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# Determining Cropland Cash Rental Arrangements

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Many crop producers rely heavily on rented land in their farming operations. Crop land is typically rented in one of three ways: (1) cash rent; (2) crop share; or (3) cash/share combination. While crop share leases have been the most common method of renting land, interest in cash rents is increasing. Reasons include: 1) increased planting flexibility; 2) landowners not wanting to share the increased expenses of new tillage/cropping systems or production technologies; 3) older landowners wanting fixed income; 4) increased farm size and number of landowners per tenant; and 5) difficulty in prorating long-term capital investments in certain technologies (e.g., precision agriculture).

The rental arrangements between landowners and producers can significantly affect risk and profitability, and producers should understand those effects. For example, one study found that where cash renting is more common, land tends to change hands more often than where land is rented on a crop share basis.

This publication describes cash rent leases and compares them to crop share arrangements. For more information on crop share rental see RM 5-13.0, *Determining Cropland Share Rental Arrangements*.

## Determining Cash Rent Rates

Landowners and tenants often request help in determining rental rates. Economic theory says that an equilibrium rate occurs where the supply of land equals the demand for land. How do we arrive at an equilibrium price? Typically, landowners and tenants negotiate to find a cash lease rate that is "fair" to both parties.

In areas where there is sufficient cash renting, the prevailing cash rent market price will help determine the "fair" rent. However, in some areas there is no established rental rate, or, if there is one, the rate is based on extenuating circumstances that make it inappropriate as a guideline (e.g., rate includes buildings or machinery, rent is between family members). In these cases, the rate negotiation may begin with factors such as the landowner's cost, the amount the tenant can afford to pay, and/or the crop share adjusted for risk (Langemeier).

Landowner's cost refers to the opportunity cost of land investment, less expected capital gains, plus real estate tax. The idea is that a landowner expects some net rate of return on his investment in the land. This net rate of return can be approximated by the historical average rent-to-value ratio. The cash rent would be calculated by multiplying the rent-to-value ratio by the market value of the land.



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The "amount a tenant can afford to pay" method of establishing cash rents says that the tenant receives all income and pays all expenses and whatever is left is available for cash rent to the landowner. In practice, landowner's cost and amount a tenant can afford to pay often represent lower and upper bounds, respectively, to the rent negotiation process. But, if individual land ownership and tenant profitability values are used, rather than averages, it may be that the "amount a tenant can afford" is actually less than land ownership costs. Nonetheless, these values help establish a framework within which to begin rent negotiation.

Because many landowners and tenants are familiar with crop share arrangements, using a crop share approach to determine a cash rental rate is practical. This approach determines the cash equivalent amount of an equitable crop share arrangement and then often makes a risk adjustment to that value. The reason for making the risk adjustment is that with cash rent all of the production and price risk falls on the producer, whereas with crop share this risk is shared between the producer and the landowner.

### Risk-return Tradeoff

With any type of investment, increased returns generally are associated with increased risk (Fig. 1). To realize higher average returns ( $\bar{x}$ ), a person must be willing to take on more risk ( $s_x$ ). Similarly, a person desiring less risk will need to accept lower returns. Putting this in the crop share and cash rent framework, it seems reasonable that a landowner would be willing to accept lower returns with cash rent than with crop share because of the lower risk (e.g., move from point A to point B). Likewise, because of the increased risk associated with cash rent, a producer would want a higher return than with crop share (e.g., move from

point B to point A). That means paying less with cash rent than with share rent. How much lower the cash rent might be will depend primarily upon the relative risk of the two options.

Producers should consider how much the variability in income (risk) might increase with cash renting compared to crop share renting.

### Comparing Tenant's Income from Crop Share vs. Cash Rent

To examine income variability from renting on a cash versus a crop share basis, 1987-1996 yield information was collected for farms in the north central (NC), southeast (SE), and southwest (SW) Kansas Farm Management Associations. Only farms having yields for wheat, milo and soybeans for each year were considered for NC and SE and only farms having wheat and irrigated corn yields each year were considered for SW. The number of farms considered were 24, 65 and 14 for NC, SE and SW, respectively. Representative farms were developed based on the average number of acres for all the farms considered. The representative farms had the following crops and acres:

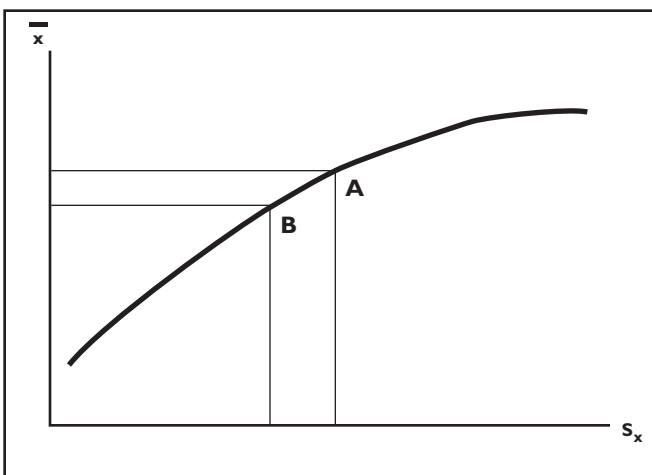
- NC — wheat (460), milo (211) and soybeans (141)
- SE — wheat (328), milo (243) and soybeans (374)
- SW — wheat (548), fallow (548) and irrigated corn (388)

Given the acreage mix of the representative farms and the actual yields of all farms considered, net income was calculated for each farm for each year using average county prices, an average government payment, and 1997 costs for the region (KSU Farm Management and Marketing Handbook). Because yields increase over time and this analysis is based on 1987-1996 actual yields, average returns over the 10-year period were normalized to zero by adjusting yields up proportionally (increase of approximately 10 percent in all regions). This normalization of returns is also consistent with the general assumption that average profits equal zero in the long run.

Equitable crop share arrangements were calculated and compared to those typical in the region (Lanagemeier, Albright and DeLano). The equitable crop share arrangements determined were  $1/3$  to  $2/3$  with the landowner sharing fertilizer, insecticide, irrigation, energy and herbicide costs on spring crops and the tenant paying all other operating expenses.

The tenant's returns were calculated for each year with the following rental arrangements:

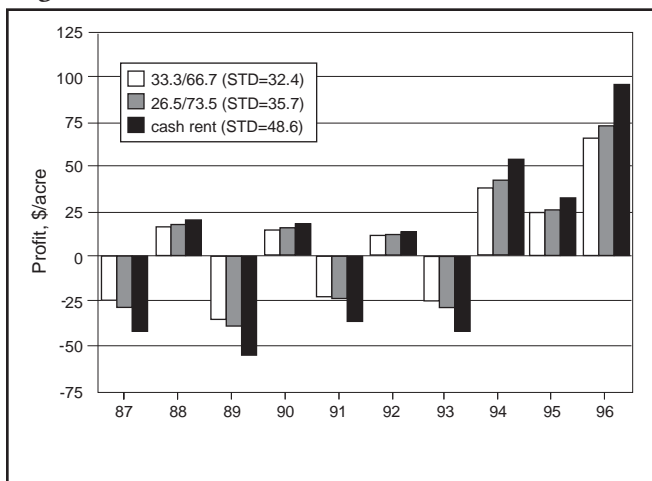
Figure 1.



(1) typical crop share; (2) cash rent equivalent; and (3) crop share with no shared inputs. The first method was the  $\frac{1}{3}$  to  $\frac{2}{3}$  arrangement discussed above. The second method was a fixed cash rent equivalent to the average net crop share returns of the landowner (landowner's  $\frac{1}{3}$  share of income less landowner's shared expenses). No risk adjustment was considered, as that would affect average returns but not income variability and so is not relevant for this analysis. The third method was an equitable arrangement where no inputs are shared by the landowner. With this method the tenant's share of the income was 73.5, 74.8 and 77.9 percent for NC, SE and SW, respectively. This third method was considered because it represents an arrangement that shares risk but allows landowners not to share associated input costs.

The analysis assumes that all acres are rented and that the producer does not make any changes in production (acres or costs) as the rental arrangement changes. Figure 2 shows the annual profit per acre to the tenant of one of the individual farms in NC Kansas for each of the three rental arrangements considered. The annual variability of profit is considerably greater with the cash rent than with either of the crop share rental arrangements; average profits are equal for all methods. As expected, the producer is better off with a cash rent in the good years but would prefer a crop share arrangement in the bad years. There were similar patterns for the farms in SE and SW Kansas.

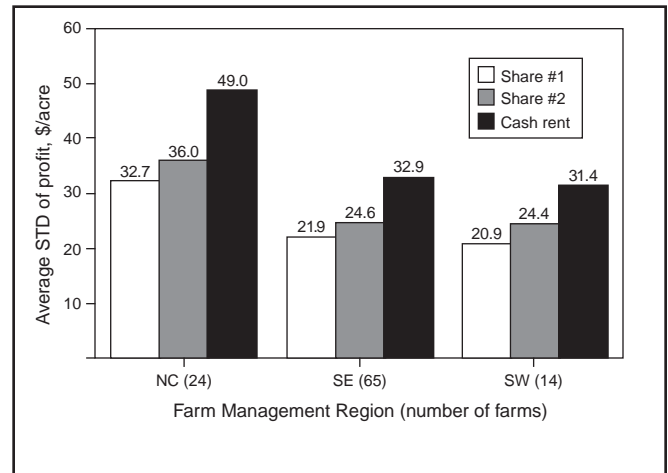
Figure 2.



The average variability of producer profit for the different rental arrangements for the different regions is shown in Fig. 3. In all regions, variability, as measured by the standard deviation of income, increased about 50 percent by going from an equitable crop share arrangement sharing some inputs to a cash rent. This indicates that the risk to producers is substantially greater with a cash rent than with the "typical"

crop share arrangement. The way to interpret a standard deviation is as follows: returns would be expected to fall in the range of the average (mean) plus or minus one standard deviation 68 percent of the time, and between the mean  $\pm$  two standard deviations 95 percent of the time. For example, in the NC region we would expect returns from a typical crop share arrangement to fall between  $-\$32.7$  and  $+\$32.7$  68 percent of the time, compared to  $-\$49$  and  $+\$49$  with a cash rent (the mean is zero for both methods because returns were normalized).

Figure 3.



If producers switched to an equitable crop share arrangement with the landowners sharing no expenses (share #2), income variability increased only 10 to 17 percent. Thus, if a landowner does not want to pay bills associated with the typical crop share arrangements, the producer may want to consider alternative crop share arrangements as opposed to switching to cash rents, unless there is an adequate "risk premium" factored into the cash rent.

### Risk Premium

A risk premium, or risk adjustment, represents a reduction in the cash rent relative to what is expected from a crop share arrangement, to account for the shift in risk from the landowner to the tenant. The amount of the risk adjustment is a function of an individual's aversion to risk as well as the income variability. Since an individual's aversion to risk is difficult to quantify, a recommended risk premium cannot be calculated. In Kansas, a risk adjustment of 5 to 10 percent is considered reasonable.

It should be pointed out that risk premiums may not always be observed (i.e., cash rents might be equal to or greater than crop share cash equivalents). This might be the case if there is concern about the producer's environmental stewardship, if the lease is short-term, or if the producer is not typical in some way. If a

landowner is concerned that a tenant will not maintain the quality of land with regard to fertility or weed control, the landowner may require a cash rent above what would be expected from a crop share arrangement. Producers wishing to spread fixed machinery and labor costs over more acres may bid cash rents up above an equilibrium long-term rate. However, because fixed costs will need to be paid in the long run, these higher cash rents can not be sustained over long periods of time. Producers with above average production abilities (i.e., higher yields) or cost efficiencies (i.e., lower costs) may bid cash rents up relative to what the average producer can pay over the long run. Thus, there are legitimate reasons why cash rent risk premiums may not be observed in all cases. However, the reasons listed are exceptions and do not necessarily represent what we expect to observe in the long run.

## References

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