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Abstract

This paper discusses the recent increases in the returns to crop production as well as trends in land rental rates and the types of rental agreements used in the Midwest. The concept of a flex cash lease and an approach to defining the terms of such a lease, relative to the current fixed cash or share arrangement, are outlined within the context of an example Midwestern corn farm. The resulting flex lease results in returns to the tenant and landowner which are a hybrid of those realized under the more traditional fixed cash and share rent agreements. Using these alternatives as benchmarks, the approach to defining a flex lease could be applied to other specific farm scenarios.

Revisiting Flexible Cash Leases

By Nicholas D. Paulson

Introduction

The economics of land tenancy has long been studied by agricultural economists. Published work in this area dates back to the periods leading up to and following the Great Depression in the 1920s and 1930s (e.g., Harris, 1937; Heady 1947). The risk-reward tradeoff between fixed cash rent contracts and crop share agreements is well known, and equally documented in the theoretical literature on tenancy contracts (e.g., Allen & Lueck, 1992a and 1992b; Stiglitz, 1974). Under fixed cash rent, the tenant pays the landlord a fixed return for use of the land and assumes all financial risks associated with production. A crop-share agreement splits both risk and returns among the tenant and landlord as they typically share in both the realized revenues from and costs associated with production based on agreed upon share rates. While the specific attributes of share rental agreements vary, the general structure is one in which the tenant provides labor and machinery, the landlord provides the land, and both parties share in the revenues from, and other costs (e.g., variable inputs) associated with, crop production.

In comparing these two contract types – cash rent and crop share – the economic theory of risk and returns would suggest that tenants would, over time, earn a risk premium for taking on the risk in a cash rent contract. This implies that the expected return under a crop share agreement for the tenant would be less than the expected return under a cash rent agreement. Alternatively, this could be stated by saying that the expected share rental payment to the landlord (landlord's share of crop revenues less costs) should be greater than the fixed cash rent payment. However, in examining realized returns to Illinois Farm Business Farm Management (FBFM) farms since 1996, the opposite result is actually found. Farms utilizing a high degree of cash rent arrangements have actually earned lower returns, on average, over the past 15 years compared to those farms relying more heavily on crop-share arrangements.



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Furthermore, there has been a continued trend away from share rent contracts towards fixed cash rent agreements throughout much of the Midwest since the early 1990s (Barry et al., 2000; Barry, Sotomayer, & Moss, 2000; Sotomayer, Ellinger, and Barry, 2000; Paterson, Hanson, & Robison, 2000). Fixed cash leases may be preferred for a number of reasons, such as greater bidding flexibility and more autonomous control of management decisions for the tenant operator, and the elimination of management decisions and a stable fixed return for the landowner. Cash rent agreements also reduce the landowner's responsibilities in dealing with the Farm Service Agency and related government payments and subsidy programs, as well as crop insurance decisions. Still, this shift in rental agreement type has serious implications for the risk exposure facing tenants, which even the ability to purchase crop revenue or yield insurance at high coverage levels cannot fully balance (Paulson, Schnitkey, and Sherrick, 2010).

Finally, with the recent increase in commodity prices and input costs, agricultural producers are dealing with an unprecedented level of financial risk in nominal terms. Expected revenues in many Midwestern crop budgets exceed \$1,000 per acre for corn, with \$500 to \$600 per acre tied up and at risk in production costs even before land costs are considered (Duffy, 2010; Schnitkey, 2011). Given the strong farm returns realized, on average, over the past five crop years, land costs have also increased substantially. Thus, while farm incomes have reached record levels, the potential for losses and the potential size of those losses have also increased considerably compared to the 1990s and early 2000s.

Based on these factors, now seems a reasonable time to once again revisit the potential for the use of flexible cash leases as an alternative to fixed cash leases or crop share agreements. This paper will discuss recent trends in land values, rental rates, and the types of rental agreements used in practice in Illinois. Then the benefits of a flexible cash lease, from both the landowner and tenant perspectives will be briefly discussed and an approach to determining the "parameters" in designing a flexible cash lease will be outlined with the resulting effect on crop return risk exposure compared to cash and share rent agreements using simple simulation methods. The final section of the paper summarizes its main points and provides some brief concluding remarks and caveats to the suggested approach for flex lease design.

Land Rental and Leasing Trends in the Midwest

Cash rental rates for land used for crop production have risen consistently since the late 1980s. Since 2005, the rate of increase has

grown to follow that of increasing crop returns driven by significantly higher prices for commodities such as corn, soybeans, and wheat. USDA (2011) data from Illinois report an average rental rate of \$180 per acre for the 2010 crop year, up from \$100 in 1990. Figure 1 reports average rental rates for cropland in Illinois along with non-land costs of production from 1976 through 2011, illustrating the sharper increase in both since 2004/05. Survey data from Iowa shows similar rental rate increases through 2010, and an even more significant increase in rent levels to \$214 per acre in 2011 (Edwards, 2011b).

Furthermore, these averages likely underestimate rental rate increases being realized at the farm level for new negotiations. Regional data from Illinois indicate rates for newly negotiated cash rent contracts exceeding \$300 per acre in Northern Illinois and \$400 per acre in Central Illinois for farms considered to have excellent soil quality (ISPFMRA, 2011). With higher commodity prices expected for 2012, all indications are that cash rent levels will continue to rise and the potential for another year of double-digit percentage increases in rental rates.

Beyond the increases in cash rents lies another important trend in the types of lease agreements which are being utilized by farmers and landowners. Since 1997, the average proportion of land operated by Illinois FBFM farms under a cash rent agreement has increased from 26 to 40 percent, while the proportion of land operated under a share rent agreement has declined from 49 to 38 percent. These trends are illustrated in Figure 2, which also shows that ownership rates among farm operators has remained relatively stable at just under 25 percent over the same time period.

The adoption rate of flexible cash leases has increased in recent years, but still varies widely across regions. This is true even within the state of Illinois. For example, between 2 and 10 percent of new rental agreements are based on a flexible cash lease in Northern Illinois, where cash rental rates tend to dominate. In Central Illinois, up to 30 percent of new agreements follow a flexible cash design. Regions in Southern Illinois reported flexible cash leases being used for as many as 75 percent of newly negotiated agreements (ISPFMRA, 2011). In general, these regional differences indicate that flexible cash leases are more popular, or adopted at greater rates, in areas where crop share rental agreements have continued to be more common.

Designing a Flex Lease

Flexible leases offer both the tenant and landlord many advantages compared to the more typical fixed cash or crop share designs (Williams, 2011a; Johnson, 2009). From the tenant's perspective, flex leases offer the same risk sharing benefits as a crop share lease while still allowing for autonomy and independence in management and decision-making. For the landlord, flex leases allow for greater returns during highly profitable crops years without requiring their involvement in marketing or other management decisions. Furthermore, since flex leases are considered to be equivalent to fixed cash rent agreements by the USDA, landowners are not required to deal with processes related to receiving government payments, such as enrolling to receive direct and counter-cyclical payments or being subject to income limitation rules (McEowen, 2008).

While it is difficult to discuss a "standard" flexible cash lease, they can be relatively easy to define based simply on crop revenue realizations for the farm during the crop year. Furthermore, the return profiles for fixed cash rent and crop share agreements can be used as baselines to aid in setting the parameters which define a flex lease contract. Flex leases should be viewed as a mix or hybrid of cash rent and crop share agreements, resulting in rent level realizations between those which would result under the two alternatives under a range of profitability conditions. This method allows both the landowner and tenant to understand what rent levels may be realized under various revenue conditions for a flex lease agreement, and compare them to their respective returns under either of the more historically common alternatives.

While a net revenue or return measure could be used to define a flex lease (i.e., one which incorporates a measure of non-land production costs), the example flex lease outlined here will be determined solely on a gross revenue measure and include the following characteristics:

- A base rent, or minimum rent level
The base rent should be set relative to either the existing or historical cash rent level paid for the farm, or typical cash rent levels paid for similar quality land in the area. The base rent provides a minimum return to the landlord and, at the same time, a cap or maximum cost to the tenant during periods of low profitability. Since the landlord is receiving the potential for higher returns under the flex lease, this base rent should be set below what would be considered a fair rental rate for a fixed cash rent agreement for the farm.
- A share, or percentage, of realized crop revenues
The share percentage in the flex lease will define the rate at which rent levels will increase with crop revenues. This share could be applied to total gross revenues, or only to gross revenues when they exceed a certain level. For the following example, the revenue share will apply to revenues only when they exceed a pre-determined base level. This base revenue will typically be set relative to some sort of break-even revenue measure.

Additional parameters could also be introduced to a flex lease contract. Examples might include a cap, or maximum, rent level that may be achieved. However, the addition of components to the contract increases its complexity which will likely make it less desirable from the perspectives of both the tenant and the landowner.

To illustrate the process for designing a flex lease contract, an example negotiation scenario will be used based on typical yield levels for central Illinois and 2012 crop budgets for prices and production costs (Schnitkey, 2011). Consider a farm with an expected corn yield of 170 bushels per acre. The planning price for the upcoming crop year will be set at \$5.50 per bushel, with non-land production costs expected to be \$500 per acre. Suppose the farm is currently cash rented at a rate of \$250 per acre. It is also assumed that farms in the surrounding area which are operated under a crop share agreement provide 55 percent of crop revenues to the landlord, while landlords pay 45 percent of total production costs. This 55-45 arrangement can be viewed as a typical or average share rent setup based on FBFM farm operations which have used share rent agreements over the past five years.

When evaluated at expected yields and price levels, the cash rental agreement yields a return to the tenant of \$185 per acre and a return to the landowner at the cash rental rate of \$250 per acre. The crop share agreement would result in a return to the tenant of \$145.75 per acre, while the landlord's return under the crop share agreement would be \$289.25 per acre. This would represent a case where there exists a fairly realistic risk-return tradeoff between the cash and share rental contract alternatives being used in practice.

The cash and share rental contracts in this case provide benchmarks which can be used in defining a flex lease which may be desirable for both the tenant and the landlord. Given the current cash rent arrangement, the landlord will not be willing to accept an expected return below \$250 per acre, given that the rent level resulting under

the flex lease will not be certain. From the tenant's perspective, the goal should be to reduce the volatility of returns while being willing to increase the expected rent level no higher than that under the crop share agreement (\$289.25 per acre). A flex lease which achieves these objectives is defined by a base rent level of \$150 per acre, and an additional share of 25 percent of revenues exceeding \$500 per acre being paid to the landlord. This results in an expected rent level greater than \$250, while reducing return variability for the tenant.

The rental contracts are summarized in Table 1, while the rent level profiles are illustrated in Figure 3. For realized revenue levels around \$850 per acre, the three rental agreements result in similar rental payments. As realized crop revenues rise – due to excellent yields, high prices, or both – the rental rate will also increase for the flex and share contracts, while the cash rental rate remains fixed. Similarly, as revenues fall, the resulting rental rates under the flex and share contracts will also decline to reflect the lower returns being earned by the tenant. Note that the flex lease results in rental payment levels between the cash and share rent contracts for both relatively high and relatively low revenue levels, illustrating the hybrid nature of these contracts. In moving towards the lease from a cash rent agreement, as was the case described here, the tenant would gain some risk sharing while the landlord would receive a slightly higher rental rate on average. If the situation were such that the flex lease was an alternative to the example share agreement, the landlord would be giving up some expected return to reduce their risk exposure, whereas the opposite would be true for the tenant. The next section will illustrate these risk-return tradeoffs in the context of a price-yield simulation.

Simulation Illustrations

A set of 5,000 corn yields and prices were simulated assuming an average corn yield of 170 bushels per acre and an average corn price of \$5.50. The standard deviation of yield and prices were set equal to 26 bushels per acre and \$1.62 per bushel, respectively. These parameter values align with the example of the previous section and would be considered typical for a grain farm in central Illinois. A simple linear rank correlation of -0.40 was then imposed on the simulated yields and prices using the method presented in Iman and Conover (1982).

The price and yield values were then used to generate 5,000 return realizations for each land lease contract assuming non-land production costs of \$500 per acre. For the cash rent agreement, production costs and the fixed rental rate of \$250 per acre were subtracted from crop revenue (product of price and yield). For the

crop share agreement, tenant returns were defined as 45 percent of revenue less 55 percent of production costs. Finally, returns under the example flex lease were defined as revenue less the base rent of \$150 per acre and 25 percent of revenue if it exceeded \$500 per acre.

Summary statistics for the tenant return distributions are summarized in Table 2. Also included in the table are summary statistics for the distribution of landlord returns, which are the distribution of rental payments made by the tenant. The greatest expected returns are earned by the landlord under the share contract, while the risk exposure of the landlord is also greatest of the three alternatives. The cash rent contract provides the highest expected return to the tenant and also the largest risk exposure, while the landlord earns a fixed return of \$250 per acre. The flex lease results in a compromise between expected return levels and risk exposure (standard deviation, minimum, and maximum) for the cash and share rent contracts.

Figure 4 illustrates the differences in return risk exposure for the tenant using cumulative probability distribution curves. Each point on the curves represents the probability of returns falling below a certain level. For example, the cash rent agreement results in the probability of a loss (tenant return less than zero) of approximately 31 percent or one out of every three years. The share agreement results in the probability of a loss of about 10 percent or one out of every 10 years. The probability of a loss under a flex lease is in between the two alternatives at approximately 20 percent or one out of every five years. Similar results can be seen for high tenant return levels. Tenant returns exceeding \$300 per acre will occur approximately 30 percent (100-70%) of the time under a cash lease, but only 10 percent of the time under a share agreement. The flex lease results in the probability of returns exceeding \$300 of approximately 25 percent or one of every four years. Again, the flex lease should be designed to provide a mix of the risk-return profiles for both the tenant and landlord under typical or actual cash or share rent agreements used on similar quality land within the region.

Figure 5 provides another graphical illustration of the distribution of returns for each of the rental contracts. The red portion of each series represents the proportion of simulated outcomes where the farmer tenant would realize a loss or negative returns per acre. The probability of a loss is 27 percent under the share rent contract, 8.1 percent under the share rent contract, and 18.8 percent for the flex lease. Similarly, the proportion of simulated outcomes where tenant returns were between \$0 and \$200 per acre, and greater than \$200 per

acre are illustrated in the yellow and green series, respectively, for each rental contract. While the probability of a loss is greatest under the cash rent contract, large returns exceeding \$200 per acre are also much more likely. The share rent agreement significantly reduces downside risk but also reduces the likelihood of tenant returns exceeding \$200 per acre. The distribution of flex lease outcomes lies between the cash and share rent agreements.

Conclusions and Caveats

As farm incomes and crop returns have increased over recent years, the costs of production – including those associated with land – have followed. Grain producers are currently realizing record income levels, but are also exposed to unprecedented levels of nominal financial risk. Therefore, it seems a reasonable time to revisit the idea of flexible cash leases for use in managing this additional risk exposure.

Flexible cash leases provide many of the advantages to the more standard fixed cash and share contract alternatives. They can be designed such that the landlord is not required to make management or marketing decisions, while also providing some risk sharing to the tenant. Furthermore, flex leases are treated as cash leases from the perspective of the USDA so that landlords do not have to deal with government programs. Furthermore, they may provide a middle-ground between cash and share rent arrangements to aid a tenant in negotiating away from the cash rental agreements which have been becoming more prevalent over the past 15 years.

This paper outlines an approach to designing a flex lease contract which is based on revenue realizations at the farm level. The example contract includes a base or minimum rent level, and also pays the landlord a share of revenues when realizations are above a specified level. The contract is designed by setting these parameters so that the resulting returns are a hybrid of those received under the existing cash

or share rental agreements (or typical agreements of those types observed in the same area for similar land). Thus, the more standard cash and share agreements are used as benchmarks in designing the flex lease. Compared to an acceptable fixed cash rate, the flex lease should result in a higher expected or average rent level paid to the landlord to counteract the risk sharing that is provided to the tenant.

While the approach which is outlined is relatively simple, actual implementation in practice will be more difficult. Some additional, non-trivial issues which need to be addressed include how revenue will be measured. This requires the landlord and tenant to agree upon a specific price, and a method for measuring and verifying yield to determine the actual rent level for the contract in any given year. Prices could be based on the futures market or local cash bids at a specific time or an average over a specific time interval. Yields may be based on actual farm yields (i.e., scale tickets), or could be based on a more verifiable aggregate yield measure (i.e., the average county yield from NASS). Incorporating production costs into the contract through the use of a net return measure is also possible, but increases complexity and requires both tenant and landlord to also agree upon a method for measuring production costs.

For these reasons, communication and trust between landlord and tenant are key to making a flex lease – or any type of land rental agreement – successful. Because they require the incorporation of more information and communication between landlord and tenant, the shift to a flexible agreement may be more difficult in situations involving absentee landlords. In these cases, the simplicity of the fixed cash rent agreement may outweigh the risk and return sharing attributes of share or flex leases. Given the recent trends in absentee land ownership and shifts towards fixed cash rental agreements in the Midwest, identifying linkages between these trends would be an interesting area for further investigation.

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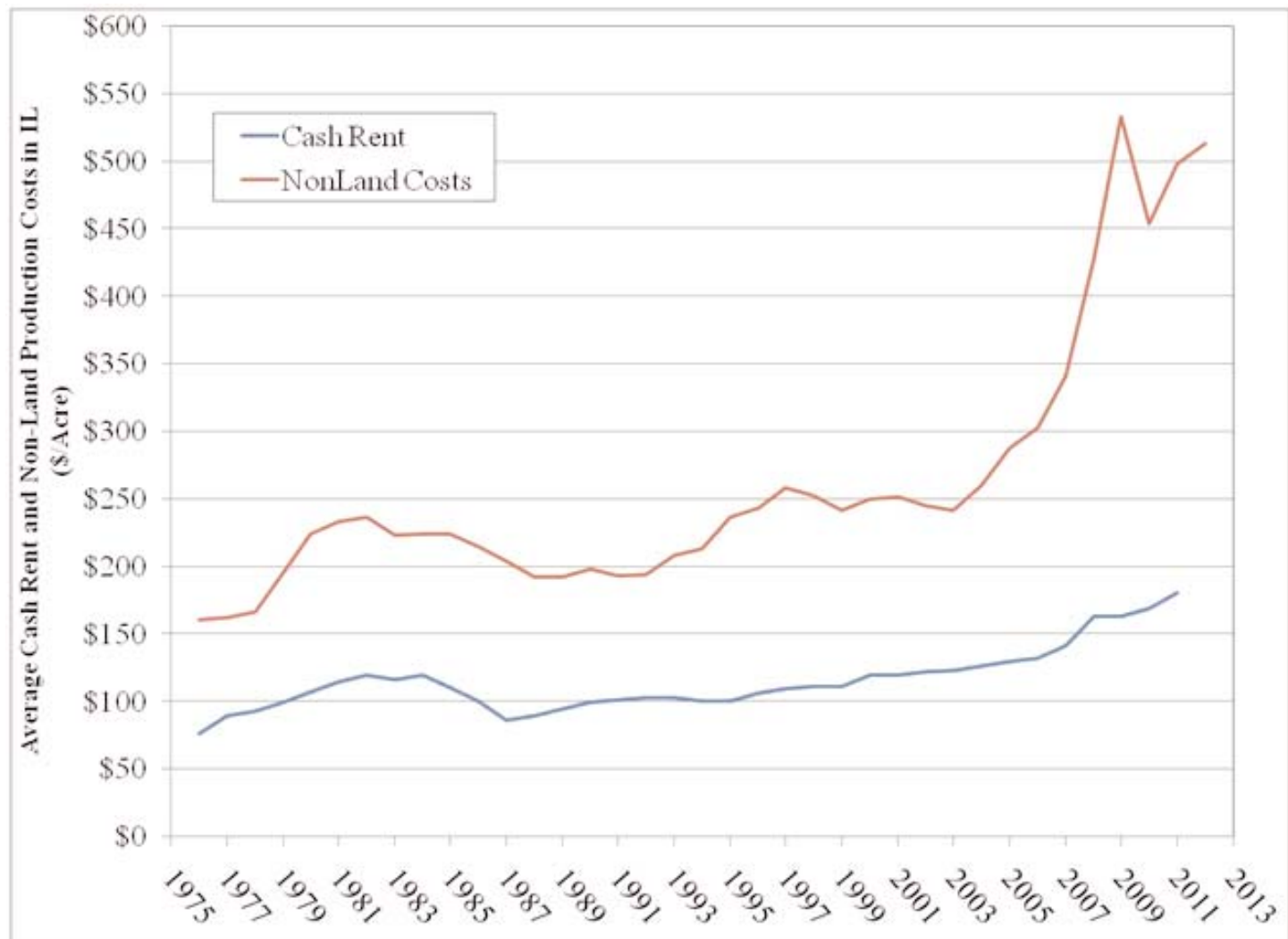
Table 1. Definition of rental payment made to landlord for example, cash, flex, and share agreements

Cash Rent	Flex Lease	Share Rent
\$250 Fixed Rent	\$150 Base Rent 25% Revenue Share Above \$500 Base Revenue	55% of Crop Revenues Less 45% of Non-land Costs

Table 2. Summary statistics of tenant and landlord return distributions

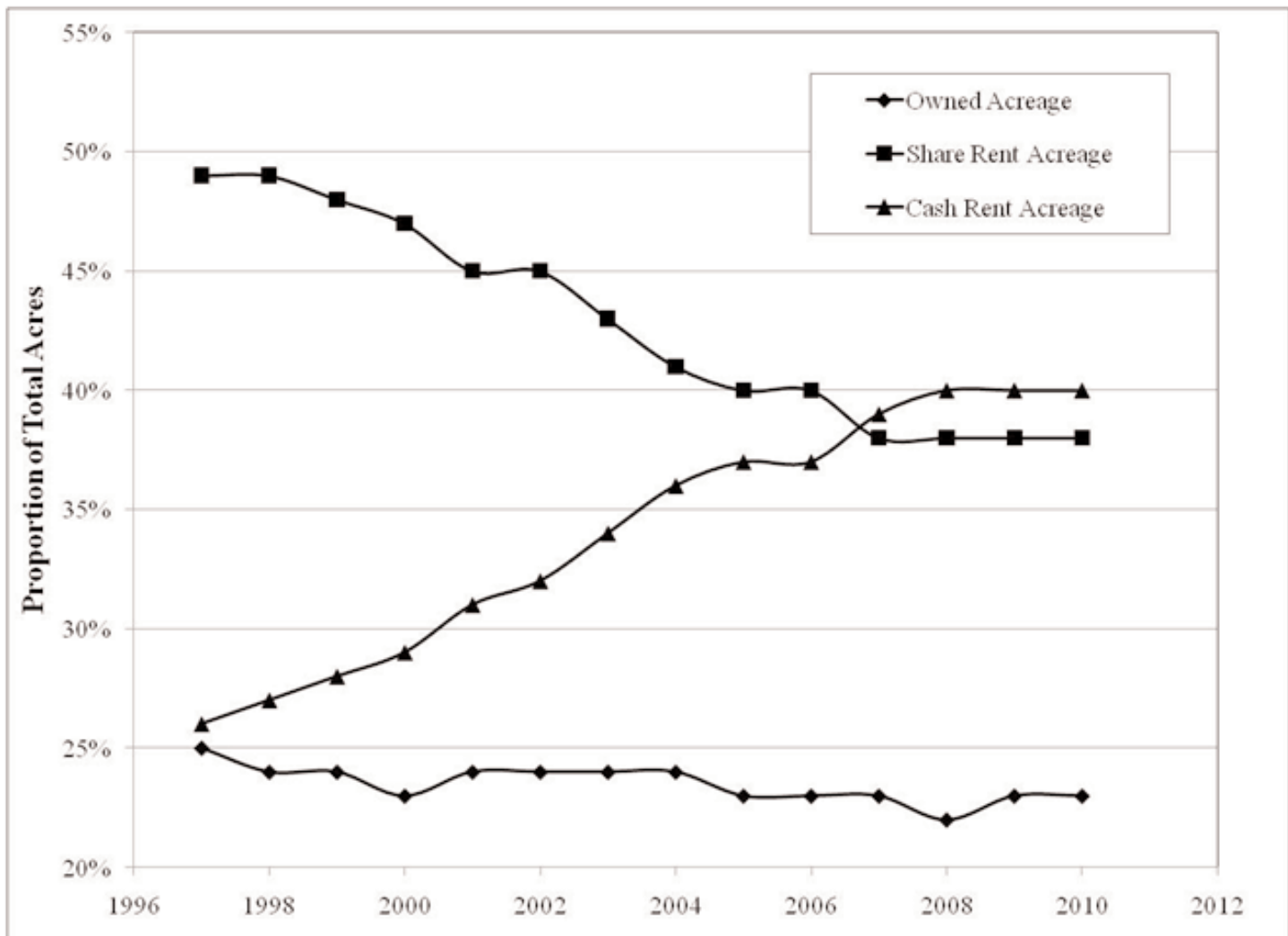
	<u>Tenant</u>			<u>Landlord</u>		
	Cash	Share	Flex	Cash	Share	Flex
Mean	\$171.58	\$139.71	\$165.99	\$250	\$281.87	\$255.59
St. Dev.	\$256.33	\$115.35	\$192.63	-	\$140.98	\$63.74
Min	-\$386.81	-\$111.56	-\$286.81	\$250	-\$25.24	\$150.00
Max	\$1,459.07	\$719.08	\$1,131.80	\$250	\$989.99	\$577.27

Figure 1. Average cash rent and non-land production costs in Illinois, 1976-2012



Source: USDA and Illinois FBFM

Figure 2. Land lease and ownership trends in Illinois, 1997-2010



Source: Illinois FBFM

Figure 3. Rental rates of cash, share, and flex leases at various revenue levels

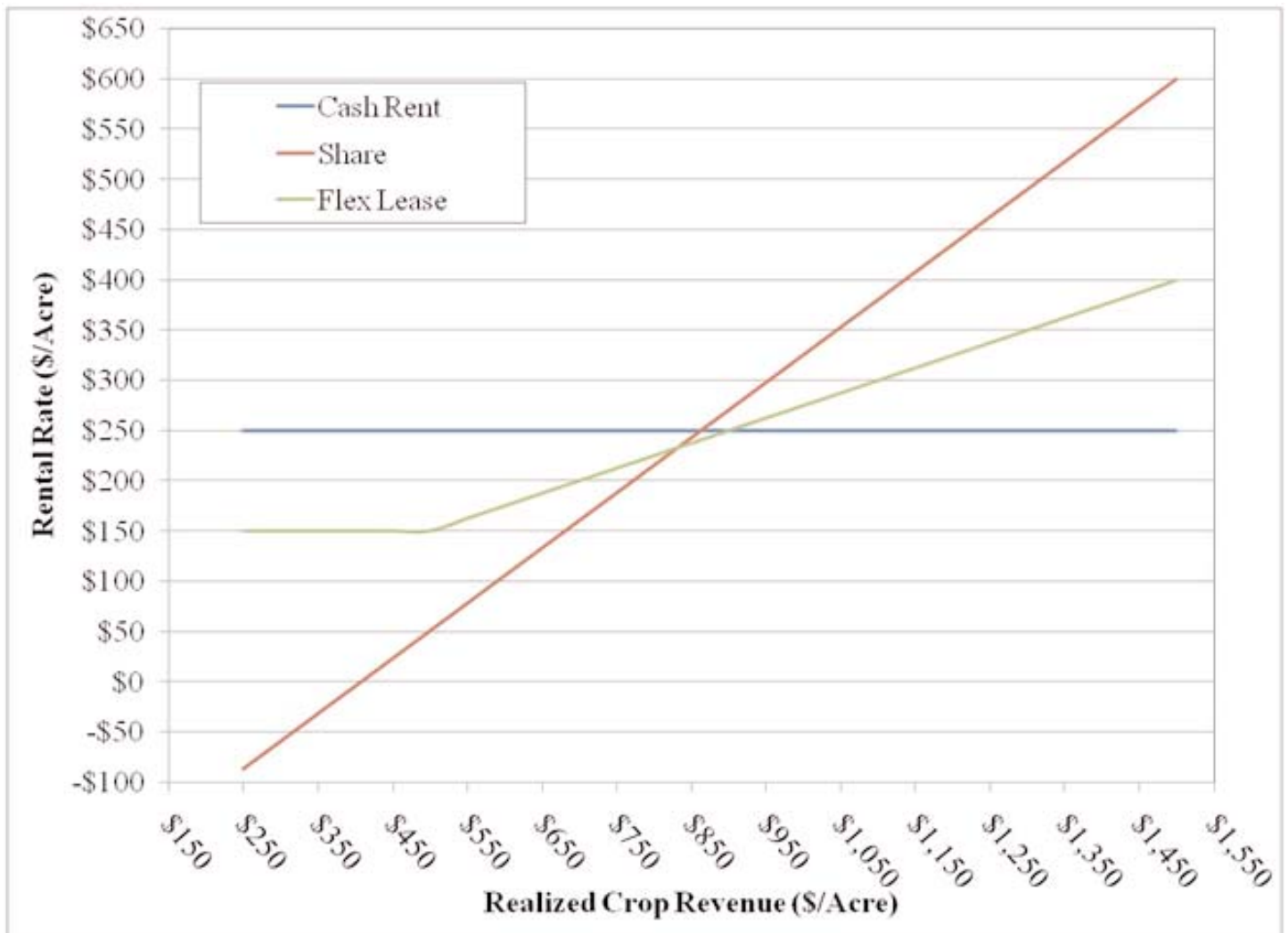


Figure 4. Probability distributions of tenant returns under cash, share, and flex agreements

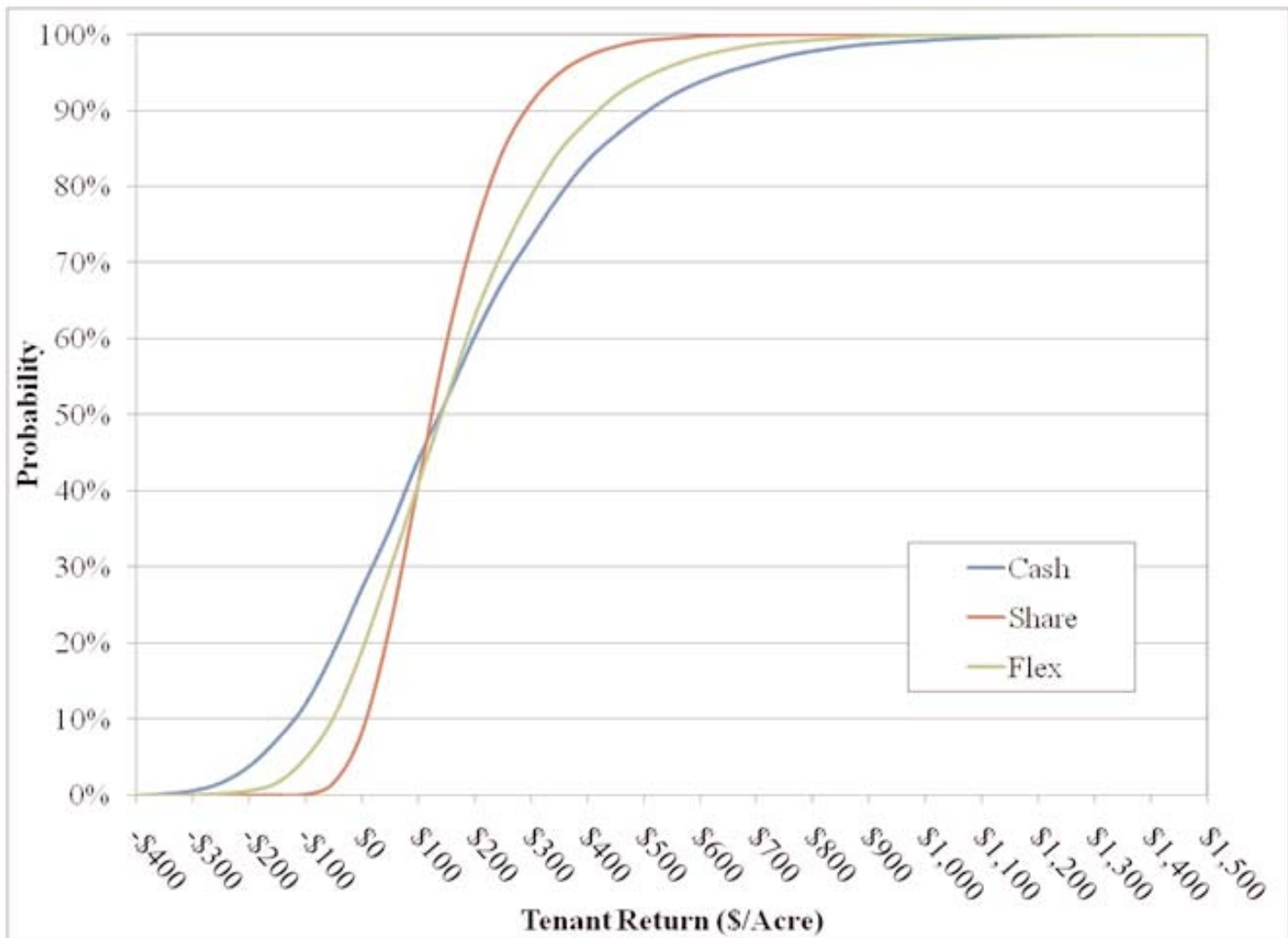


Figure 5. Stoplight graph of tenant returns under cash, share, and flex agreements

