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Landlord influence on soil conservation practice adoption

Abstract

The objective of this study is to identify which farm or farmer characteristics explain tenants' perceptions of whether landlords are supportive or not of no-till farming and to describe landlords' attitudes towards tenants switching to no-till on their land. Results indicate that size of farm, percentage of the farm in wheat, and having a cash lease were found to be the most significant variables influencing farmers' perceptions about landlords' disposition toward no-till or more intensive spring cropping. The first two were negatively correlated and the last was positively correlated. Overall, farmers appeared to be more pessimistic regarding landlords' acceptance of no-till than were landlords themselves.

Keywords: tenant, landlord, conservation, logit.

JEL Classification: Q50.

Introduction

In Washington State there has been a long history of farmland leasing and it has increased slightly in recent years. The 1997 Census of Agriculture indicated that 44.9% of all farmland in the state was leased, which was 3.9% more than in 1972 (USDC, 1999). The two dominant farmland leasing arrangements in the state are crop share and cash lease. Under crop share the lessor and lessee agree to share the yield and certain expenses in specified proportions. The common crop share lease for wheat is $\frac{2}{3}$ of the crop to the tenant and $\frac{1}{3}$ to the landlord. While peas and lentils, are split commonly $\frac{3}{4}$ and $\frac{1}{4}$ for tenant and landlord, respectively. Landlords always pay 100% of the property taxes and sometimes split with the tenant the herbicide, fertilizer, and/or crop insurance costs in the same proportion as the crop. Crop share leases share risk between landlord and tenant because no crop share is paid to the landlord if there is a crop failure. Cash leases are a fixed monetary amount per year, due regardless of crop performance. Cash leases transfer all production risk to the lessee. Crop share leases are dominant in the dryland cereal growing region of eastern Washington. A survey by Willett et al. (1987) showed 86% of all leases were crop share in Whitman County.

Langemeier (1997) described five basic principles for a successful crop share lease: (1) yield increasing inputs should be shared by tenant and landlord; (2) share arrangements should be adjusted as technology changes (such as shifts to conservation tillage); (3) total crop returns should be divided in the same proportion as resources contributed; (4) compensation for long-term investments should occur at termination through land or other resource value changes; and (5) good landowner/tenant communication is a key to a successful lease. Willett et al. (1987) described two objectives of a desirable lease as: (1) obtaining optimum economic efficiency in

the use of resources; and (2) equity in allocating returns between the landowner and lessee.

Burgener and Dillon (1999) studied how technological advances changed the equitable shared lease in Nebraska. They found that when conservation tillage and intensive spring cropping were introduced the traditional $\frac{2}{3}$ - $\frac{1}{3}$ share lease for wheat-fallow changed to $\frac{3}{4}$ - $\frac{1}{4}$. This provided a fairer return for the tenant, because of the additional production expenses associated with intensive cropping systems. The new crop share fairly provided the landowner the same return as under the traditional crop share. However, inertia in crop shares may slow environmentally and economically desirable technical changes in farming.

Landlord attitudes have sometimes retarded technical change in the past (Dillman and Carlson, 1982). Their survey indicated that 38% of eastern Washington-northern Idaho farmers stated "landlord resistance" as a moderate or very important reason for farmers not doing a better job of controlling soil erosion.

In eastern Washington more intensive rotations and direct seeding are two common conservation practices (Upadhyay et al., 2003). Whitman county growers have increased no-till farmland from 2.9% of county farmland in 1989 to 12.1% in 1998 (CTIC, 2001). Landlords will normally contend with both positive and negative consequences from tenants switching to no-till and intensive spring cropping. For the short run, the landlord's fractional share of crop and income may be reduced if crop shares are split in accordance with the new resource contributions, and may cause apprehension by the landlords. However, the annual dollar return to the landlord may not be reduced as shown by Burgener and Dillon (1999). In the long run, landlords would be beneficiaries of improved land quality, which is protected by conservation tillage. But in the end landlords may have different attitudes pertaining to soil quality improvements and different tolerances in waiting for long-run payoffs.

Government program changes can also influence landlord and tenant lease negotiations. Since 1985 landlords have had the option of enrolling erodible land in the Conservation Reserve Program (CRP). In return for planting perennial grass on CRP land for 10 years, the landlord receives an annual payment from the government. Some prospective tenants have argued that the CRP has reduced the supply of rentable land and increased the bargaining terms for landlords.

The objective of this study is to use survey data from eastern Washington to (1) statistically analyze which farm or farmer characteristics explain tenants' perceptions of whether landlords are supportive or not of no-till farming; and (2) describe landlords' attitudes towards tenants switching to no-till on their land.

1. Materials and methods

Data for this study came from an exploratory survey of participants attending field days and farm meetings in Benton, Lincoln, and Whitman Counties in Washington during early 2003. The sample included 27 completed one-page questionnaires from farmer-tenants and 11 from landlords. Farmer perceptions of landlord influence on no-till adoption were ascertained by the question: What do you feel are the main barriers, and/or encouragements which landlords represent with regard to switching to no-till, or to more intensive rotations, in your area?

Responses to question (1) were divided into the binary variable *ENCOUR* coded (1) indicated they considered landlords encouraged no-till or discouraged no-till coded (0) (Table 1). For this study "no-till" included "no-till or more intensive rotations." In a previous large regional survey, the two practices were adopted together 58% of the time (Upadhyay et al., 2003). The following farm and farmer characteristics listed in Table 1 were used in the analysis. *LEASE* describes whether the farmer has predominantly cash (coded 1) or crop-share (coded 0) leased land. *SIZE* represents the size of the farm in acres. *%WHEAT* represents the percentage of the farm in wheat. *EDUC* represents the farmer's level of education with 0 indicating high school graduate, 1 if some college or technical school, and 2 if college graduate. *%RENTED* indicates the percent of farm rented. *%RENT_REL* indicates the percentage of farmland rented from relatives.

Table 1. Description of variables used in farmer survey conducted in 2003

Variable	Unit	Description
Dependent:		
ENCOUR	(1,0)	1 if landlord encourages adoption, 0 if landlord discourages
Independent:		

LEASE	(1,0)	1 if lease is cash, 0 if crop-share
SIZE	Acres	Acres
%WHEAT	Percent	Percentage of farm in wheat
EDUC	(0,1,2)	0 if high school graduate, 1 if some college or technical school, 2 if college graduate
%RENTED_REL	Percent	Percent of farm rented from relatives
%RENTED	Percent	Percent of farm rented

The primary attitudinal question in the landlord questionnaire was "What do you feel are the main advantages, and/or disadvantages, associated with your tenants switching either to no-till, or to more intensive rotations, on your cropland?" Responses to this question were then used to divide the small sample of 11 landlords between (1) those where no-till or intensive rotations' *advantages* predominated and (2) for those where *disadvantages* predominated. Agricultural characteristics elicited in the landlord questionnaire were: would allow change in crop rents with no-till adoption, lease type (cash or share, percent), rainfall (inches) on their rented land, % wheat on their rented land, total acres rented to others, number of landlords they knew who had no-tilling renters. Personal characteristics elicited in the landlord questionnaire were: male or female, age (years), distance from their home to their rented farmland (miles), % of their land rented to relatives.

Logit regression analysis was conducted to statistically measure how closely the different farm and farmer characteristics were related to the farmers' perceptions of how supportive landlords were of no-till. Logit model places the estimated probabilities inside the binary 0-1 variable without actually creating probability estimates of 0 or 1 (Kennedy, 1998). The dependent variable was described by a binary '*ENCOUR*' variable, which represents a tenant's perception of landlords' encouragement or discouragement for a switch to no-till. In addition to the statistical results, some verbatim comments of responding farmers are provided for possible insight and interpretation of tenant's perception of landlords' encouragement or discouragement for a switch to no-till. In contrast to the farmer survey data, no statistical analysis is provided for the landlord data because of the small number (11) of respondents. However a descriptive comparison of means of landlord characteristics for both those considering no-till advantageous and those considering it disadvantageous is presented.

2. Results and discussion

2.1. Farm and farmer characteristics. Of the 27 farmers surveyed, 44% reported that their landlords encouraged no-till (Table 2). Current lease terms were 88% crop-share and 12% cash. Of the respondents, 88% had graduated from college, and two had a master's degree and one a doctorate. Farm size ranged from 650 to 7000 acres with an average of

3344 acres. Average percent of farm in wheat was 54.4%. Percent of farm rented ranged from zero to 100 with a relatively high average of 72.6%. Percent of farm rented from relatives also ranged from zero to 100 and with an average of 24.7%.

Table 2. Farm and farmer characteristics

Variable	Value	N	% of 0	% of 1	% of 2
Categorical:					
ENCOUR	(1,0)	27	56	44	
LEASE	(1,0)	27	12	88	
EDUC	(0,1,2)	27	04	07	88
Continuous:					
			Average		
SIZE	Acres	27	3344.4		
%WHEAT	Percent	27	54.4		
%RENT	Percent	27	72.6		
%RENT_REL	Percent	27	24.7		

Note: *ENCOUR* = 0 if landlord discourages adoption or 1 if encourages. *LEASE* = 0 if crop-share lease or 1 if cash, *EDUC* = 0 if highest education is high school, 1 if some college or technical school, 2 if college graduate.

2.2. Producers. Based on the Pearson chi-square, the equation (Table 3) was statistically significant at the 10% level when testing the global null hypothesis that all coefficients equal zero. Probability of landlord encouragement at the mean ($Y = 1$) is zero. For this exploratory model with a small sample size, it was promising to note that farm *SIZE* was nega-

tively related at the 7.8 percent statistical level to farmers' perception of landlords' supportiveness of no-till. This suggests a hypothesis that smaller acreage farmers have had a more positive experience with landlords when adopting no-till, than larger acreage farmers. Possibly landlords have found that smaller acreage farmers have had the time to properly manage no-till fields. However, farmers' comments show there is some diversity of views and experience within farm size levels and other attributes. One producer with a farm size of 2400 acres, reports, "My landlords are all older than 65 years and have been very open and good to deal with (when switching to no-till)." In contrast, a producer that farms 3400 acres, (67% wheat with crop-share leases), stated landlords don't encourage adoption no-till because "It doesn't look as good to them as cultivation." A producer that rents all farm land, farms 4200 acres, 67% wheat and leases half by crop-share and half cash cites that "Not too many barriers as far as switching to no-till, but more intensive rotations are hard to accomplish when the number one cash crop is winter wheat and all other crops seldom breakeven." Another producer that farms 2000 acres, that intensively crops 100% wheat under all crop-share leases, responded "Landlords don't understand the benefits from direct seeding and worry about income" as the main barrier to no-till.

Table 3. Logit regression coefficients and their statistical significance

	Intercept	EDUC	SIZE	%WHEAT	%RENT	%RENT_REL	LEASE
Coefficient	3.839	-.8545	-.00064	-.0434	-.00954	.0107	2.744
Significance	.2137	.1490	.0780	.1156	.5671	.5295	.1490

%WHEAT was significantly negatively related at the 11.6 percent level to perceptions of landlords' supportiveness of no-till and crop diversity. This provides some modest preliminary evidence that diversified farmers (less wheat) have experienced a more positive reception by landlords to no-till. Some research has shown that diversified cropping fosters no-till success (Boerboom et al., 1993). One producer with only 33% wheat reports, "It is important to show landlords cost and yield comparison against conventional systems. [Provide] good communication and education by the renter and get the landlord involved. Show them with pictures and tours of their land."

The only other variable with even modest statistical support is that farmers with cash *LEASE* have a more optimistic view of landlords' approval of no-till. This seems plausible because with cash leases landlords are shouldering less risk if no-till fails.

One producer with all cash leases reports "Information and education. Most of my landlords are absent-

tee with little knowledge of agriculture. Mostly interested in environment and their finances."

Overall, *EDUC*, *SIZE*, *%WHEAT*, and *%RENT* were negatively associated with perceptions of landlord supportiveness of no-till; however, *EDUC* and *%RENT* displayed very low levels of statistical significance. *LEASE* and *%RENT_REL* responded positively to landlord encouraging no-till, but the latter had an unacceptable statistical significance level.

In addition to *%RENT_REL* being non-significant statistically testimony of respondents was mixed regarding landlord encouragement of no-till. One respondent with 100% of his cropland crop-share rented, 90% from relatives, cited landlords as a discouraging influence to no-till because "They want to guarantee that their income doesn't change, and they cannot withstand criticism from neighbors or coffee clutches." Another grower who leased 75% of his farm acreage and zero percent from relatives stated, "My landlord has been very positive and behind me in my direct seeding program."

2.3. Landlords. Seventy two percent of the 11 surveyed landlords favored no-till as an advantageous practice (Table 4) while 28% of the landlords considered no-till as a disadvantageous practice. Of landlords considering no-till as advantageous about 75% reported that one of the primary benefits of more intensive rotations or no-till was “erosion control.” One landlord reports that “Advantages are conserve soil – less cultivating – we have steep hills and clay knolls. This supplies nutrients to the soil and prevents erosion”. Interestingly 67% of those viewing no-till as disadvantageous also reported erosion control as an advantage, but felt that “risk” and “weed infestation” made more intensive rotations or no-till unappealing.

However, many landlords saw a mix of advantages and disadvantages. For example, one landlord wholesales 2000 acres, crop-shares and is 67% wheat, cites that benefits are “More acres in crop, better crop if it rains” and disadvantages “when rainfall low, yields are

low.” While another landlord that leases 150 acres, 67% wheat with a crop-share lease states “Advantages should have better soil on the farm, should have less erosion. We might make more money with a more intensive rotation. Disadvantages, will my present tenant be able to keep up with a rapidly changing learning curve? Will I end up with weed problems a future tenant will not be able to control?”

Sixty two and half percent of landlords who favored no-till reported using crop-share leases, whereas 100% of those who disfavored the practice reported using crop-share leases (Table 4). When landlords were asked, “If one of your renters wished to switch to a more intensive rotation from a less intensive rotation on one or more of your leases, please describe any change in lease terms you would permit upon switching.” 37.5% of respondents favoring no-till reported no change in lease terms, 37.7% would negotiate, 12.5% already required spring cropping, and 12.5% might negotiate on spring crops.

Table 4. Comparison of attribute averages for landlords who favor and disfavor no-till

Attributes	Unit	Landlord categories	
		Favors no-till*	Disfavors no-till*
Change in crop rents with no-till adoption (decrease)	%	3	0
Crop-share lease	%	63	100
Rainfall (av in/yr)	Inch	17	21
Wheat	%	58	44
Acres rented	Acres	1619	765
Known landlords with no-tilling renters	Number	2	1
Rented to relatives	%	25	0
Home to farm distance	Miles	60	12
Age (landlord)	Years	56	55
Male	%	63	100
Sample size	Number	8	3

Note: * indicates landlord’s perception about more advantages or disadvantages in switching to no-till or more intensive crop rotations.

Landlords were asked “Some argue that no-tilling increases the long-run quality and productivity of the land by limiting erosion and boosting organic matter. What percentage reduction in annual cropland rents, if any, would this long run land quality improvement be worth to you?” 37.5% of landlords favoring no-till reported willingness to make an average reduction of 8.5% in lease rent, while 62.5% of those favoring no-till indicated no willingness to change lease rent. One landlord that rents out 4000 acres, and reported no willingness to change lease rent, stated, “Direct seeding should be a better method to farm costing less to the farmer. We would expect our farmers to use the latest farming techniques and always use the best available farming methods. We should both benefit.” Not surprisingly, no landlords disfavouring no-till indicated a willingness to decrease their rent with no-till.

Other questions included in landlord questionnaire were: lease type, rainfall on their land, % wheat on their land, number of leases, acres rented, number of landlords known with no-tilling renters, % rented to relatives, distance from landlord’s home to farm, age, and gender (Table 4). Landlords favoring no-till had higher %WHEAT cropped, more crop-share leases, greater acres rented, more other landlords known who had no-tilling renters, and greater home to farm distance. Landlords disfavouring no-till had higher rainfall and were 100% male.

Conclusions

Size of farm, percentage of the farm in wheat, and having a cash lease were the three most significant variables influencing farmers’ perceptions about landlords’ disposition toward no-till. The first two were negatively correlated and the last was positively correlated. Generally, farmers were more pessimistic re-

garding landlords' acceptance of no-till than were landlords themselves. Only 44 percent of surveyed farmers saw landlords as favoring no-till, but 72 percent of landlords characterized themselves as favoring no-till. However, fewer landlords reported willingness to cut rents to tenants who no-tilled their land. Perhaps landlords' general support for no-till was offset in tenants' eyes by their reluctance to offer concrete incentives for no-till adoption. This might underlie farmer pessimism regarding landlords' support for the practice.

Currently farmers and landlords generally agree that more intensive rotations or no-till can increase soil quality and decrease erosion. Income risk and uncer-

tainty seem to be problems for both landlords and tenants regarding more intensive rotations or no-till. Both see potential income risk while landlords also perceive future weed problems. Some tenants feel landlords need to be educated on the benefits of more intensive rotations or no-till. The large percentage of crop share leases indicates landlords desire to be involved in the risk of farming. Over time, with more successes with these new cropping systems, more landlords may become convinced of their value and offer incentives for their adoption. Future research should consider both landlord and producer objectives in developing conservation farming technologies that appeal to both groups.

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