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OPPORTUNITIES FOR LEASING IN THE BROILER INDUSTRY

by

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OPPORTUNITIES FOR LEASING IN THE BROILER INDUSTRY

Abstract

This study develops theoretical models of leasing from the perspectives of both the lessor and lessee. The models address effects of tax distortions and imperfect debt markets on the value of leasing. Analysis of the broiler industry shows that leasing is an important financing consideration for broiler houses and equipment which can benefit both the lessor and lessee.

Key words: broiler house investment, financial leasing, tax distortions

OPPORTUNITIES FOR LEASING IN THE BROILER INDUSTRY

The broiler industry has experienced rapid growth for several years. But for the industry to maintain its growth rate and the level of activity it has achieved, continuing substantial investments in structures and equipment are required for adequate replacement and expansion of production facilities. A 1985 estimate of the replacement value of production facilities in Georgia alone is a half-billion dollars.[1] Traditionally, these investments have been made largely by individual farm producers, not the integrated broiler processing firms (integrators).

Good reasons for concern over the outlook for continued investments by individual producers recently have emerged. First, the Tax Reform Act of 1986 in general repealed the investment tax credit.[2] Prior research shows that without this credit the incentive for investing in farm capital assets is substantially reduced.[3-6] Also, the marginal tax rates were lowered and tax depreciation lives were lengthened, which may cause a decline in the value of the depreciation deduction. However, part of this effect is offset by higher initial depreciation rates. A second factor which may compound the tax change effect on investments by broiler producers is the concurrent financial problems in traditional agricultural lending institutions. In Georgia, the Farm Credit System (FCS) is the largest financier of broiler houses and equipment, financing about 50% of the approximately $40 million needed by producers in 1985.[1] The current problems of the FCS have caused their interest rates to remain relatively high, and prospects for relatively more favorable interest rates seem dim because of the base loan pricing methods used and the fact that FCS bonds recently have sold at relatively higher discounts.[7] Other agricultural

lenders also are experiencing financial difficulty and have adjusted their loan pricing policies to pass costs of loan losses and lower volume to the borrowers.[7] The resulting effect on broiler house and equipment loans depends on the pricing of these loans relative to other agricultural loans. Barry and Calvert's loan pricing survey indicates that only 47% of commercial banks use differential pricing of agricultural loans among customers, only 12.6% of agricultural banks use customer profitability analysis for evaluating loan costs and revenues, and only 4% of the banks have profit centers for farm lending separate from commercial lending.[8] This implies that when loan pricing does occur it is subjective in nature. Therefore, debt financing of broiler houses and equipment may become less attractive to producers and may cause further slowing in the investment rate because of the general financial problems of agricultural lenders.

One option for integrators to encourage investment in production facilities is to raise contract rates to increase producer profit margins. However, this increase directly affects the profitability of the integrators. A potential alternative that would not have a negative effect on integrator profits is to provide financing through financial leasing arrangements. Such leasing arrangements would serve as an alternative to conventional debt financing and would help assure adequate broiler production capacity. Financial benefits for both the integrator and producer may result if the integrator can offer lease financing which is more competitively priced than conventional sources of debt. More competitive financing rates may be achieved with integrator financial leasing to producers because of differences between corporate and individual income tax rates and differences in pricing financial capital for broiler house and equipment investments.

This study investigates the potential for integrated broiler processing firms and broiler producers to enter into financial leasing arrangements. Effects of differential tax rates as well as effects arising from inefficient pricing by the agricultural debt intermediaries are considered. The analyses value the incentives which occur from these effects. Models for analyzing these various aspects are developed after a review of financial leasing theory in perfect and complete financial markets. Understanding leasing theory is important in developing these analytical models of leasing, because previous leasing studies in the agricultural economics literature have not considered the perspective of both the lessor and lessee, and/or have failed to neutralize risk differences between debt and lease financing before making comparisons.[9-12]

Review of Financial Leasing Theory

The basic theory of financial leasing under conditions of perfect and complete financial capital markets and simple, nondistorting tax assumptions is presented by Levy and Sarnat, and Copeland and Weston.[13,14] The theory under these conditions is reviewed in this section and forms the basis for the analytical models of the next section. The theory is developed from the perspective of both the lessor and lessee.

The Lessor

Given complete and perfect financial capital markets in which financial capital is priced by the capital asset pricing model (CAPM),[15,16] suppose the lessor's cost of equity for the leasing project is r, based on all equity financing. Copeland and Weston[14] show that the Miller-Modigliani[17] cost of capital concept can be used to

derive the weighted average cost of capital for the leasing project financed at the firm's optimal capital structure:

$$WACC_i = r\,[1 - T_i\, B/(B + S)] \tag{1}$$

where $WACC_i$ is the after-tax weighted average cost of capital for leasing firm i for the lease project; r is the cost of equity for the lease project assuming all equity financing; B is the market value of debt; S is the market value of equity; B/(B + S) is the optimal debt to asset ratio for leasing firm i; and T_i is the incremental tax rate for leasing firm i. Assuming a world in which (1) the lease is fully amortized, (2) no salvage value exists for the tangible leased assets, (3) no special tax provision exists other than the tax on operating income, and (4) the payment occurs at the end of the period, the value of the lease to lessor firm i is given by

$$NPV_i = -I + \sum_{t=1}^{n} \frac{L\,(1 - T_i) + T_i dep_t}{(1 + WACC_i)^t}, \tag{2}$$

where NPV_i is the net present value of the lease to lessor firm i; I is the investment cost of the leased assets; L is the lease payment received in each period; and dep_t is the tax depreciation write-off in period t. The $WACC_i$ from equation (1) is used to discount all cash flows, because they all are contingent on the lease contract, making them all of near-equal risk.

In a competitive lease market in equilibrium, $NPV_i = 0$; the lessor earns exactly the cost of capital. Thus, the required lease payment can be solved from equation (2) as

$$L_i = \frac{I}{\sum_t \frac{(1 - T_i)}{(1 + WACC_i)^t}} - \frac{\sum_t \frac{T_i dep_t}{(1 + WACC_i)^t}}{\sum_t \frac{(1 - T_i)}{(1 + WACC_i)^t}}, \tag{3}$$

where L_i is the periodic lease payment required by lessor i that returns exactly the cost of capital, i.e., makes $NPV_i = 0$. Therefore, if the lessor can secure conditions in which $L > L_i$, profits will be made in excess of those required to keep the firm in the leasing business.

The Lessee

In evaluating a financial lease the lessee is concerned with the value of the financing method, not the evaluation of the investment in the tangible assets. These facts must be kept in mind in order to properly value financial leases. One way of valuing the financial benefit (cost) of a financial lease is to find the difference in the value of the investment under each financing alternative, i.e.

$$NPV_p = NPV(L) - NPV(P), \tag{4}$$

where NPV_p is the net present value of the lease to lessee p; NPV(L) is the net present value of the tangible assets under the financial leasing arrangement; and NPV(P) is the net present value of the tangible assets acquired through conventional financing. In comparing NPV(L) to NPV(P), any difference in leveraging assumptions will give rise to risk differences in comparison. Thus, making the same leveraging assumptions for each method of financing is an appropriate procedure for neutralizing the risk effect of different financing methods. Because financial leases are pure substitutes for debt in a firm's capital structure, an opportunity cost which must be considered is the displacement of the firm's debt capacity and the associated tax shield on interest expense. Levy and Sarnat[13] show that equal leveraging and the opportunity cost of displaced debt capacity are appropriately modeled by discounting cash flows associated with leasing by the after-tax cost of lease capital and depreciation cash flows by the after-tax borrowing rate.

Assuming the same financial capital markets and tax situation for the lessee as for the lessor, consider the investment evaluation using lease financing. The value of the tangible asset investment in this situation is

$$NPV(L) = -\sum_{t=1}^{n} \frac{L\,(1 - T_p)}{(1 + (1 - T_p)k)^t} + \sum_{t=1}^{n} \frac{NOI_t\,(1 - T_p)}{(1 + WACC_p)^t}, \qquad (5)$$

where NOI_t is the net operating income in period t before depreciation, interest, and taxes arising from employing the tangible assets in production; $WACC_p$ is the after-tax weighted average cost of capital that applies to the risky operating cash flows with lease financing; T_p is the incremental tax rate of lessee p; and k is the before-tax cost of lease capital which applies to the lease cash flows.

Under the assumptions of perfect and complete capital markets, CAPM pricing, and equal incremental tax rates, the risk of the lease cash flows is the same for the lessor and lessee. Therefore, the optimal capital structure and cost of equity for the lease project is the same for each firm because

$$k = \frac{WACC_i}{(1 - T_i)} \quad \text{and} \quad (1 - T_p)k = WACC_i.$$

That is, the lessor's before-tax weighted average cost of capital becomes the lessee's before-tax cost of lease capital, k.

Now, consider acquiring the tangible assets through conventional debt financing. The value of the investment in this situation is

$$NPV(P) = -I + \sum_{t=1}^{n} \frac{NOI_t\,(1 - T_p)}{(1 + WACC_p')^t} + \sum_{t=1}^{n} \frac{T_p\,dep_t}{(1 + (1 - T_p)k')} \qquad (6)$$

where k' is the before-tax cost of debt associated with the investment giving rise to the tax shield on depreciation and $WACC_p'$ is the after-tax weighted average cost of capital that applies to the risky operating cash flow with debt financing. Notice that the tax shield cash flow from depreciation and from leasing are about of equal risk because both can offset the same taxable income. Also, note that operating cash flows in equation (6) and equation (5) are of equal risk because they are the same. Thus, given complete and perfect capital markets and the fact that financial leases substitute for debt in a firm's capital structure, then $k' = k$ and $WACC_p' = WACC_p$.

Substituting equations (5) and (6) into (4) to find the value of a financial lease yields

$$NPV_p = I - \sum_t \frac{L\,(1 - T_p)}{(1 + (1 - T_p)k)^t} - \sum_t \frac{T_p dep_t}{(1 + (1 - T_p)k')^t} \qquad (7)$$

This form of the value of a financial lease shows that the investment value, I, is an implicit value received with the lease, while the depreciation tax shield is an opportunity cost of the lease. Recalling that $k' = k$, $T_p = T_i$, and $(1 - T_p)k = WACC_i$, the terms involving net operating income cancel each other, leaving the terms in equation (7) the same as those in equation (2) but with the signs reversed. Therefore, when lease and debt markets are competitive and in equilibrium, $NPV_p = 0$ and no advantage exists for lease financing over debt financing. Therefore, solving the lessee's maximum acceptable lease payment from equation (7), L_p, is exactly the same as the lessor's minimum acceptable lease payment, L_i, solved in equation (3). If the lessee can secure conditions such that $L < L_p$, the lease will have a $NPV_p > 0$, indicating that value is attained from choosing leasing over debt financing.

Analytical Models

The previous section illustrated that the concepts used for valuing financial leases are theoretically appropriate because, as required by the restrictive assumptions of perfect and complete capital markets and no tax distortions, neither the lessor or lessee earns excess profits from leasing. In reality, however, financial capital market imperfections and distortions from taxes do exist. These present opportunities for gains (losses) from the choice of financing method.

This section extends the models of the previous section by relaxing assumptions which are critical to realistic valuation of financial leases. In particular, analytical models of financial leasing for the broiler industry are developed which include the conditions of different incremental tax rates for the lessor and lessee, including the tax effect on the residual tangible asset value, and imperfect financial capital markets.

The Lessor

Suppose the lessor is an integrated broiler processing firm (integrator) which leases broiler houses and equipment to its contracted producers. Because the integrator has good access to equity and debt markets, the firm's cost of capital can be considered priced according to the CAPM. Equation (2) can be extended to reflect the tangible assets' residual value and tax effect. The value of the lease to the integrator under these conditions is

$$NPV_i = -I + \sum_{t=1}^{n} \frac{L(1 - T_i) + T_i dep_t}{(1 + WACC_i)^t} + \frac{S_n - (S_n - BV)T_i}{(1 + WACC_i)^n}, \qquad (8)$$

where NPV_i is the net present value of a lease to the integrator (lessor); I is the investment cost of the houses and equipment being leased; L is the

lease payment received in all periods; dep_t is the tax depreciation write-off in period t; S_n is the contractual fixed salvage value received; and BV is the tax book value of the leased assets at the end of the lease period. As before, the $WACC_i$ is used to discount all cash flow components because they are all contingent on the lease contract, which makes them all of near-equal risk. Solving the minimum acceptable periodic lease payment from (8) yields

$$L_i = \frac{I}{\sum_t \frac{(1 - T_i)}{(1 + WACC_i)^t}} - \frac{\sum_t \frac{T_i dep_t}{(1 + WACC_i)^t}}{\sum_t \frac{(1 - T_i)}{(1 + WACC_i)^t}} - \frac{\frac{S_n - (S_n - BV)T_i}{(1 + WACC_i)^n}}{\sum_t \frac{(1 - T)_i}{(1 + WACC_i)^t}}. \qquad (9)$$

The additional term in equation (9) not shown in equation (3) indicates that the salvage value recovery reduces the lease payment necessary to earn exactly the cost of capital.

The Lessee

Assume the lessee broiler producer is a sole proprietorship. In this situation, the producer does not have good access to equity or debt markets. Equity capital for the producer is not priced in the equity markets and debt is secured primarily through agricultural financial intermediaries. In this situation it is not clear whether or not the cost of equity capital corresponds to pricing by the CAPM in the market as a whole. It can be argued that the cost of equity is higher for the producer-investor because he is not well diversified. In contrast, it can be argued that it is lower because he considers opportunities only in agricultural production. Nevertheless, CAPM pricing of equity will be assumed for lack of better information and in order to focus on the problem of debt. With the opportunity of leasing from a lessor with

efficiently priced capital, the producer's before-tax cost of capital for the lease is $k = WACC_i/(1 - T_i)$ (the lessor's before-tax weighted average cost of capital). Therefore, except the term for the purchase value of the tangible assets at time n, S_n, the model of tangible asset investment valuation using lease financing is the same as equation (5):

$$NPV(L) = -\sum_{t=1}^{n} \frac{L\,(1 - T_p)}{(1 + (1 - T_p)k)^t} + \sum_{t=1}^{n} \frac{NOI_t\,(1 - T_p)}{(1 + WACC_p)^t} \qquad (10)$$

$$- \frac{S_n}{(1 + (1 - T_p)k)^t}.$$

The cost of capital in which the acquisition of the tangible assets is financed with debt becomes a bit more complex under the less restrictive assumptions. In lease financing, the producer obtains capital based on the market-determined required rate of return ($WACC_i$) of the lessor (integrator); the producer who debt finances pays interest costs charged by a financial intermediary. These intermediaries lend for many purposes of varying risks. If such loans are not efficiently priced according to their risk class, differences between the cost of capital for lease and debt financing may occur for investments in broiler facilities. The potential difference in costs of capital already is reflected in equations (5) and (6). Therefore, equation (6) is unchanged as the tangible asset valuation model with debt financing because no tax changes are needed and an asset purchase payment is not required at n in order to own the asset.

Using the more realistic assumptions that $k' \neq k$ and $WACC_p' \neq WACC_p$, the model valuing the lease becomes

$$NPV_p = I - \sum_{t=1}^{n} \frac{L\,(1 - T_p)}{(1 + (1 - T_p)k)^t} - \sum_{t=1}^{n} \frac{T_p dep_t}{(1 + (1 - T_p)k')^t} \tag{11}$$

$$+ \sum_{t=1}^{n} \frac{NOI_t\,(1 - T_p)}{(1 + WACC_p)^t} - \sum_{t=1}^{n} \frac{NOI_t\,(1 - T_p)}{(1 + WACC_p')^t} - \frac{S_n}{(1 + (1 - T_p)k)^n}.$$

The terms involving the net operating cash flows do not cancel each other in this situation because of differing discount rates. If $WACC_p' > WACC_p$ because debt is not competitively priced, the value of the operating cash flows is higher with lease financing. Also, if $k' > k$, the depreciation tax shield foregone in leasing becomes less valuable. These two components make leasing more attractive in this situation than they do when debt is competitively priced. This is clearly shown by the following equation for the maximum lease payment the lessee is willing to pay:

$$L_p = \frac{I}{\sum_t \frac{(1 - T_p)}{(1 + (1 - T_p)k)^t}} - \frac{\sum_t \frac{T_p dep_t}{(1 + (1 - T_p)k')^t}}{\sum_t \frac{(1 - T_p)}{(1 + (1 - T_p)k)^t}} \tag{12}$$

$$+ \frac{1}{\sum_t \frac{(1 - T_p)}{(1 + (1 - T_p)k)^t}} \left[\sum_t \frac{NOI_t(1 - T_p)}{(1 + WACC_p)^t} - \sum_t \frac{NOI_t\,(1 - T_p)}{(1 + WACC_p')^t} \right]$$

$$- \frac{\frac{S_n}{(1 + (1 - T_p)k)^n}}{\sum_t \frac{(1 - T_p)}{(1 + (1 - T_p)k)^t}}.$$

The higher priced debt raises the maximum periodic lease payment the lessee is willing to make (L_p) because the depreciation value decreases and a premium exists in the value of net operating income from leasing over the value obtained from debt financing.

Another factor affecting L_p is the tax rate, T_p. Because the lessee (producer) is a sole proprietor, the likely situation is that $T_p < T_i$. If T_p is lowered, the values of all components decrease. Nevertheless, it is difficult to say, a priori, whether a tax rate change increases or decreases L_p; the effect depends on the changes in the depreciation and salvage value components relative to the investment cost component.[18] However, it appears that under reasonable circumstances the decrease in the depreciation component and salvage value component will be more than the decrease in the investment cost component. Thus, the probable net effect due to a decrease in T_p is to increase L_p.

The distortions of competitive conditions caused by differentials in tax rates between the lessor and lessee and imperfect debt pricing cause the maximum lease payment the lessee is willing to pay (L_p) and the minimum payment the lessor is willing to accept (L_i) to differ; $L_p - L_i$ shows the amount of this discrepancy. If this amount is positive, a negotiated lease payment which can allow both parties to earn excess profits is possible. The share of this margin obtained by the lessee and lessor depends upon market power, or perhaps, the benevolence of the lessors and lessees. If $L_p - L_i$ is negative, no efficient leasing opportunities exist.

Situations and Assumptions

The Lessor

The major features of financial leasing of broiler houses and equipment which may be considered by the integrator (lessor) firm are as follows: The

integrator receives title to a specified acreage of land from the producer on which the house can be constructed. The producer is responsible for implementing the construction of the building and equipment placement. This feature allows the producer to have control of the cost of the lease. Also, it virtually eliminates added costs to the integrator associated with implementing the leasing activity because the producer bears the same implementation cost as in the purchasing case. After the house is constructed and equipped, it is leased to the producer for a term of 8 years with lease payments based on the original cost of construction and equipment. The producer is given an option to buy the house and equipment at the end of the term fixed at 10% of the original cost. The integrator receives the right of access if the producer defaults on the lease or chooses not to exercise the buyout option. The analyses of this study are based on a lease of two broiler houses with capacity of approximately 44,000 broilers and an initial cost of $138,000.[1]

The cost of equity parameter used to characterize the lease project of an integrated broiler processing firm (the lessor) is based on the average of two firms publicly traded on the New York Stock Exchange--Federal Company and Conagra. The two firms are among the largest broiler processing firms, although they have other business segments as well. Each firm's Standard and Poor's beta[19] is used in the excess returns form of the CAPM equation to calculate the equilibrium risk premium on equity. This risk premium estimate is based on the annualized monthly returns using the Standard and Poor's 500 from 1976-1985 as the market portfolio.[20] The return on a risk free asset is represented by the annualized monthly yield to maturity on short-term government bonds.[20]

The risk premia estimates for the two integrators are 2.39% and 2.63% for Federal Company and Conagra, respectively.

The leveraged cost of equity estimated for 1986 are found by adding the respective risk premium to the risk free rate for 1986 of 6.60%, the average yield on short-term government bonds for the last half of 1986. Thus, the leveraged cost of equity estimates are 8.99% and 9.23% for Federal Company and Conagra, respectively. To adjust for the leverage risk effects, the unleveraged cost of equity is solved from the following leveraged cost of equity equation:[14]

$$k_e = r + (r - i)\,(1 - T_i)\,\frac{B}{S}, \qquad (13)$$

where k_e is the leveraged cost of equity, r is the unleveraged cost of equity, i is the interest rate on debt, T_i is the effective tax rate to lessor i (the integrator) and B/S is the debt-to-equity ratio. The unleveraged cost of equity is 8.76% and 8.55% for Federal Company and Conagra, respectively. The estimates are calculated based on i = 8% (the approximate prime rate for 1986) and the respective T_i and B/S for 1986.[19] The average of these estimates for the two firms is used to represent the unleveraged cost of equity for the broiler lease project, i.e., r = 8.66%. This figure probably is an upper limit because it is doubtful that a lease project is as risky as the firm. Using the unleveraged cost of equity estimate, the 1988 corporate tax rate of 34% and a target debt-to-asset ratio of 0.80, the weighted average cost of capital for the integrator lease project is calculated from equation (1). This equation results in $WACC_i$ = 6.30% and represents the after-tax required rate of return on the lease project for 1988. The target capital structure of 80% debt for the lease project is reasonable (probably conservative) given the fixed cash flow stream from leasing.

The Lessee

As shown previously, the before-tax cost of capital for lease cash flows are the same for the lessor and lessee, i.e., $WACC_i/(1 - T_i) = k$. However, the after-tax cost may differ because of different tax rates, i.e., $(1 - T_p)k \neq WACC_i$ because $T_p \neq T_i$. Because most broiler producers are taxed on the individual rate schedule, the likely situation is that $T_i > T_p$. Two rates are considered for the producer in the analyses--15% and 28%, the applicable federal rates for 1988 under the Tax Reform Act of 1986.

Benefits from a financing method also can occur because of noncompetitive or inefficient pricing of capital. Two situations are considered in order to show the effect: (1) when the cost of debt, k', is the same as the cost of the lease capital, k, i.e., when $k' = k$, and (2) when $k' = 12\%$, the approximate rate charged by agricultural banks in 1986 for machinery and equipment loans.[21]

The difference in debt and lease capital also causes the weighted cost of capital applicable to net operating income to differ for each financing assumption, i.e., $WACC_p' \neq WACC_p$. The weighted average cost of capital for net operating income is based on a target debt-to-asset ratio of 0.4. The producer's cost of equity is assumed to be the same as the integrator's. The unleveraged cost is adjusted for the appropriate leveraging and then used in the traditional weighted cost of capital formula along with either the cost of debt or lease capital to find the appropriate weighted cost of capital. Although the different costs of debt and lease capital may affect the cost of equity, the slight abstraction of leaving the cost of equity constant helps focus attention on the effects of different costs of debt and lease capital.

Considering the two tax rates and the two rates for debt capital, four situations are analyzed. These situations along with the appropriate parameter values are summarized in Table 1.

The net operating income before taxes and depreciation (NOI) for two broiler houses is approximately $25,200 per year.[1]

Analyses

The potential for broiler house and equipment leasing by integrated broiler processing firms is analyzed from the perspective of the integrator and producer. Equation (9) is used with the parameter estimates for the integrator to calculate the annual payments required (L_i) for leasing out two broiler houses. This equation results in L_i = $23,823.

The four situations summarized in Table 1 are considered for the producer in order to value the separate effects. Equation (12) is used to calculate the annual payment the producer is willing to make (L_p) to lease the two broiler houses for each of these situations. The resulting calculations which correspond to the situations in Table 1 are as follows:

(1): L_p = $23,826
(2): Lp = $23,379
(3): Lp = $24,806
(4): Lp = $24,454

The difference in situations (1) and (2) shows that as the tax rate (T_p) moves up from 15% to 28%, given competitively priced debt, the maximum annual payment the producer is willing to make drops over $400. The difference between situations (3) and (4) shows the same type effect for noncompetitively priced debt. The difference between situations (2) and (4) shows that moving from a situation in which debt is competitively priced (9.55%) to one in which debt is inefficiently priced (12%) causes over a $1000 increase in the annual lease payment the producer with a 28% effective

Table 1. Cost of Capital Situations and Parameters for the Broiler Producer Analysis

Cost of debt (k') situation	Producer Tax Rate (T_p) Situation 15%		Producer Tax Rate (T_p) Situation 28%	
	(1)		(2)	
$k' = k$	$k = .0955$	$WACC_p = .0862$	$k = .0955$	$WACC_p = .0812$
	$k' = .0955$	$WACC'_p = .0862$	$k' = .0955$	$WACC'_p = .0812$
	(3)		(4)	
$k' \neq k$	$k = .0955$	$WACC_p = .0862$	$k = .0955$	$WACC_p = .0812$
	$k' = .12$	$WACC'_p = .0945$	$k' = .12$	$WACC'_p = .0883$

[a]Number in parentheses refers to situation depicted below it.

tax rate is willing to make. The difference between situations (1) and (3) shows the same type effect for the 15% tax rate situation.

The annual benefit from leasing over debt financing is determined by $L_p - L_i$. Table 2 shows these differences for the situation summarized in Table 1. Virtually no benefit arises from leasing in situation (1). Although the tax rates for the lessor and lessee differ by 19% in this situation, the difference generates just enough benefits to offset the extra amount of lease payment the lessor requires to cover the taxes on the 10% salvage value of the investment. Given the outcome for situation (1), the negative benefit from situation (2) is obvious. Leasing in situations (3) and (4) produces positive benefits. These benefits occur because debt is noncompetitively priced. As before, the benefit from leasing is larger for the situation with the lowest tax rate, situation (3).

Table 2 also gives the present value of the annual benefits for two different assumptions: (1) when the annual benefits all accrue to the producer and (2) when the annual benefits all accrue to the integrator. As shown, substantial benefits can accrue when debt is inefficiently priced and the producer has low tax rates.

Summary and Concluding Comments

This paper develops theoretical models of leasing from the perspectives of both the lessor and the lessee. These models are used to explicitly consider the value of leasing arising from differences in tax rates between the lessor and lessee and imperfectly priced debt available to the lessee. These models are used to analyze the potential for leasing in the broiler industry, but they also provide the bases for analyzing other industries and other tax and financial situations affecting the value of financial leasing.

Table 2. Benefits of Leasing for Various Broiler Producer Situations

Cost of debt (k')	Producer Tax Rate (T_p) 15%	28%
	Annual benefit in $	
k' = 9.55%	3	-444
k' = 12.00%	983	631
	Present value if annual benefit accrues to producer	
k' = 9.55%	14	NA
k' = 12.00%	4781	2725
	Present value if annual benefit accrues to integrator	
k' = 9.55%	13	NA
k' = 12.00%	3982	2556

NA = not applicable because of negative benefits.

Analysis of the broiler industry shows that leasing may become an important alternative in considering financing of investments in broiler production facilities. Tax rate differences between the producers and integrators, when considered alone, produce marginal or inadequate benefits to make leasing an attractive alternative. Overall, this means that leasing and debt financing are competitive on an after-tax basis when competitively priced on a before-tax basis. However, when the tax rate differences are considered in conjunction with debt pricing inefficiencies which cause debt to broiler producers to be higher than lease capital, the incentives are strong enough to make leasing somewhat attractive. Seemingly, this portrays the situation which presently exists. Although the incentives for leasing under the situations depicted do not appear extraordinarily strong, worsening financial conditions of agricultural lenders which may increase the price of agricultural debt relative to lease capital may cause the incentive to increase sufficiently to induce substantial leasing activity. This may in turn cause agricultural lenders to assess more carefully the risk in the various types of agricultural loans in order to price each type more risk efficiently.

In conclusion, this study shows the potential for integrated broiler processing firms to use their higher tax write-off benefits and more favorable access to capital markets to create benefits which can be passed to producers through leasing. As the agricultural debt crisis worsens, leasing may provide the additional incentive needed to insure adequate investment in broiler production facilities. Analysis of the parameters used in this study shows that current incentives may be strong enough to justify lease financing at present. Whether leasing comes into widespread use, however, depends on the need for production capacity and how the agricultural lending institutions respond to the possibility of leasing as a financing alternative.

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