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Relationship between Cash Rent and Net Return to Land

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Net crop returns have dropped significantly since 2013. Budgeted earnings per acre for a corn/soybean rotation in Indiana were $120 in 2013. Since then budgeted losses per acre have ranged from $45 to $107 (Dobbins et al., 2017). What effect has this significant drop in net crop returns had on cash rent? This article examines the relationship between cash rent and net return to land for Indiana, and attempts to answer this question.

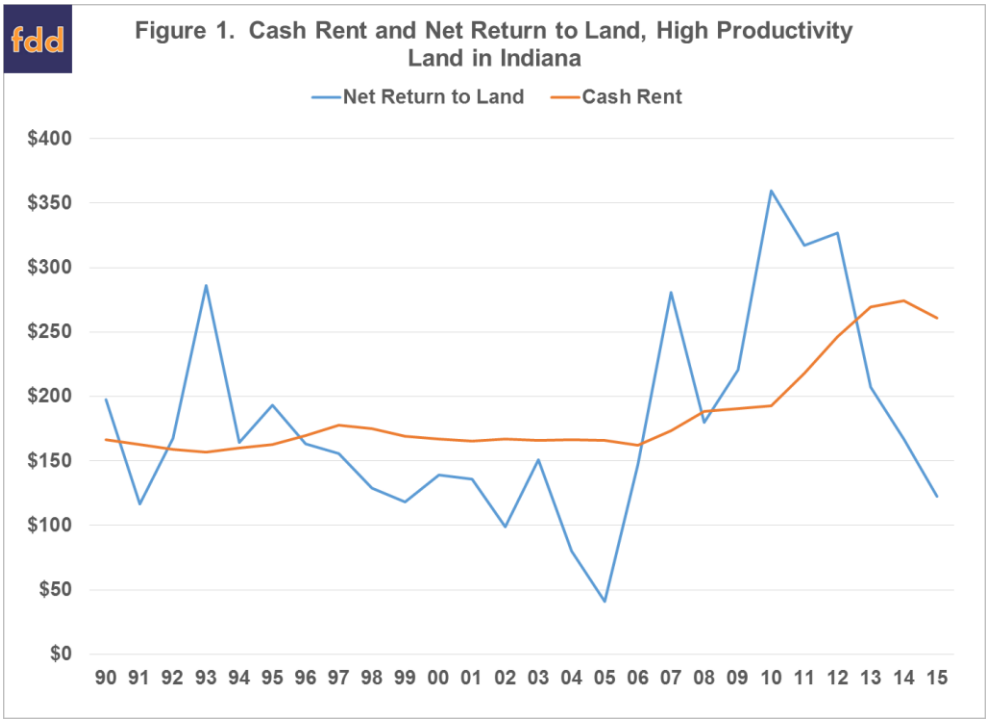
Model and Data

Regression analysis was used to quantify the relationship between cash rent and the net return to land. Specifically, cash rent was hypothesized to be related to lagged cash rent, lagged net return to land, and a time trend. All variables were adjusted for inflation using the implicit price deflator. Lagged cash rent captures the persistence in cash rents over time or the sticky nature of cash rents. Specifically, cash rents do not adjust as fast as net returns to land. The lagged cash rent variable helps quantify this phenomenon. The lagged net return to land is used rather than contemporaneous net return to land to reflect the fact that the current net return to land is not known with certainty when cash rents are established. The regression coefficient on lagged net return to land is of particular importance in this study. A relatively small coefficient would suggest that cash rents do not adjust very rapidly to changes in the net return to land. For example, a coefficient of 0.10 would suggest that the adjustment in cash rents is only 10 percent of the adjustment in the net return to land.

A corn/soybean rotation was utilized to compute the inflation-adjusted net return to land for low, medium, and high productivity land in Indiana from 1990 to 2015. Market revenue included crop revenue, crop insurance indemnity payments, and government payments. Historical prices and yields were obtained from USDA-NASS, Quick Stats. All costs, except for land cost (i.e., cash rent or land ownership cost), were included. Budgeted costs for each land productivity category were generated using various issues of the Purdue Crop Cost and Return and Guide, and USDA-NASS input price indices. The net return to land was computed for low productivity, average productivity, and high productivity land in Indiana by subtracting costs from market revenue. Cash rents for different land qualities were obtained from the annual Purdue Agricultural Land Values Archive. Both the net return to land and cash rent were converted to inflation-adjusted or real values using the implicit price deflator.

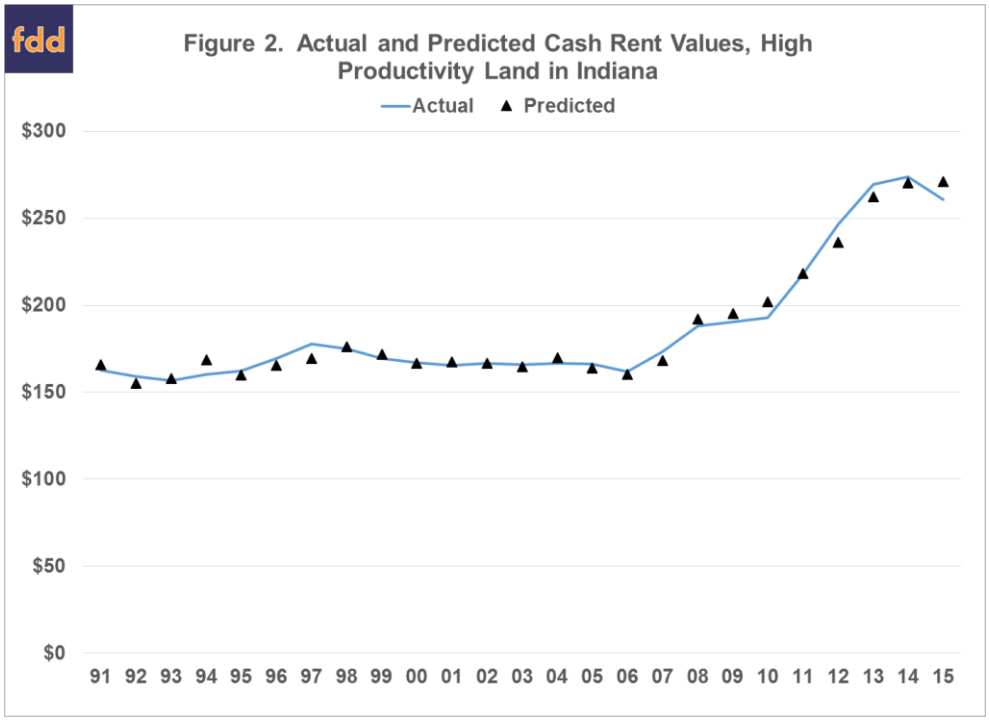
Figure 1 presents inflation adjusted cash rent and the net return to land for high productivity land. Similar movements in the two variables are evident. It is also evident from the figure that the net return to land is

more variable than cash rent. This suggests that the co-movement in these items is not one to one (i.e., a $1 movement in the net return to land does not necessarily correspond with a $1 movement in cash rent).



Empirical Estimates

Empirical estimates were generated for low productivity, average productivity, and high productivity land in Indiana. Actual and predicted values for high productivity land are presented in figure 2. The average absolute difference between actual and predicted cash rent values was 2.1 percent. The absolute difference was larger than twice the average difference in 1994, 1997, 2010, and 2012. Changes in the lagged net return to land were rather pronounced for these years.



Using the empirical regression estimates and assuming that the 2017 net return to land reverts to the long-term average, the projected cash rents for 2016 and 2017 are $256 and $241 per acre, respectively. Empirical regression estimates can also be used to create adjustment coefficients, which illustrate the response of cash rent to a change in the net return to land. The short-term and long-term adjustment coefficients in response to a change in the lagged net return to land are presented in table 1. The short-term adjustment coefficient represents the impact of a one-year change in the lagged net return to land on cash rent. The long-term adjustment coefficient assumes that the change in the lagged net return to land is permanent.

Table 1. Short-Term and Long-Term Adjustment Coefficients in Response to a Change in Net Return to Land

Time Frame	Low Productivity	Medium Productivity	High Land Productivity
Short-Term	0.05	0.10	0.10
Long-Term	0.11	0.36	0.68

The short-term adjustment coefficients range from 0.05 for low productivity land to 0.10 for medium and high productivity land. Using a value of 0.10, a $100 drop in the net return to land would result in a $10 drop in cash rent in the subsequent year. Due to the importance of lagged cash rent in explaining changes in current cash rent, this $100 drop in the net return to land would result in additional declines in cash rent two or more years after the $100 drop. For example, using the high land productivity results, a $100 drop in the lagged net return to land would result in a $10 drop in cash rent in the subsequent year and a cumulative drop of $38 in cash rent during the first five years after the $100 drop.

The long-term adjustment coefficients range from 0.11 for low productivity land to 0.36 for medium productivity land and 0.68 for high productivity land. It is important to note that the large changes for medium and high productivity land are unlikely to materialize because the drop in the net return to land is often not permanent. In other words, net return to land may drop $200 or more in a particular year, but in subsequent years increase from its relatively low levels.

Conclusions and Implications

This article examined the relationship between cash rent and the net return to land in Indiana. A significant and positive relationship exists between these two variables. However, the relatively low short-term adjustment coefficients on the lagged net return to land variable in the regressions for each land productivity category suggests that cash rent values are sticky, that is landowners are unwilling to make large changes in annual cash rent.

Cash rents in Indiana have dropped approximately 12 percent since their peak in 2014. The empirical results reported in this article suggest that if the net return to land remains relatively low, another 5 to 10 percent drop in cash rents is likely.

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