

# Principles and Background

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## Background

Agricultural production requires the services of many capital items. A capital item is one whose useful life stretches beyond a single production period, where a production period typically is considered to be one year. Prime examples of capital items are farm land, buildings, breeding livestock, and machinery. There are three principal ways that the services of capital assets can be acquired: 1) through ownership, 2) by renting (leasing), and 3) by hiring (custom work). This publication is focused on the second method, renting or leasing.

Farm managers often are interested in discovering the optimal (profit maximizing) way to acquire the services of capital assets. To do this, farm managers must compare the costs and benefits of each capital acquisition option. Consequently, though our focus is on rent, certain issues and aspects associated with ownership and custom services will enter the discussion as necessary.

Determining optimal renting strategies typically entails substantial number crunching around numerous assumptions or expectations. Indeed, several spreadsheet-based analytical decision-aiding tools already have been made available to farm managers to guide their number crunching. For example, to name a few, spreadsheets designed to aid land buying, land renting, cow leasing, tractor ownership, and crop sprayer ownership decisions already are available on the [www.agmanager.info](http://www.agmanager.info) website. On the other hand, managers' questions often stretch beyond such classical cases, for example, to grain or hay storage facility leasing. Regardless of whether canned software such as spreadsheets are currently available from K-State or elsewhere, understanding certain basic principles will go a long ways to help answer the difficult questions associated with leasing. We start with three fundamental principles, followed by several auxiliary issues.

## Three Basic Principles

### Basic Principle #1: Competitive Markets

In a highly competitive environment such as that associated with production agriculture, market forces bring together supply and demand through market price. For example, as the rental price of a tractor rises, more and more tractors would be offered for rent (supply) by machinery owners (lessors), whereas fewer and fewer tractor users (lessees) would be willing to rent a tractor at those prices. At some point, supply and demand meet, and that establishes the "market" price.

The presence of business competition affords many comparisons that can improve understanding around a rental issue. Following are several examples of how the competitive market principle provides insight into rental issues.

- It means that the average cash equivalent of a crop share lease across several years likely will not depart too far from the typical cash rent paid in the area.
- It means that tractor rental rates will not vary dramatically from dealer to dealer or farmer to farmer.
- It means that we would not expect ownership to systematically result in greater or less profits than renting.
- It means that building ownership or rent likely will not be universally preferred to the alternative, and a similar story for cow leasing compared to cow ownership.

The competitive markets principle is both descriptive and prescriptive. Certainly, it describes “how things are,” and prescribes “how things are expected to be.” Thus, consider the question, How much should I charge my neighbor to rent my grain bin? A reasonable place to start is by asking an additional question: How much do grain elevators charge for commercial grain storage? That is, if many farmers routinely were renting their grain bins to other farmers, the rental charge would converge on the rate charged by commercial grain storage facilities.

### **Basic Principle #2: Cost Equals Revenue Equals Price**

In principle, a profit maximizing manager will increase the level of a production input until the cost associated with the last unit of input is just covered by the revenue associated with the output induced by that last unit of input. In economics terms, this is a statement that marginal cost equals marginal revenue ( $MC = MR$ ). But, in competitive markets, marginal revenue equals price ( $MR = P$ ), meaning that the  $MC = MR$  principle can be recast as  $MC = P$ . Also, in the long run for competitive markets, average cost equals marginal costs ( $AC = MC$ ). Thus, in practice, this  $MC = MR$  economic principle can best be seen by the fact that the typical or average cost of a product or service generally is close to the typical or average price of that product or service. The fact that different producers have different marginal costs results in the supply curve briefly alluded to in the previous section.

Like the competitive markets principle, the  $MC = MR$  principle (and its extensions from the preceding paragraph) is powerful when it comes to gaining an understanding of rental issues. The following examples illustrate the importance of the  $MC = MR$  principle in rental issues.

- It means that average tractor rental rates will be (or “should” be, or are expected to be) close to comparable ownership costs.
- It means custom rates likely will be close to comparable machinery ownership and operating costs.
- It means commercial elevator grain storage charges will not be dramatically different from on-farm grain storage costs.

- It means that alternative methods of financing, such as a bank loan vs. a company lease-purchase plan, should not be dramatically different in their outcomes. Thus, an analyst who finds a lease-purchase agreement that appears “too good to be true” relative to bank financing likely has made a mistake in the analysis.

The competitive markets and  $MC = MR$  principles may assist in making “first cuts” at resolving rental problems. As such, a constant awareness of these principles will prevent the educator or decision maker from reaching extremely outlandish conclusions. This alone is valuable in that it provides a good place to start further negotiations around rental arrangements. But, these principles should not constitute the entirety of a lease analysis. In fact, it often is the subtle distinctions around a market equilibrium price that allow for generating positive economic profits. For example, finding one or the other of bank financing or lease-purchase to be slightly economically advantageous is precisely what generating positive profits is all about.

### **Basic Principle #3: Equitable Lease**

The first two principles are based on the theory of profit maximization, which assumes also that cost equals revenue at the profit maximizing point (0 economic profit). Economic profit is defined somewhat differently than financial profit or accounting profit. Economic profit assumes all opportunity costs are accounted for. That is, all assets of value are assigned an opportunity interest cost – because the assets presumably otherwise could be sold and the money invested in an interest bearing account. Financial profit or accounting profit can best be considered as “return on investment,” either in dollar terms or in percentage terms. These distinctions in the word “profit” can best be seen by example. Consider an individual who has invested \$100,000 of his or her own money in a tractor. Now, suppose that the individual pays all cash costs associated with using the tractor, and even sets aside money to cover the non-cash cost of depreciation that will be needed to fund tractor replacement. Suppose revenue is generated from the tractor’s use. An obvious example of revenue would be rent if the tractor were rented to someone to use. Suppose that, after cash and non-cash costs are subtracted from the tractor’s revenue for a year, \$6,000 remains. This \$6,000 return or “financial profit” can be referred to as a 6% return on investment. Now, if the going interest rate on tractor loans happens to also be 6%, the tractor owner is said to have acquired 0 economic profit. That is because the owner presumably could have made a loan to a different tractor buyer rather than buy a tractor himself or herself. Put another way, the tractor owner could have invested his or her money in an investment with similar risk as tractor ownership, and could have acquired \$6,000 that way instead of through tractor ownership. Finally, “financial profit” lower than \$6,000 would mean negative economic profit and greater than \$6,000 would mean positive economic profit.

Economic profit is worth considering in decision making because it accounts for risk. That is, ownership of riskier assets would be assigned a greater opportunity interest cost. Put another way, return on investment is expected to be higher for riskier ventures. More importantly, computing economic profit rather than financial profit ensures that all costs are accounted for. An example cost that is easy to miss otherwise is market depreciation

(replacement cost). Failure to account for replacement cost ultimately would result in a failed investment that could not be sustained. On the other hand, if tax depreciation were accounted for rather than market depreciation (tax depreciation typically is greater than market depreciation), the investment may look much worse than it is – because it fails to account for the fact that an asset typically can be sold for more than its tax book value in the future.

Likely, decision makers are smart enough to “see through” the investment-comparison difficulties associated with using only financial accounting. Consequently, economists assume that decision makers generally behave in a way that maximizes their economic profits, not their financial profits. Although economic profit (henceforth, just “profit”) maximization probably is the dominant descriptor of business behavior, it does not of itself guide rental negotiation to a point of agreement. That is because expected costs and revenues for a given situation might result in positive or negative expected profits, for either or both of a landlord and a tenant considering a possible rental arrangement. More to the point, suppose that a crop-share landlord and tenant both agree that profits should be maximized to the farm as a whole, yet it is not clear exactly how crop inputs and costs should be shared. There could be a wide range of possible arrangements where either or both the landlord and the tenant expect to make a positive profit. Clearly, in such settings, there will be room for negotiations.

When profit maximization does not lead immediately to a rental solution, decision makers routinely turn to the equitable lease principle. By this principle, it is agreed that revenues (or expected revenues) will be shared in the same proportion at which inputs (or expected inputs) will be provided. A tenant contributing 60% of a crop’s total annual input costs agrees to accept 60% of the crop revenue (the landlord gets the other 40%). The equitable lease principle is not so much based on economic theory as it is on convention. That is, it generally has been accepted as an appropriate and intuitively reasonable way to split input and output shares in a share rental arrangement. Interestingly, in an equitable share rent setting with 0 profit, prices and costs do equate – for the landlord and tenant individually, and for the farm as a whole.

There is one way that the equitable lease principle can be considered based on economic theory. In particular, if all costs (cash or otherwise) are annualized, with the related “investment” considered to be those annual costs, then the equitable lease will result in the same rate of return on investment for both the landlord and the tenant, regardless of whether the lease results in negative, 0, or positive economic profits. Having equal percentage returns on investment would be expected from economic theory as long as the risk is similar for the landlord and the tenant. And, the way costs are annualized in an equitable share lease, this automatically happens. That is, the annualization process, which inherently uses interest or capitalization rates commensurate with the different landlord and tenant risks involved, makes the annualized “investments” comparable from a risk perspective.

## **Other Issues**

The competitive markets and  $MC = MR$  basic principles are based on an underlying general assumption of perfect competition. That general assumption embodies these specific assumptions: 1) an adequate number of market participants (buyers and sellers), 2) market participants with similar tastes and preferences, 3) perfect information (i.e., everyone is a price taker), and 4) firms earn only normal profit (just enough to keep them in business, that is, a rate of return on investment commensurate with the risks taken – 0 economic profit). These are strong assumptions. Thus, the more a rental situation departs from these assumptions, the more likely other principles and ideas will be needed to resolve the rental question.

## **Thin Markets**

Thin markets describe a situation where there are very few buyers and sellers, say only one of each. In this case, two possibilities arise. The first case is where the seller's reservation price (the least he/she will take) is greater than the buyer's reservation price (the most he/she is willing to pay). Clearly, no transaction will occur. The second, and reverse case, is where the seller's reservation price is less than the buyer's reservation price. This is the more typical situation of thin markets, for example, when one hay shed owner is confronted by one hay owner to negotiate a rental price for the hay shed. The participants may recognize the overlap in their positions, but that alone is not adequate to resolve a rental price. One quick solution is to "split the difference" between the two reservation prices. But that assumes the reservation prices are accurately known to both parties, which is unlikely given the incentive to distort reservation prices in one's favor.

## **Market Power**

Market power is associated with thin markets on only one side, either for the buyer or for the seller, but not both. An example might be one hay shed owner but multiple hay growers desiring the hay storage space. In that case, the seller (the hay shed owner) will wield market power by letting the hay growers bid among each other to acquire the desired hay storage space. Here, the seller's reservation price will be nearly irrelevant to the negotiation, and the seller typically will be in a good position to extract positive economic profits from the rental arrangement.

## **Time Value of Money (discounting principle)**

By definition, renting means controlling capital asset services in a relatively short, piecemeal fashion, for example one hour or one year at a time. As such, rental payments are considered comparable to other non-capital expenditures (e.g., fertilizer, seed, utilities), implying that the complexity associated with investment analysis can be avoided in a rent setting. On the other hand, it is often capital asset ownership against which rent will be compared. For example, a manager considering a tractor rental may want to compare the rental cost against comparable costs associated with ownership. Consequently, rental arrangements can be better understood alongside an at least

rudimentary understanding of investment principles, in particular the time value of money, or net present value analysis.

There is a cost associated with using money over time, whether the money is from borrowed funds or from equity funds. With borrowed funds, the obvious cost is the interest on the loan. As noted earlier, if the money is from equity funds, the cost is the foregone opportunity interest, or that which could have been earned had the money been invested in other comparable investments.

An interest rate is used to determine money values across time. For example, using an interest rate of 7 percent annually, a dollar today is worth \$1.07 a year from now, or  $1.07 \times 1.07 = \$1.1449$  two years in the future (basic compound interest formula). Similarly, a dollar to be received 2 years from now would be worth  $1 / 1.1449$ , or approximately \$0.87 today. To make a string of money flows from one alternative (e.g., tractor ownership) comparable to a competing alternative (e.g., tractor rent), each of the money flows must be adjusted to a common point in time using the discounting principle. Thus, in the example just given, a dollar expected to be received 2 years from now would be multiplied by 0.87 to adjust it back to today. Finally, all point-in-time adjusted money flows for a particular investment are added together to become the net present value (NPV) of that investment. Then, that NPV can be compared to the NPV of a different alternative to determine which is preferred.

With NPV analysis, the common point in time referenced is typically today, hence net *present* value. NPV can be expressed in terms of net costs or in terms of net revenues. A strategy with lower NPV of net costs or one with higher NPV of net revenue will be preferred to the corresponding opposite alternative.

## **Income Tax**

Because money spent on taxes cannot be used for personal consumption or enjoyment, it is likely that decision makers maximize after-income-tax profits rather than pre-income-tax profits. All that means is that income taxes are considered costs to the production process just like fuel and repairs might be. It means also that it is after-tax cash flows that should be tracked over time in an NPV analysis. Furthermore, an after-tax interest rate should be used for discounting money flows over time, to allow for the fact that loan interest is tax deductible and investment interest typically is taxed.

Income tax has an important role to play when comparing ownership strategies with rental strategies. In particular, those who are in high tax brackets typically have an incentive to own an asset rather than rent it. For farm land, that arises from the fact that a portion of investment returns are not taxed until far in the future, and maybe not at all, if the land successively passes to heirs upon death, that is, to those who get a “stepped-up” tax basis upon acquisition (e.g., land and machinery acquired through an estate are valued at the market; hence, if they are immediately sold at market prices, no capital gains taxes are assessed). Such tax deferral or near tax exemption is more beneficial to those in high tax brackets (exempting income tax is worth more to them). For machinery, tax laws

generally allow tax depreciation that is faster than market depreciation, hence, more “expenses” to write off early on in an asset’s life compared to a rental situation. As with the land, the faster write-offs in this scenario lead to taxes being deferred into the future – a feature that is more preferred by those in higher tax brackets.

### **Sunk Costs**

Farm managers routinely find themselves in settings where certain costs are sunk or fixed. That is, they represent monies that are gone and which cannot easily be recovered. One example is grain storage facilities that may have been acquired in a land purchase or which simply otherwise exist. Unless the manager has an opportunity to sell the grain bins, it would be beneficial to rent the facilities even if the rental fee covers only variable costs, such as those associated with electricity to run aeration fans and annual wear and tear from use. Of course, this characteristic of the rental situation might be combined with other characteristics such as thin markets or market power, leaving the pricing problem unresolved. Regardless, becoming aware of the various economic characteristics should help negotiators work through the negotiation process.

The idea of sunk costs often is captured by economists in their distinction between long run and short run. In the preceding example, the grain storage facility owner who chooses to rent out the facilities for something greater than variable costs but less than total costs is making a short run decision. That is, the revenues acquired will be insufficient to replace the facilities at the time they become obsolete or otherwise deteriorate to a state of un-usability. Of course, making such a short run decision could be rational and optimal. For example, location and mechanical features of the facilities may mean the market simply will not bear a storage charge sufficient to cover total costs of replacement. In that case, it makes sense to “take what you can get,” recognizing that the long run decision to build new facilities that are more attractive to potential renters is a totally different decision.

Economists often consider that, before an investment is actually made, all expected costs are intrinsically variable, which also means that all pre-investment decisions are intrinsically long run decisions. Thus, prior to investment, expected revenues should be greater than expected total costs. Then, once the investment is made, a portion of the expenditures become sunk costs – because they are monies that are gone. Sometimes a further assumption is made, that the investment would not be easy to sell on the open market. In this scenario, and following with a grain facilities example, it is argued that owners are better off charging a rent above variable costs (regardless of whether or not it is above total costs) than not renting the facility at all. While this is a true statement, this rendition of the idea of sunk costs is no more helpful than the one in the preceding paragraph. The result is the same – not charging sufficient rent will make replacement in the future impossible.

All in all, the ideas of sunk costs, fixed costs, variable costs, short run, and long run only provide a framework for evaluating expected returns on investment given different rental charges. They do not, of themselves, “set” rental rates. They do, however, lead to

conversations of the following form. “Look, if you don’t pay me at least this much, I won’t be able to keep up nor replace my facilities and they will hence become un-usable or unavailable to you in the future.” On the other hand, what does the concept of total costs mean in a year when commercial grain storage is essentially unavailable in a locale due to an unexpected large harvest (causing a large increase in demand for grain storage facilities)? What does it mean in a situation when commercial storage is readily available and largely preferred to my facilities?

### **Economies of Size**

Economies of size implies that larger farms have lower per-unit costs than smaller farms. This is a powerful economic reality based on the idea that fixed costs can be spread over more units of production. As an example, larger tractors are less expensive to purchase on a per horsepower basis than are smaller tractors. As another example, the cost of a manager’s time meeting with the FSA to certify crop acres, or negotiating input purchases, will be lower on a per-acre basis for the large farm relative to a smaller one. Economies of size make it possible for larger farms to “bid up” rents relative to smaller ones. Of course, whether this actually happens depends on the presence of at least two large farms in direct competition in the area. This can give the illusion that such “high” rents are inappropriate for an area. In particular, average or typical farmers may consider prevailing rents to be economically unjustifiable, whereas, from an individual farmer’s viewpoint, the prevailing market rate may be more than appropriate.

### **Risk**

Risk is defined as expected variation about an expected or average outcome. For example, you might expect a 40 bu/acre wheat yield across multiple years, but recognize that you might be hailed out in some years and get bumper crops in others. In general, we assume that individuals are risk averse. That is, assuming price is the same each year, receiving 40 bu/acre each and every year is preferred to receiving 0 bu/acre one year and 80 bu/acre the next. Put another way, investors must “see” (expect) a higher return (financial profit) on investments that are perceived to be more risky. They simply refuse to invest unless the expected return is sufficient to accommodate the risks. This is referred to as the risk/reward tradeoff, and means that capital assets associated with high risk production processes will be valued lower than they would be in the absence of risk. It is the risk/reward tradeoff that causes us to believe that the cash equivalent of a share lease would or should be higher than that of a cash lease (because the tenant, presumably, is taking most of the risk).

Unfortunately, for a number of reasons, the economic concepts associated with risk and reward do not always lead to a straightforward answer in rental negotiations – because landlord and tenant risks associated with cash and share rental arrangements often are poorly understood and hard to generalize into rules of thumb. For example, suppose that cash rents are expected to be lower than the cash equivalents of share rents. This should be a reasonable expectation in that the cash renting landlord likely would be willing to “accept a lower payment” because he or she is assuming less risk than with a crop sharing



arrangement. Similarly, the tenant probably is willing to pay less with cash rent because of the added risk assumed by that tenant (cash rent must be paid even when crops are wiped out). But, just how much higher are the risks of share renting compared to cash renting from the tenant's perspective?

Continuing with the supposition of the previous paragraph, many tenants readily use the heavily subsidized crop insurance program to reduce risk substantially from that which is inherent in crop yield variability across years. Additionally, ad hoc disaster programs often emerge that lower the tenant's risk even further. Also, some tenants have sharply reduced their risk through geographical diversity. Moreover, from the landlord's perspective, cash rent is not riskless. That is, the risk of default on payment can be very real, especially if payments are not demanded until the end of the year, but also in the case where tenants request a late payment due to hard times and the landlord wants to oblige.

Perhaps even more important than the fact that share renting may not be "as risky as commonly assumed," the costs of servicing a share lease may very well be higher than the costs of servicing a cash lease. For example, crop inputs must be invoiced and paid in a share rental arrangement, separate landlord and tenant crop ownership and marketing occur in a share rental arrangement, and ensuring that the landlord is informed about crop production is costly for both tenant and landlord. Avoiding such costs by cash renting means that cash rents might actually be higher than the cash equivalent of share rents. That is, there could be more profits to divide between the tenant and landlord, meaning a higher cash rent could result. Finally, if a disproportionate part of the added costs associated with share rental arrangements falls to the tenant (and it probably does), and assuming competition is keener among tenants than among landlords, this could result in cash rents that might be considerably higher than the cash equivalents of share rents – since the tenant bids up cash rents to avoid these costs.

Besides those issues noted above, simplistically considering cash vs. share rent in a risk/reward framework is less than appropriate for still other reasons. For example, prevailing share-rental arrangements can be "sticky" for years. That means farmers who have the capacity (lower costs) to "bid up" cash rents can only do so in the form of a cash rental arrangement, which implies that average cash rents can be higher than average cash-equivalents of share rents. Secondly, a successful high-crop-yielding tenant may be substantially more profitable paying prevailing cash rents than prevailing share rents since the cash equivalent of high-yielding crops could comprise substantial foregone revenue. Once again, an implicit assumption is that competition is keener among tenants than among landlords. Regardless, few of the issues noted above are expressly about risk/reward, but rather inherently about costs and revenues.

### **Motives Other than Profit**

People generally are thought to be utility (happiness) maximizers. It just happens that profit maximization often is closely aligned with utility maximization. Yet, there are those whose utility motives are much stronger than their profit motives. For example, a

farm with a view might be preferred over one without a view. A farm with hunting or recreational possibilities might be valued more highly than one without. A landlord may be willing to rent to a tenant at less-than-market rates because the arrangement is seen to further a non-pecuniary goal of the landlord, say to “help the guy get started.” The point here is that recognizing such human characteristics might result in an acceptable rental arrangement that can depart substantially from one that would emerge in a “profit-only” environment.

On the other hand, where it appears someone is maximizing something other than profit, it could simply be a difference in perception between the short run and long run. For example, landlords who accept less-than-market cash rental rates appear to be acting outside the realm of profit maximization, when in fact, they may simply be recognizing long-run search costs associated with high turnover of tenants. Or, they might recognize that long run average annual rent could be higher in this situation than where an above-market rent is agreed to by a tenant but not consistently carried through with due to inability to pay. Finally, for many, the people relationships attached to land leasing arrangements often can be more important than the pecuniary aspects. This means good communication between landlords and tenants is absolutely critical. Repeating, and perhaps most importantly of all, good people skills and good communication often mean higher profits in the long run – for all parties involved.

### **Summary**

Economic principles are important for guiding rental decisions. First of all, competitive market principles can lead a rental negotiator to ask the right questions. For example, in the case of a hay storage facility, How many other potential renters are there? What is my alternative for hay storage if I am not able to arrive at an acceptable arrangement with an owner of a hay storage building? What are my costs associated with storing the hay outside? Or, in the case of land, What is the going cash rent in the area? Second, economic investment principles can help fine tune a rental arrangement and help determine whether ownership or renting is preferred from a profitability standpoint. Thirdly, understanding economic principles can foster an understanding about what is observed. For example, recognizing that different farms have different costs and different income tax rates will help a farm manager understand why different farms might tender different rental bids.