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The Connection Between Cash Rents and Land Values

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Abstract

The last few years have seen big increases in land values. Cash rents have also increased but perhaps at a slower rate than land values. This paper examines the ratio of land values to cash rents to determine if how cash rents have changed in relation to land value changes. This ratio is important because it helps indicate whether cash rents are a good way of controlling farmland relative to purchasing the land. Results indicate there may be a lag in cash rents before they match the level of land prices. However, this relationship does not always hold.

The Connection Between Cash Rents and Land Values

Introduction

The last few years have seen a surge in land values as commodity prices have risen to record levels. This is to be expected as a net present value analysis of land prices would capitalize the expected future returns by an expected discount rate and come up with a land value. As most farmers and land investors don't expect commodity prices to drop down to loan values anytime soon, these values appear to be somewhat rational.

Real growth rates are probably also being factored into the land prices seen across the country as well. The perpetual model of pricing land divides the next period's return by the discount rate minus the growth rate. Higher growth rates make the denominator smaller in the equation which results in a higher land valuation.

There is still a question about how cash rents should be evaluated in relation to higher land prices and higher commodity prices. First, are cash rents a leader or follower to land price changes? Arguments can probably be made both ways. The cash rent as a leader of land value argument can probably look at yearly profitability as setting the cash rent. Land values would follow based on a capitalization of those rents. The land price as a leader of cash rent argument can use the fact that land prices can adopt immediately while many cash rents are longer term and take longer to change. In this argument, the net income directly is being capitalized into land values rather than the cash rents.

In either argument, the relationship or ratio between cash rents and land values becomes important. One would expect this ratio to remain relative stable over time no matter if the cash rents or the land values react first. This ratio should remain stable because when the land value to rent ratio becomes large, more renting will occur as

farmers rent more instead of purchasing thus increasing rents relative to land value. When the ratio becomes small, the reverse will also occur. This paper examines the land value to rent ratio to determine its stability and to examine whether land prices support cash rents or cash rents support land values. Several different states across the country will be examined and potential models explaining the ratio will be considered.

Data and model

According to Ricardian Rent Theory, cash rents should reflect the level of profitability of the land. However, Hennessy and Edwards (2007) found that cash rents did not immediately reflect the changes in profitability. They reasoned that contract inertia contributed to this discrepancy.

This paper first explores the idea the cash rent changes may lag the changes in land values because of the multi-year nature of leasing contracts. Our initial thinking is that because many cash rents are fixed in 3 to 5 year contracts, cash rents should lag land values. Most of the data will come from the USDA surveys of land values and cash rents. While land values have been recorded for many years, the survey of cash rents does not go back as far. In general, the cash rent data only goes back to the mid-90's. However, we do have data from Iowa that goes much farther back.

An initial look at average farmland values in the U.S. might indicate that land prices have stabilized. As shown in Figure 1, average U.S. land prices have increased much slower since 2008.

Farm Real Estate, Average Value per Acre – United States

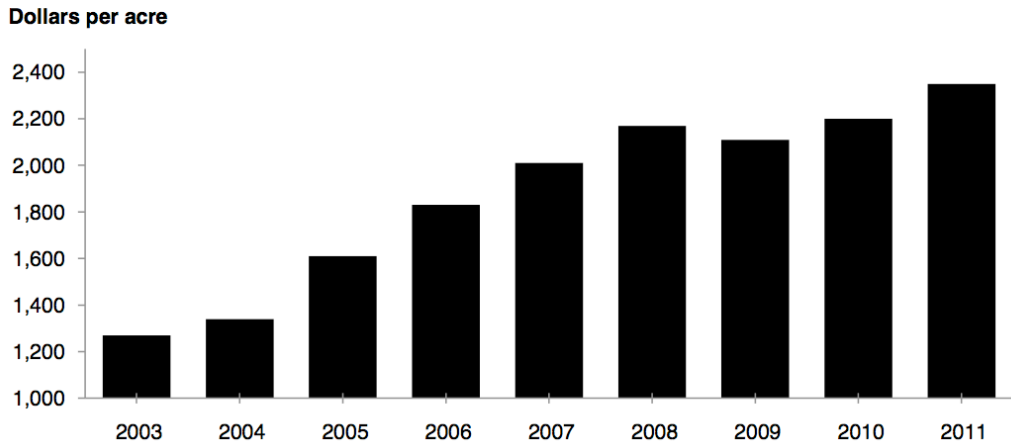


Figure 1. Average U.S. Real Estate Prices (Source: USDA)

However, this graph is somewhat misleading as in the major crop producing regions, land prices have continued to increase much faster than they historically have.

Figure 2 shows the increase from 2010 to 2011 for each state.

2011 Farm Real Estate Value by State

Dollars per Acre and Percent Change from 2010

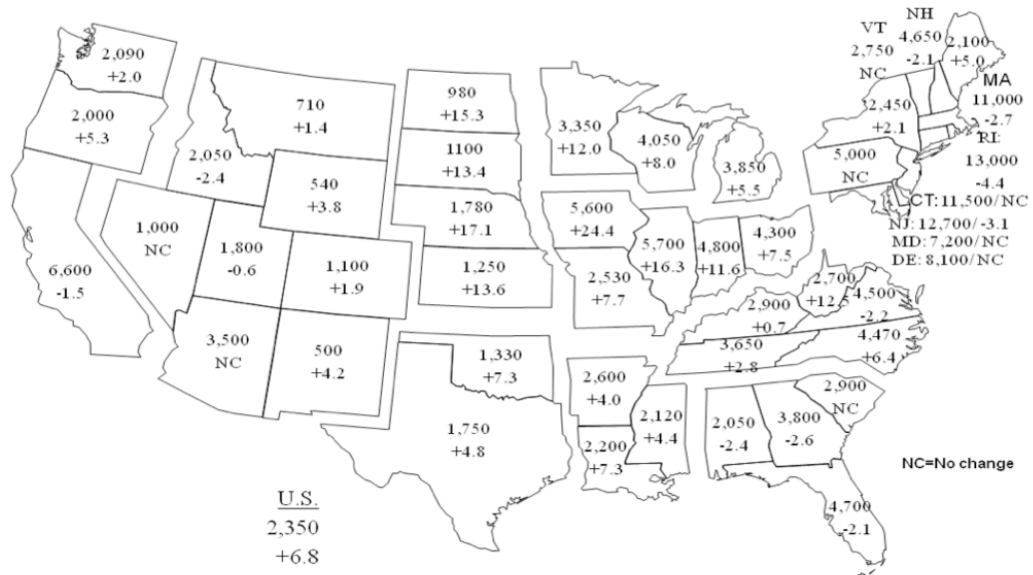


Figure 2. Percent Change from 2010 to 2011 for Farm Real Estate

(Source: USDA)

The model employed here examines the land price to cash rent ratio for selected states. To test whether cash rent changes lag land price changes, the ratio is calculated by lagging the land values by up to five years and dividing these lagged land values by the current cash rent.

The analysis employed here is mainly an exploratory analysis. The comparisons were done by just looking at the slope of the calculated ratios to see if lagging land values would flatten the land value to cash rent calculation over time.

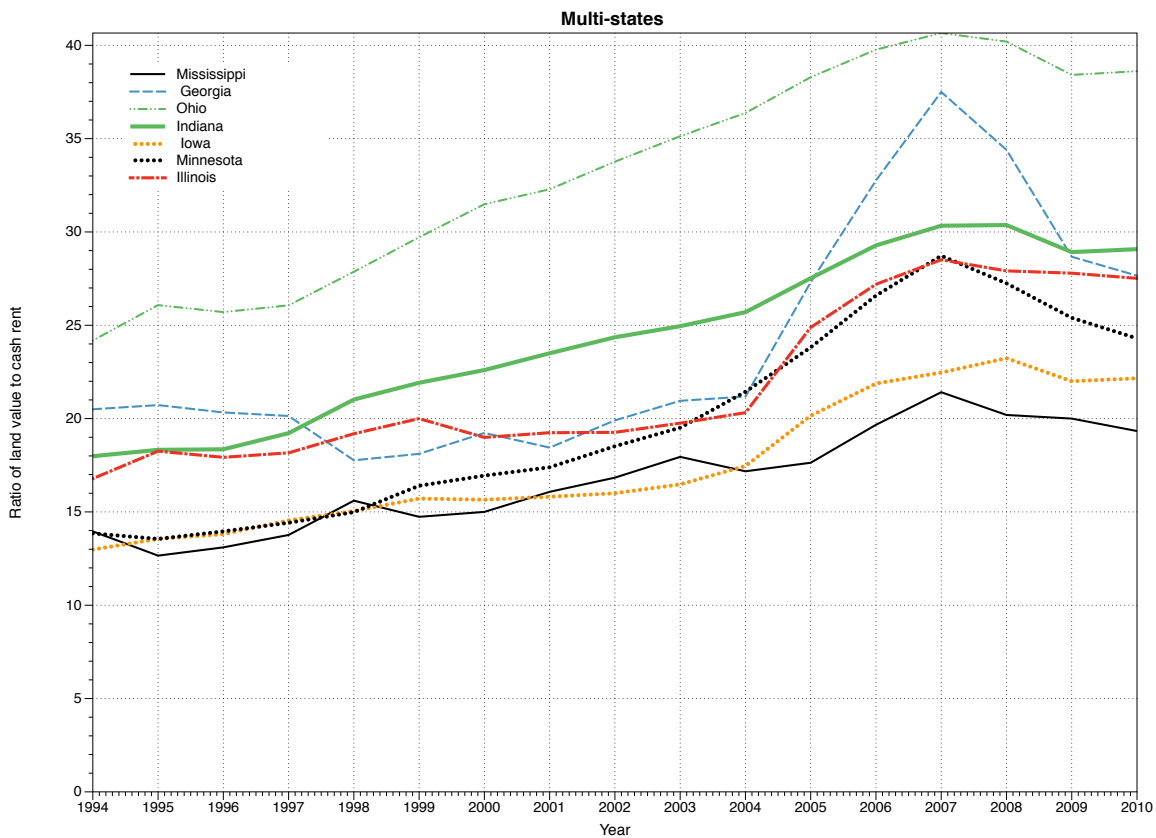


Figure 3. Current Land Value to Cash Rent Ratio for Selected States

Figure 3 shows what the current land value to cash rent ratio looks like over time for the states of Mississippi, Illinois, Georgia, Ohio, Indiana, Iowa, and Minnesota.

Notice that in all states, the ratio has been increasing over time. During this time period,

land prices have been increasing each year. This figure would indicate that land prices have been increasing faster than cash rents.

The other thing to notice from this figure is that some states have much higher land value to cash rent ratios than in other states. In particular, Ohio is consistently higher than the other states. Whether this is because there are other factors besides farm profitability remains to be determined. By contrast, Mississippi has the lowest ratio.

The seven figures below show each individual state's ratio including the five lagging years.

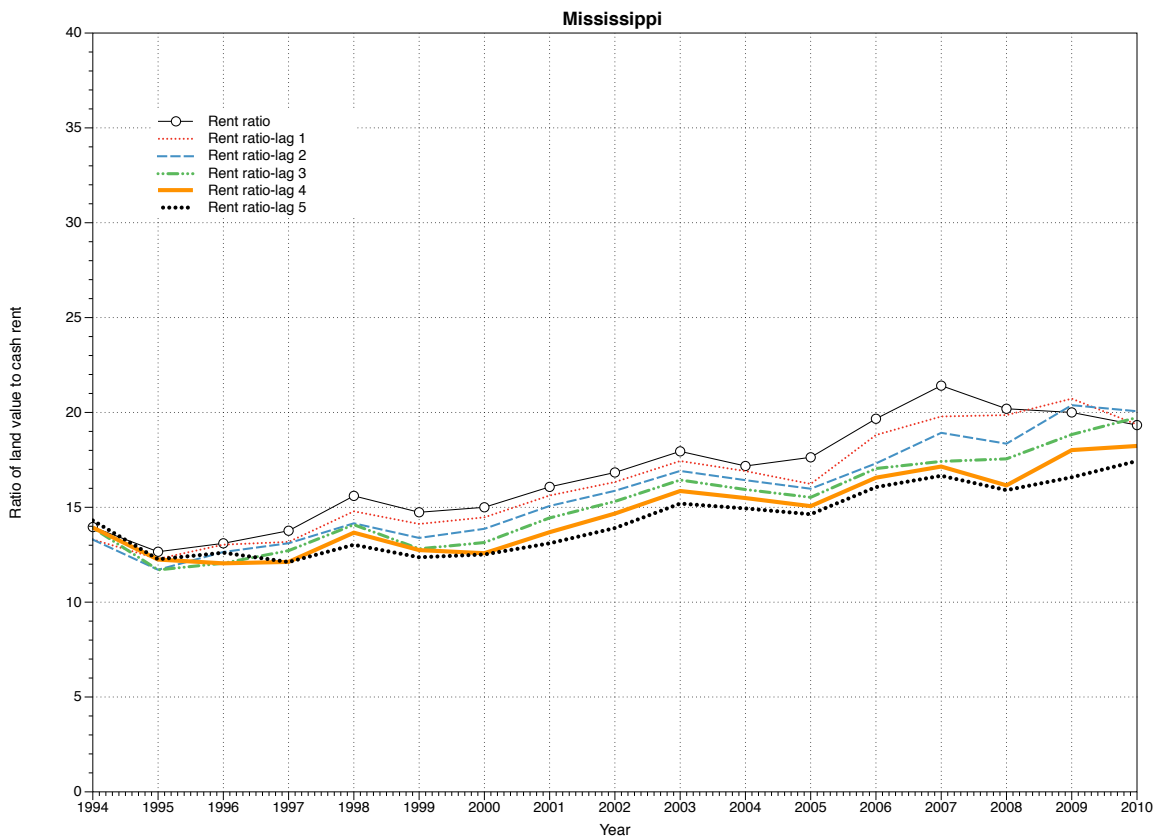


Figure 4. Land Value to Cash Rent Ratio for Mississippi

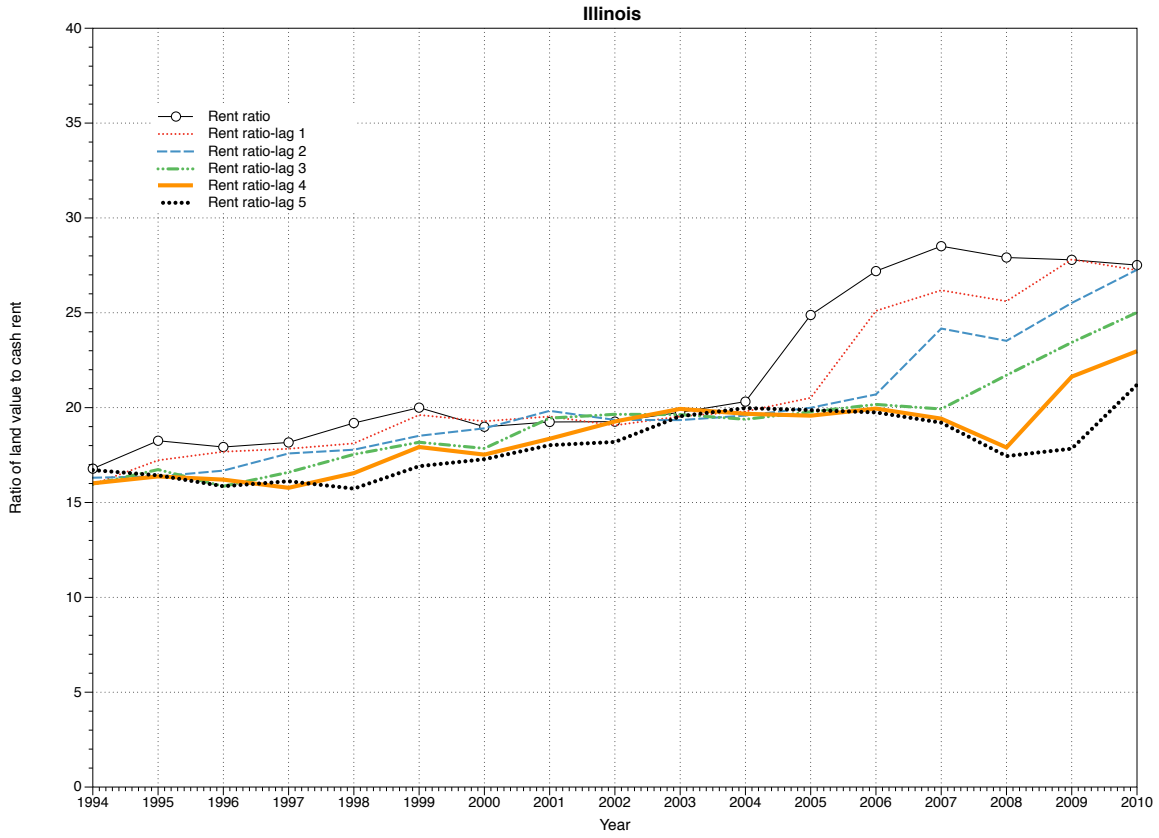


Figure 5. Land Value to Cash Rent Ratio for Illinois

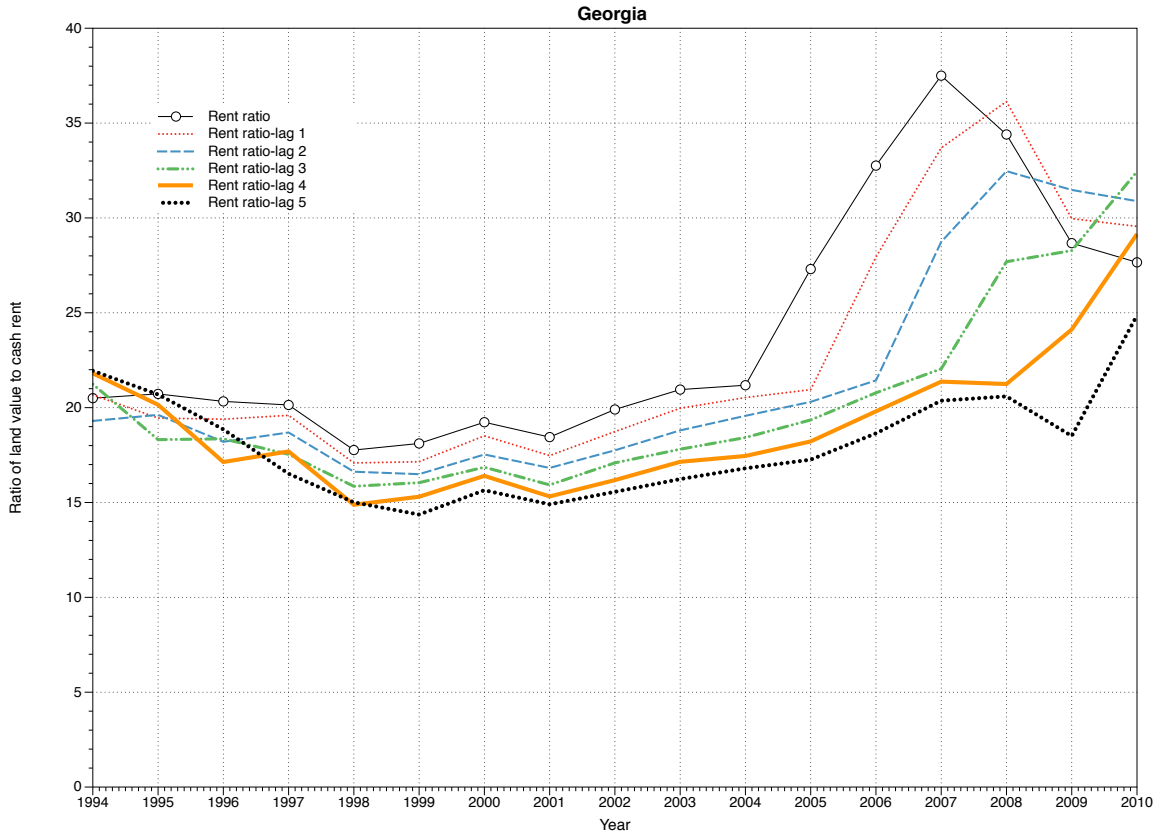


Figure 6. Land Value to Cash Rent Ratio for Georgia

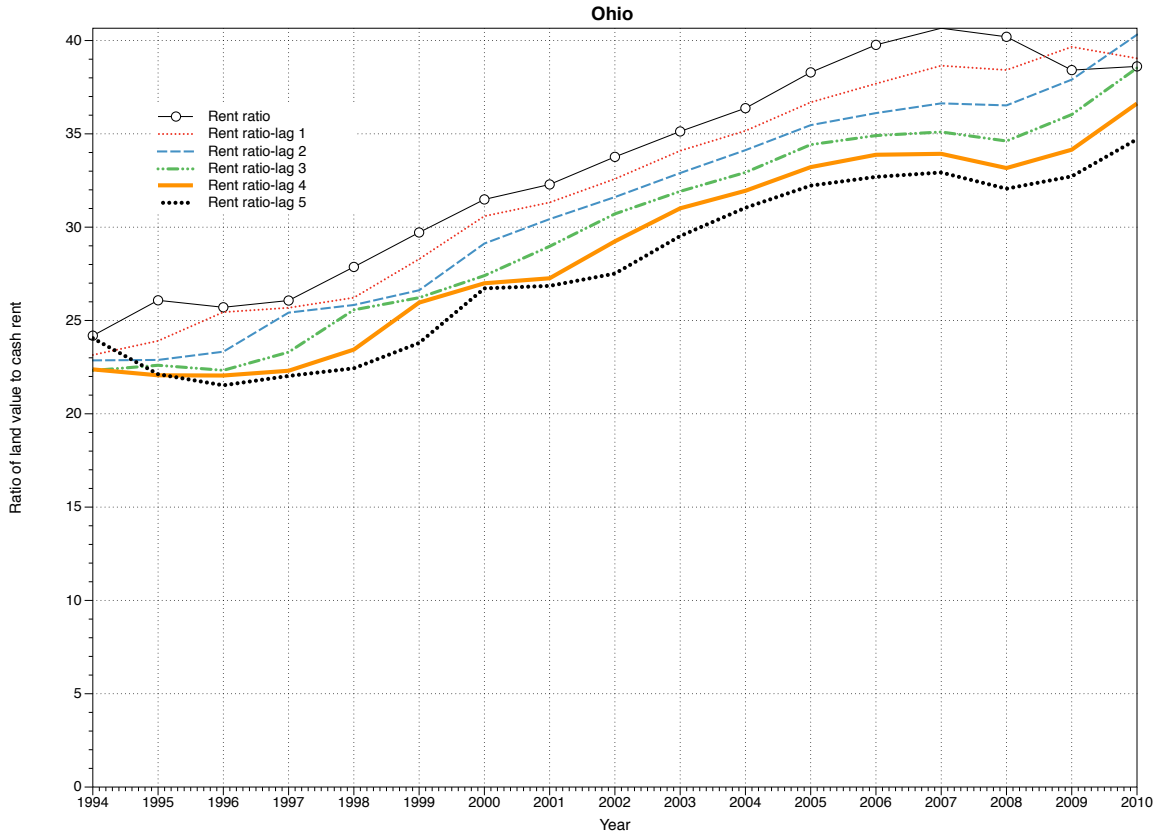


Figure 7. Land Value to Cash Rent Ratio for Ohio

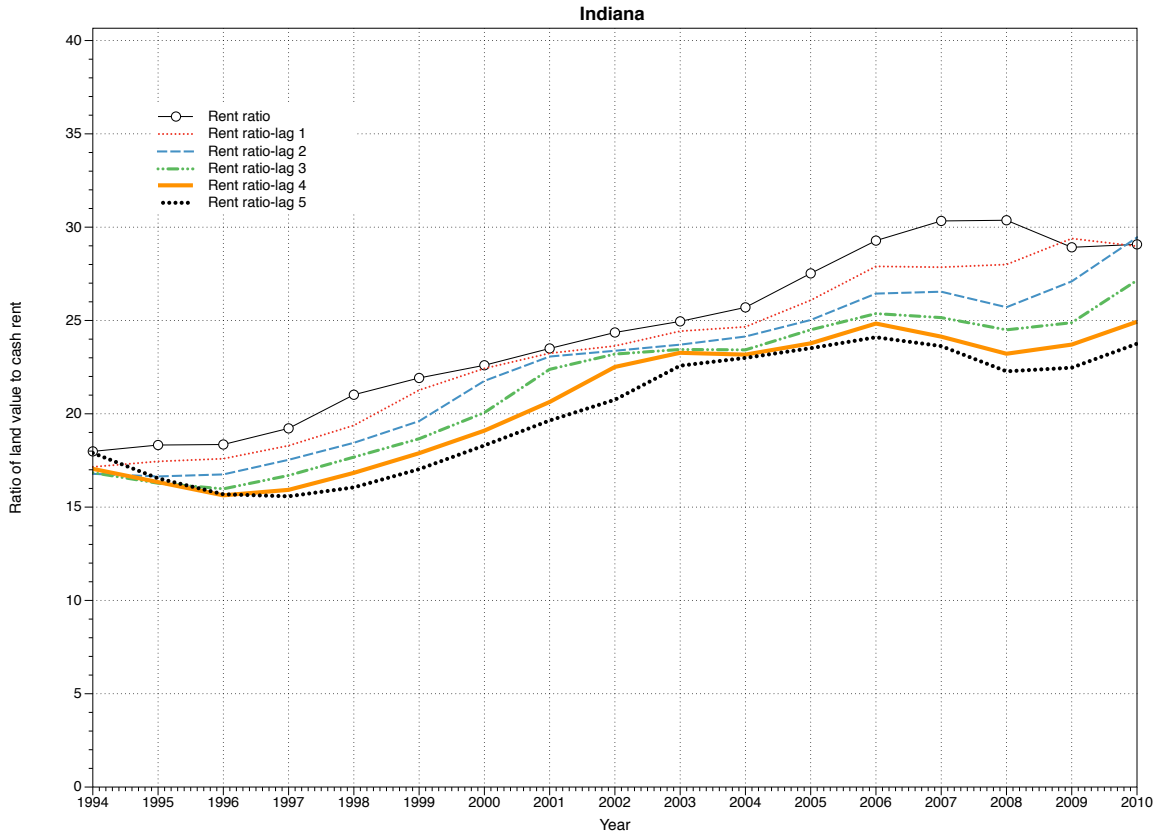


Figure 8. Land Value to Cash Rent Ratio for Indiana

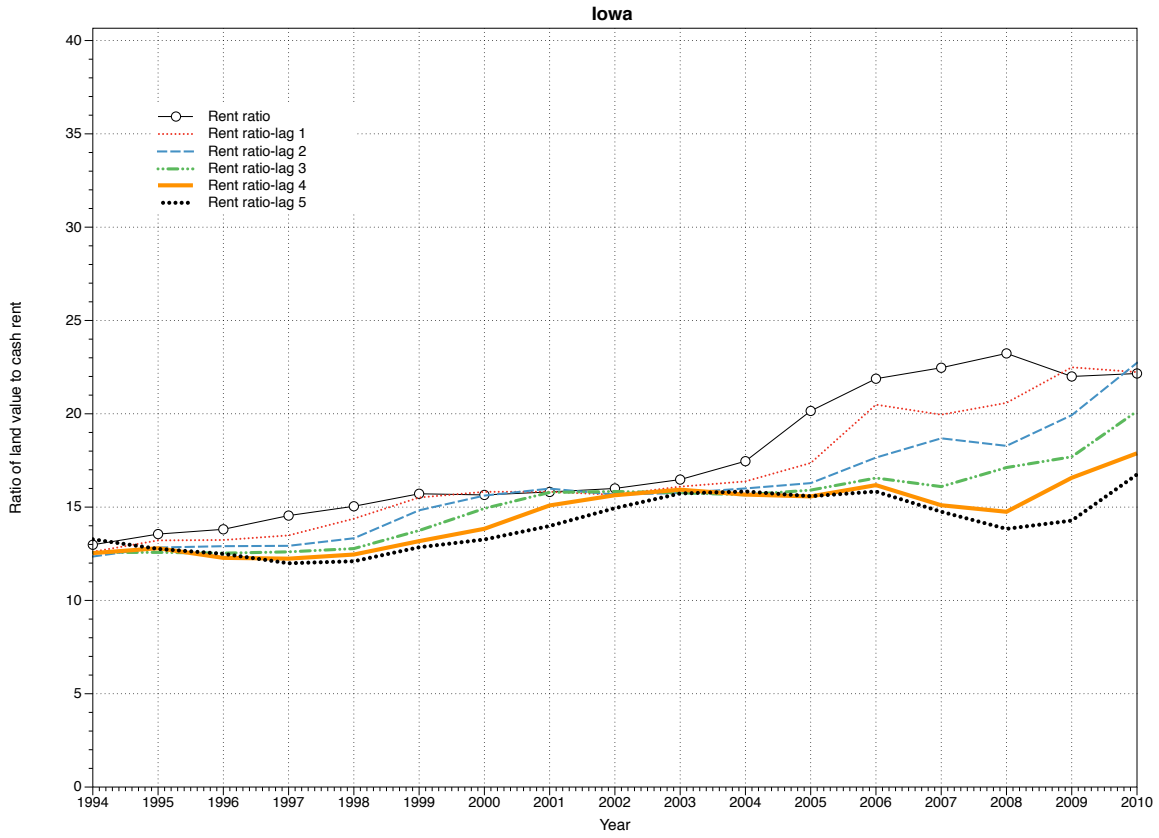


Figure 9. Land Value to Cash Rent Ratio for Iowa

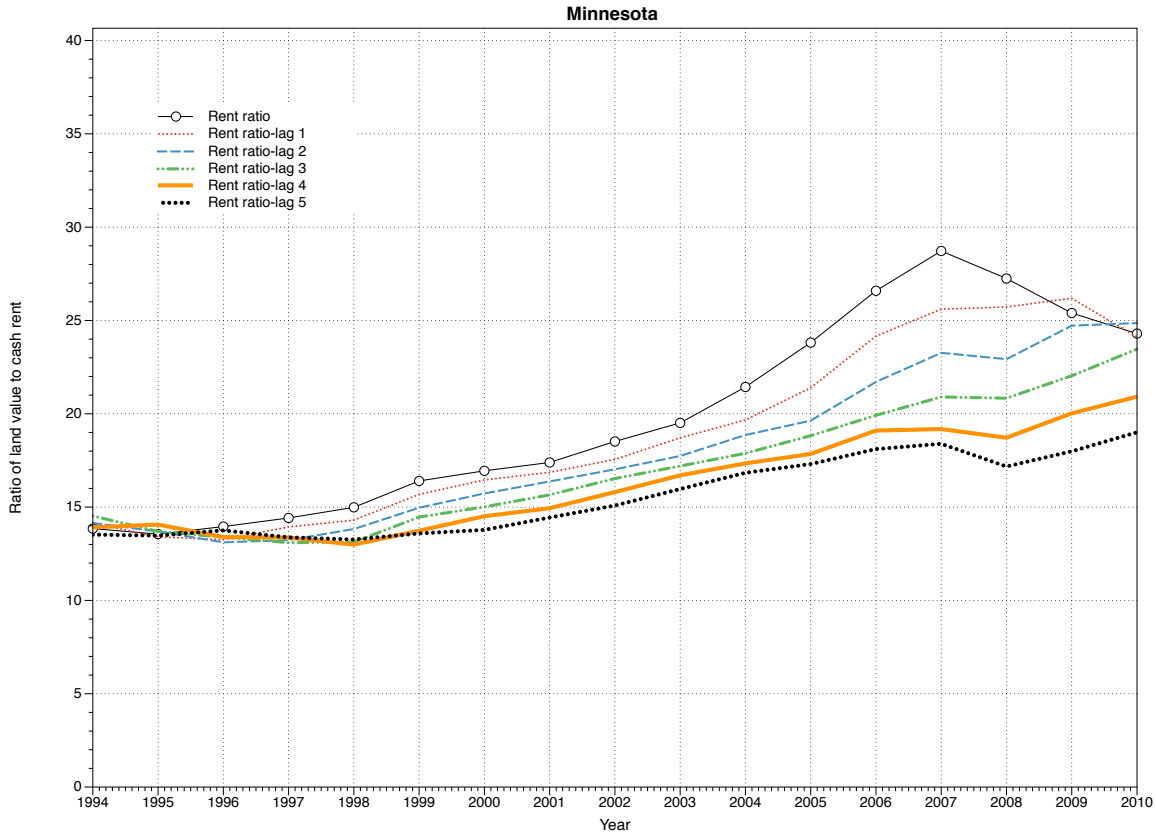


Figure 10. Land Value to Cash Rent Ratio for Minnesota

Figures 4 through 10 visually seem to confirm that cash rent changes lag the changes in land values. In most cases, lagging the land values five years tends to smooth out the ratio the most. In addition, the five year lag also gives a fairly flat line as well. The exception would be Ohio where every lag ratio calculation increases over time.

One issue with these calculations is that the data set is limited. During the period from 1994 to 2010, land prices increased nearly every year. Thus, it is not really surprising that lagging the ratio calculation would flatten the ratio over time. Fortunately, a data set from Iowa goes back to 1920s. During this time frame there were decreases in the land values as well as increases. Figure 11 below shows how a lagging model of the ratio works with this data.

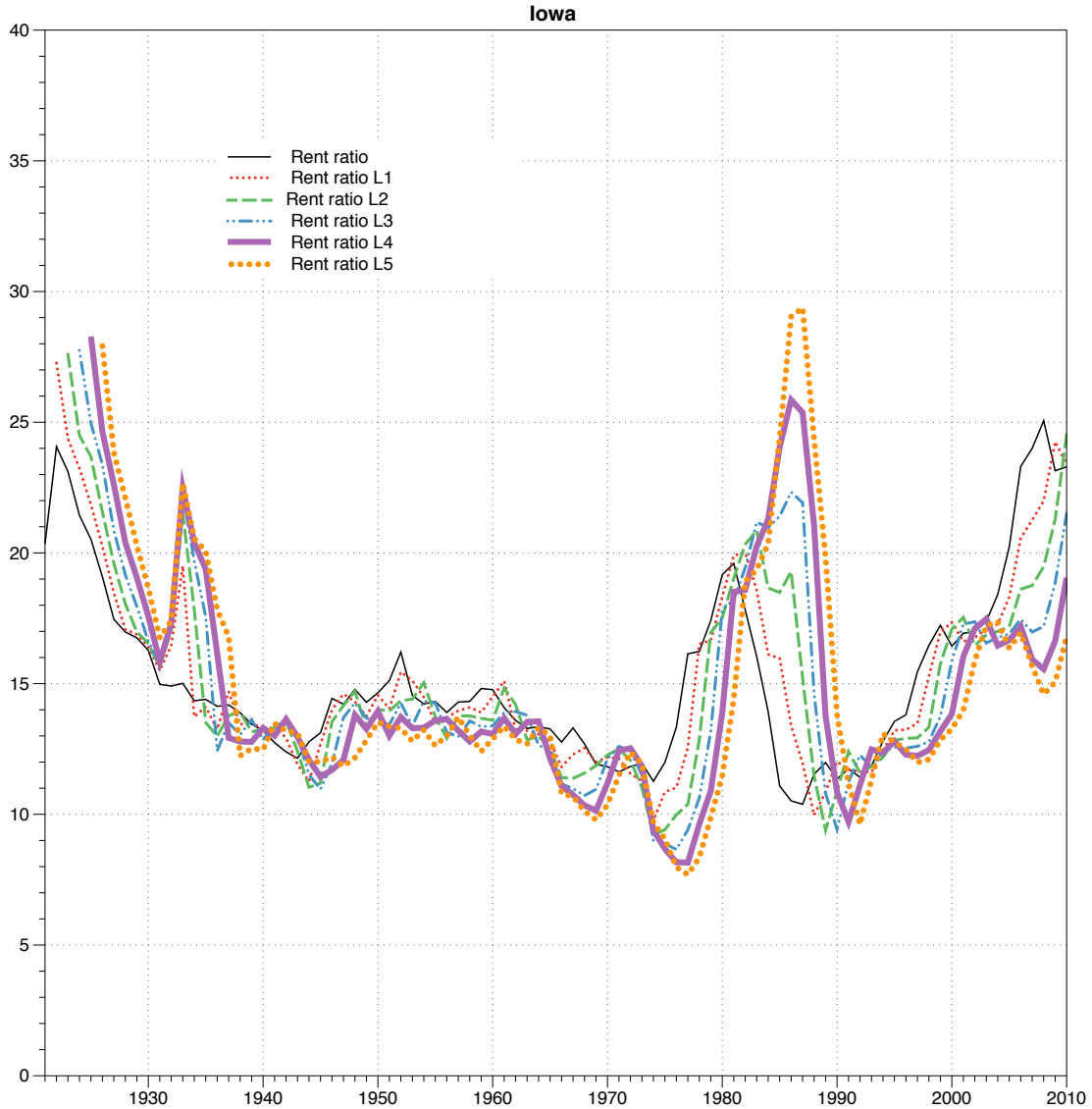


Figure 11. Land Value to Cash Rent Ratio for Iowa – A Longer Time Frame

Now, the lagging model does not work very well. Notice that during the 1980's when the first farm crisis occurred, the lagging models actually makes the variability in the land price to cash rent calculation worse.

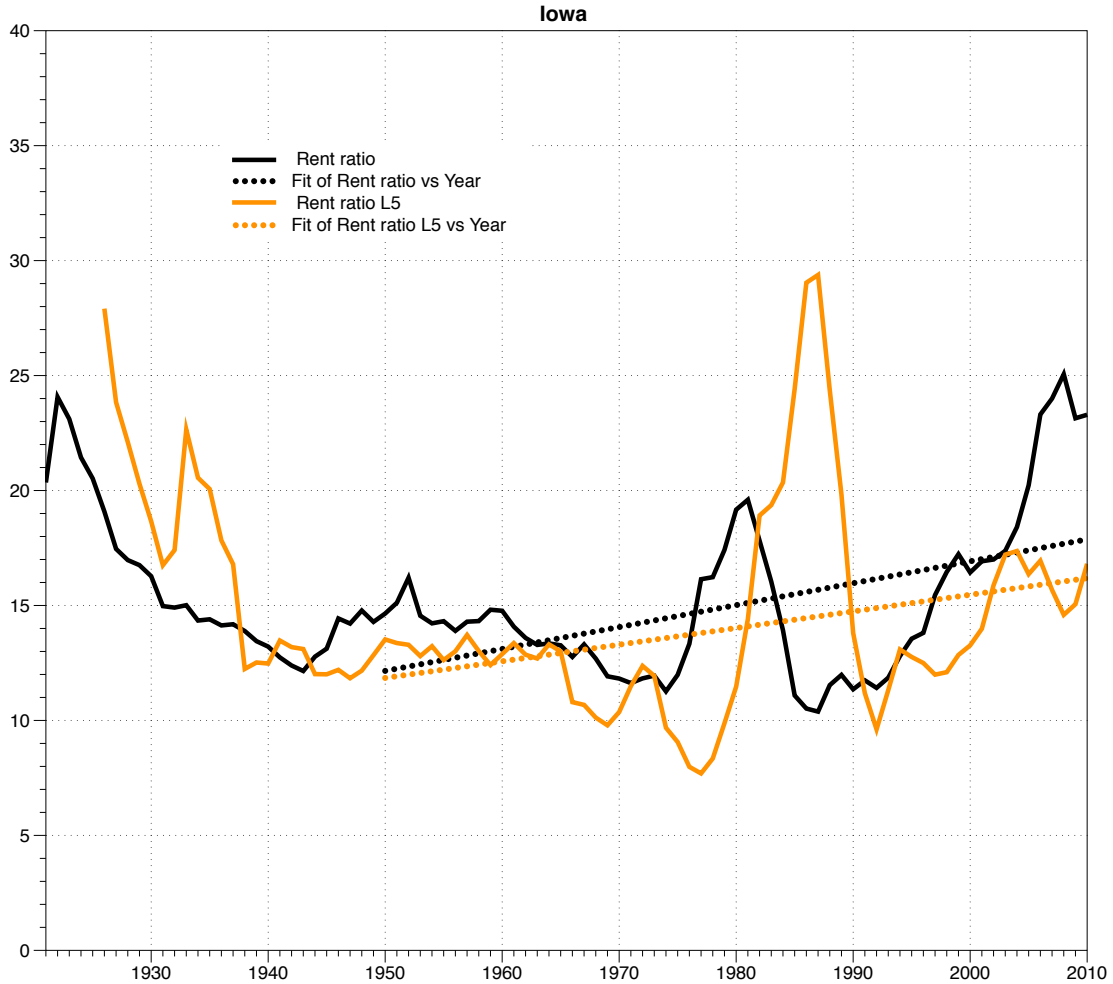


Figure 12. A Focus on the Five Year Lag Model to the Current Ratio Calculation

Figure 12 highlights the five year lagging model calculation and compares it to the current land value to cash rent calculation. The slope of the fit since 1950 is also shown for the two ratio calculations. While the slope of the five year lag is less, it certainly has more variability.

Discussion

This exploratory analysis shows that lagging models might work for explaining the land value to rent ratio. However, when land prices start to decline, the model doesn't

work so well. This could be an indication that cash rents only lag when land prices are increasing but do not lag when prices are declining. To fully investigate the relationship between land values and cash rents, a full blown econometric model should be developed.

The land value to cash rent ratio seems to average around 20 or so across agricultural states. However, there is quite a lot of variation. Some of this could be explained by the pressure on land values other than agricultural uses. Ohio has a much higher ratio than either Iowa or Mississippi. One could argue that Ohio has much greater urban influences compared to either Iowa or Mississippi.

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