A Subversive Argument:

Land Costs, Lease Terms, and the Federal Farm Program

By

Tom McCoy

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93340 Hwy 206
Wasco, OR 97065

Phone: (541) 442-5233
Fax: (541) 442-5389
E-mail: tmccoy@gorge.net

Summary and Conclusions

Land costs – land payments to a lender or rental payments to a landowner – are the biggest expense faced by most wheat farmers. Both land prices and lease terms adjust to changes in the long-run profitability of farming. However, because the adjustment is slow and may take many years to complete, the effects of changing land costs are often ignored in discussions of farm policy.

I use data from a representative farm in Sherman County, Oregon to calculate the effects of a big change in farm profitability on land values and the terms of crop-share leases. In particular, I examine how a sharp reduction in federal farm program payments or a sustained decline in world prices would affect wheat farmers.

If federal farm program payments were eliminated, land prices would fall from approximately $450 per acre to $150 per acre and lease terms would adjust so that the landowner's share of crop-share leases would decline from 33% to 17%. After a very painful adjustment period, the income of the surviving tenant farmers would be approximately the same as it was before federal payments were eliminated. The amount of wheat produced in Sherman County would also be unaffected.

I also examine what would happen if "non-traditional" exporters continue to sell wheat at very low prices. Can we compete? The current cost of production of a Sherman County tenant farmer is estimated to be $4.07 per bushel. If federal farm program payments continue at past levels and land costs adjust, the calculations suggest that Oregon farmers could be competitive at prices as low as $2.06 per bushel.

The paper includes a short appendix about trade issues. In the appendix, I discuss the effects of decoupled payments on production. I argue that any discussion of this issue must take into account the effects of farm program payments on land costs.

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A couple of years ago, a friend of mine traveled to the Far East on a trade-promotion trip. His schedule included a stop in Australia, where he met with local wheat farmers. He expected to hear them complain about the agricultural depression and share his concern about low world wheat prices. To his surprise, the Australian farmers were upbeat and reported that they were doing fine – in spite of the fact that their government provided little assistance to them.

My friend asked how this was possible when wheat prices had fallen by as much as 40%. The Australian farmers replied that most of them are able to buy their own land. Land that would cost $500 per acre in the U.S. was selling for $150 per acre in Australia. With much lower land costs, the Australian farmers could make a profit on $3 per bushel wheat, even without government payments.

Soon after I heard this story, the distinguished agricultural economist, J.B. Penn, was appointed by President Bush to be the USDA's Undersecretary for Farm and Foreign Agricultural Services. Dr. Penn was quoted in the press as worrying that U.S. farm program payments were being used to bid up land prices in the U.S. and that higher land prices were preventing U.S. farmers from being competitive in depressed world markets without more government payments.[1]

I have long been aware that big changes in the profitability of farming will cause land values and lease terms to change. After the tripling of wheat prices in the early 1970's following the "Russian wheat deal," land prices in my area increased by 250% and the landlord's share in many leases increased from one-third of the crop to 40%. Both of these changes occurred over a period of several years. When the profitability of wheat farming subsequently declined, lease terms and real land prices slowly returned to their previous levels.

Land costs are the biggest cost faced by most farmers – either in the form of land payments to a lender or rental payments to a landowner. I pay one-third of my crops to my landlords. Yet changes in land costs are neglected in most discussions of farm policy. Given the large yearly fluctuations in prices, yields, and government programs, the slow changes in land values and lease terms are easy to ignore. Most discussions of agricultural issues assume that land costs are fixed and variations in prices and farm program payments are borne mainly by farmers. This assumption is appropriate for analyzing short-run changes. However, the initial effects of a sustained change in farm profitability will often be offset by later changes in land costs.

In the following discussion, I will examine how a big change in farm profitability – elimination of federal farm programs or a sustained decline in world wheat prices – would affect the Mid-Columbia area of Oregon where my farm is located. Most of the farmland is leased by landowners to tenant farmers using crop-share leases – leases that specify that the landowner will receive a percentage of the crop as rent.[2] The tenant's land costs are primarily determined by the share of the crop that he must pay as rent to the landowner. Hence, any discussion of land costs must address both land prices and lease terms. I will use data from the local area to calculate how change in the long-run profitability of farming will affect both.

The Data

I farm in Sherman County, which is located in north-central Oregon near the Columbia River. Conditions in Sherman County are similar to those in much of the non-irrigated wheat growing areas of Eastern Oregon. Yearly rainfall averages 11.5 inches. Most of the cropland is planted to wheat, with barley occasionally planted as a rotation crop. It is too dry to grow other crops.

Because it is so dry, my area has traditionally used the summerfallow method of farming – a crop is grown once in two years to conserve moisture. This means that, for each acre of cropland that is harvested, the farmer usually has another acre that is fallowed and will be harvested the following year.

The majority of land is rented by farmers using crop-share leases. There is no standard lease. However, the landlord commonly receives one-third of the crop and pays the property taxes. The tenant receives two-thirds of the crops, pays the cash expenses, and provides the machinery and labor.

For more than 20 years, Oregon State University has published yearly enterprise budgets for a representative wheat farm located in the Mid-Columbia area where I farm. The OSU budget provides data on cash and machinery costs for a summerfallow farm with 1,500 acres of cropland each year. I combined the OSU cost estimates with actual market prices, county wheat yields, and farm program payments to calculate net incomes for a representative Sherman County tenant farmer and his landlord. I assume the lease specifies that the landlord receives one-third of the crop and the tenant receives two-thirds. The results are contained in *The Effect of the Farm Crisis on Oregon Wheat Growers -- A Case Study of a Representative Farm in Sherman County*.[3] Estimates were developed for the period from 1993 to 2001. The nine years included a wide variety of conditions – some of the best years for farm income (1995-96) and some of the worst years in recent memory (1999-2001). The nine-year average revenue and cost estimates are contained in Table 1.

Table 1

Average Per Acre Revenue and Costs
Sherman County Wheat Farmers 1993-2001

Average wheat price (net)	3.26 per bushel	
Average Sherman County wheat yield	x 52.67 bushels per acre	
Average total revenue from crop sales	$171.70 per acre	
	Landlord	Tenant
Share of Crop	1/3	2/3
Crop sales income	57.24	114.47
Federal farm program payments	14.30	28.60
Revenue per acre	71.54	143.07
Cash costs	1.20	74.91
Machinery costs		48.44
Property taxes	7.00	
Net Income per acre	63.34[4]	19.72

[source McCoy(2002)][5]

The Tenant

A quarter of Sherman County's cropland was enrolled in the Conservation Reserve Program (CRP) in the late 1980's. This fact plus bigger tractors and combines means that many farmers are eager to expand. I will assume that competition among farmers for leases has already bid the tenant's share in leases as low as tenants will accept.

Assumption 1: Competition among tenants has already bid the tenant's average income as low as the tenant will accept. Tenants will not accept a future average net income per acre that is lower than the average of the last nine years.

From Table 1, the tenant's average income per acre was $19.72. The representative farm has 1,500 crop acres. Hence, the tenant's average yearly income was $19.72 x 1,500 = $29,580. In economist's jargon, I am assuming that the "opportunity cost" of the tenant's labor and management inputs is $29,580 per year; i.e., if average income from farming is less than $29,580 for a number of years, the tenant will find a job doing something else.[6] Although a tenant's expected average income over the term of the lease must be at least

$19.72 per acre, his actual income in any year may be much less. Using actual prices and yields, I estimated that the tenant's net income was negative between 1999 and 2001.[7]

Assumption 1 is equivalent to assuming that landlords are currently not leaving "money on the table;" i.e., they are being good businessmen and don't pay tenants more than they need to pay them.

Assumption 1 is the key assumption behind most of the subsequent discussion. If competition among tenants has already driven a tenant's returns as low as he will accept, any change in the long-run profitability must ultimately be reflected in the landowner's income.

The Landowner

In the area where I farm, there are few alternatives to growing wheat. We are 30 miles from the nearest urban area. The federal government does not allow more than 25% of a county's cropland to be enrolled in the Conservation Reserve Program (CRP). By the early 1990's, Sherman County and the surrounding counties had reached the CRP limit.

Assumption 2 –A landowner's only option is to lease his land to a tenant wheat farmer using a crop-share lease. However, a landowner will enter into a lease only if he expects his average income will be greater than his cash costs and property taxes.

From Table 1, a landowner's cash costs and property taxes have averaged ($1.20 + $7.00) $8.20 per acre. Federal farm program rules have always dictated that total farm program payments are split using the same percentages by which the crop is split. Hence, landowner's income per acre equals

$$(\text{Price x yield} + \text{total federal payments per acre}) \times (1\text{-}t) - \text{landowner's costs}$$

where t is the tenant's share of the crop.

From Table 1, for the period from 1993 to 2001, landowner's average income per acre was

$$(\$171.70 + \$42.90) \times (1 - .6667) - \$8.20 = \$63.34.$$

Assumption 2 states that lease terms can never change in a way that makes landowner's expected average income negative.

Where there are no good alternatives to farming, the value of land should equal the discounted sum of the landowner's expected future farm income per acre. This can be simplified using the "capitalization" formula to

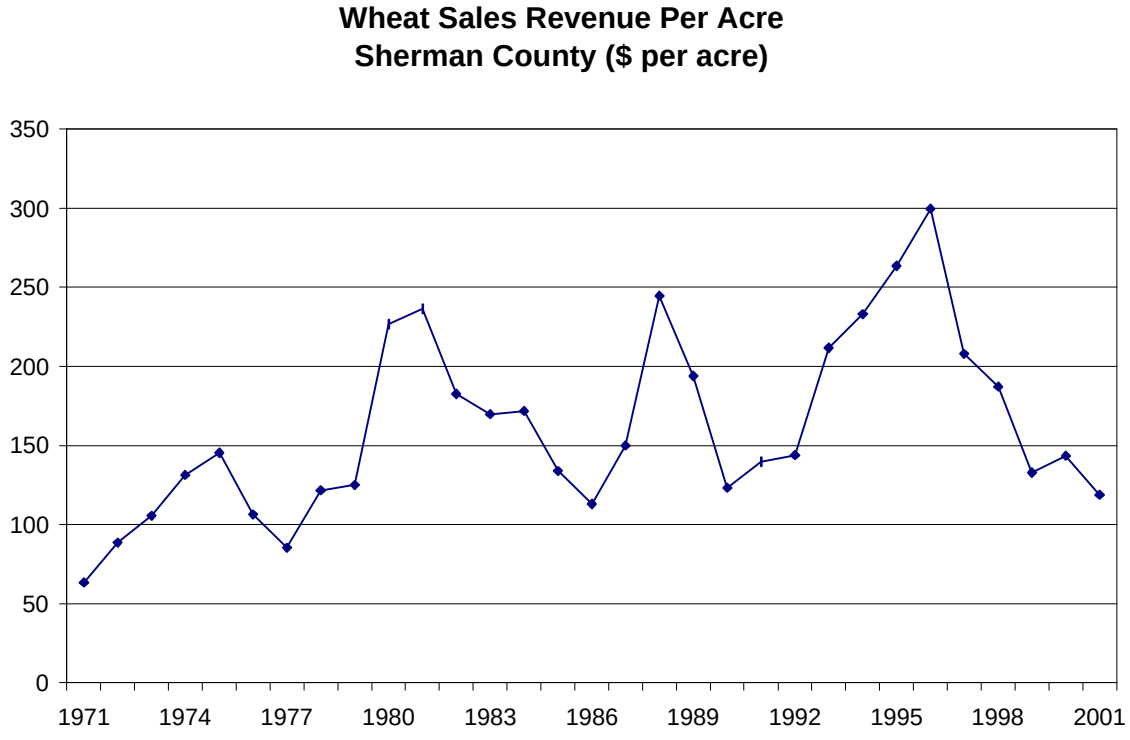
$$\text{Value of land per crop acre} = \frac{\text{Landowner's income per acre}}{r}$$

The "capitalization rate," r, depends on the market interest rates and the expected increase in the landowner's income. If we assume r equals 7%, the value of land would equal $63.34 ÷ .07 = $905 per crop acre. Since the summerfallow method of farming requires two acres of land for every acre that is cropped, the predicted price of an acre of farm land would be $905 ÷ 2 or $453 per acre. This is close to what farmland currently sells for in Sherman County.

Eliminating Farm Program Payments

What would happen if, God forbid, Congress suddenly eliminated the federal farm program? Assume that future average wheat prices, yields and costs are the same as they have been for the last nine years. From Table 1, the average net income of tenants during the last nine years has been less than their farm program payments. If farm program payments were eliminated, the average income of tenants would be negative ($19.72 – 28.60 = -$8.88). What would they do? Yearly wheat sales revenue has fluctuated greatly over the last 30 years – often by more than 100% (see Figure 1). Revenue per acre for the next crop is difficult to predict. If he had sufficient working capital, a tenant's first reaction might be to continue farming at a loss and hope that market prices will improve. After several years, if average crop sales revenue per acre did not improve,

Figure 1



he would need to ask his landlord for a more favorable lease. Since the landlord also suffered a significant reduction in his income when farm program payments were

eliminated, he is not likely to respond favorably, at least not initially. Better capitalized neighboring farmers probably would be willing to assume the lease on the original terms, also hoping that prices will improve. **Many farmers would lose their leases in the transition and be forced out of farming.** The adjustment process might take eight to ten years. Eventually, the landlord would be forced to change the terms of the lease so that the tenant is minimally profitable (Assumption 1). No matter how eager farmers are to lease more land, bankers will not allow them to farm at a loss for very long.

Assumption 1 implies that the lease terms will eventually change so the tenant's average per acre income is $19.72. Hence, the tenant's share will adjust so that

$$\text{(Average Total Crop Revenue) x (tenant's share) - (tenant's costs) = \$19.72}$$

$$\text{\$171.70 x (tenant's share) – (\$74.91 + \$48.44) = \$19.72}$$

or, solving for the tenant's share

$$\text{t = tenant's share = .833}$$

The landlord's share would then be (1 - .833) = .167 and the landlord's average income per acre would be

$$\text{\$171.70 x .167 - (1.20 + 7.00) = \$20.44}$$

If the adjustment process proceeds as outlined above, landlords will eventually be forced to bear all the cost of the elimination of farm program payments. The reduction in the landlord's income per acre is equal to the combined total of their farm program payments and the tenant's payments [($63.34 - (14.30 + 28.60) = $20.44]. After the transition is over, lease terms will adjust so that the remaining tenants are as profitable as they were before farm programs were eliminated.

Land Prices

If farm program payments were eliminated, the calculations above indicate that the landlord's net income per acre would fall to $20.44 per acre. Capitalized at 7%, this implies that Sherman County farm land would sell for ($20.44 ÷ .07) ÷ 2 = $146 per acre. Any landowner who purchased land before the elimination of farm program payments (i.e., paid $450 per acre) and still had substantial debt would be unable to pay his interest payments out of the landlord's share. Farmers who recently purchased land would face bankruptcy.

Note that the changes in land values calculated above for Sherman County are similar to those used by the Australians when they explained to my friend how they were able to farm profitably without government payments.[8]

Long-run Effects and the Transition

The argument presented above implies that the effect of farm program payments is to support land prices and to allow tenants to accept traditional lease terms. In the long-run, the main beneficiaries of farm program payments are landowners. Politically, it is more difficult to defend farm programs if they mainly help landlords and support asset values. This is why I call it a "subversive argument."

The adjustment process outlined above also illustrates why reducing farm program payments causes such hardship. Farm program payments have been bid into existing lease terms. To remain viable, tenants must change the terms of their leases. Landowners will naturally resist changes in "traditional" lease terms. In the short-run, farm program payments are vital to prevent bankruptcies and to keep many farmers in business.

If future prices, yields and government payments were known, the adjustment would be quicker and less disruptive. Landowners and tenants would be able to reach agreement on new lease terms more easily. However, because of the uncertainty of future prices and yields (as illustrated by Figure 1) and future government programs, the actual process will be difficult and many tenants will lose their leases.

Can We Compete?

Exports of cheap wheat have flooded the world market in 2002-03. John Oades of U.S Wheat Associates recently wrote

> …non traditional wheat exporters (Russia, Ukraine, Kazakhstan, Hungary, Romania, Turkey, India, Pakistan) now hold a 29+% share of world export markets, up from 12% three years ago. … As of this writing, ordinary (no protein specification) SW is selling FOB Portland at $164/MT (metric ton) ($4.45/bu). We know that cost of production is variable, but easily exceeds $110/MMT ($3.00/bu). … Today, Black Sea origin (E.Europe, FSU countries) milling wheats are selling at FOB $90-130/MT ($2.45-3.54/bu), and Indian wheats are selling FOB $105-110/MT ($2.86-2.99/bu). We don't know the real cost of production in all countries, but USDA recently indicated that Ukrainian production cost averages between $50-60/MT ($1.36-1.63/bu). We know that Eastern Europe, and former FSU countries are working hard on improving production practices and infrastructure necessary to improve the quality and the reliability of their supply. We are also assured that many of these non-traditional suppliers (E. Europe, FSU) are not going away, that in fact their production and exports are expected to increase. **So**, we know the US is no longer the lowest cost producer of export wheat to the world, and hasn't been for some time. We know that a significant portion of producer income is coming from farm program payments. We also know that SW wheat exports are slow due to the relatively high export price of SW in deference to non-traditional wheats ($90-$110/MT, $2.45-$2.99/bu). We acknowledge that SW exports are becoming more dependent on government food aid sales. 27% last market year vs. normal 7%-10% of total sales. Our situation is summed up in four words, "Not a pretty picture"![9]

What will happen to Oregon wheat farmers if exports from "non-traditional exporters" continue to expand? Can we compete?

During the period from 1993-2001, wheat yields in Sherman County averaged 52.67 bushels/acre. Using the data in Table 1 and Assumption 1, the cost of production for a tenant farmer is

Table 2

Tenant's average cost of production
1993-2001

Cash costs	$ 74.91
Machinery costs	48.44
Opportunity cost of tenant's labor and management	19.72
Tenant's total cost per acre	$143.07

Average bushels available for sale by tenant = 2/3 x 52.67 = 35.11 bushels

Cost of production per bushel = $143.07 ÷ 35.11 = **$4.07 per bushel**

The cost of handling and transporting a bushel of wheat from Sherman County to Portland averaged almost 58¢ per bushel between 1993 and 2001. Federal farm program payments averaged ($28.80 ÷ 35.11) 81¢ per bushel during the period. Hence, in terms of the Portland FOB prices that John Oades is referring to, the Portland price that a Sherman County farmer needed to break even averaged $4.07 + .58 - .81 = **$3.84/bushel**. This breakeven price is far above the price at which wheat is now being offered by the "non-traditional exporters."

What would happen if non-traditional exporters continue to offer cheap wheat on the world market? Tenants would suffer a series of years with negative net income and leases and land values would eventually adjust. How low could prices drop before wheat production was abandoned in Sherman County?

Assume that future farm program payments remain the same as they have averaged between 1993 and 2001; i.e., the combined total of the tenant's and landlord's payments will be ($14.30 + $28.60) $42.90 per acre. Let p* be the lowest price at which a landlord will lease his land and t* be the lowest percentage of the crop that a tenant will accept. Then, using Assumptions 1 and 2 and the cost data from Table 1,

$$(p^* \times 52.67 + 42.90) \times t^* - 74.91 - 48.44 = 19.72$$

and

$$(p^* \times 52.67 + 42.90) \times (1 - t^*) = 8.20$$

Solving these two equations,

$$p^* = \$2.06 \text{ per bushel} \qquad \text{and} \qquad t^* = .946 \ .$$

Hence, after lease terms have fully adjusted, Sherman County wheat growers will not produce wheat if the Portland price averages less than ($2.06 + .58) $**2.64 per bushel**. By a similar calculation, if farm program payments were eliminated, the breakeven price would be ($2.87 + .58) $3.45 per bushel.

John Oades is certainly correct that it is "not a pretty picture." However, if federal farm program payments are maintained at the same level they average between 1993 and 2001 and if lease terms adjust, the U.S. could compete with the current prices ($2.45-$2.99/bushel) of the non-traditional exporters.

J.B. Penn's Concern

U.S. farm program payments have caused U.S. land prices to be higher than they otherwise would be and have caused lease terms to be more favorable to the landowners. Are these higher land costs making U.S. farmers less competitive with low-cost exporters? The answer is no – as long as farm program payments are maintained at the levels we have seen in the past. The extra land costs are being paid for by the federal farm program payments. As we discussed above, if long-term average world prices were to decline significantly, land values and lease terms would need to adjust downward. The adjustment process would be very painful, but the level of farm program payments wouldn't have much affect on the adjustment process.

There is one situation in which farm program payments would make the U.S. more competitive in world markets. If market prices fell so low that the landowner's return became negative, land would be retired from wheat farming. As discussed above, this would happen in Sherman County if the Portland price of wheat averaged below $2.64 per bushel for an extended period. In this case, raising farm program payments would keep landowner's return positive and land in production at prices below $2.64.

Conclusion

Wheat farmers in my area have been in a severe depression since 1997. Our difficult situation has caused many of us to think "outside the box" and reconsider many traditional parts of farming – such as tillage practices and lease terms. We have not seen big changes yet. However, without the emergency "market loss payments" of 1999-2001, I am convinced that more leases would have been renegotiated.

Thinking about how land values and lease terms could adjust leaves me with both positive and negative feelings. On the positive side, my calculations show that wheat farming is likely to remain a viable occupation in Sherman County. This is true even if

federal farm programs are drastically reduced or world wheat prices remain permanently below $3.00 per bushel. On the negative side, I know that the changes necessary to keep farms viable would be very bloody. I wouldn't want to be part of, or even witness, the transition.

Appendix

Are U.S. Farm Programs Harmful to Other Wheat Exporters?

The U.S. Farm program will cause harm to other wheat exporters if it artificially stimulates wheat production in the U.S. and, hence, causes U.S. exports to increase. The 2002 Farm Bill did mandate a small increase in loan rates. If world prices fall below loan levels, LDP payments will be paid on each bushel of production. LDP payments are clearly trade-distorting. A good argument can be made that the Direct Payments and the new Counter-Cyclical payments are not trade-distorting (i.e., they are decoupled) because they are not influenced by production in the current year and a producer receives them whether or not he produces any wheat. They should provide no incentive to produce extra bushels. The most worrisome question is what the effect of base-updating will be. Farmers were allowed to update their payment acres using an average of the number of acres of planted to wheat in the past four years. Will they plant more wheat during the next six years in the hope of getting additional payment acres in a future farm bill? If they do, the Direct Payments and the Counter-Cyclical Payments would be trade-distorting.

Two other arguments have been made that decoupled payments are trade-distorting. Both fail to consider the effects of adjustments in land costs. First, look at Table 1. Average tenant's income over the last nine years is less than the average of farm program payments. Some have argued that this shows that even decoupled payments are trade distorting. They argue that, if the federal payments were eliminated, farmers would be unprofitable and many would exit farming. Consequently, U.S. production and exports would decline.[10] However, as was argued above, land costs and lease terms would adjust and production would be largely unaffected.[11] According to the calculations above, the elimination of government payments would affect production in Sherman County only if the average Portland price stayed below $3.45 per bushel for a number of years. The Portland wheat price averaged $3.77 per bushel between 1993 and 2001. Hence, average prices would need to decline by 32¢ per bushel before the elimination of government payments would have an effect on wheat production in Sherman County.

A second argument against decoupled payments focuses on how farmers respond to risks. It argues that the increased income and wealth provided by decoupled payments will cause farmers to be more financially secure and more willing to expand production.[12] However, if federal payments are bid into land values and lease terms, the income and wealth of tenants (who normally make input decisions) will be unaffected by decoupled payments in the long-run.

If decoupled payments are capitalized into land values and lease terms, they will have little effect on production decisions in U.S. agriculture in the long-run. Even the European Commission recognizes this fact. In a recent discussion of the new U.S. farm bill, they note

The increased level of support under the [2002 US farm bill] with respect to the [1996 US farm bill] implies higher production levels than what market prices would generate and should thus exert further downward pressure on market prices. This could enhance the competitiveness of the US farm sector in the short term… However, in the long-term, the capitalization of support in land prices should increase production costs, and could lead to a deterioration of the financial situation of the US farm sector, thus generating an **ever increasing need for additional support**; [bold in original][13]

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Endnotes:

[1] See (USDA, 2001), page 48. See also the two articles from *Agricultural Outlook*, (Economic Research Service/USDA, 2001a) and (Economic Research Service/USDA, 2001b). For a recent article from the popular agricultural press see (Thompson, 2002).

[2] Almost all of the landowners are retired farmers or the heirs of farmers. Some farmers own part of the land they farm. Farmers who own their own land can be thought of as both a landlord and a tenant.

[3] A copy can be obtained by contacting the author at tmccoy@gorge.net. The paper is currently available on the Oregon Wheat Growers League web site at www.owgl.org.

[4] It is important to point out that land costs are not included when the average net income for the landlord is calculated above. In the analysis that follows, I am treating the return to land as a residue; i.e., the landlord gets what is left over. If a farmer recently purchased the land and is paying for it now, land payments are a cash cost. Sherman County cropland has sold recently for approximately $450 per acre. Using a 6% interest rate, the interest cost of buying land would currently be approximately $27 per acre. Since summerfallow requires two acres of land for each acre of cropland, the interest cost would be approximately $54 per crop acre and the net income of the landlord would be reduced to $9.34/acre. See (McCoy, 2002), page 6.

[5] Sherman County suffered from a severe drought in 2001 and the representative farm would have collected federal crop insurance payments. This is the only year during the nine years surveyed that federal crop insurance payments would have been made to a farm with county average yields. For 2001, wheat sales revenue includes a federal crop insurance payment of $12.32 per acre for the tenant and $6.16 for the landlord. This payment was not included in the yearly income estimates provided on pages 3 and 4 of (McCoy, 2002). However, the calculation of the federal crop insurance payment is discussed. See (McCoy, 2002), pages 7-8. The federal crop insurance payments in 2001 are included in the average income estimates presented here.

[6] Farms in Sherman County are getting bigger. If there are still significant economies of scale available, farmers may be willing to farm more acres for the same net income. A major reduction in farm profitability might cause many leases to be renegotiated and efficient farmers could expand by spreading their labor and management costs over more acres. This would result in a lower opportunity cost per acre than the average of the last nine years. However, if large unrealized economies of scale currently exist, why have lease terms been stable? The effects of economies of scale need further investigation.

[7] See (McCoy, 2002).

[8] A large reduction in land values is consistent with recent USDA studies. (Barnard, Whittaker, Westenbarger, and Ahern, 1997) estimates an elasticity of land values with respect to government payments of 69% for the Northern Great Plain. The Northern

Great Plain may be the area of the country that is most similar to Sherman County in its dependence on wheat farming. The estimate of an elasticity of land values with respect to government payments from the discussion above is [(453 – 146) ÷453] = 68%. Also see (USDA, 2001a), page 25 and (USDA, 2001b).

[9] See (Oades, 2002).

[10] See (Chau and de Gorter, 2001)

[11] I argued above that a reduction in decoupled payments would cause leases to be renegotiated and the tenant's share of the crop would increase. This would increase the tenant's return on the marginal unit of production. Since tenants make most of the production decisions, their higher net return should increase production in the long-run.

[12] See (Hennessy, 1998).

[13] See (European Commission, 2002), Chapter III, page 161.