

## **A Transaction Cost Economics and Property Rights Theory Approach to Farmland Lease Preferences**

LeeAnn E. Moss, Peter J. Barry, Gary D. Schnitkey,  
and Randall E. Westgren

**Selected Paper to be presented at the American Agricultural Economics  
Association Annual Meeting, August 5-8, 2001, Chicago, Illinois.**

*Copyright 2001 by L.E. Moss, P.J. Barry, G.D. Schnitkey and R.E. Westgren. All rights reserved.  
Readers may make verbatim copies of this document for non-commercial purposes by any  
means, provided that this copyright notice appears on all such copies.*

---

LeeAnn E. Moss is an assistant professor of agribusiness management in the Department of Agricultural, Environmental and Development Economics at The Ohio State University. Peter J. Barry is a distinguished professor of agricultural finance, Gary D. Schnitkey, is an associate professor, and Randall E. Westgren is an associate professor, all in the Department of Agricultural and Consumer Economics at the University of Illinois at Urbana-Champaign.

## **A Transaction Cost Economics and Property Rights Theory Approach to Farmland Lease Preferences**

Contractual choice in leasing arrangements for farmland is becoming increasingly important as a result of greater absentee ownership, expanded reliance on cash versus share leases, more extensive contracting opportunities for crop production, and new sources of risk and related risk management options for agricultural producers (Barry, Moss, Sotomayor, and Escalante). Numerous theoretical approaches to farm real estate leasing arrangements have been developed over time, with little consistent empirical support. Moreover, few demonstrate noteworthy explanatory power for the governance of landlord-tenant relationships in the U.S. Corn Belt.<sup>1</sup> This is critical void, in that more than 50 percent of U.S. corn and soybeans are produced in this region, and approximately 45 percent of Corn Belt land in farms is leased (USDA, NASS).

The lack of empirical support for existing models of contract choice, in combination with the institutional characteristics of Corn Belt agriculture and anecdotal evidence from the industry, suggest the exploration of a new paradigm. Dasgupta, Knight and Love provide a detailed survey of the evolution of leasing models in agriculture. Empirical testing of models relating to U.S. agriculture is limited and has provided mixed evidence. Recent conceptual contributions (Allen and Lueck) question the validity of the prototypical principal-agent model and the risk-sharing motivation for share leasing, and use elements of transaction cost economics to explain the choice between cropshare and cash rent contracts.

Characteristics of row-crop agriculture in the Corn Belt further limit the applicability of traditional models that have addressed issues such as incentives, costs of contract enforcement, shirking,

non-optimal input use, and monitoring costs. Contractual issues such as enforcement, good husbandry, and shirking/fraud are denominated or determined both by statute and a notable accumulation of common law. Incentives are aligned between contracting parties because of the threat of punishment through the loss of future opportunities for trade (i.e., the farmer's security of tenure). Farm real estate leasing contracts appear to meet conditions for effective market self-enforcement through reputation. Producers are permanent members of stable agricultural communities, where these reputations are well known and where lessee and lessor often reside in the same community or have ex ante social capital (Allen and Lueck 1992; Bierlen, Parsch, and Dixon).

Anecdotal and industry evidence reveals leasing trends with important conceptual implications stemming from property rights issues. A 1998 survey of professional farm managers in Illinois indicated that 42.2 percent of respondents reported significant, and 50.8 percent reported modest, increases in the level of cash leasing in their market areas (Barry, Sotomayor and Moss). Landlords and tenants identified avoidance of management sharing and ease of use as motivating factors. Notably, this trend is occurring despite increasing farmland values and associated per acre cash rents (USDA, NASS). Anecdotal evidence suggests that the cash lease is increasingly attractive to farmer-lessees because it provides managerial autonomy and ensures that residual returns to the farmer's management accrue to him and are not shared with the landlord.

The importance of transaction costs and property rights issues as drivers of leasing choice suggests the exploration of an alternative leasing model grounded in organizational economics. However, these issues are not well analyzed and defy measurement in conventional ways using secondary data. An analytical approach is needed that focuses on these variables, produces testable

hypotheses, and is capable of generating data for empirical analysis. As such, the goals of this study are to develop a conceptual approach to explain Corn Belt producers' farm real estate leasing preferences, uniquely integrating elements of transaction cost economics and property rights theory with producer characteristics, and to test it empirically using newly-generated primary micro-analytic data in an experimental design approach. The research considers the producer side of the relationship only, since industry evidence suggests that producer preferences are evolving while landlord preferences and characteristics are reasonably well documented (e.g., Rogers).

The remainder of the paper is organized as follows. First, a model of lease preferences with testable hypotheses are introduced. Next, the experimental design, data generation approach, and analysis are described. The research results are presented in three parts - descriptive statistics of farmer and farm business characteristics, the results of the analysis of variance of the treatment effects, and the regression results for models representing both explicit and implicit indicators of lease preferences. The paper closes with concluding comments.

### **Model Development and Testable Hypotheses**

Transaction cost economics provides a valuable framework for studying relationships between the features of the transaction and the type and extent of the structures that govern them. Transactions with different attributes are assigned to governance structures in a transaction cost economizing way (Williamson). Transaction costs relating to Corn Belt farmers' leasing preferences include lessor-lessee relationship uncertainty. Lessees may fear that that landlord will act opportunistically when governed by a leasing contract that is by nature incomplete. Under share leases in particular, there are also relationship costs associated with landlords' monitoring activities and involvement in production-related

decisions. Transactions costs in row crop agriculture are also not dominated by asset specificity – land, equipment, and human capital suitable for production are widely available with limited opportunity for hold-up.

But as Barzel suggests, though means of analyzing economic behavior do not necessarily assume that transaction costs are zero, they do not explore the exact nature of the property rights of the respective parties. This inquiry is important for leasing preferences because of the nature of farm real estate. Specifically, the law defines real property, such as farmland, as a bundle of rights (Galaty, Allaway and Kyle). Economists concur -- it is not the resource itself that is owned but the rights bundle or a portion of the rights to use that resource (e.g., Alchian and Demsetz). As such, property rights are a principle for exclusion, for the distribution of income and costs, and for transferring these rights (Cantor, Henry, and Rayner).

Choices among means of controlling the farmland resource can be viewed as a continuum (Figure 1), paralleling the output marketing governance decision. Discrete or spot market transactions are at one extreme, with a highly centralized or hierarchical organization at the other. Hybrid or contracting relationships are common and are situated centrally (Williamson). As one moves from spot marketing to vertical integration, the degree of managerial autonomy changes. With respect to farm real estate control choices, the custom or fixed wage contract for labor and field operations conveys no bona fide control or possessory rights from lessee to lessor. (As such, it is not considered in this study.) On the other end of the continuum, fee simple equity ownership provides for enjoyment of the full bundle of rights, including complete managerial control.

Most farmers combine ownership and leasing of farmland. Leasehold interests (i.e., the

farmer's real property interest created by the lease contract) partition or alienate real property rights in different ways, depending on lease type and terms. In addition to differences in the allocation of income, expenses, and production or price risk, responsibility for and benefits from the managerial input also differ among leases. All are shared under the cropshare lease, in proportions that vary depending on custom, region, and crop or land type. Under a cash lease, the farmer assumes the full responsibility for production-related income and expenses, and gains freedom from the burden of shared management with the landlord (Reiss). The farmer provides all of the entrepreneurial input and receives all of the residual profit, whereas the landlord shares in these benefits with cropshare governance. Accordingly, the potential for transaction costs varies between lease types, depending upon the nature or extent of the lessee-lessor interface.

The theoretical framework addresses the specific effects of the experimental treatment variables related to transactional characteristics. The farmer's total profit derived from the farmland to be leased is represented as follows:

$$(1) \quad \mathbf{p} = \mathbf{a} \mathbf{q} R - (1 - \mathbf{a})t - \mathbf{d}$$

Where  $\mathbf{p}$  represents the farmer's profit,  $\mathbf{a}$  the input/output and decision-making sharing rate ( $\mathbf{a} = 1$  for a cash lease,  $\mathbf{a} = 0.5$  for a 50-50 cropshare lease),  $\mathbf{q}$  a production uncertainty factor (e.g., weather)  $\sim (1, \mathbf{s}^2)$ ,  $R$  the net returns from crop production ( $R$  where there exist no returns to the farmer's superior management, and  $R_m$  where they do), and  $t$  represents transaction costs resulting from the landlord-tenant relationship ( $t = 0$  in the low transaction cost case,  $t = 1$  for high). Finally,  $\mathbf{d}$  is the fixed cash payment to the landlord represented by  $\mathbf{d}_c$  for the cash and  $\mathbf{d}_h$  for the hybrid lease, where  $\mathbf{d}_c > \mathbf{d}_h$ , and  $\mathbf{d} = 0$  for cropshare. Producer preferences are revealed by the

lease choice that provides the highest expected utility.

Now consider the theoretical lease preferences under four experimental cases, based on different combinations of the transaction costs (TC) and potential returns to management (MR) treatment variables, expressed as a comparison of utility relationships:

**A. Low TC and Low MR:** We expect the cropshare lease to be preferred in the case where  $t = 0$  and net returns from crop production are average ( $R$ ). In the context of the main treatment effects, the expected utility of profit from the share lease should exceed that received from the cash in order for it to be preferred. In other words,  $\hat{V}_s > \hat{V}_c \Rightarrow 0.5q R > 1q R - d$ . This relationship holds for risk averse farmers due to the nature of the fixed cash payment obligation. Though the magnitude of  $d$  may in fact approximate  $0.5q R$ , a risk averse farmer may derive greater utility from  $0.5q R$ . (For risk neutral farmers,  $0.5q R = 1q R - d$ .)

**B. High TC and High MR:** We expect the cash lease to be preferred when  $t = 1$  and additional returns to the lessee's management are available, represented by  $R_m$ , where  $R_m > R$ . The cash lease may be preferred when  $\hat{V}_c > \hat{V}_s$ . Now,  $\hat{V}_c > \hat{V}_s \Rightarrow 1q R_m - d > 0.5q R_m - 0.5t \Rightarrow 0.5q R_m > d - 0.5t$ .

**C. High TC and Low MR:** We expect the hybrid lease to be the preferred alternative, where  $t = 1$  and net returns from crop production offer no opportunity for additional returns to the farmer's management input ( $R$ ). (Recall that the contracting parties do not interface in decision making with the hybrid lease.)

For the farmer to prefer the hybrid to the cropshare lease,  $\hat{V}_h > \hat{V}_s \Rightarrow 0.5q R - d_h > 0.5q R - 0.5t$ . This relationship depends on the utility associated with paying the supplemental rent as a

management exclusion mechanism.

**D. Low TC and High MR:** Farmers may prefer the hybrid lease in the case where  $t = 0$  and net returns from crop production are  $R_m$ , where  $R_m > R$ . For the hybrid to be preferred to the cash lease,  $\hat{V}_h > \hat{V}_c \Rightarrow 0.5qR_m - d_h > 0.5qR_m - d_c$ . This relationship holds in that  $d_h < d_c$ . The magnitude of the supplemental payment for the hybrid is smaller than the fixed payment associated with the cash lease, and it is assumed that the utility associated with any fixed cash payment varies inversely with the magnitude of that payment.

The research hypotheses tested in the experimental design relate to both (i) the main and interaction effects of the experimental factors derived from transaction cost economics and property rights theory presented in the model, and (ii) those producer characteristics posited to influence farmers' lease preferences:

Hypothesis 1: With low levels of both TC and MR expected in the leasing situation, the cropshare lease will be the preferred form of governing the landlord-tenant relationship. With high levels, the cash lease will be preferred by the farmer.

Hypothesis 2: With low TC and high MR, or with high TC and low MR, a hybrid form of governing the landlord-tenant relationship will be preferred.

The remaining four hypotheses explore the relationship between farmer characteristics and the preferred lease.

Hypothesis 3: The greater the producer's management/entrepreneurial ability, the greater the preference for the cash lease. A farm size proxy is used (Brown and Atkinson).

Hypothesis 4: Another important producer characteristic is financial strength. The cash lease



can introduce significant financial risk when business risks from commodity price and yield variations are high (Barry, Ellinger, Hopkin, and Baker). Farmers with higher debt-to-asset ratios are expected to prefer a cropshare lease.

Hypothesis 5: Producer preferences may also be influenced by ex ante attitudes or biases toward lease types. The more positive the farmer's general attitude toward a lease type, the greater his preference for it. Attitudes may mitigate or exacerbate the effects of transaction attributes, and are represented by Likert ratings of existing preferences toward cash leasing.

Hypothesis 6: The more risk averse the producer, the greater the preference for the cropshare lease because of its risk-sharing attributes. Due to the perfect correlation between crop returns and the farmer's rental obligation to the lessor, share leases are highly efficient risk management tools (Barry, Ellinger, Hopkin, and Baker).

These research hypotheses are tested empirically using data generated from farmers who responded to a representation of actual decision situations.

### **Experimental Design and Analysis**

Since little if any historical data exist regarding evolving drivers of leasing preferences, new primary micro-analytic data were obtained from a panel of Illinois row crop producers in an experimental design framework. The research hypotheses are translated into a set of four simulated treatments or cases for empirical testing with a panel of 61 farmers in a workshop setting in August of 1999 sponsored by the Department of Agricultural and Consumer Economics at the University of Illinois at Urbana-Champaign. Participants were presented with four simulated case decision situations to elicit explicit and implicit indicators of lease preferences.

The experimental design approach allows for a degree of precision in controlling those variables expected to influence behavior not available through alternate methodologies. As such, this approach has been widely applied in the behavioral sciences and is increasingly used in economics. Examples include contingent valuation in recreation analysis, lender credit responses to farmers' management characteristics, and the valuation of food safety (Boyle and Bishop; Barry, Baker and Sanint; Eom). A two-factor repeated-measures design is used in this research, which provides increased sensitivity in detecting treatment effects and lower experimental error than alternate designs (Keppel). The experiment explores two factors or treatment variables: (i) relationship uncertainty and other transaction costs, and (ii) potential returns to management.

Two levels for each factor, high and low, are distinguished in four simulated case situations. In the low transaction costs situation, the farmer has evidence that the landowner is non-opportunistic and requires minimal reporting from the farmer during the lease term. In contrast, high transaction costs are characterized by the farmer having evidence that his potential landlord is opportunistic, will require excessive reporting, and has certain production requirements (e.g., choice of hybrids, herbicide application method, approval of field operations). The potential returns to management (MR) treatment variable, reflecting property rights considerations, is characterized by the crops to be grown on the leased acreage. In the low MR case, the crops are those customarily grown in the Corn Belt (#2 yellow corn and #1 yellow soybeans, forward contracted for fall delivery). For high MR, a value-added corn hybrid is to be grown under contract with a processor. Contract terms include a significant per bushel premium, though superior production management by the producer will be necessary in order to meet delivery and quality specifications. (See Moss for a full case description.)

The case questionnaire elicited three types of information from participants: (i) lease preferences, (ii) farm operator characteristics, and (iii) a risk attitude assessment. Each case was prefaced by the presentation of general facts (e.g., characteristics of the farmland asset, landlord, lease, and commodity markets) to reduce the influence of nuisance variables. The lease types are empirical realities in the Corn Belt, and are characterized as follows:

- A. Cropshare Lease: Leasing parties share equally in income, expenses, and management.
- B. Hybrid Lease (modified cropshare): Landlord and tenant share equally in income and expenses. However, the landlord agrees to exclude herself from production management for which the tenant pays a supplemental cash payment of \$20 per acre.
- C. Cash Lease: The tenant pays a fixed rent of \$130 per acre to the landlord, who will have no involvement in production management decisions.

In each decision situation, farmers express their lease preferences by ranking the contracts offered from most to least preferred. Next, they bid for the tenancy in dollars per acre for each lease type. Bidders were given wide behavioral latitude, including the option of not bidding, bidding a zero dollar premium (i.e., supplemental rent) for the cropshare and hybrid leases, or bidding a lower cash rent. Risk attitudes were assessed through a Likert scale rating of their use of various risk management tools, from which a risk aversion score is developed (Bard and Barry). Several iterations of the experiment were pretested and subjected to expert validation by academics and industry experts. The treatments were digram-balanced to address practice effects, and differential carryover effects were mitigated by allowing sufficient time between cases (Keppel).

Statistical methods and testing procedures for experimental designs are well reported in the

literature. Accordingly, analysis of variance (ANOVA) is used to investigate the treatment effects (Hypotheses 1 and 2). The linear model underlying the ANOVA is specified as:

$$(3) \quad Y_{ijk} = \mathbf{m}_T + \mathbf{a}_i + \mathbf{p}_k + \mathbf{b}_j + (\mathbf{a} \mathbf{b})_{ij} + (\mathbf{b} \mathbf{p})_{jk} + \mathbf{e}_{ijk}$$

Where  $\mathbf{m}_T$  is the overall population mean,  $\mathbf{a}_i$  is the treatment effect at level  $i$ ,  $\mathbf{p}_k$  is the average effect for each subject,  $(\mathbf{a} \mathbf{b})_{ij}$  represents the interaction of treatment and subject,  $(\mathbf{b} \mathbf{p})_{jk}$  is the interaction of treatment and subject,  $\mathbf{e}_{ijk}$  is the experimental error, and  $i, j,$  and  $k$  are the levels of factors 1, 2 and the experimental subjects. Underlying assumptions include constant variance and covariance of responses, independence of treatment observations from different subjects, and normally distributed responses (Keppel).

Regression techniques are used to expand the analysis to include individual farmer or farm business characteristics, in that both transaction and farmer characteristics are thought to influence preferences. Though few in number, empirical studies investigating the choice among cash and share leasing in the U.S. have suggested hypotheses relating to social capital (Gwilliam), managerial or entrepreneurial ability (Brown and Atkinson), efficiency (Heady and Kohlberg), and transaction costs (Allen and Lueck; Datta, O'Hara and Nugent). Bierlen and Parsch suggest a qualitative choice model based on random utility maximization where farmers' preferences for lease type are driven by lease, farmer, landlord, and land characteristics. The empirical specification model used in this paper is expanded to include institutional characteristics of Corn Belt row-crop production and a unique focus on transaction costs and property rights considerations. A variety of regression models are applicable to discrete or limited dependent variables (Liao). The conceptual form of this model is represented as:

$$(4) \quad \text{PREF} = f(\text{TC}, \text{MR}, \text{DAR}, \text{ENTRE}, \text{ATT}, \text{RISK})$$

PREF is the dependent variable representing the farmer's lease preference. Transactional characteristics surrounding the leasing situation are represented by transaction costs (TC) and potential returns to the farmer's managerial input (MR). Farmer characteristics include debt-to-asset ratio (DAR), managerial/entrepreneurial ability (ENTRE), attitude toward cash leasing (ATT), and risk aversion (RISK). Results of binary logit models of lease rankings and bidding behavior are presented in this paper.

## **Results and Discussion**

### ***Descriptive Statistics***

Participating farmers demonstrate a variety of experience with multiple farms, landlords, and lease types. As such, they appear well suited for participation in this experiment. Producers farm an average of 8.08 tracts and associate with 5.63 landlords. On average, 59.51 percent of their total land leased is rented on a cropshare basis and 28.12 percent on a fixed cash rent basis. Hybrid lease types accounted for 7.85 percent of total leased acres, while the remaining 4.52 percent consists of other agreements. Compared to other published data (USDA Census of Agriculture; Ellinger, Escalante, Barry and Raab), participants are relatively young (mean age of 47.87 years) and operate larger farms (1,394.02 cropland acres). They have average tenure ratios (22.90 percent) close to the average for Illinois farmers. They have average to somewhat below average debt-to-asset ratios -- in fact, 39.34 percent have ratios less than 0.30. The self-selected group reflects the larger end of the commercial scale farmer in Illinois with respect to tenure, financial structure, and farm size.

Table 1 presents summary statistics for lease rankings and bidding behavior (Table 1). Farmers

revealed explicit preferences by ranking leases from 1 to 3, where 1 is most preferred, in each of the four cases. As expected, the cropshare lease was preferred in Case 1 while the cash alternative is preferred in Case 4, suggesting initial support for Hypothesis 1. The interaction effects (Hypothesis 2) are more ambiguous. A by-column reading indicates that the hybrid lease is not preferred in Cases 2 and 3 as was anticipated. However, a by row reading indicates that the hybrid is clearly preferred across treatments in Case 2.<sup>2</sup> Per acre bids are consistently higher in the high potential returns to management (HMR) cases, which may reflect a strictly return-related behavior. As anticipated, transaction costs and farmers' cropshare bids vary inversely, and potential returns to management and cash bids vary directly. Virtually all farmers bid for the tenancy based on the cash lease, though non-bidding behavior for the cropshare lease is intriguing. When transaction costs increase, ceteris paribus, the number of cropshare non-bidders increases significantly. Few farmers wish to interface in decision making with a landlord they expect to be difficult or opportunistic.<sup>3</sup>

### ***ANOVA Results***

Table 2 reports the ANOVA results for both explicit and implicit indicators of lease preferences. The transaction costs treatment variable is highly significant in influencing rankings over all lease types. Multivariate results (not reported here; see Moss) provide additional support for the dominance of the transaction costs factor on producer preferences. Participants' bids are analyzed as absolute dollar per acre bids and as bids relative to a reference bid. The results for bidding behavior demonstrate that the management returns treatment variable is significant at the 1 percent level for the cash and cropshare leases and at 5 percent for the hybrid. However, the reason for or direction of this effect remains unclear. Note that the comparison of the absolute and relative bid models is only relevant

for the cash lease, and both models provide consistent conclusions. This is expected for the cash lease, since a reference or “market” cash rent is provided to the experimental subjects. The transaction costs factor is also a significant source of bidding variation, but for the cropshare lease only. These results demonstrate the consistent importance of transaction costs considerations in influencing producers’ explicit preferences, yet suggests that the precise nature of the treatment effects for bidding behavior cannot be precisely revealed through ANOVA alone.

### ***Regression Results***

The regression variables and their anticipated signs are described in Table 3. Table 4 presents the results of the binary logit model of lease rankings. Rankings were characterized as binary variables, with a ranking of one assigned to the producer’s preferred lease.<sup>4</sup> Consistent with the ANOVA, transaction costs are important explanatory variables for explicit lease preferences. With an increase in the TC factor from low to high, the probability of the cropshare lease being preferred is reduced by a factor of 0.425, while the probability that the fixed cash lease is preferred increases by a factor of 0.310. The probability that the hybrid contract is chosen when transaction costs increase also rises, as anticipated, in that this lease type precludes joint decision making. Though not significant, the direction of the marginal effect relating to the MR factor also supports the related research hypothesis for the cash and share leases.

Most producer characteristics do not appear to significantly nor consistently influence rankings. Though farmers with higher debt-to-asset ratios are more likely to prefer the risk reducing effects of the cropshare or hybrid lease, this effect is not significant. The influences of both management ability and risk aversion are ambiguous. In particular, it remains unclear why risk attitude would significantly

influence hybrid but not cropshare lease preferences. Producers' ex ante attitudes toward lease types do matter. For a unit increase in the Likert rating representing cash lease attitude (meaning that the cash lease type is liked less by the participant), the odds of preferring leases characterized by shared input/output with the landlord are significantly increased. The odds of choosing the cash lease decrease by a greater magnitude, as anticipated.

The log likelihood statistic demonstrates that the rankings model is significantly different than its null or intercept-only counterpart, based on the Chi-squared tests and their significance. Without undue emphasis, the model is a reasonably accurate predictor of explicit preferences, particularly for landlord-tenant relationships governed by cash and cropshare leases.

Results of the binary logit model of relative bidding behavior are provided in Table 5. As predicted by the ANOVA, participating farmers are motivated by both treatment variables though in different ways. They were less apt to bid aggressively for the tenancy governed by a share lease with the expectation of a friction-ridden relationship with their landlord. Though the sign of the marginal effect for the cash lease is also negative (and different from the hybrid lease, yet both preclude landlord-tenant interface in decision making), it is not significant.

The crux of the property rights argument lies in the comparison of the management returns experimental factor in the hybrid and cash lease models. Theory suggests that the lessee may wish to exclude the lessor from input-output sharing in order to claim returns to the lessee's additional/superior management input required for the value-added crop grown. Recall also that the landlord is not involved in decision making with either the fixed cash or hybrid relationships. However, like the cropshare lease, both parties to the hybrid contract continue to share returns. Any difference in bidding



behavior between the cash and hybrid leases, thus, represents the farmer's desire to exclude the landlord from sharing in the benefits of any additional returns generated directly by the farmer. The marginal effects reveal that, while management returns do not significantly affect relative bidding behavior for the hybrid, they are a significant motivator for the probability of bidding above the reference bid for the cash lease.<sup>5</sup>

Producer characteristics are also important explanatory variables in this implicit preference model. As anticipated, debt-to-asset ratio exhibits a significant positive influence on the probability of bidding on lease types where the rental obligation to the landlord is correlated with crop output, and a negative though insignificant influence for the cash lease. However, the directional effects of management ability are the opposite of those predicted. Moreover, they are inconsistent with the rankings model results. Farmers with greater management ability appear to bid more aggressively for the cropshare tenancy, though they do not necessarily rank the lease types differently. This leads one to question the adequacy of the farm size proxy. With structural changes in agriculture leading to a bimodal or tri modal distribution of farms, superior managers with different business strategies may in fact be found across all farm sizes (Porter).

Producer attitudes are less powerful predictors of bidding behavior or implicit preferences than of explicit preferences or rankings. This makes intuitive sense for two reasons. First, participants can alter the terms of trade in the bidding model, while per acre rents are specified in the rankings model. Second, producer attitudes may be reflected more strongly in non-bidding behavior for the share and hybrid leases (recall Table 1), while “non-ranking” behavior was not observed. This result reinforces the importance of considering both explicit and implicit indicators of economic behavior, both in farm

real estate lease pricing models, and more generally in constructing experiments or developing other research methodologies.

The marginal effect for risk aversion is positive for all lease types, and is significant for both the cash and share contracts. More risk averse farmers bid more aggressively for both cash and share leases. Combined with the ambiguity demonstrated in the rankings model and consistent with the literature, these results suggest a lack of explanatory power of risk in lease preferences.

Model statistics indicate that both the cropshare and cash lease models can explain farmers preferences for leases, as revealed by their willingness to bid for the respective tenancies based on each lease type. Bidding behavior is complex, however, and is motivated by a variety of factors.

### **Conclusions**

The results of this study provide support for a combined transaction cost economics and property rights theory approach to producers' farm real estate lease preferences. The research expands upon earlier work relating to the role of transaction costs in a manner consistent with the characteristics of Corn Belt agriculture. Transaction cost economics maintains that contractual variety is explained by underlying differences in the attributes of transactions, and that efficiency-related issues are addressed through aligning governance structures to these attributes in a discriminating way. Farmers appear to do so, subject to their attitudes toward the various lease types. This study further demonstrates how terms of trade are significantly influenced by real property rights, which allocate benefits and control between the contracting parties. The legal and valuation professions in particular have long recognized how the alienation or partitioning of real property rights can influence both farmland values and lease pricing.

Moreover, the results stress the importance of a leasing model that considers both transaction-related and farmer characteristics in explaining farmers' preferred means of governing the landlord-tenant relationship. Ex ante attitudes toward cropshare and cash leasing can influence behavior, despite the attributes of the transaction. Management ability is not a consistent source of variation, at least based on the proxy used. An opportunity exists for researchers to develop a more robust indicator of managerial ability than age, education, or farm size proxies. Debt-to-asset ratio does provide some explanation of implicit preferences. Consistent with the literature, more highly leveraged farmers bid more aggressively to obtain a cropshare contract. This study adds to the mixed evidence regarding the risk sharing motivation for share leasing.

Several limitations warrant discussion. The study focuses on farmer or lessee preferences alone. Though the farmer focus was motivated by the lack of previous work addressing producer preferences, an extension of similar experimental research to landlord preferences would be interesting. These results will provide an important foundation toward developing a comprehensive model of the landlord-tenant relationship within this new paradigm. Although these results likely apply to row crop producers in other areas, an extension of similar studies to a broader sample of farm types and production regions would be valuable. Lack of familiarity with or bias against hybrid leases may prove less an issue in other regions less dominated by the traditional 50-50 cropshare relationship.

Finally, this study reinforces the value of an experimental approach to generate new, primary, micro-analytic data regarding drivers of economic behavior, particularly for research questions where secondary data provides little consistent empirical support.



**Table 1. Summary Statistics for Lease Rankings and Bidding Behavior**

	<b>CASE 1</b>		<b>CASE 2</b>		<b>CASE 3</b>		<b>CASE 4</b>	
	Low TC Low MR		High TC Low MR		Low TC High MR		High TC High MR	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<b>Rankings</b>								
Cropshare	1.41	0.69	2.21	0.84	1.54	0.72	2.23	0.78
Hybrid	2.49	0.60	2.15	0.70	2.56	0.62	2.26	0.75
Cash	2.10	0.77	1.64	0.80	1.90	0.77	1.51	0.70
<b>Bids (\$/Acre)</b>								
Cropshare	8.13 (13)	7.90	4.39 (20)	7.09	13.94 (8)	9.51	6.67 (16)	9.05
Hybrid	13.88 (12)	9.75	13.75 (13)	7.89	16.11 (7)	9.79	16.37 (9)	9.75
Cash	139.91 (3)	12.44	138.31 (2)	13.15	146.12 (3)	13.35	144.66 (3)	13.79

Note: TC refers to the transaction costs and MR to the potential returns to management treatment variables. The number of non-bidders is in parentheses.

**Table 2. ANOVA Results for Lease Rankings and Bidding Behavior**

		Ranking	Absolute Bid	Relative Bid
Source of Variation		Value of F-Statistic	Value of F-Statistic	Value of F-Statistic
Cropshare	TC	58.633*** (0.000)	20.112*** (0.000)	--
	MR	0.574 (0.450)	11.240*** (0.001)	--
	Interaction	0.347 (0.556)	1.486 (0.224)	--
Hybrid	TC	13.882*** (0.000)	0.010 (0.922)	--
	MR	1.104 (0.294)	3.899** (0.050)	--
	Interaction	0.082 (0.775)	0.084 (0.773)	--
Cash	TC	19.255*** (0.000)	0.819 (0.336)	0.910 (0.341)
	MR	2.848* (0.09)	13.196*** (0.000)	13.534*** (0.000)
	Interaction	0.114 (0.74)	0.002 (0.967)	0.008 (0.928)

Notes: Asterisks indicate significance at the 10%(\*), 5%(\*\*), and 1%(\*\*\*) levels. There is no difference between the absolute and relative bids for the cropshare or hybrid lease, since the “reference” bid is \$0/acre. The cash bid is relative to the “market” rent of \$130/acre.

**Table 3. Regression Variables and Expected Signs**

---

Variable	Description	Expected Sign (Cropshare/Hybrid/Cash)
PREF	Dependent variable representation of lease preferences. Coded as 1 if preferred, 0 if not (rankings model); 1 if producer bid above the reference bid, 0 if at or below (bidding model).	N/A
TC	Transaction costs treatment variable. Value of 0 if low, 1 if high.	- / + / +
MR	Potential returns to management treatment variable. Value of 0 if low, 1 if high.	- / - / +
DAR	Producer's categorical debt-to-asset ratio: 1 if <0.15, 2 if 0.15-0.29, 3 if 0.30-0.49, 4 if 0.50-0.74, 5 if 0.75 to 1, and 6 if >1.	+ / + / -
ENTRE	Producer's management/entrepreneurial ability. Farm size proxy (acres farmed/160).	- / - / +
ATTIT	Producer's categorical representation of his attitude toward cash leasing: 1 if preferred, 2 if neutral, and 3 if disliked.	+ / + / -
RISK	Producer's risk aversion score (maximum 50).	+ / + / -

---

**Table 4. Lease Rankings: Binary Logit Model**

Variable	Cropshare		Hybrid		Cash		Mean of X
	Marginal Effect (on Prob[Y=1])	S.E.	Marginal Effect (on Prob[Y=1])	S.E.	Marginal Effect (on Prob[Y=1])	S.E.	
Constant	0.172 (0.445)	0.387	-0.134 (-0.731)	0.184	-0.318 (-0.832)	0.383	---
TC	-0.425*** (-5.778)	0.074	0.096*** (2.825)	0.034	0.310*** (4.259)	0.073	1.500
MR	-0.106 (-1.463)	0.072	0.007 (0.216)	0.033	0.094 (1.309)	0.072	1.500
DAR	0.009 (0.364)	0.025	0.008 (0.796)	0.104	-0.029 (-1.114)	0.026	2.879
ENTRE	0.001 (0.061)	0.000	-0.003 (-0.696)	0.000	0.003 (0.350)	0.000	8.680
ATTIT	0.144** (3.233)	0.046	0.042** (2.209)	0.019	-0.215*** (-4.497)	0.048	2.379
RISK	0.005 (0.562)	0.008	-0.008** (-2.068)	0.004	0.006 (0.696)	0.008	38.172
N	232		232		232		
Log L	-135.028		-73.104		-136.215		
Chi-Squared	48.176***		20.668***		-46.271***		
Correct Predict.	71%		52%		77%		

Notes: Rank responses are coded as binary variables indicating if the lease is preferred or not for each treatment. Asterisks indicate significance at the 10%(\*), 5%(\*\*), and 1% (\*\*\*) levels. Figures in parentheses are t-statistics.



**Table 5. Relative Bids: Binary Logit Model**

Variable	Cropshare		Hybrid		Cash		Mean of X
	Marginal Effect (on Prob[Y=1])	S.E.	Marginal Effect (on Prob[Y=1])	S.E.	Marginal Effect (on Prob[Y=1])	S.E.	
Constant	-0.847* (-1.896)	0.447	-0.366 (-2.014)	0.182	-1.540*** (-4.251)	0.362	---
TC	-0.321*** (-3.828)	0.084	0.034 (0.895)	0.038	0.573 (0.911)	0.063	1.492
MR	0.187** (2.248)	0.083	0.027 (0.703)	0.038	0.259*** (4.064)	0.064	1.524
DAR	0.071** (2.464)	0.029	0.031** (2.099)	0.015	-0.003 (-0.139)	0.021	2.794
ENTRE	0.016* (1.688)	0.000	0.000 (0.042)	0.000	-0.001 (-0.063)	0.001	8.700
ATTIT	0.015 (0.275)	0.054	0.069** (2.464)	0.028	-0.053 (-1.407)	0.038	2.344
RISK	0.019** (2.048)	0.009	0.006 (1.434)	0.004	0.004*** (5.287)	0.008	38.556
N	176		189		221		
Log L	-103.650		-61.644		-109.695		
Chi-Squared	33.931***		12.677**		53.430***		
Correct Predict.	79%		50%		88%		

Notes: Asterisks indicate significance at the 10%(\*), 5%\*\*), and 1% (\*\*\*) levels. Figures in parentheses are t-statistics. Y=1 if participant bid above the reference bid, Y=0 if at or below. The reference bid is \$0/acre for the cropshare and hybrid leases, and \$130/acre for the cash. Mean values reflect the hybrid lease.

## Footnotes

<sup>1</sup> Defined by the USDA National Agricultural Statistics Service as IL, IN, IA, MO and OH.

<sup>2</sup> Mixed support for the interaction effects may reflect a negative bias toward hybrid leases.

Several respondents' comments suggested a negative view of (or a lack of experience with) lease modifications away from traditional cropshare (i.e., share plus supplemental rent) and fixed cash leases. Moreover, the magnitude of the supplemental rent itself, however judiciously determined, may have influenced rankings.

<sup>3</sup> Approximately 21 percent of farmers chose not to bid based on a cropshare lease Case 1.

Several participant comments indicated that they preferred not to bid on the 50-50 cropshare lease because it destroys the equality of the contract. Recall that farmers also had the option of expressing their preference for that lease type, though bidding nothing additional (i.e., \$0/acre) to secure it, and readily did so with the alternate leases. This inconsistency may relate to the traditional perception of a cropshare relationship, one based fundamentally on fairness, trust, and equality among lessee and lessor (Reiss).

<sup>4</sup> Though not reported, results of a multinomial logit model of actual rankings produced similar marginal effects, though goodness of fit and predictive accuracy (particularly for the hybrid and cash leases) was poorer. Though both probit and logit models provide the same conclusions in most applications, logit models are more appropriate when a heavy concentration of observations fall in the tails of the distribution. Few farmers preferred the hybrid.

<sup>5</sup> Producer comments reveal that the positive significant effect for the cropshare lease reflects a return motivation, and as such it is not important to the research questions considered.

## References

- Alchian, A., and H. Demsetz. "The Property Rights Paradigm." *J. Econ. Hist.* 33(1973): 16-27.
- Allen, D.W., and D. Lueck. "Contract Choice in Modern Agriculture: Cash Rent versus Cropshare." *J. of Law and Econ.* 35(October 1992): 397-426.
- Allen, D.W., and D. Lueck, "Transaction costs and the Design of Cropshare Contracts." *RAND J. of Econ.* 24(Spring 1993): 78-100.
- Bard, S.K., and P.J. Barry. "Developing a Scale for Assessing Farmers' Risk Attitudes." *Working Paper*, The Center for Farm and Rural Business Finance, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, 1999.
- Barry, P.J., C.B. Baker, and L.R. Sanint. "Farmers' Credit Risks and Liquidity Management." *Amer. J. Agric. Econ.* 63(1981): 216-27.
- Barry, P.J., P.N. Ellinger, C.B. Baker, and J.A. Hopkin. *Financial Management in Agriculture*, 6<sup>th</sup> ed., Interstate Publishers, Danville, IL, 2000.
- Barry, P.J., L.E. Moss, N.L. Sotomayor, and C.L. Escalante. "Lease Pricing for Farm Real Estate." *Rev. of Agric. Econ.* 22(Spring/Summer 2000): 2-16.
- Barry, P.J., N.L. Sotomayor, and L.E. Moss. "Professional Farm Managers' Views on Leasing Contracts and Land Control: An Illinois Perspective." *J. Amer. Soc. Farm Managers and Rural Appraisers* 1998-99: 15-19.
- Barzel, Y. *Economic Analysis of Property Rights*. Cambridge, MA: Cambridge Univ. Press, 1997.
- Bierlen, R., and L.D. Parsch. "Tenant Satisfaction with Land Leases." *Rev. of Agric. Econ.*, 18(1996): 505-13.

- Bierlen, R., L.D. Parsch, B. Dixon, and B.L. Dixon. "How Cropland Type and Term Decisions are Made: Evidence from an Arkansas Tenant Survey." *Int. Food and Agribusiness Mgt. Rev.*, 2(1): 103-21.
- Boyle, K.J., and R.C. Bishop. "Welfare Measurements Using Contingent Valuation: A Comparison of Techniques." *Amer. J. Agr. Econ.* 70(1988): 20-28.
- Brown, D.J., and J.H. Atkinson. "Cash and Share Renting: An Empirical Test of the Link between Entrepreneurial Ability and Contractual Choice." *Bell J. of Econ.* 12(1981): 296-99.
- Cantor, R., S. Henry, and S. Rayner. *Making Markets: An Interdisciplinary Perspective on Economic Exchange*. Westport, Connecticut: Greenwood Press. 1992.
- Dasgupta, S., T. O. Knight, and H. A. Love. "Evolution of Agricultural Land Leasing Models: A Survey of the Literature." *Rev. Agric. Econ.* 21(1999): 148-76.
- Datta, S.K., D.J. O'Hara, and J.B. Nugent. "Choice of Agricultural Tenancy in the Presence of Transaction Costs." *Land Econ.* 62(May 1986): 145-158.
- Ellinger, P.N., C.L. Escalante, P.J. Barry, and D. Raab. *Financial Characteristics of IL Farms: 1997-98*, 99-F-4, University of Illinois at Urbana-Champaign, October 1999.
- Eom, Y.S. "Pesticide Residue Risk and Food Safety Valuation: A Random Utility Approach." *Amer. J. Agric. Econ.* 76(1994): 760-71.
- Galaty, F.W., W.J. Allaway, and R.C. Kyle. *Modern Real Estate Practice*. 12<sup>th</sup> ed., Chicago, IL: Dearborn Financial Publishing, Inc., 1995.
- Gwilliam, K. "Farmland Leasing and Contract Choice in Michigan: The Influence of Social Distance." Ph.D. Thesis, Michigan State University, 1993.

- Hallagan, W. "Self Selection by Contractual Choice and the Theory of Sharecropping." *Bell J. Econ.* 9(Autumn 1978): 344-354.
- Heady, E.O., and E. Kohlberg. *Relationship of Crop-Share and Cash Leasing Systems to Farming Efficiency*. Iowa State Agric. Experiment Station Bulletin 386. 1952.
- Keppel, G. *Design and Analysis: A Researcher's Handbook*. 2<sup>nd</sup> ed. Englewood NJ: Prentice Hall, 1991.
- Liao, T. F. *Interpreting Probability Models: Logit, Probit, and Other Generalized Linear Models*. Sage University Paper series on Quantitative Applications in the Social Sciences, 07-101. Thousand Oaks, CA: Sage, 1994.
- Moss, L.E. "A Transaction Cost Economics and Property Rights Theory Approach to Farmland Lease Preferences." Ph.D. Thesis, University of Illinois at Urbana-Champaign, 2000.
- Porter, M.E. *Competitive Strategy*. New York: The Free Press, 1980.
- Reiss, F. J. "Farm Tenancy Arrangements in the U.S.A." *J. Amer. Soc. of Farm Managers and Rural Appraisers* 48(October 1984):16-24.
- Rogers, D. *Leasing Farmland in the United States*. Resources and Technology Division, Economic Research Service, USDA AGES-9159. 1995.
- USDA, *1997 Census of Agriculture*, Volume 1 Part 13. Geographic Area Series: Illinois.
- USDA, NASS. *Crop Production 1999 Summary*. CrPr 2-1(00)a. Washington, DC, 2000.
- USDA, NASS. *Agricultural Land Values*. Bulletin No. 957. Washington, DC, 1999.
- Williamson, O.E. *The Mechanisms of Governance*. New York: The Free Press, 1996.