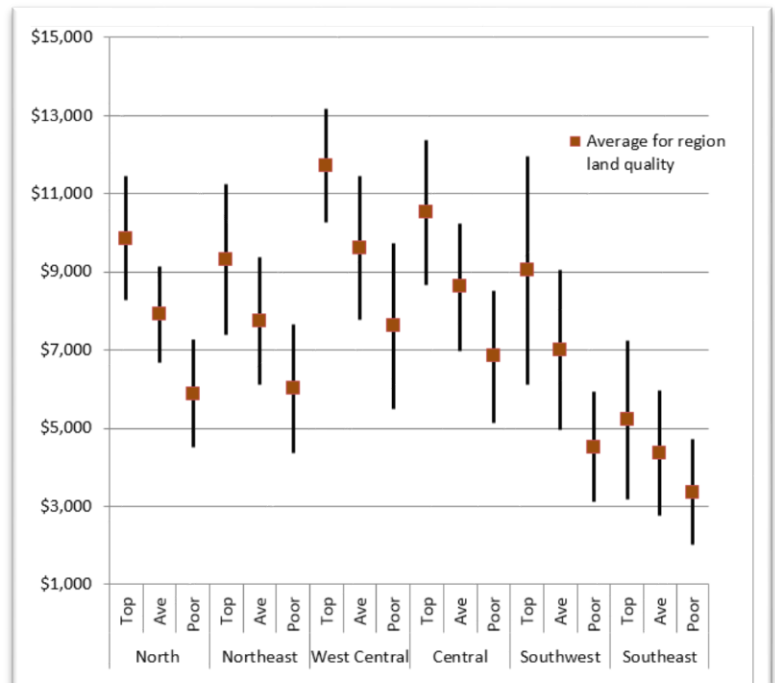


Figure 2. Average value per acre and average value plus or minus one standard deviation by farmland quality and region, June 2014

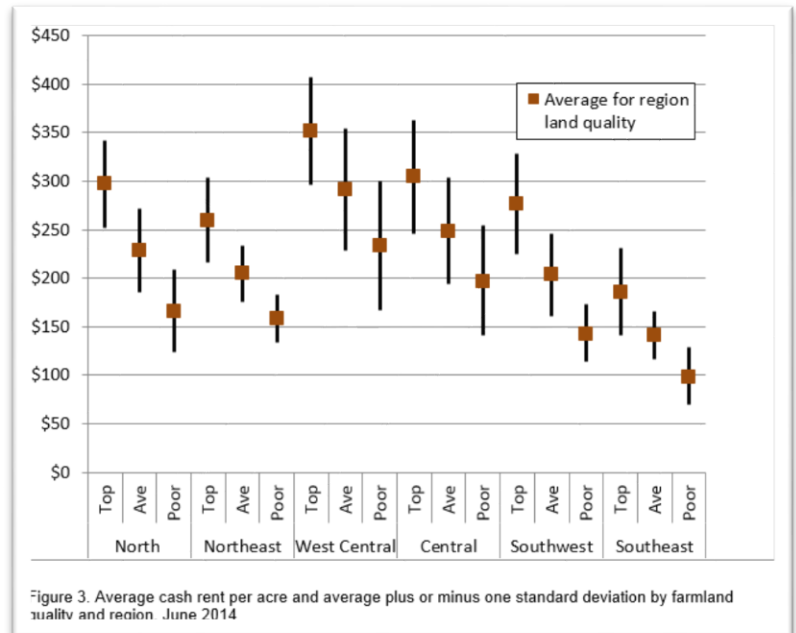
to be the lowest in the Southeast, ranging from \$98 to \$186 per acre.

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 long-term corn yield. Rent per bushel of corn yield in the West Central region ranged from \$1.59 to \$1.71. Cash rent per bushel of corn yield in the North, Northeast, Central, and Southwest regions ranged from \$1.20 to \$1.53 per bushel. Per bushel cash rent in the Southeast ranged from \$0.98 to \$1.03 per bushel. Only one cash rent per bushel was less than \$1.00 per bushel; this on poor farmland in the Southeast.

Range of Responses

Tables 1 and 2 provide information about the averages of the survey responses. Averages are helpful in establishing a general value for farmland and cash rent and the direction in which values and rents are moving across time. However, it is important to remember that an average is developed from a number of responses about perceived values and cash rents. In some cases, responses might be closely clustered around the average. In other cases, the responses may be widely dispersed because there is a wide difference in survey responses. It is possible to have the same, or nearly the same, average with either type of dispersion. Figure 2 illustrates these properties for farmland values. The top of the vertical lines is the average price plus one standard deviation. The bottom of the vertical lines indicates the average price minus one standard deviation. The square is the average. If farmland values are normally distributed, 66% of the respondents' values will fall between the bottom and top value of the line.

Figure 3 illustrates the same information for cash rents. In both the case of farmland value and cash rent, the survey provides a general guide to values or rents but does not indicate a farmland value or cash rent for a specific farm. Arriving at a value or cash rent for a specific farm requires additional research or assistance from a professional.



Rural Home Sites

Respondents were asked to estimate the value of rural home sites located on a blacktop or well-maintained gravel road with no accessible gas line or city utilities. These properties have a very wide range in value. Because of this wide range, median values (the value at the midpoint of the range) are used. The median value for five-acre home sites ranged from \$8,500 per acre in the North region to \$12,000 per acre in the Central region (Table 3). Estimated per acre median values of the larger tracts (10 acres) ranged from \$8,750 per acre in the North region to \$14,000 per acre in the West Central region. For 2014, the home site data indicate that for many of the regions the value of rural housing sites increased from June 2013 to June 2014.

Expected Grain Prices, Interest Rates, and Inflation

Current market conditions and expectations about the future have a strong influence on farmland values. To obtain

information about their future expectations, survey respondents were asked to provide an estimate of the average corn and soybean price for the period 2014 to 2018. On average, survey participants expect corn prices to average \$4.70 per bushel, a decline of \$0.82 from their 2013 estimate (Table 4). The estimated five-year soybean price decreased

Area	Median value, \$ per acre							
	5 Acres or less for home site				10 Acres & over for subdivision			
	2011 \$/A	2012 \$/A	2013 \$/A	2014 \$/A	2011 \$/A	2012 \$/A	2013 \$/A	2014 \$/A
North	9,000	8,000	8,500	8,500	7,500	7,500	8,000	8,750
Northeast	8,000	8,350	8,500	10,000	7,500	7,700	10,000	10,000
West Central	7,500	8,250	10,000	10,000	8,000	9,750	9,000	14,000
Central	9,000	9,500	12,000	12,000	8,000	9,250	10,000	10,000
Southwest	9,000	8,775	10,000	9,500	8,000	9,000	10,000	9,500
Southeast	7,750	10,000	6,000	9,000	7,000	7,000	7,000	9,000

\$0.14 to \$12.02 per bushel. If these prices are realized and current production costs for corn and soybeans do not change, the net return from soybean production will remain strong, but the return from corn production will be much smaller than the past four years. However, price expectations can quickly change. In addition to the change in corn price from 2013 to 2014, the change in five-year average price expectations for corn and soybeans from 2010 to 2011 also illustrate a major change in expectations. At the current time, the growing conditions for 2014, have raised concern about a large drop in corn and soybean price levels this fall. Where prices may be in 2015 and 2016 is even less clear.

Interest rates have important implications for real estate markets. As interest rates decline, the price of real estate tends to increase. There has been a general decline in interest rates for the past 30 years. Interest rates have reached a level where there seems to be little possibility of further declines. Signals from the Federal Reserve Bank indicate they plan to reduce the amount of monetary stimulus this Fall. If this occurs a rise in interest rates would be expected. Survey respondents' expectations about the average long-term interest rate over the next five years indicates an expectation that interest rates will remain low. The 2014 expected interest rate was 10 basis points (0.1%) less than the estimate in 2013.

Inflation does not seem to be a worry. The expected inflation rate for the next five years is the same as reported last year. On average, survey respondents estimate annual inflation over the next five years will be 2.7%. Over the last five years, inflation expectations have only varied 0.6%.

Market Influences

Respondents' expectations of corn and soybean prices are weaker, but expectations for other forces influencing farmland prices are still pointed in an upward direction. To identify the importance of the forces influencing the farmland market, survey respondents were asked to assess the influence of 11 different items. 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 and expected interest rates, 6) returns on competing investments, 7) outlook for U.S. agricultural export sales, 8) U.S. inflation rate, 9) current inventory of land for sale, 10) cash liquidity of buyers, and 11) current U.S. agricultural policy.

Respondents used a scale from -5 to +5 to indicate the effect of each item on farmland values. A negative influence is 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 2012, 2013, and 2014 are presented in Figure 4. The horizontal axis indicates the item from the list above. Given the decline in crop prices it comes as no surprise that current net farm income, the expected growth in returns, and crop price outlook have declined as positive forces in the farmland market. The crop price outlook, the third item, was just barely positive. However the outlook for livestock prices has seen a significant improvement.

Interest rates, the return from alternative investments, supply of land on the market, and the cash position of buyers continue to be important positive influences in the farmland market. Current U.S. agricultural policy is perceived as having little influence on farmland prices. As the new Farm Bill is implemented and if commodity prices continue to decline, it seems likely that the importance of agricultural policy may increase.

Expected Future Land Values

In the short-run, survey respondents see the rise in farmland values stopping and being replaced by a modest decline. While the survey shows that farmland values were up for the June to June period, respondents reported a small decline for the period from December 2013 to June 2014. This means that the increase in farmland values occurred during the last half of 2013. During the first half of 2014 the general trend in farmland values has been slightly downward.

When asked to forecast farmland values in December 2014, Survey respondents expect the slow decline in values to continue. On a state-wide basis, Table 1 indicates that for the period from June to December 2014, survey respondents expect the

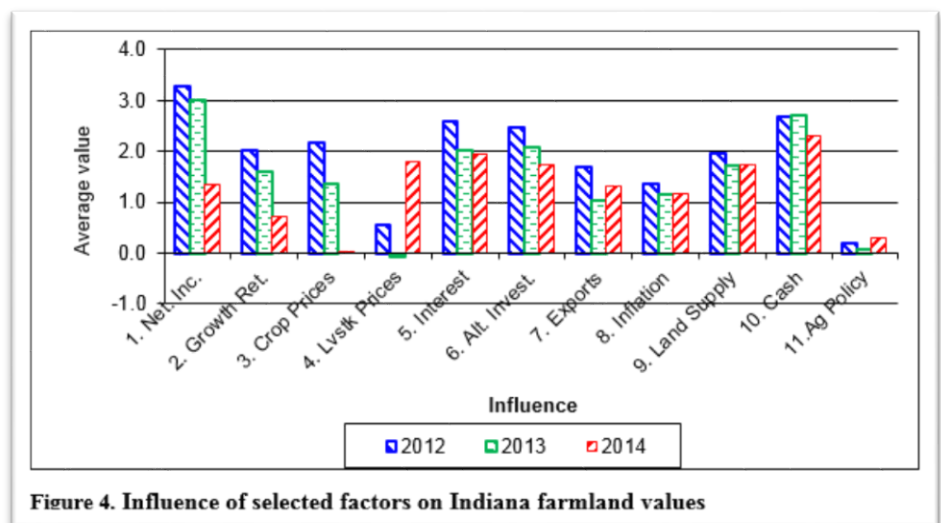


Figure 4. Influence of selected factors on Indiana farmland values

Table 4. Projected five-year average corn and soybean prices, mortgage interest, and inflation

Year	Prices, \$ per bu.		Rate, % per year	
	Corn	Beans	Interest	Inflation
2010	3.79	9.20	6.5%	3.1%
2011	5.68	11.59	6.1%	3.3%
2012	5.56	12.04	5.2%	3.1%
2013	5.52	12.16	5.1%	2.7%
2014	4.70	12.02	5.0%	2.7%
Average	\$5.05	\$11.40	5.6%	3.0%

farmland values to move slightly lower. Top farmland is expected to decline 0.9%, average land is expected to decline by 1.2% and poor land is expected to decline by 1.7%. While the differences across land quality are not large, these changes are consistent with the idea that higher quality land will be the best at holding its value. The pattern of adjustment is similar in most regions except in the Southeast region where small increases are expected.

Respondents also projected farmland values five years from now. Forty percent of the respondents expect farmland values to be higher. The average increase for this group was 13%. This translates into an average annual increase of 2.5%. Thirty-six percent of the respondents expect farmland values to decline. The average decline for this group was 12%, an annual decline of 2.5%. This leaves 23% of the respondents that do not expect any change in land values five years from now. Given the large increase in farmland values for the past several years, a period of steady values or a decline in value would not be surprising. From a historical perspective having a period of slow growth is also a possible outcome. Which path occurs will depend on how prices respond to the more equal balance between global supply and demand for grains and oil seeds.

Concluding Comment

Lower grain and soybean prices have significantly slowed the increase in farmland values and cash rents. In 2013 farmland values increased statewide by 14.7% to 19.1%. In 2014, this increase was 6.4% to 7.1%. However, the increase occurred from June to December 2013 and was followed by a modest decline from December 2013 to June 2014. Respondents indicate they expect the modest declines to continue through the remainder of 2014. These results indicate that the run-up in farmland values has either come to an end or will at least take a pause.

The grain and soybean price changes have affected cash rents in the same way. In 2013, state wide cash rents increased 9.4% to 10.9%. The 2014 survey found the change in statewide cash rents ranged from -0.7% to 2.9%. This is the

first time since 2009 the survey has reported a decline in cash rent.

Based on futures market prices for 2015, 2016, & 2017 and the current costs of corn and soybean production (see [2014 Purdue Crop Cost & Return Guide](#)) we are entering a period when crop farmers will be facing economic losses. This means there will not be sufficient income to provide a market return to all inputs. Farmers will be looking for ways to reduce their cost of production. The first resources that do not receive a market return are the economic charges for a farmers own labor and economic charges for machinery, buildings, and farmland. The cost of these items can be reduced by using fixed labor and machinery resources over more acres or delaying replacement. If these adjustments are not sufficient, then farmers will be looking to reduce the cost of seed, fertilizer, chemicals, and cash rent.

Prior land value and rent reports are located in August issues at the Department Web Site – [Please click here to view](#)

How the Survey is Conducted

The Purdue Land Value and Cash Rent Survey is conducted each June. The survey is possible through the cooperation of numerous professionals 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 provide an estimate of the market value for bare poor, average, and top quality farmland in December 2013, June 2014, and a forecast value for December 2014. They also provide an estimate of the current cash rent for each farmland quality.

To assess the productivity of the land, respondents provide an estimate of long-term corn yields. Respondents also provide a market value estimate for land transitioning out of agriculture and recreational land.

Responses from 217 professionals are contained in this year's survey representing all but eight Indiana counties. There were 34 responses from the North region, 30 responses from the Northeast region, 55 responses from the W. Central region, 51 responses from the Central region, 19 responses from the Southwest region, and 27 responses from the Southeast region. Figure 1 illustrates the counties in each region.

Appraisers accounted for 20% of the responses, farm loan professionals represented 53% of the responses, farm managers and farm operators provided 18% of the responses, and other professionals provided 9% of the responses.

We express a special appreciation to the support staff of the Department of Agricultural Economics. Tracy Buck coordinated survey mailings and handled data entry. Without her assistance and the help of others the survey would not have happened.

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 appraiser or farm manager that has a good understanding of the local situation.

Table 1. Pastureland: Number of responses, annual cash rent, and carrying capacity, June 2014

Region	Number of responses	Annual rent (\$ per acre)	Carrying Capacity (acres per cow)
North	15	\$95	1.7
Northeast	9	\$87	2.1
West Central	26	\$162	1.6
Central	25	\$120	1.5
Southwest	12	\$72	2.0
Southeast	21	\$48	1.7
State	108	\$105	1.7

Indiana Pasture Land, Irrigated Farmland, Hay Ground, and On-Farm Grain Storage Rent

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Table 2. Irrigated farmland: Number of responses, estimated market value, annual cash rent & rent as a percent of farmland value, June 2014

Region ¹	Number of responses	Corn Yield (bu. per acre)	Market Value (\$ per acre)	Cash Rent (\$ per acre)	Rent as % of Land Value
North	18	231	\$10,650	\$378	3.5%
Northeast	8	229	8,625	\$309	3.6%
West Central	11	236	12,836	\$426	3.3%
State	49	231	\$10,714	\$378	3.5%

¹ There was an insufficient number of responses for the West Central, Central, and Southeast regions to report values for these regions. The values from these regions are included in the state total.

Estimates for the rental value of irrigated farmland, pasture land, hay ground, and on-farm grain storage in Indiana are often difficult to find.

For the past several years, questions about these items have been included in the Purdue Farmland Value Survey.

The values from the June 2014 survey are reported here. Because the number of responses for some items is small, the number of responses is also reported.

Table 3. On-Farm grain storage rental: Number of responses and annual per bushel rent, June 2014

Region	Bins only		Bins and electric utilities	
	Number of responses	Rent (\$/bu.)	Number of responses	Rent (\$/bu.)
North	16	\$0.20	15	\$0.28
Northeast	14	\$0.21	10	\$0.23
West Central	34	\$0.32	24	\$0.53
Central	29	\$0.27	28	\$0.38
Southwest	6	\$0.15	8	\$0.23
Southeast	11	\$0.17	7	\$0.23
State	112	\$0.25	94	\$0.37

Averages for pasture rent, the market value of and cash rent for irrigated farmland, and the rental of on-farm grain storage are presented in Tables 1, 2, and 3, respectively.

The rental rate for grain bins includes the situation where there is just a bin and the situation where there is a bin and utilities.

Table 4. Rental of established alfalfa and grass hay ground, June 2014

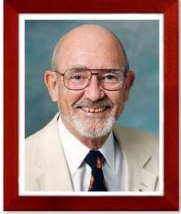
Region	Alfalfa/Alfalfa-Grass Hay		Grass Hay	
	Responses	Rent (\$/A)	Responses	Rent (\$/A)
North	12	\$186	13	\$133
Northeast	11	\$198	10	\$154
West Central	20	\$256	19	\$216
Central	15	\$205	15	\$172
Southwest	6	\$118	6	\$64
Southeast	11	\$102	11	\$55
State	76	\$194	75	\$150

Table 4 provides information about the rental rate for established alfalfa-grass and grass hay ground.

Information from prior years' surveys can be found in the [Purdue Agricultural Economics Report](#) archive. This information can be found in the August issue beginning in 2006.

40 Years of Purdue Land Surveys

This year marks the 40th year the Purdue Agricultural Economics Department has provide their annual survey of Indiana land values and rents. In that time, it has become one of the most widely used information sources for Indiana agriculture.

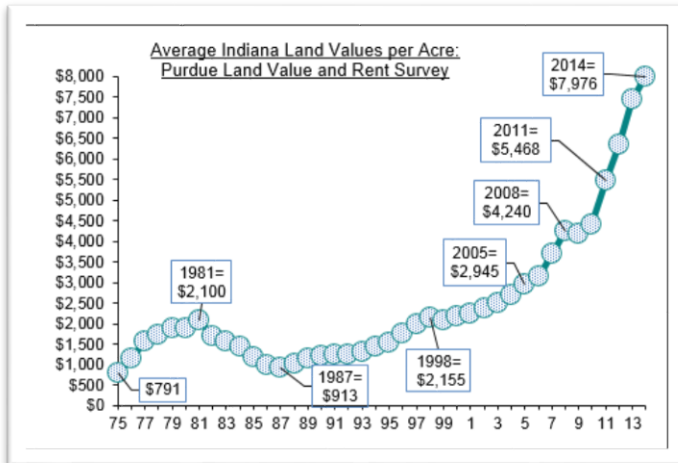


The survey began in a boom period as huge new export demands lifted crop prices. Land values had already started their surge in 1975 when Dr. Jake Atkinson first gathered opinions from professional farm managers, rural appraisers, Ag lenders, and others close to the land market.

He found that average quality land had reached \$791 per acre and that cash rents had “swelled” to \$63 per acre. In 1975, corn was \$2.54 a Earl Butz was U.S. Secretary of Agriculture attending cabinet meetings at the White House and leading agriculture into the global marketplace.

In these early years, Indiana land values peaked in 1981 at \$2,100 before collapsing 57% to \$913 an acre by the 1987 survey. Land values would not recover back to that 1981 high for 17 years in 1998.

Kim Cook joined Jake in conducting the survey about 1980 and Dr. Craig Dobbins replaced Jake after his retirement. Together they continue Purdue’s long legacy. This year’s results, show that Indiana’s average land value is now 10 times higher than that first survey in 1975.



As Jake would ask, “What do you think will happen to land values in the next 40 years?”

Farmland Taxes: The Coming Dilemma of Higher Taxes and Lower Crop Incomes!

By Larry DeBoer, Professor

Property taxes for most Indiana residents have gone down, but not for farmland owners. Since 2007 Indiana property taxes have dropped by 15%. Why? The sales tax increase in 2008 provided about a billion dollars to help fund the elimination of school general fund property taxes reducing property tax rates. The tax caps voted into the Constitution in 2010 have reduced tax bills by another \$780 million. Thus, homeowner property taxes have fallen 39% since 2007 primarily due to big homestead deductions. Tax caps and lower rates kept property taxes on rental housing and businesses almost unchanged during that time.

However, property taxes on agriculture have risen 33% since 2007.

The Rising Base Rate per Acre

The reason for this big tax hike has been the rise in the assessed value of farmland. The base rate is the starting point for farmland assessment. It’s a statewide dollar amount per

Table 1: Calculation of the Base Rate for an Acre of Farmland

Year	2013 pay 2014		Capital-ization Rate	2014		Average
	Cash Rent Income	Operating Income		Cash Rent Value	Operating Value	
2005	110	59	7.22%	1,524	817	1,170
2006	110	74	8.18%	1,345	905	1,125
2007	122	184	7.94%	1,537	2,317	1,927
2008	140	189	6.56%	2,134	2,881	2,508
2009	139	116	6.17%	2,253	1,880	2,066
2010	141	173	5.97%	2,362	2,898	2,630

Base Rate, Pay 2014 \$1,760

Year	2014 Pay 2015		Capital-ization Rate	2015		Average
	Cash Rent Income	Operating Income		Cash Rent Value	Operating Value	
2006	110	74	8.18%	1,345	905	1,125
2007	122	184	7.94%	1,537	2,317	1,927
2008	140	189	6.56%	2,134	2,881	2,508
2009	139	116	6.17%	2,253	1,880	2,066
2010	141	173	5.97%	2,362	2,898	2,630
2011	160	254	5.61%	2,852	4,528	3,690

Base Rate, Pay 2015 \$2,050

acre calculated each year by the state's Department of Local Government Finance. The base rate is then adjusted for each acre by its soil productivity index and influence factors, if any.

The base rate was \$880 per acre for taxes in 2007. For taxes payable in 2014, its \$1,760, exactly double. For taxes payable in 2015, the base rate per acre will be higher still, at \$2,050.

Table 1 shows details of the base rate calculations for taxes in 2014 and 2015. The calculation is a capitalization formula, which divides two different measures of income per acre by a rate of return to estimate how much an investor would pay for an asset yielding that income. The calculations sound complex so it really helps to look at Table 1.

Cash rent income per acre is the first income measure and comes from the Purdue Department of Agricultural Economics land value survey completed each June. Operating income is the second and is a calculation of corn and soybean bean prices times yield per acre, less costs. The capitalization rate is the average of the interest rates for farm operating loans and for real estate loans, as reported by the Chicago Federal Reserve. The calculations use data from six years, which enter with a four-year lag (that is, the latest data used for 2014 taxes is from 2010). For each year, the two income figures are divided by the capitalization rate, and the resulting values are averaged. The highest value for the six years is dropped, and the average of the remaining five is rounded to the nearest ten dollars to determine the base rate.

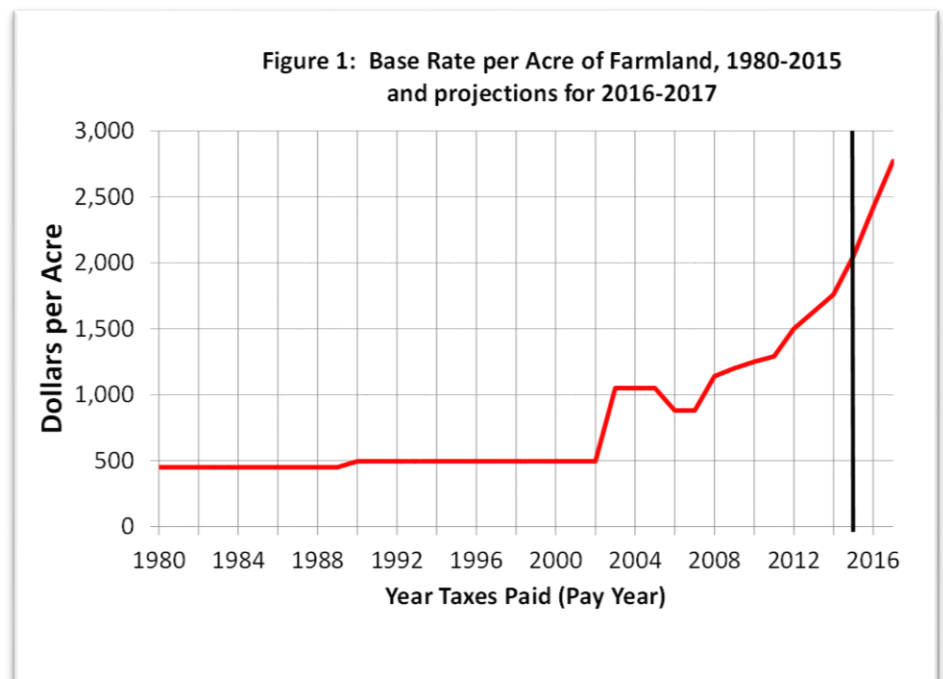
The base rate is recalculated each year. For 2015 taxes, for example, the Department of Local Government Finance rolled the years forward, dropping the data from 2005 and adding the data from 2011, see Table 1. The average capitalized value for 2011 was \$3,690, by far the highest of the six, so it was dropped from the base rate calculation. The remaining five years were averaged to get \$2,050, a 16.5% increase from the previous year. The increase occurred because the calculation dropped the 2005 average of \$1,170 and added the 2010 average of \$2,630.

The base rate is rising because the recent income figures are higher, and recent capitalization rates are lower, than the

earlier figures. Rents and commodity prices were higher in 2010 and 2011 than they were in 2005 and 2006. More recent interest rates are lower as well.

Problems Coming for Land Owners

The four-year lag of data entering the formula means that Indiana agriculture may be entering a multiyear period of rising base rates and higher real estate taxes at a time when actual crop returns are sharply reduced starting with the 2014 crops. We can estimate changes in the base rate through pay-2017 with data already in the books. Assuming no change in the calculation formula, the base rate for taxes in 2016 will be about \$2,420, an 18.0% rise from 2015. The base rate for 2017 will be about \$2,770, another 14.5%



increase. The increases occur because the very low 2005 and 2006 values are dropped from the calculation, while newer much higher values are added in. Figure 1 shows the base rate from 1980 through the 2017 estimates.

Lower actual incomes starting in 2014 will not help to potentially reduce the base rate until 2018 because of the four-year lag.

Policy Alternatives and Consequences

What could be done to ease the coming tax burden on farmland? There are policymakers who would like to lessen further increases in farmland assessments and farmland property taxes, but, assessment policy is restricted by three

facts: (Note: the author is not an attorney, but is basing these comments on the State Constitution!)

1. Policy is restricted by the Indiana Constitution. Article 10 Section 1 of our Constitution requires “a uniform and equal rate of property assessment and taxation” and “a just valuation for taxation of all property, both real and personal.” This article has been amended to create exceptions for household property, intangible property, motor vehicles, homesteads, inventories, personal property—but not farmland. This restricts the exemptions, deductions or credits that might be used to reduce farmland property taxes.

2. Policy is restricted by the Supreme Court’s 1998 market value decision. In December 1998 the Indiana Supreme Court decided the “Town of St. John” case, which forced a change in the way Indiana assessed property. The court required that assessments be based on “objective measures of property wealth.” Every number in the current base rate formula is objective, in the sense that it comes from an authoritative source outside the assessment system. And capitalization is a recognized method of determining property wealth. While it has not been challenged in court, the current formula seems defensible under the Town of St. John criteria. This restricts changes that might be made in the base rate formula.

3. Policy is restricted by the nature of the property tax. The property tax is a tax on the value of property. The value of farmland has been increasing faster than the values of other property types. So property taxes on farmland will increase, because that’s how a property tax works.

Given these restrictions, what policy alternatives could be used to slow the growth in farmland property taxes? And, what would be the consequences for other taxpayers, and for local government revenues?

The tax caps voted into the Constitution in 2010 do not reduce the tax bills on farmland by very much. This is because taxes are capped at 2% of gross assessed value before deductions. Most rural tax rates are less than \$2 per \$100 assessed value, so the cap does not apply. Further, as the base rate rises, the cap rises too. The cap does not prevent tax bill increases when the cause of the increase is a rise in assessed value.

The Constitution does say that taxes on farmland *may not exceed 2% of gross assessed value.* The cap could be set lower. A cap of (say) 1.75% would cut property taxes for many farmland owners. It would also reduce the revenues received by a large number of rural local governments.

Farmland owners would pay less, and rural governments would have less to spend on local services.

Gross and net assessed value are nearly equal for farmland, because there are no deductions. In contrast, homestead net assessed value is less than half of gross assessed value, because of the large deductions that homeowners receive on their houses. The Constitution allows homestead deductions, but might not allow deductions simply aimed at reducing farmland taxes. There is no farmland exception to the uniform, equal and just requirements in the Constitution. Perhaps deductions for other public policy purposes could be devised for farmland, like the economic development deductions and abatements on business property. Such deductions would reduce taxable assessed value and raise tax rates. Farmland owners would pay less, but other taxpayers would pay more, and if they hit their tax caps, local governments would lose revenue.

Another approach could be to attempt to reduce other taxpayer deductions. Most homeowners receive a \$45,000 standard deduction, and a 35% supplemental deduction on the assessed value that remains. These are the deductions that reduce homestead taxable or net assessed value to less than half of gross assessed value.

If homeowner deductions were reduced, assessed value would increase and tax rates would fall. Homeowners would pay more, other property owners would pay less. Some local governments would receive more revenue, since lower rates would reduce the tax bills of non-homestead property below their caps. Other local governments would receive less revenue, because more homeowners would hit their caps. Of course, homeowners would object to higher taxes, and they make up a majority of voters in almost every legislative district.

The property tax is the problem for farmland owners. Property taxes could be reduced by shifting local revenues to other taxes. Since the early 1970’s Indiana has been shifting local taxation away from property taxes, towards state sales and local income taxes.

Higher local income tax rates to reduce property tax rates would decrease the property tax bills of all property owners, but increase the tax payments of all taxable income earners. Most farmland owners would pay less in combined property and income taxes, but most renters and employed homeowners would pay more. Lower property tax rates would mean less revenue lost to tax cap credits for local governments.

Some policymakers recognize the difficulties that ever-higher property taxes could cause farmland owners. The next few years could be a period of falling farm incomes while taxes continued to rise, because of the lags in the base rate calculation. The high capitalized value of 2013 will first enter the base rate calculation in 2017, and will still be influencing the base rate in 2022.

The Indiana farmland tax dilemma may prove hard to avoid. All policymakers recognize the multiple difficulties of solving this problem: There are Constitutional difficulties; Farmland does not appear to be eligible for special treatment under our Constitution; There are revenue difficulties; Under the tax caps, any policy that raises property tax rates will reduce local government revenues; and there are distributional difficulties because if farmland owners pay less tax, somebody else will generally pay more.

Is Farmland Currently Priced as an Attractive Investment?

By Timothy G. Baker, Michael D. Boehlje & Michael R. Langemeier, Professors

Farmland prices in the Corn Belt and Great Plains states have increased dramatically during the last few years. For example, farmland prices in West Central Indiana have increased 92% since 2010. The recent dramatic increase in farmland prices has attracted interest from the broader investment community as a component of their investment portfolio, as illustrated by financial services company TIAA-CREF's recent acquisition of the farmland portfolio of Westchester, a large farmland realtor and investment company with farm properties throughout the United States. Similar investment interest is reflected by numerous articles on farmland investing found on banking and financial websites.

Concern is being expressed by many investment analysts that farmland prices will become higher than justified by the fundamentals, and will result in what we will later recognize as a bubble. One justification for this concern is that previous

research has established the tendency of the farmland market to over-shoot its fundamental value. Thus, from the standpoint of the literature and of history, another bubble in farmland prices would not be a surprise.

A standard measure of financial performance most commonly used for stock is the price to earnings ratio (P/E). A high P/E ratio sometimes indicates that investors think the investment has good growth opportunities, relatively safe earnings, a low capitalization rate, or a combination of these factors. However, a high P/E ratio may also indicate that an investment is less attractive because the price has already been bid up to reflect these positive attributes.

This paper determines the equivalent ratio of farmland price to cash rent ratio (P/rent) and compares the P/rent ratio for farmland to the P/E ratio of stocks included in the S&P 500. We use land value and cash rent data for the 1960 to 2014 period for West Central Indiana to illustrate the P/rent ratio. That data from 1975 to 2014 were obtained from the annual Purdue Land Value and Cash Rent Survey. For 1960 to 1974, the 1975 Purdue survey numbers were indexed backwards using the percentage change in USDA farmland value and cash rent data for the state of Indiana.

Price to Rent Ratio

The P/rent ratio for West Central Indiana has an average value of 18.2 over the 55 year period from 1960 to 2014, with a high of 33.0 reached in this year (2014) and a low of 11.1 in 1986, which was perhaps the bottom of the valley after the price bubble of the 1970s and very early 1980s (Figure 1). At

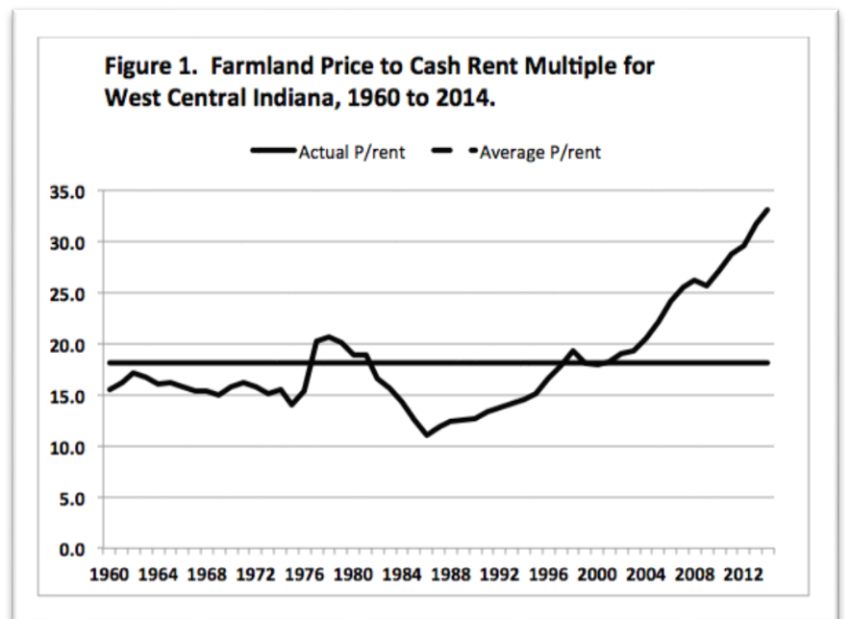
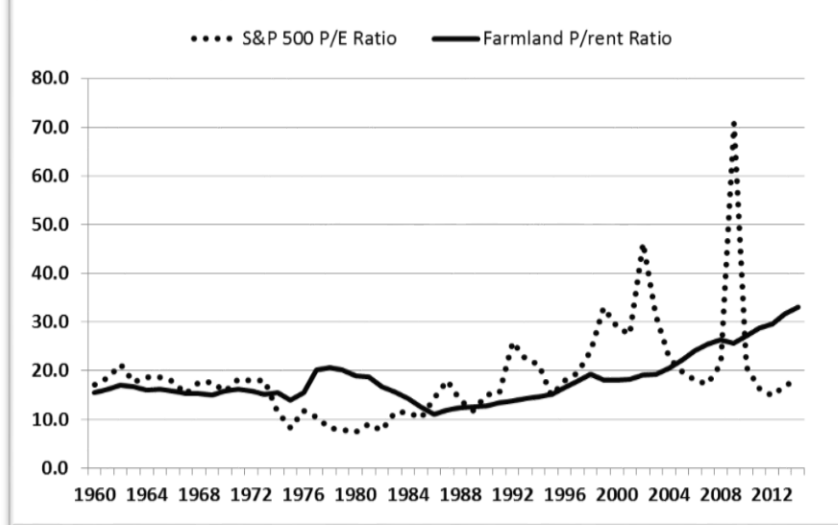


Figure 2. Farmland P/rent Ratio and S&P 500 P/E Ratio, 1960 to 2014.



the peak of this bubble, the P/rent ratio reached a high of just over 20 from 1977 through 1979. The P/rent ratio subsequently dropped to the teens in the early 1980s, and reached its low in 1986. The rise from around 15 in 1976 into the 20s and down to 11.1 in 1986 corresponds exactly to what is viewed as the bubble in farmland prices that was followed by one of the more difficult periods for agriculture in the early-to-mid 1980s. The current value of 33.0 relative to the historic average of 18.2 and previous high around 20 at least raises concerns that current farmland prices could be overvalued in relationship to returns.

Farmland Versus Stock

A comparison of the P/rent ratio to the P/E ratio used for stocks provides insight into the comparative attractiveness of farmland as an investment. Figure 2 shows the P/E ratio for the S&P 500 and the P/rent ratio for farmland. The average P/E ratio for the S&P 500 for the 1960 to 2014 period at 18.7 is relatively close to the 18.2 average for the P/rent ratio for farmland. The P/E ratio for stocks was generally higher than the P/rent ratio for farmland from 1986 to 2004. Since 2004, except for 2009 which exhibited a very high P/E ratio for stocks, the P/rent ratio for farmland has been higher than the stock P/E ratio. In addition, to being relatively high, the P/rent ratio has exhibited an upward trend in the last ten years. The current P/rent ratio of 33.0 is well above the average P/E multiple of 18.7. From an investor viewpoint, to receive \$1,000 of earnings

they would have to buy \$33,000 of farmland compared to only \$18,700 worth of stock to get the same earnings. This is at least a signal that farmland prices are very high compared to alternative investments in the stock market.

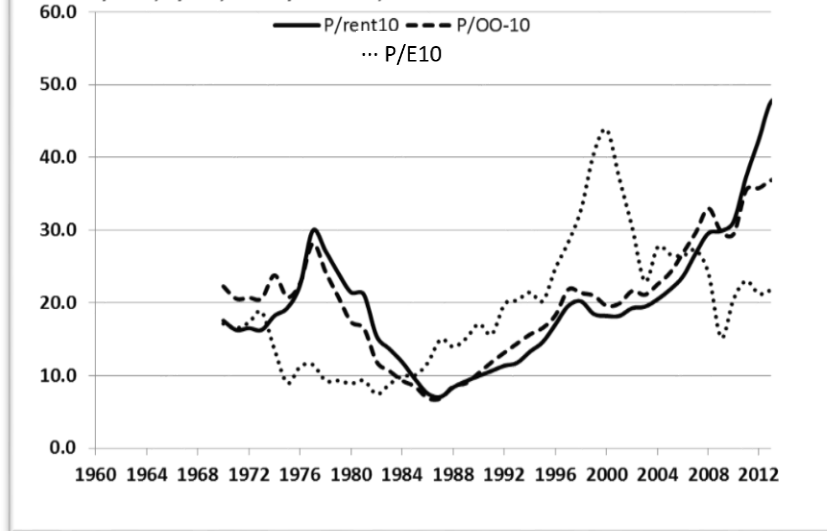
Cyclically Adjusted P/Rent

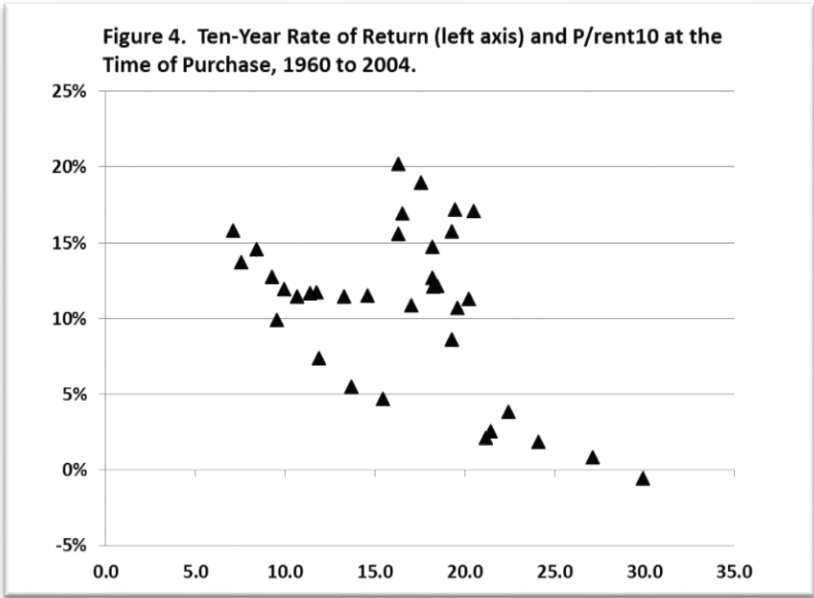
Shiller (2005; 2014) uses a 10-year moving average for earnings in the P/E ratio, often labeled either P/E10 or cyclically adjusted P/E (CAPE), to remove the effect of the economic cycle on the P/E ratio. When earnings collapse in recessions, stock prices often do not fall as much as earnings, and the P/E ratios based on the low current earnings sometimes become very large (e.g., in 2009). Similarly, in good economic times P/E ratios can fall and stocks look cheap, simply because the very high current earnings are not

expected to last, so stock prices do not increase as much as earnings. By using a 10-year moving average of earnings in the denominator of the P/E ratio, Shiller has smoothed out the business cycle by deflating both earnings and prices to remove the effects of inflation. Shiller also uses the P/E10 to gain insight into future rates of return. That is, if an investor buys an asset when its P/E10 is high, do subsequent returns from that investment turn out to be low, and vice versa? Similar to Schiller we want to examine if there has been a similar relationship for farmland?

The P/rent ratios reported thus far are the current year's farmland price divided by current year cash rent. Here we

Figure 3. Ten-Year Moving Average of Cyclically Adjusted P/rent, P/OO, and P/E Ratios, 1960 to 2014.





Buy a High Ratio: Get a Low Future Return?

Shiller also discusses the relationship between the P/E10 ratio and the annualized rate of return from holding S&P 500 stocks for long periods. In general, his results show that the higher the P/E10 ratio at the time of purchase, the lower the resulting multiple year returns, like for the next 10 or 20 years. The West Central Indiana farmland and cash rent data from 1960 to 2014 are used to compute 10 and 20 year annualized rates of return. Returns are the sum of the average of cash rent as a fraction of the farmland price each year, plus the annualized price appreciation over the holding period.

model our P/rent10 after Shiller’s cyclically adjusted P/E ratio. Cash rent and farmland prices are deflated, and then 10-year moving averages of real cash rent are calculated. The P/rent10 ratio is computed by dividing the real farmland price by the 10-year moving average real cash rent. A similar computation is done for 10-year owner-operator returns (P/OO-10).

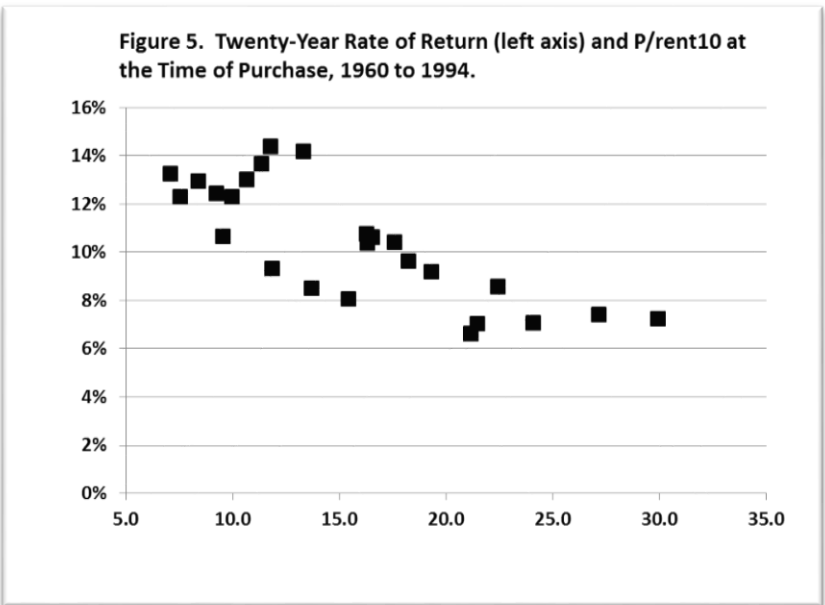
Figure 3 shows all three of these ratios: P/rent10; P/OO-10, and Shiller’s P/E10. The P/OO-10 fell through the first half of the 1970s when real returns grew faster than land values, increased from around 20 in the mid 1970’s to 28.2 in 1977, and then fell to 6.8 in 1987. The P/OO-10 then increased steadily until it reached 37.0 in 2014. In the last three years, the P/rent10 ratio has risen substantially above the P/OO-10 ratio.

Two important points are evident from Figure 3. First, the P/rent10 ratio in 2014 now exceeds the peak of the S&P 500 P/E10 ratio during the dot-com stock bubble in the late-1990s and early-2000s. Could this be suggesting that the current farmland market is also in an extreme bubble? Second, the relationship between the P/rent10 ratio and the P/OO-10 ratio suggests that producers are not bidding all of the increases in owner/operator returns into cash rents. Producers may be expecting owner/operator returns to decline, which would make it difficult to maintain high cash rents. However, this relationship could also be explained if one expects cash rents to adjust slowly to changes in operator returns. Historically, there have been times when cash rents were slow to adjust.

The results for farmland show a negative relationship similar to that exhibited in Shiller’s stock data. The 10-year holding period returns for farmland show a strong negative relationship (Figure 4). That is, if one purchased farmland when the P/rent10 ratio was very high, like now, they tended to have a low 10-year rate of return. Alternatively, if one purchased farmland when the P/rent10 was intermediate or low, they tended to have moderate to high 10-year returns.

The 10-year returns ranged from a small negative to 20%. In a similar way, the 20-year holding period returns also exhibit a strong negative relationship with the P/rent10 ratio (Figure 5). The 20-year holding returns range from 6 to 14%.

The highest historical P/rent10 in our data for which a 10-year holding period return can be calculated is 30 in 1977, resulting in a negative 10-year holding period return in our



data. The P/rent10 levels in 2011 through 2014 have grown to values well above 35, which is literally off the chart (horizontal axis of Figure 4). In this recent period, cash rents have increased, but farmland prices have increased much more. Farmland prices in 2014 were at a historically high multiple of moving average cash rent, even higher than the level seen in the late 1970s prior to the agricultural crisis of the 1980s.

The high P/rent10 in 2011-2014 could be partially explained by market participants incorporating the current high rents into future expectations faster than they are incorporated into a 10-year moving average. Biofuel demand has been a step-up in demand that is not very likely to decline substantially. Similarly, increased export demand, mainly soybean demand by China, could be seen as likely to hold and even expand rather than decline. However, even if one considers the average of only the highest two years of cash rent, one still requires a combination of strong continued growth expectations and low cost of capital to justify current farmland prices and the current ratios.

Final Comments: Land Buyers Beware

Farmland prices are currently at unprecedented levels and our analysis indicates that the P/rent ratio (price per acre divided by cash rent per acre) is substantially higher than historical values, and that this ratio is also high relative to the comparable P/E ratio on stocks as measured by the S&P 500. In addition, in order to maintain the current high farmland values, cash rents would have to remain very high, or even move higher, and interest rates would also have to remain very low. Most agricultural economists expect crop returns to drop sharply and for interest rates to move upward in coming years.

“Most agricultural economists expect crop returns to drop sharply and for interest rates to move upward in coming years.”

Furthermore, we demonstrated that farmland values have tended to have a cyclical component in which farmland values move too high relative to the underlying fundamentals and then over time move too low relative to fundamentals. We use a cyclically adjusted P/rent ratio to show that a very high P/rent ratio, as we have now, tends to be associated with low subsequent returns. Simply stated this means that the historical relationships show that those who bought farmland when the P/rent ratio was high tended to have low subsequent returns. On the other hand, those who bought

farmland when the P/rent ratio was intermediate or low, tended to have intermediate or high subsequent returns. The current record high P/rent ratio could be a warning to current farmland buyers that their odds of favorable returns on these purchases may be low.

Our reading from examining 55 years of history is that current farmland values are now extremely elevated in relationship to the underlying economic fundamentals. If we are correct, this means that those purchasing farmland at current prices have a high probability of experiencing “buyer’s remorse” in coming years.

“If we are correct, this means that those purchasing farmland at current prices have a high probability of experiencing “buyer’s remorse” in coming years.”

But having said this, there remain some possible situations in which farmland values could be maintained or even increase. These might include further unexpected growth in grain and soybean demands, perhaps with a greater ramping-up of biofuels programs, or with even greater expansion of exports to developing countries like China. Rising farmland values could also result from long-term factors that limit crop supplies such as global climate change or lack of irrigation water, both of which could reduce world crop productivity.

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