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VARIABILITY IN RENTAL RATES PAID IN THE FLUE-CURED TOBACCO ALLOTMENT RENTAL MARKETS IN SELECTED NORTH CAROLINA COUNTIES

SOPHIA EFSTRATOGLOU
and
DALE M. HOOVER

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PREFACE

Sophia Efstratoglou's thesis, "The Market for Flue-Cured Tobacco Allotment in North Carolina under the Provisions of the Lease and Transfer Program," provides the basis for this bulletin. The authors are grateful to Mr. Eugene Naylor, Tobacco Program Officer, and Mr. Weldon Denny, former State Executive Director, North Carolina Agricultural Stabilization and Conservation Service, and to the Office Managers in the 15 study counties. The authors also wish to thank Professors W. D. Toussaint, F. E. McVay, J. A. Seagraves and B. L. Gardner for their assistance and constructive comments during the study.

ABSTRACT

The economic factors that determine the differential level of variance of rent paid per pound of allotment transferred were analyzed in the framework of cost and returns to information.

Regression analysis was used to test the hypothesis, that the variance in rent paid within a county for the 1966 production year was affected by the cost of information, returns to information and the level of variance existing before the search of market processes. The data used to study these hypotheses were obtained by a mail survey in 15 counties in North Carolina and from the ASCS county offices.

Two basic models were developed. In the first one the dependent variable was an estimate of the total variance of rent paid in a county. In the second model the dependent variable was the variance due to differences among farmers within a county.

The variable representing the cost of information hypothesis was found to be a significant factor in explaining the level of variance in the second model. The variable representing the returns to information hypothesis was significant in the first model.

The "percentage of underplanting in 1961" was used as the independent variable representing the hypothesis that variance existing before the search of the market affects the variance in rent paid. Its coefficient was significant in both models.

Transferability of information was expected to result in the reduction of variance as the trading season advances. Regressions of variance of rent paid by 15-day intervals on the time variable indicated no trend in the level by variance within each county.

The effect of large poundage, transferred by each farmer, on the price paid by him was investigated. A negative effect was hypothesized, but the regression coefficient had the hypothesized sign in only a few of the sample counties.

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SUMMARY AND CONCLUSIONS

This study was primarily concerned with the measurement and explanation of the variability in rental rates paid per pound of flue-cured tobacco in North Carolina and in an evaluation of the effectiveness of the allotment market. The study is concerned with the rental market during the 1966 allotment transfer season in 15 North Carolina counties.

If the rental market is working efficiently, the rental price can be expected to be about the same for all contracts. Insofar as rental rates vary from contract to contract, the rental market can be said to be imperfect and farmers will expend resources in seeking the best rental contract. If the efficiency of the rental market can be improved, farmers' welfare can be increased.

The specific objectives of the study were:

(1) To determine the geographic pattern of rental rates for the counties in the sample and to determine the variability in rental rates from contract to contract within each county.

(2) To analyze economic factors that determine differences in the variability in the rent paid within counties.

(3) To explain the differences in the rent paid within counties based on the characteristics of the contracts such as the rental date and the size of the contract.

A mail survey of renters was used to obtain rental rates in each of the counties. The counties were randomly selected from three divisions in the state: the Old and Middle Belts, the Eastern Belt,

and the Border Belt. From each county a number of farmers were selected randomly from ASCS office lists. These farmers were sent a mail questionnaire asking the rental rate they paid for tobacco allotment for the 1966 production year. Data on the number of pounds transferred and the date of the contract were obtained from the ASCS office.

Variability in rental rates can arise for a number of reasons. The possible sources of variability were divided into three groups for the purpose of the study: Factors related to the cost of obtaining information about market rental rates, factors related to the returns from obtaining information on rental rates, and factors associated with the variability and the opportunity costs of allotment owners. Regression analysis was used to test for statistically significant relationships between the variance in rental rate and representatives of the three classes of factors. In each instance the analysis was conducted from the point of view of the lessee. Analysis of costs and returns from the lessor's point of view was not made. Lessors search activities probably tended to reduce rental variability also but no hypotheses about lessors were tested.

Where tobacco is an important crop, information about the rental rates may be readily available. In such a case the cost of information can be said to be low. Farmers will seek considerable information on prevailing rental rates and the resulting variance will be small. Variables chosen to represent this factor were the total acreage of tobacco allotment in the county and the proportion of farm income coming from tobacco. In every case as the importance of tobacco increased, the variability in the rental rates paid decreased. However, the coefficients of the selected variables were not statistically significant at the .05 probability level in approximately half of the regressions.

The variable chosen to represent the second class of factors, returns to the information about rental rates, was the average total pounds of allotment transferred per farmer in each county. The larger the amount rented, the greater will be the financial gain to a renter who finds a low rental rate. Hence, he can be expected to search the market and in the process reduce the variability observed from contract to contract. In the regression analysis the regression coefficient for this variable had the expected sign in all cases and was significantly

different from zero at the .05 probability in some cases. Thus, there is substantial evidence that as the returns to market information increase with the size of the contract, the amount of information sought also increases and the variability in a rental rate paid within a county falls.

Several variables were selected to represent the variation in opportunity costs facing the owners of allotment. As the variation in the opportunity costs increases, the initial asking price of rental rates could be expected to cover a wider range. Some of the range in asking prices will usually continue to exist even after the contracting process is completed. Only one of the variables chosen to represent variation in opportunity costs had a statistically significant relationship with the variance in contract prices. This variable was the number of acres underplanted in 1961. Its coefficient was significant at the .01 probability level. The presence of the variable improved the performance of the regression equation substantially.

Two additional analyses were conducted by using the data from within counties in contrast to using data cross-sectionally between counties. It was reasoned that if information is transferable through the rental season, the variability in rent might decline as the rental season proceeded. The variance for each county was estimated for each period of 15 days and this measure was regressed on a time variable. The regression coefficient of the time variable was not significant at the .05 probability level. Thus, the hypothesis that information is transferable over time was rejected.

The relationship between the quantity of pounds rented and the average rental rate was also investigated. In some counties the rental rate paid by an individual farmer declined as the quantity of quota rented increased. However, in most counties the reverse relationship occurred. Using data from all 15 counties in a pooled regression, the rental rate increased slightly as the quantity of poundage increased. While the relationship was statistically significant, it was of a very small order. In additional regression analyses, the rental rate declined as the number of contracts for a farmer increased relative to the county average number of contracts per farmer. This result suggests that there is a trade-off or exchange between number of contracts and the average

rental rate. The rental rate may be reduced by searching for a relatively large number of small but low-priced contracts. Alternatively, search and the attendant expenses may be reduced by paying a higher price for relatively large contracts.

The evidence suggests that as information is made easier to obtain, the variance in rental rates could be expected to decline in each county quota market. Farmers as a group would benefit if price information generated by quota transactions was made more freely available and would expend less of their time attempting to obtain the best rental contract. The cost of obtaining and publicizing rental rate data through some central agency was not investigated, but it seems possible that some central information system might reduce the total cost of leasing and transferring tobacco quota.

INTRODUCTION

Tobacco quota is a factor of production which must be possessed or rented by a farmer if he is to undertake flue-cured tobacco production. Between the establishment of the tobacco allotment program and 1962, the primary markets for allotments consisted of the purchase and rental of land to which allotment was attached. If a farmer wanted to expand his allotment, he had to acquire the right to use land to which allotment was attached.

Under the Lease and Transfer Program beginning in 1962, it became possible for allotment to be transferred from one farm to another within a county for one production season. The acreage transferred was adjusted between farms of different historic yields to maintain effective control of total tobacco production. In 1965, when the basic program was changed to include restraints on both acreage allotment and market quotas, the Lease and Transfer Program was changed to what is basically a poundage transfer program. Lease and transfer was still limited to farmers within the same county and lessees were limited to 5 acres of transferred allotment or/and a total acreage allotment equal to not more than 50 percent of cropland on the farm for the production years 1962 through 1967. The five-acre restriction was not in force between 1968 and 1970.

Under the current Lease and Transfer Program, the product traded is a pound of tobacco. It is basically a homogeneous input. Variance in rental rates per pound of quota within a county would indicate that information about rental rates is not freely available. Previous studies have been concerned with other allotment problems such as the economic effects of transferable poundage (Bradford and Toussaint, 1962) and the determinants of participation of producers in the program (Bordeaux, 1964), but little is known about the variance in the rental rates under the transfer provisions of the program.

Variation in the price of a homogeneous commodity occurs among contracts as information varies and as supply and demand conditions change. Some variation is inevitable and necessary as a way of

accommodating changes in economic conditions. On the other hand, substantial differences or shifts in expectations among buyers and sellers within a rental season can lead to fluctuation in prices which perform no economic functions. Great divergence in prices leads to non-optimal allocation of resources and implies losses for the economy as a whole. In addition, in the presence of some variability in prices, buyers and sellers will spend resources hunting for the best price. The greater is the initial variability, the greater will be the resource use in market search.

Objectives

The primary objective of this study is to evaluate the effectiveness of the allotment market for flue-cured tobacco in North Carolina under the provisions of the Lease and Transfer Program.

This primary objective will be realized by accomplishing the following specific objectives:

(1) To determine a geographical pattern of rental rates for the counties in the sample, and estimate means and variances.

(2) To analyze economic factors that determine differences in the variance of the rent paid within counties.

(3) To explain differences in rents within counties based on the characteristics such as date and pounds of each contract.

Procedure

Sample

For estimating the variances and the means of rental rates, new data were needed. No effort was made by public bodies to collect data on rental rates in all counties prior to 1966 and no estimates of rental variance outside of this study existed.

A mail questionnaire was sent to a random sample of farmers in each of 15 counties asking for rental rate, date and pounds per contract for the 1966 production year.

Prior to the sample collected in the 15 study counties, a pilot study was conducted in Wake County to test the existence of variance of rental rates, time trend, and the bias of the non-respondents, if

any existed. The pilot study resulted in an estimate of the variance in rent paid and the conclusion that no bias resulted from the exclusion of the non-respondents based on Bartlett's test of the homogeneity of variances (Efstratoglou, 1968, pp. 61-64).

The first step in the sampling procedure was to divide the state into three areas (Figure 1). The reason for dividing the state in areas, before selecting counties from each part, was to obtain variability in the characteristics such as acreage allotment, average yield, off-farm labor opportunities, importance of tobacco as a crop of the counties that might be expected to determine difference in the level of the cost and return per unit of search. The second step was to draw five counties randomly from each of the three divisions of the state. Counties that had fewer than 120 farms participating in the Lease and Transfer Program in 1965 were not allowed to enter the sampling process.

A sample of farmers was selected randomly from the Agricultural Stabilization and Conservation Service (ASCS) county list of contracts. Contracts were listed by the date on which the allotment was transferred. As soon as a contract was selected, the farmer was identified and all his contracts were included in the sample. To avoid bias in the sample by giving farmers with more than one contract too great a probability of entering the sample, a second step in selecting the sample was made. Each farmer with more than one contract was given a probability of staying in the sample, equal to the inverse of the number of the contracts he had.

In an effort to eliminate memory bias, information on pounds and date of contracts were obtained from the ASCS offices and included in the letter sent to participants. Data on variables that were selected in the regression analysis were obtained from the ASCS annual reports for North Carolina (N. C. Agricultural Stabilization and Conservation Service, 1964, 1965, 1966).

Analysis

All data were tabulated and estimates of variances and means were obtained (objective 1). Variance was estimated based on rents paid per pound of each contract after transfers made among relatives or in

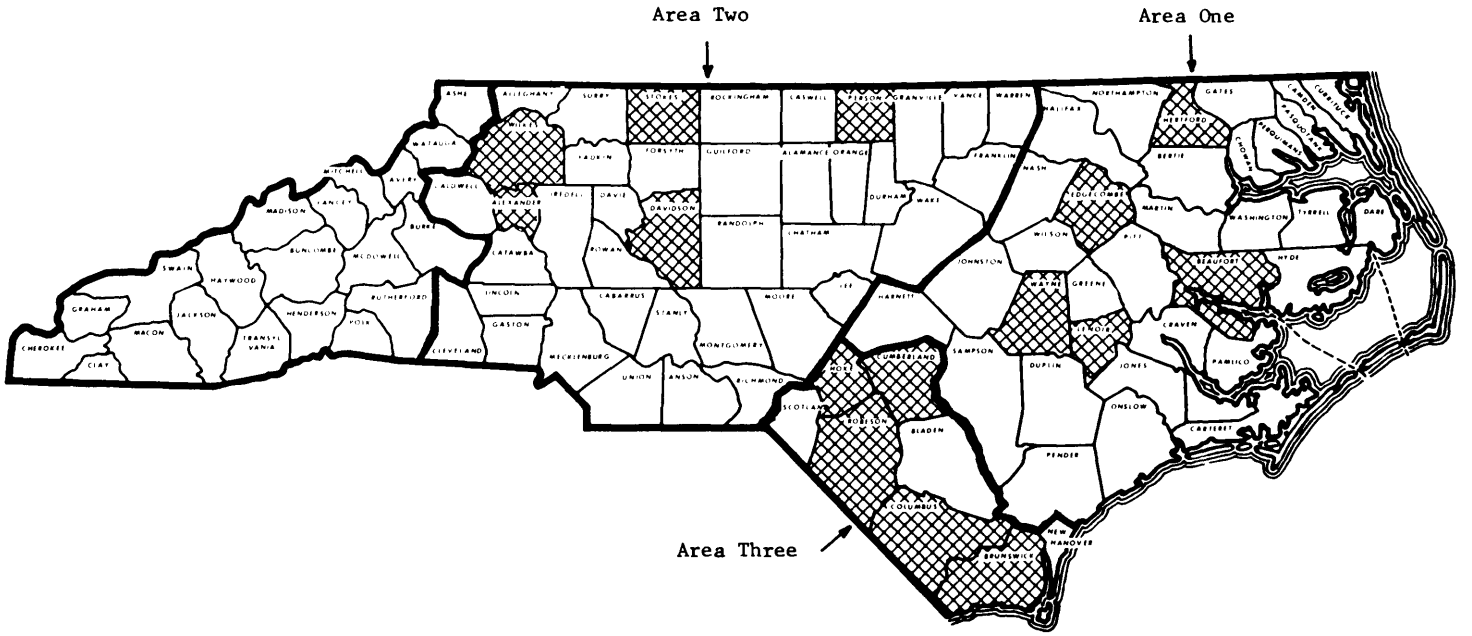

Figure 1. Areas and counties of the study

non-cash terms were excluded from the sample. These results are presented in the next chapter.

An economic model of costs and returns of search was developed and hypotheses directed to differences in rental variance among counties were analyzed in that framework (objective 2). These analyses are found in the second chapter devoted to results. Two measures of variance were chosen for analysis. One was the variance among all sample contracts in the county. This measure consists of the variance due to the difference among farmers plus the variance due to the differences among contracts made by a given farmer. The second measure of variance analyzed was the variance among the mean rental rates paid by individual farmers. The differences between these two basic measures have been investigated (Efstratoglou, 1968, pp. 68-71) and it has been concluded that there is no necessary relationship between the two measures. Formally, the two measures differ by excluding the variability arising when a given farmer with more than one contract did not pay the same rental rate for each contract.

Theory, models and analyses related to the third objective are found in the third main results chapter. In that chapter the theory of search is developed to predict changes in the variability of rent from time period to time period within the rental season. In addition, a model to predict differences in the absolute level of rent paid by renters within counties is developed and tested. For both of these problems, data on rents within a county are utilized.

In the last chapter some ways of providing rental information to contracting parties are discussed.

GEOGRAPHICAL PATTERNS OF VARIANCES AND MEANS

The sample counties in Eastern and Border Belts had a lower variance of rental rates than the sample counties in the Old and Middle Belts. Columbus County had the lowest variance observed, 1.63 cents (Border Belt) and Alexander County had the highest variance, 15.61 cents (Old Belt). Columbus County had 13,979 allotted acres of tobacco in 1965 with 44.5 percent of farm income coming from tobacco. In comparison Alexander County had 1.141 acres of allotment and only 11.7 percent of its gross farm income comes from tobacco. The geographical pattern of variances, and means, for rental rates paid in 1966 and expected in 1967 as well as data on estimated rental rates for 1967 studied by Hoover (1967) are reported in Table 1.

Rent values estimated by Bordeaux (1964) for Pitt and Wilson (Eastern Belt) were 16.7 and 18.3 cents per pound, respectively, for 1963. Guilford (Old Belt) had an average of 10.2 cents per pound. Bradford and Toussaint (1962) estimated that rental rates would be about 12 cents per pound in the Old and Middle Belts and about 16.5 cents in the Eastern and Border Belts. They based their estimates on budgeted costs and returns and the distribution of average yields by county of owner-operators.

The data obtained by the mail survey are close to the results of the above studies. Averaging these results for the corresponding belts, the estimated average rent paid was 16.2 cents for the Eastern and Border and 11.2 cents for the Old and Middle Belts for the 1966 production year.

The farmers in the sample were asked what price per pound of allotment they were expecting for the 1967 lease and transfer period. The average rent values for each county and the estimated variance of those values appear in Table 1. Columbus County had the lowest observed variance and the highest expected average rental value, while Davidson County reported the highest variance.

Table 1. Sample estimates of variances and mean rental rates paid in 1966 and expected in 1967 in cents per pound contrasted to reported rental rates in 1967[a]

Belt and county	No. of contracts, lessee sample	No. of farmers, lessee sample	Mean price			Variance	
			1966	Expected 1967	1967	1966	Expected 1967
Old and Middle Belts							
Alexander	84	41	4.92	5.48	3.00	15.61	4.30
Davidson	61	39	9.43	10.09	8.00	6.59	7.20
Person	82	54	16.17	14.52	15.00	4.76	2.10
Stokes	68	55	15.77	14.60	15.00	3.62	4.70
Wilkes	86	49	9.81	10.89	12.00	6.69	5.50
Eastern Belt							
Beaufort	76	48	12.58	13.09	10.00	4.35	2.70
Edgecombe	82	61	18.10	17.29	18.00	2.91	1.10
Hertford	56	47	12.69	13.77	14.00	6.48	2.90
Lenoir	73	67	17.53	17.31	18.00	1.89	1.30
Wayne	91	55	17.37	17.51	18.00	4.82	2.60
Border Belt							
Brunswick	92	56	18.47	19.37	16.50	6.08	1.60
Columbus	85	47	20.43	20.14	18.00	1.63	1.10
Cumberland	65	32	13.53	14.57	15.00	3.98	2.40
Hoke	96	44	12.83	12.53	13.00	4.36	2.80
Robeson	68	53	18.53	15.98	15.00	4.53	2.00

[a]1967 data were obtained from county ASCS office manager's reports. Summary data from these reports are published in Hoover (1967).

The simple average rent paid per Belt for 1966, 1967 and the price farmers predicted for 1967 were as follows:

	1966	1967	Predicted 1967
Old and Middle Belts	11.2	15.8	11.1
Eastern Belt	15.7	15.8	15.6
Border Belt	16.8	16.5	15.5

The variance of the predicted values was systematically smaller than the estimated variance in 1966 rental rates for all counties in the sample except Davidson and Stokes counties. These data were collected right after the end of the season for the lease and transfer for the 1966 production year. It could be argued that farmers had a better picture of the market and that they knew what the supply and demand conditions were after having gone through the whole period. As a result, their prices had less variance than before the opening of the rental market for the next year.

Expectations do not appear to have been good guides to the rental rates estimated to have prevailed in 1967. In six counties the expected direction of change failed to occur. In four counties the expected price for 1967 exceeded the 1966 price but the reported price for 1967 actually was less than the 1966 price. The reverse occurred in two other counties.

ANALYSIS OF RENTAL RATES AMONG COUNTIES

Dispersion of prices of a homogeneous product is evidence of a lack of perfect knowledge of the market. To ascertain the most favorable rental rate, both the renter and owner canvass the market to a greater or lesser extent. This activity has been called "search of the market."

The "search of the market" is divided into two kinds of activities for the renter.

(a) Search to identify who possible contracting parties may be.

(b) Search for the most profitable price, lowest for the renter, highest for the owner.

"Search of the market" in any of these two forms implies costs and returns. A unit of search might be defined to be equivalent to a unit of resources expended in search such as energy, time or money. Alternatively, search might be defined in terms of results such as the reduction in the asking price confronting the purchaser or an increase in price for the seller. The first of these definitions is so closely related to the concept of cost that it is not possible for the cost of search to vary as occurs in most other economic situations. In the second definition the unit of search is identical with returns. It would be inappropriate as long as both costs and returns are to be analyzed.

Each of these definitions of search covers up some important aspect of search. A definition of search as "the contact of a person whom the buyer regards subjectively as being capable of giving the purchaser a lower price or whom the seller regards as being capable of paying a higher price" escapes the problem present in the first two definitions. Under this definition, it should be possible to specify conditions which would lead to constant or rising marginal cost and falling marginal returns to search. If this is the case, it is possible to conceive of an equilibrium amount of search (Figure 2) with the marginal cost equal to the marginal return of search for each lessee and lessor. The theory is discussed from the point of view of the lessee (buyer). The regression analyses are confined to hypotheses about costs and returns for the lessee.

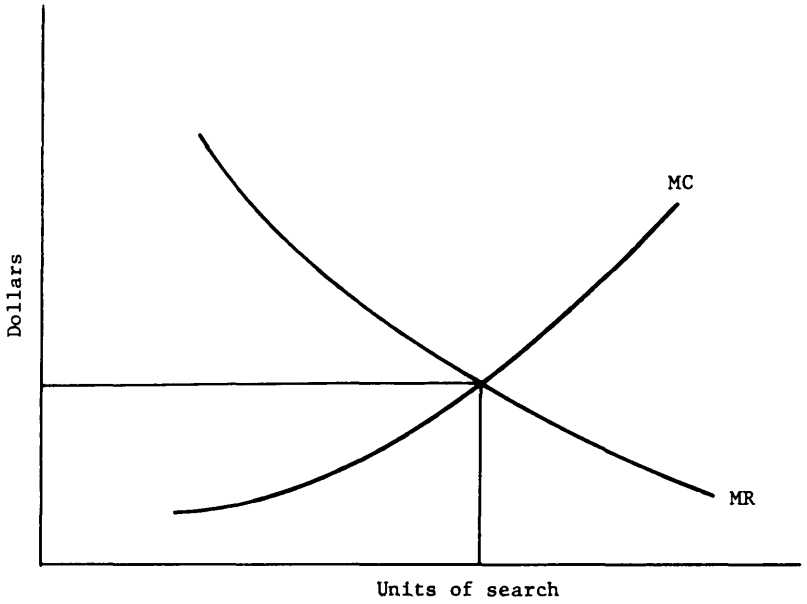

Figure 2. Marginal costs and returns to search

The theory of search for the lessor (seller) is analogous to the theory for the lessee but hypotheses about lessors were not tested in this study. For simplicity the remainder of the theory is discussed from the point of view of the buyer. In principle both the buyer and seller engage in search. The principles governing the two are the same.

Cost of Information

Cost is defined as the resources spent in terms of dollars per unit of search. Cost is a function of the quantity of search.

Slope of the Marginal Cost Curve

The total cost of search increases as additional search is conducted. But it is necessary to specify the conditions which cause the total cost curve to rise and to determine whether it rises at an increasing, constant or decreasing rate. The marginal cost curve might be constant; in which case the marginal cost curve would be a line horizontal to the X axis. This is mainly Stigler's point of view (Stigler, 1961, p. 216):

> Cost of search for a consumer may be taken as approximately proportional to the number of (identified) sellers approached, for the chief cost is time. This cost need not be equal for all consumers, . . . time will be more valuable for a person with larger income.

The result will be that his cost curve lies on a higher level than the cost curve of a person with less valuable alternatives.

Alternatively, the marginal cost curve could rise as search is conducted. Consider the problem of the farmer who wishes to expand tobacco production. To rent allotment a farmer would probably first contact his close neighbors whom he regards as possible lessors (sellers). Later he may contact those further away and those who have a lower probability of contracting production. Each successive activity is more expensive. Diminishing returns appear as search increases. Factors which would result in an increasing marginal cost curve are:

(1) Duplication of contacts. Those become more probable as search increases, leading to lower effectiveness of search. Ozga (1960, p. 40) explains this point and calls it diminishing returns to advertising:

> According to Chamberlain, diminishing returns in advertising are due to the fact that the best potential markets are exploited first, . . . diminishing returns are due to the fact that as more and more of the potential buyers become informed of what is advertised, more and more of the advertising effort is wasted, because a greater and greater proportion of people who see the advertisements are already familiar with their content.

(2) Difficulty in identifying the potential sellers as the population in the market becomes larger. As the number of sellers increases, fewer of them are known to a given purchaser. As a farmer goes beyond his own neighborhood and circle of friends, he would need to resort to new forms of search which might cost more per unit.

The shape of the marginal cost curve might be determined empirically if data on individual cost functions were available. Unfortunately, these data are not available. The study is not greatly influenced by this lack of data because the hypotheses examined are appropriate if the marginal revenue curve is constant, rising or falling. If either the marginal cost or marginal returns curve has slope, the equilibrium amount of search is affected by cost and returns factors.

Location of the Marginal Cost Curve

The location of the marginal cost curve may differ from county to county or from farmer to farmer, although the slope (change of cost per unit of search) may be the same. There are several factors which could determine the location of the schedule by affecting either the price of factors involved in search, or the production function of search itself. For example:

(a) Different opportunity costs exist among individuals in each county. For some people the cost of search is higher than for others. For people having higher opportunity costs, search is more expensive.

(b) Different cost per unit of resource other than the time of the searcher may exist. In some counties free bulletin boards are used for advertisements. In others brokers with wide acquaintance in the community have acted to bring buyer and seller together.

(c) The production of information may occur more easily in some areas than others, aside from differences in the cost of factors.

A usual way for pooling production information is through comparisons of prices in casual conversation among farm operators while engaged in leisure or other productive activities. In counties with lower cost per unit of search, the marginal cost curve MC' lies to the right (Figure 3) and given the curve of the marginal returns to search, a higher equilibrium level of search is attained leading to elimination of price variance of the homogeneous good.

Returns to Information

The marginal revenue of search is the expected savings from an additional unit of search. Expected savings are defined to be equal to the quantity purchased times the reduction of price resulting from search. The slope of this curve is probably negative; return to search is a decreasing function of the activity.

Slope of the Marginal Returns Curve

At any time there is a distribution of prices quoted by sellers. For the buyer who explores the market, the probability of finding a lower price than he previously has found increases with each unit of search but at a decreasing rate.

A simple example patterned after Stigler (1961, p. 214) can be used to show that the marginal returns from search are probably diminishing. Let all sellers in a market be equally divided between asking prices of $2 and $3. The distribution of the expected minimum price is as follows:

Number of units of search	Probability of minimum price $2	$3	Expected minimum price
1	.50	.50	2.50
2	.75	.25	2.25
3	.875	.125	2.125
4	.9375	.0625	2.0625
⋮	⋮	⋮	⋮
∞	1.000	.0000	2.00

If a buyer searches the market with a probability of 50 percent that he will find the price $2 or $3, the expected minimum price in the market will be 2.50 resulting from [2 (.50) + 3 (.50)] = 2.50. In the second trial for the minimum price in the market, 75 percent will have found the price of $2 as a result of 50 percent who found it in the first

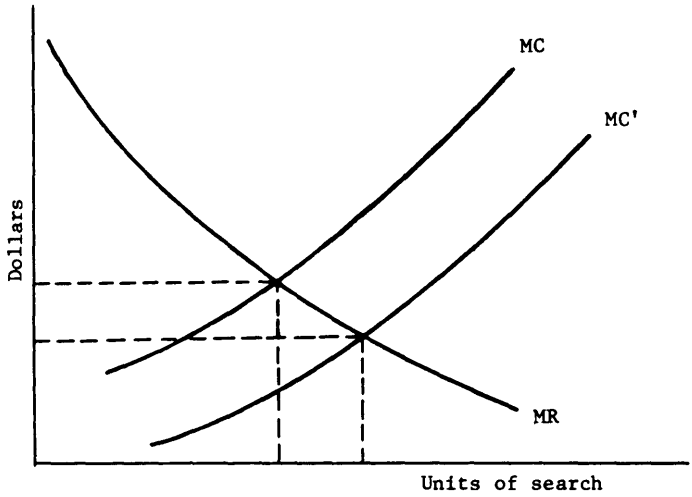

Figure 3. Equilibrium amount of search with different marginal cost schedules

trial and 25 percent who found the lower price on the second trial. The expected minimum price will be $2.25 at the close of the second trial. With more units of search, the expected minimum price will fall but at a decreasing rate so that expected savings will diminish with additional units of search.

Whatever the initial distribution of quoted prices, it is certain that increased search will yield diminishing returns as measured by the reduction of a new lower price expected from additional search.

As mentioned above, there is a distribution of asking prices at a particular time. Suppose that the distribution is a normal one. As the sampling process begins, each buyer takes a sample of one observation. If there are n buyers in the market

$$E(P_1) = \bar{P}$$

where i = 1, 2, ... n buyers,

$E(P_1)$ = expected price of all sample observations, and

$\bar{P}$ = the mean price of the distribution of asking prices.

As the search continues, the selective process is at work. Each buyer inquires about a rental rate, selecting the new price if it is lower than on the first sample but retaining the old one if it is lower. The distribution of the lower prices is the point of interest. Thus, additional units of search lead to a skewed distribution of lowest prices. The mean of interesting prices moves to the left and does not coincide with the median. The variance of the new distribution is smaller, since higher prices are left out, and becomes smaller as search increases (Figure 4). The same happens if the distribution is uniform, that is, if every observation has the same probability to be found in the market (Figure 5).

The slope of the expected marginal returns curve is derived from the fact that the minimum price may already have been found. In addition as contracts are signed, the lower prices are more apt to be removed from the pool of possible contracts further reducing the chance of finding a lower price through further search.

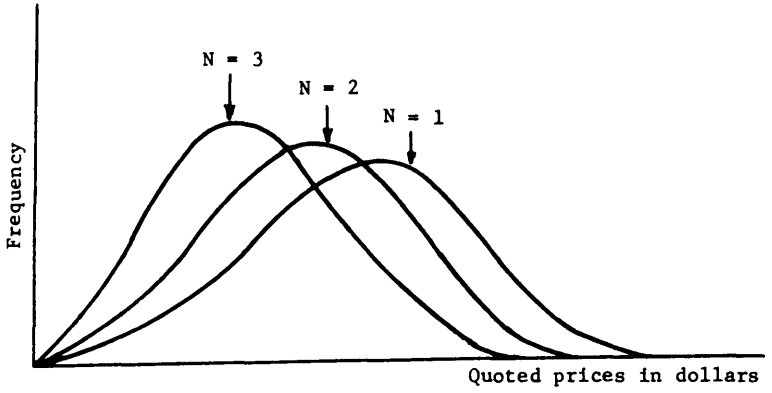

Figure 4. Distribution of the lowest price after succeeding units of search, starting from a normal distribution of prices

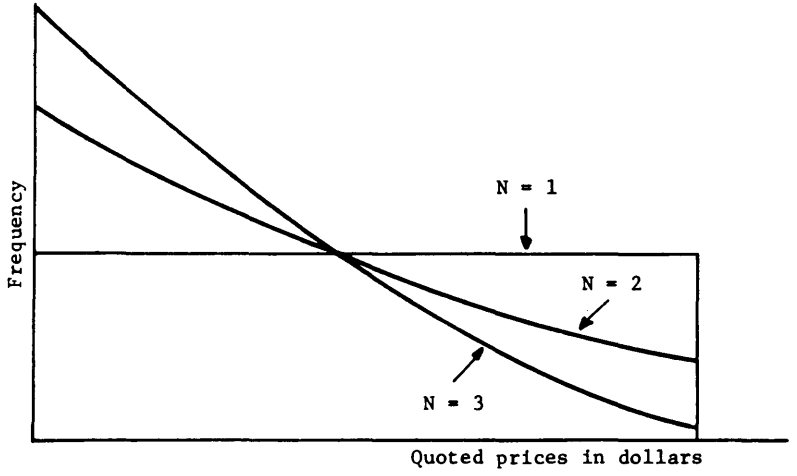

Figure 5. Distribution of the lowest price after succeeding units of search, starting from a uniform distribution of prices

Location of the Marginal Returns Curve

Factors influencing the location of the curve indicating the returns to marginal units of search are (a) the size of the contract and (b) the amount of variance existing at the onset of search.

(a) The greater the volume of the contract, the greater the expenditure entailed for the commodity. Given a dispersion of quoted prices, the expected reduction in the minimum price resulting from a specified level of search is given too. But because the quantity of the contract is larger, there will be a higher absolute level of returns or savings from the expected reduction associated with each unit of search.

(b) When the dispersion of quoted prices is larger, the expected reduction from finding a new lower price is relatively large and the expected savings are higher at any given level of search. In counties where a high variance exists initially, it is more profitable for farmers to explore the market because search will yield higher return than in counties of smaller variance.

The two factors discussed above shift the MR curve to the right, and with a given MC curve there will be a higher equilibrium level of search (Figure 6).

The Relationship between Search and Measured Variance

With positive costs for search activities, each lessee writes a contract before he is convinced he has the lowest possible rental rate. The lower the schedule of search costs or the higher the returns schedule, the more he searches before contracting. In searching the lessee disregards all rates not lower than the ones he has previously discovered. High rental contracts tend to be bypassed. Similarly on the selling side, low offers tend to be ignored. Search is the activity which tends to move contracting parties toward a uniform price with low offers and high asking-price not completed. This is the process whereby hypotheses regarding costs and returns of search for individual lessees are tested against observed variance in market rental rates.

Insofar as any factor affecting slope or location of either the cost or returns schedules of search varies among counties, there will be differences in (1) the equilibrium quantity and cost of search and (2) the remaining or residual variance in contract prices. For every

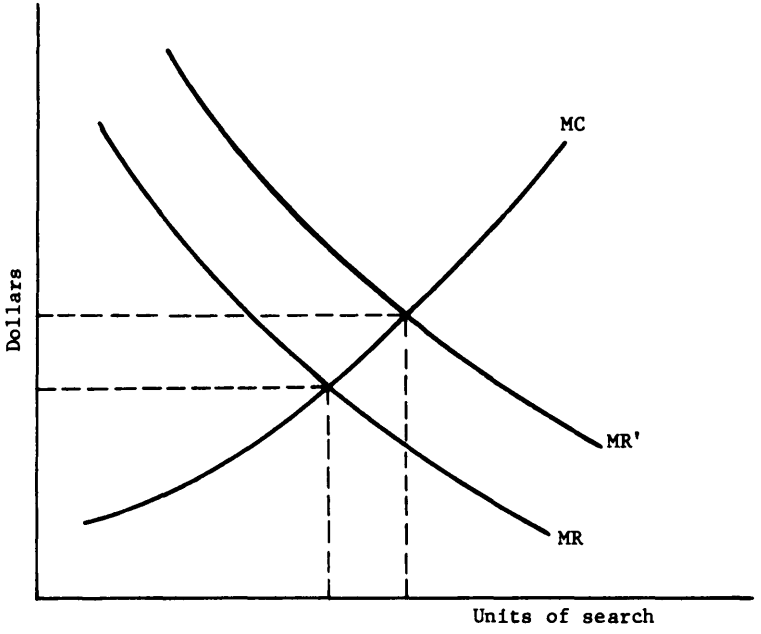

Figure 6. Equilibrium amounts of search with different marginal return schedules

county, the location and slope of each curve depicted in Figure 6 differ, leading to intercounty variation in price variance. It is the measured price variance which is analyzed and not the quantity and cost of search which are of primary concern.

Hypotheses Concerning Variance among Counties

While the theory of search underlies the study, there are no direct observations of the cost and quantity of search. Implications for measured variances of rental rates can be drawn from the theory and some observable factors of costs and returns to search. Several alternative measures of variance could be selected for analysis. The variance and the standard error of rental rates are used as alternative dependent variables in the analysis that follows. An additional possibility is the coefficient of variation. It is not used, however, because the hypotheses developed below are based on a theory of search which assumes the returns to search are a function of the absolute change in rent which results from search.

The market for allotment leasing is active for more than six months although the time period for filing contracts with ASCS is a somewhat shorter period. It is evident that the time at which an allotment was transferred may affect the rent paid as well as the variance of the rents over time. For example, a farmer who has a long planning horizon might pay a higher rental rate for allotment to obtain it early in the time period. In the hypotheses that follow it will initially be assumed that time of leasing is not an important source of variation. This assumption will be relaxed later in formulating some hypotheses to be tested within counties.

Hypothesis I: Cost of Information

It is hypothesized that the variance observed in rent paid per pound of allotment will decline as the cost of search declines.

This hypothesis is based on the idea that the equilibrium level of search will be higher when the cost curve lies to the right. To test this hypothesis, there must be some variation in cost of search. In some areas, the rental rates which are being asked by landlords and being paid by renters may be common knowledge. In such circumstances,

it may be said that information is virtually a free good. In counties in which the cost of search is low, the equilibrium amount of search would be expected to be high, resulting in a reduction in the variance as compared to other counties in which the cost of information is higher.

Since cost of information cannot be measured directly for the farmers in the sample, it is necessary to identify economic variables that could represent cost of information in a county, or that would contribute to diffusion of information and make cost of search lower for each farmer.

Such variables are (1) total acreage of tobacco, (2) proportion of farm income coming from tobacco, (3) number of allotments in a county and (4) proportion of total cropland used in tobacco. These variables will be discussed in detail in the remainder of this section.

It is assumed that as tobacco increases in importance the number of contacts yielding information made in the normal routine of casual social contacts rises and does not represent an explicit cost to those searching for tobacco rental. The greater the importance of tobacco, the less the cost of search and the less the variance in rents paid, other things equal. A negative correlation of tobacco importance and variance was hypothesized. In the sets of regressions estimated, it was decided to use the total acreage of tobacco and the percentage of income arising from tobacco sales to represent low costs of search. Moreover, the total acreage variable and the number of allotments had a high degree of correlation, .838.

Hypothesis II: Returns to Information

It is hypothesized that the variance in rent paid per pound will decrease as the mean size of allotment leased and transferred increases.

This hypothesis is based on the idea presented in Stigler (1961) that the returns to search on the margin can be represented by the marginal decline in price times the quantity of the contract. Thus in a county where there are large rental contracts, each renter will engage in large amounts of search and, as a result, the variance will be reduced. It should be noted that there is a step between individual search and county variance which is assumed within this hypothesis. It might be

possible for renters in different parts of the county to exert a great amount of search within their neighborhoods and yet a considerable amount of variance might remain in rent paid between different parts of the county. If this is the case, the hypothesis may be rejected even if it is true within communities.

The independent variable used to test this hypothesis is the average number of pounds per renter. This variable is expected to be negatively correlated with the variance. Given the expected savings per unit of quota the larger the poundage transferred, the greater the expected savings. This will lead to large amounts of search of the market and to a lower variance in the county.

Hypothesis III: Initial and Residual Variance

It is hypothesized that the variance in rent paid is a function of the variance in asking prices. Thus in counties in which there is a high initial variance in asking prices, there will be a high variance in rent paid per pound.

This hypothesis is based on the assumption that, ceteris paribus, the level of the marginal revenue curve is a function of the remaining variance. If in two counties the marginal cost is the same, the county with a higher initial variance has a marginal returns curve to the right of the other county. This raises the equilibrium amount of search but at the equilibrium the county with the higher initial variance has a higher residual variance if the marginal cost of search is constant or increases with the quantity of search.

There are at least two sources to the possible differences in the variance of asking price of allotment before the search processes. These are: (1) the variance in net income per pound of quota expected by quota owners if they produce the tobacco themselves (opportunity costs) and (2) the expectations of what rental rate will be in the county this year given the experiences of other years (prior information). These two sources of variance will be discussed separately.

Opportunity Costs as a Source of Variance. Suppose the initial offer price of a pound of quota is based on the alternatives open to the quota owner. If he has a high net income per pound of quota through producing it himself, his asking price would be high. On the other

hand, if he has low alternatives, his asking price in the absence of search may be low. The result of search by both renters and landlords will be to reduce this variance. Variables which might be used to test the hypothesis linking initial variances and rental variances because of production alternatives are: (1) variance in yield within a county and (2) percentage of underplanting in 1961.

Earlier studies (e.g., Bradford and Toussaint, 1962) have shown that the cost of producing tobacco is affected by yield. Net returns per pound of tobacco are also affected by yield. The greater the range of yield in a county, the greater will be the range of net returns per pound of tobacco and in terms of the hypothesis the greater will be the range of quoted prices by the lessor. A large variance in yield will result in a large variance in net returns and in a large variance in asking prices before the search processes begin. If the marginal cost of search increases as the quantity of search increases, the net result is a large variance in contract rental rates. High initial variance is expected to be positively correlated to rental variance.

Yields per acre for the townships in each county were available for the period 1959-1963. An average value of yields for each township based on those four years of observations was estimated and the variance of the average yield of township was estimated for each county and used in the regression analysis.

Underplanting is another variable which can be used to test the hypotheses because underplanting represents a zero return to allotment. Bordeaux (1964) showed that underplanting is a significant factor for farmers' participation in the Lease and Transfer Program. Farmers whose net return for producing tobacco is zero will enter the rental market, but their price may not follow any particular pattern because they do not have a minimum opportunity cost that should be attained. It is enough for them to obtain a positive price. Of course the higher the rental rate is, the higher will be their income. A positive correlation of variance and percentage of underplanting was hypothesized and data published in the 1961 annual report were used to estimate the percentage of underplanting (N. C. Agricultural Stabilization and Conservation Service, 1961). The best year for attaining data on underplanting was thought to be 1961 because it is the year immediately prior to the

initiation of the Lease and Transfer Program. Underplanting has declined sharply since the Lease and Transfer Program was developed.

Prior Information and Changing Conditions as a Source of Variance. The second source of variance in initial asking prices arises because of changing conditions within a county. If the rental market is more or less continuous from earlier years, renters and owners enter the season with information about quantities and prices on rent paid from previous periods. If there is some element of uncertainty, such as the quantity of allotment to be offered this year, this information will have to be obtained through the marketing process. If the quantity of tobacco allotment offered this year in contrast to previous years changes very abruptly in one county but not so much in another county, one might find that there is a greater continuity of information in the latter county and a lower variance in rental rates. To test this hypothesis one could regress the variance in rent paid upon the change from one year to the next in the quantity of tobacco rented in a given county. Variables that could be used to test the hypotheses would be (a) the percentage change in quota transferred from 1965 to 1966 in a county, (b) the percentage change of acres transferred in the same period, or (c) the absolute change in the number of farmers participating in the Lease and Transfer Program. It was hypothesized that there would be a positive correlation between each of these variables and the variance in rent paid.

Regression Analysis

Model I: Variance among All Sample Contracts within Counties

Regression analysis was used in order to test the hypothesis that the total variance is determined by factors related to the cost of information, returns to information and to the variance in asking price. In these regressions, there were 15 observations, the number of the sample counties. Two basic sets of regressions were estimated, one using the variance in rent paid among all sample contracts in a county as the dependent variable and one using the standard error for the same sample as the dependent variable. Since each hypothesis could be represented by more than one independent variable, several regressions were computed.

Tables 2 and 3 present the results of the alternative regressions. Linear relationships among the variables were assumed for all regressions. Selected models and results are presented below:[1]

$$\hat{Y}_1 = 6.65 \underset{(.000089)}{-.000082^{*}} X_1 \underset{(.000037)}{-.00048^{*}} X_3 + \underset{(.08767)}{.46646^{***}} X_5 \qquad (1)$$

where

$\hat{Y}_1$ = the estimate of the variance of rent paid in a county for the 1966 production season;

a = constant;

X_1 = total number of allotment acres in each county in 1965;

X_3 = estimate of the average pounds transferred per renter in each county for the 1966 production season, and

X_5 = percentage of allotments underplanted in each county in 1961.

The coefficient of determination (R^2) was .852 for $R_{1,2}$. The coefficient of the variable representing initial variance, percentage of underplanting (X_5), was significant at .01 level of significance. The coefficient of the variable representing returns to search, pounds per renter (X_3), was not significant at the .05 level but the coefficient was negative as hypothesized. The coefficient of the variable representing cost of information, acreage of allotment (X_1), was not significant at the .05 level but its sign was consistent with the hypothesis.

By using some alternative variables for each hypothesis, the following regression was developed resulting in a coefficient of determination of .55:

$$\hat{Y}_2 = 3.539 \underset{(.000032)}{-.000051^{*}} X_1 \underset{(.00012)}{-.00022^{**}} X_3 + \underset{(.02211)}{.00080^{*}} X_4 \qquad (2)$$

where

$\hat{Y}_2$ = estimate of the standard error of rents paid in the county in the 1966 production season;

a = constant;

X_1 = total number of allotment acres in each county in 1965;

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[1]One star denotes that the sign of regression was as hypothesized. Two stars show significance at .05 level and three stars show significance at .01 level. The numbers in parentheses are the standard errors of regression coefficients.

Table 2. Regression analysis using the variance of rental rates within counties as the dependent variable[a]

Regression	Constant term (a)	Acreage of allotment (X_1)	Proportion of farm income (X_2)	Average pounds per renter (X_3)	Percent change in quota 1965-66 (X_4)	Percent of underplanting 1961 (X_5)	Variance in yield (X_6)	Percent change in the no. of farms 1965-66 (X_7)	Percent change in acres rented 1965-66 (X_8)	R^2
$R_{1,1}$	11.72	-.00025* (.00018)		-.00107* (.00073)	-.00646 (.12643)					.47
$R_{1,2}$	6.65	-.00008* (.00008)		-.00048* (.00037)		.46646*** (.08767)				.85
$R_{1,3}$	11.76	-.00024* (.00016)		-.00109* (.00068)			-.0000028 (.000064)			.47
$R_{1,4}$	11.66	-.00026* (.00018)		-.00108* (.00067)				.00317* (.02538)		.47
$R_{1,5}$	11.76	-.00021* (.00021)		-.00108* (.00067)					-.00732 (.03249)	.47
$R_{1,6}$	12.08			-.0016** (.0006)						.35
$R_{1,7}$	11.70	-.00024* (.00015)		-.00109* (.00064)						.47
$R_{1,8}$	6.87	-.00010* (.00011)	-.00866* (.03266)	-.00031* (.00048)	-.05970 (.0862)	.46652*** (.0985)				.86
$R_{1,9}$	12.47		-.06823* (.05283)	-.00098 (.00080)	-.04842 (.14968)					.46
$R_{1,10}$	6.60		-.00676* (.02334)	-.00055* (.00038)		.48376*** (.09309)				.84
$R_{1,11}$	13.15		-.06384* (.03971)	-.00107* (.00067)			-.0000479 (.000064)			.48
$R_{1,12}$	12.00		-.05536* (.04413)	-.00112* (.00068)				-.00182 (.02460)		.45
$R_{1,13}$	12.22		-.04360* (.04924)	-.00109* (.00068)					-.01339 (.03023)	.46
$R_{1,14}$	12.26		-.05682* (.03784)	-.00112* (.00065)						.45

[a]One star indicates the expected sign was obtained. Two stars indicate .05 level of significance and three stars indicate .01 level of significance, using a one-tailed test.

Table 3. Regression analysis using the estimated standard error of rental rates within counties as the dependent variable[a]

Regression	Constant term (a)	Acreage of allotment (X_1)	Proportion of farm income (X_2)	Average pounds per renter (X_3)	Percent change in quota 1965-66 (X_4)	Percent of underplanting 1961 (X_5)	Percent change in acres rented 1965-66 (X_8)	R^2
$R_{2,1}$	3.539	-.000050* (.000032)		-.00022** (.00012)	.00080* (.02211)			.55
$R_{2,2}$	2.772	-.000026* (.000198)		-.00013* (.000084)		.07104*** (.01953)		.80
$R_{2,3}$	3.548	-.000048* (.000037)		-.00022** (.00011)			-.00091 (.00569)	.55
$R_{2,4}$	3.673		-.01202* (.00950)	-.00022* (.00014)	-.00426 (.02693)			.52
$R_{2,5}$	2.779		-.00327* (.00533)	-.00015* (.000088)		.0748** (.02127)		.77
$R_{2,6}$	3.648		-.00827* (.0088)	-.00023** (.00012)			-.00277 (.00540)	.53

[a]One star indicates the expected sign was obtained. Two stars indicate .05 level of significance and three stars indicate .01 level of significance, using a one-tailed test.

X_3 = estimate of the average pounds transferred per renter in each county for the 1966 production season, and

X_4 = percentage change in pounds of total quota transferred for the period 1965-1966 in each county.

The coefficient of X_3, average pounds per renter, in $R_{2,1}$ was significant at the .05 level with 12 degrees of freedom using a one-tailed test. The significance of this variable indicates that returns to information is a factor determining the level of variance in a county. The coefficient of X_4, percentage change of quota, failed to be significant but it had the same sign as hypothesized. The coefficient of X_1, acreage allotment, was not significant at the .05 level but the coefficient had the right sign throughout all regressions. Regression $R_{2,6}$ reported in Table 3 resulted in a significant regression coefficient for X_3, the average pounds per renter. In that regression the sign of the coefficient of X_6, percentage change in acres rented, was negative but not significant. A positive coefficient for this variable had been hypothesized.

The use of the percentage of farm income coming from tobacco, X_2, as a variable resulted in a coefficient with the expected negative sign throughout all regressions but none were significant at the .05 level. Moreover, the use of this variable instead of X_1, acreage allotment, systematically gave a lower R^2 (Tables 2 and 3).

The regression $Y_i = a + b_3 X_3$, where X_3 is average pounds per renter, was computed. The R^2 was .35 when the dependent variable used was Y_1 and .45 when the dependent variable used was Y_2. By adding X_1 and X_4 to the above regressions, the R^2 improved to .47 for Y_1 ($R_{1,1}$) and to .55 for Y_2 ($R_{2,1}$). In the case where X_1, acreage allotment, and X_5, percentage of underplanting in 1961, were added, the R^2 improved to .85 ($R_{1,2}$) and .80 ($R_{2,2}$), respectively.

This strong correlation of average pounds per renter (X_3) with the dependent variables supports the hypothesis that the returns to information determines the amount of search, which in turn affects the levels of variance in rental rates.

Regression support for the cost of information hypothesis proved to be somewhat weaker, but still the regression coefficient had the hypothesized sign in all regressions. If the regression had more degrees of freedom,

the cost of information hypothesis might have been statistically significant at the .05 level.

None of the three variables representing pre-search variance in asking prices, variance in yield (X_6), the percentage change in the number of farms transferring allotment (X_7) and the change in acres transferred between 1965 and 1966 (X_8), had coefficients that were significant at the .05 level and only in some regressions did the coefficient have the expected sign.

An additional variable, percentage of underplanting of allotment in 1961 (X_5), used to test the hypothesized relationship between initial and residual variance was strongly significant. Bordeaux (1964, p. 27) found a very strong relationship between underplanting and percentage of participation in the program. But this variable could not be considered as an ideal variable for two reasons: (a) the underplanting data were taken from five years before the trading season for which rental variance was analyzed and (b) some factors highly correlated with underplanting may be related to variance in rental rates for other reasons than high initial (pre-search) variance. If those factors could have been identified and had been explicitly included in the regression analysis, a better explanation of the variance of rents paid might have been obtained.

Model II: Variance among Farmers

The second model was developed to test the same hypotheses as the first one. The independent variables were the same for the corresponding hypotheses. However, the dependent variable used was the variance due to the differences among the mean rents paid by farmers in a county.[2]

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[2]This variance can be considered to be the result of an analysis of variance of rents paid per pound of allotment conducted for each county in the sample. The analysis of variances was a one-way classification, where the treatment term was the differences among contracts established by a given farmer. The variance among farmers (S_F^2) and the variance "within" farmers (S_C^2) were computed for each county.

Regressions were estimated having as a dependent variable the variance among the contracts established by a given farmer, the "within" variance (S_C^2). None of the regression coefficients were significantly different from zero at the .05 level of significance. It appears that the "within" variance is affected by factors other than those represented by the hypotheses studied.

Table 4 represents the results of the regressions computed. The relationship was assumed linear for all regressions. One of the estimated regressions is presented below:

$$\hat{Y}_3 = 14.64 - \underset{(.00020)}{.00041^{**}} X_1 - \underset{(.00086)}{.00106^{*}} X_3 - \underset{(.000082)}{.0000038} X_6 \qquad (3)$$

where

$\hat{Y}_3$ = the estimate of the variance due to the differences among farmers in a county;

a = constant;

X_1 = total allotted acres in each county in 1965;

X_3 = estimate of the average pounds transferred per renter in each county for 1966 production year, and;

X_6 = variance in yield in each county.

The coefficient of determination (R^2) was .50 in $R_{3,3}$. The regression coefficient of the variable X_1 representing the cost of search was significant at the .05 level of significance. The coefficient for the returns to search variable was not significant but the sign was negative as hypothesized. The regression coefficient for X_6, variance in yield, failed to be significant and had an unexpected sign.

Generally, in the set of regressions presented in Table 4, the cost hypothesis represented by the two variables X_1 and X_2 resulted in a significant regression coefficient for most of the regressions computed. The cost of search is apparently a factor determining the differences in rents paid among farmers and helps to determine the differential level of variance in rental rates. The evidence for the cost hypothesis was stronger in this model than it was in the first model in which the dependent variable was the total variance of rents paid in a county.

The returns to search hypothesis was rejected in the second model because the regression coefficient of X_3 was not significant at the .05 level except in the regression $R_{3,5}$ where X_3 was the only variable used. In that case the regression coefficient was significant and the R^2 was .30. Although the coefficient of X_3 was not significant, it had the hypothesized sign throughout all regressions.

The evidence for the third hypothesis, the initial and residual variance was about as strong as it was in the first model. Underplanting, X_5, had a very strong regression coefficient which was significant at

Table 4. Regression analysis using the variance among farmers within counties as the dependent variable[a]

Regression	Constant term (a)	Acreage of allotment (X_1)	Proportion of farm income (X_2)	Average pounds per renter (X_3)	Percent change in quota 1965-66 (X_4)	Percent of underplanting 1961 (X_5)	Variance in yield (X_6)	Percent change in the no. of farms 1965-66 (X_7)	Percent change in acres rented 1965-66 (X_8)	R^2
$R_{3,1}$	14.18	-.00031* (.00021)		-.00139* (.00089)	.14657* (.15366)					.54
$R_{3,2}$	8.27	-.00021** (.00011)		-.00030* (.00049)		.58101*** (.11502)				.85
$R_{3,3}$	14.64	-.00041** (.00020)		-.00106* (.00086)			-.0000038 (.000081)			.50
$R_{3,4}$	14.65	-.00039* (.00023)		-.00106* (.00085)				-.00622 (.03207)		.50
$R_{3,5}$	15.21			-.00191** (.00081)						.30
$R_{3,6}$	14.57	-.00041** (.00019)		-.00106* (.00081)						.50
$R_{3,7}$	15.07	-.00021* (.00022)	-.08618* (.06492)	-.00076* (.00098)	.01699* (.17779)					.61
$R_{3,8}$	9.12		-.06229** (.02803)	-.00027* (.00046)		.55194*** (.11180)				.86
$R_{3,9}$	15.60		-.11441** (.05104)	-.00092* (.00079)				-.00624 (.02845)		.57

[a]One star indicates the expected sign was obtained. Two stars indicate .05 level of significance and three stars indicate .01 level of significance, using a one-tailed test.

the .01 level ($R_{3,2}$). The R^2 was .85. The other variables connected with the third hypothesis, X_4, X_6, X_7, did not have significant coefficients and many times failed to have the hypothesized sign.

VARIANCE WITHIN COUNTY

The factors that determine the differential levels of variance among counties may also be analyzed by examining rental rate differences within counties. Two hypotheses were formulated within the economics of information framework developed above concerning rental rates within counties. For the hypothesis concerning variance among counties, it was assumed that time was not an important factor of variation. This assumption is now relaxed.

Hypothesis One: The Effect of Time on Variance

It is hypothesized that the variance in rent paid is significantly related to the time at which the contract was established.

It is known that there is a market of approximately four months within which allotment transfer contracts may be filed. This hypothesis is based on the assumption that the quantity of allotment available is not known, but additional information is acquired as the rental season advances. Accumulation of information throughout the season results in more effective market operation by reducing the size of variance of the homogeneous product over time. It is possible, however, that the mean rent paid might decline or rise, depending on the kind of information that enters the market.

A regression of the variance in rent paid in each 15-day period during the season, upon the time the contract was signed, used as a continuous variable, could be estimated. The regression coefficient was hypothesized to be negative. That is, as time advances, variance in rent is expected to decrease. The regression equation was of the form

$$Y_{ic} = a + d_c \sum_{c=1}^{14} D_c + b\, t_{ic} \qquad (4)$$

where

$c = 1, 2 \ldots 14$ counties;

$i = 1, 2 \ldots y$ 15-day period;

Y_{ic} = a measure of the variability for the i^{th} 15-day period in the c^{th} county;

a = the constant term representing Robeson County;

D_c = dummy variables equal to 1 for the c^{th} county, zero otherwise;

d_c = the coefficient representing constant difference for the c^{th} county from the Robeson County constant term, and

t_{ic} = the number of the i^{th} 15-day period in the c^{th} county.

This is the usual form of a linear regression except that discrete variables are used for 14 counties which assume the value of one for the relative county and zero otherwise. The basic assumption about this form of regression (Johnston, 1963) is that the slope of the variable t_i is the same in all counties. This assumption permits data of 15 counties to be pooled with a consequent increase in the degrees of freedom for the regression. The regression coefficients of the 14 dummy variables are reported in Table 5 using two different measures of rent variability.

$Y_{1_{ic}}$ = estimate of the variance of rent paid for the i^{th} 15-day period in the c^{th} county, and

$Y_{2_{ic}}$ = estimate of the standard error of rent paid for the i^{th} 15-day period in the c^{th} county.

In addition the trend in mean rent paid by 15-day intervals through the season was also analyzed using:

Y_3 = estimate of the mean rent paid for the i^{th} 15-day period.

The regression coefficient for the time variable was not statistically different from zero in any of the three regressions. It had a positive sign, although for Y_1 and Y_2 it was hypothesized to be negative. Failure to accept this hypothesis shows that information is not transferable throughout the marketing season. A piece of information obtained at the beginning of the season may not be useful in marketing transactions later in the work because conditions in the market change. Perhaps new information must be obtained for each period of time. If information were transferable, the variance should be negatively and significantly correlated with the time variable. The R^2 was .17 when the dependent variable was Y_1, .22 when the dependent variable was Y_2, and .96 when the dependent variable was Y_3.

Table 5. Coefficients of regression for dummy variables and time as a continuous variable using alternative dependent variables[a]

Counties	Y_1	Y_2	Y_3
Beaufort	-3.35	-.55	-6.19*
Edgecombe	-3.89	-1.08*	-.28
Hertford	-.18	.06	-5.65*
Lenoir	-3.49	-.79	-.77
Wayne	-1.49	-.15	-1.13*
Alexander	6.13	.56	-13.51*
Davidson	-1.58	-.31	-8.90*
Person	-.88	-.41	-2.48*
Stokes	-3.15	-.66	-2.61*
Wilkes	-.16	.01	-8.44*
Brunswick	-1.50	-.14	-.16
Columbus	-5.48	-1.27*	2.19*
Cumberland	-2.90	-.54	-4.73*
Hoke	-2.07	-.29	-5.61*
Robeson (constant)	3.93	2.13	18.82
Time variable	.546	.057	.019
Standard error	(.312)	(.045)	(.042)
R^2	.171	.219	.957

[a]One star indicates statistically significant at the .05 level.

The possibility of the existence of different time trends in each county was tested by computing a regression for each county on rent paid for each contract using the date the contract was signed as the independent variable. The results did not show any systematic time pattern. In some counties the coefficient of regressions was positive and in some negative. Moreover, R^2 was very small ranging from .06 to .007 with an exception for Beaufort County where it was .20. In the remainder of the analysis, the time trend was ignored since it was so trivial.

Hypothesis Two: The Effect of Size on Variance

It is hypothesized that those renters with large contracts or large total amounts of transferred quota within a county pay a lower mean price per pound of allotment than renters with small contracts.

This hypothesis is based on the assumption that information is not costless and once acquired is not shared freely. An individual renter with a large poundage contract has a high marginal return to additional search because if the rental rate is reduced by search, the reduction applies to a large quantity of allotment. Thus, renters who are seeking a large quantity of tobacco will search more, and the probability that they will find a lower price than those searching less is increased. It can be noted that this hypothesis is similar to the second hypothesis used to analyze differences in the variance of rental rates among counties.

Total poundage leased and transferred per renting farmer in each county was selected as the variable to be used in testing this hypothesis. For reasons explained above, the relationship was hypothesized to be negative and linear.

$$P_{ij} = A + b \sum_{i=1}^{n} Q_{ij} \qquad (5)$$

where

$i = 1, 2 \ldots$ contracts per farmer;

$j = 1, 2 \ldots$ farmers in each county;

P_{ij} = price of contract, and

ΣQ_{ij} = total pounds per farmer.

The regression coefficients for each county are reported in Table 6.

Table 6. County regressions of rental rate paid for each contract by a farmer on number of pounds[a]

County	Regression coefficient		Standard error		R^2	
Beaufort	-07[b]	.629	-06[b]	.750	-04[b]	.951
Edgecombe	-06	-.237	-06	.614		.0018
Hertford	-05	.435**	-05	.146		.142
Lenoir	-06	.202	-06	.612		.002
Wayne	-05	.2207**	-06	.765		.085
Alexander	-06	.518	-05	.165		.001
Davidson	-05	.118	-05	.126		.014
Person	-06	-.235	-06	.713		.001
Stokes	-06	-.2007	-06	.949		.001
Wilkes	-06	-.558	-05	.121		.002
Brunswick	-05	.1311*	-06	.645		.044
Columbus	-06	.899*	-06	.391		.059
Cumberland	-06	-.743	-06	.682		.018
Hoke	-06	.740**	-06	.268		.075
Robeson	-05	.181*	-06	.739		.083

[a]One star indicates statistically significant at the .05 level. Two stars indicate statistically significant at the .01 level.

[b]This negative integer shows number of decimals that the decimal point should be moved to the left for the coefficient; for example, -06 .237 is the decimal number .000000237.

For five counties the regression coefficient was negative as assumed but failed to be significant, i.e., different from zero at the .05 level. For the other ten counties the regression coefficient was positive and for six of them it was significant at the .05 level. However, the R^2 was very small. In some counties it was less than .01.

To increase the degrees of freedom, the data from the fifteen counties were pooled. The dependent variable, price paid for each contract by a farmer, was transformed by subtracting average rent paid in the county. The model and results were the following:

$$(P_{ijc} - \bar{X}_c) = -.00313 + \underset{(.000000169)}{.000000604^{**}} \sum_{i=1}^{n} Q_{ijc} \qquad (6)$$

where

P_{ijc} = rent paid for i^{th} contract by j^{th} farmer in c^{th} county;

$\bar{X}_c$ = average rent paid in c^{th} county, and

$\sum_{i=1}^{n} Q_{ijc}$ = total pounds for j^{th} farmer in c^{th} county.

The R^2 was only .01 and the regression coefficient was positive and significantly different from zero at .01 level of significance.

The results of this regression show that farmers transferring a larger than average poundage pay a higher than average price. This result contradicts the returns to search hypothesis in which it is reasoned a farmer with large poundage has higher returns from search, searches more and succeeds in obtaining a lower price.

It is possible that different factors exist which force bigger farmers to pay a higher rental rate. These unknown factors might offset the reduction of price resulting from returns to search. One of those factors could be the cost of transaction for each farmer represented by the number of contracts. There may be a cost to establishing contracts. If so, this cost might be reduced by paying more than would otherwise be justified for large contracts.

A regression was computed with the same dependent variable as in the previous regression: the difference between the rent paid for each contract and the average rent paid in that county. Two independent variables were used: (1) the difference between the total pounds transferred by each farmer in each county and the average total pounds

transferred for farmers in the county, and (2) the difference between the number of contracts for each farmer and the average number of contracts per farmer in the county.

$$(P_{ijc} - \bar{X}_c) = .00038 + \underset{(.000000211)}{.000001180^{**}} \left(\sum_{i=1}^{n} Q_{ijc} - \bar{Q}_c \right) - \underset{(.00058)}{.00260^{**}} (N_{jc} - \bar{N}_c)$$

where

P_{ijc} = rent paid for the i^{th} contract by j^{th} farmer in c^{th} county;

$\sum_{i=1}^{n} Q_{ijc}$ = total pounds for j^{th} farmer in c^{th} county;

$\bar{Q}_c$ = average pounds transferred for farmers in the c^{th} county;

N_{jc} = number of contracts of j^{th} farmer in c^{th} county;

$\bar{N}_c$ = average number of contracts for farmer in c^{th} county;

and P_{ijc} and $\bar{X}_c$ are the same as defined above.

The R^2 was .028 and the partial regression coefficient for $\sum_{i=1}^{n} Q_{ijc} - Q_c$ was positive and significant from zero at .01 level of significance. Farmers who transferred large amounts of quota tended to pay more per pound. This finding runs counter to the usual assumption that large purchasers are able to purchase goods advantageously because of their size.

The second variable, $N_{jc} - \bar{N}_c$, had a negative coefficient as hypothesized and it was significantly different from zero at the .01 probability level. As the number of contracts increased per farmer, the average rental rate fell. This suggests that there is a trade-off or exchange between the size and the rental rate of an allotment. To purchase a given quantity of quota a farmer could pay a lower than average price if he was willing to search for a large number of contracts. Alternatively, he could pay a little more per pound and make fewer but larger contracts.

The fact that big farmers still pay a higher price would lead to the interpretation that there are unidentified cost of search factors which cause farmers with large poundage to pay a higher price which more than offset the reduction in price which might otherwise be expected to occur as the result of larger amounts of search on the part of farmers who rent larger quantities of allotment.

ORGANIZATION OF FUTURE RENTAL MARKETS

Resources efficiency can be increased through a well-organized information system in which the equilibrium price can be developed. In the past, public agencies have not published data on prices because farmers are not obliged to report the rent paid when the transfer contract is signed. Only the pounds transferred have to be reported. It would be appropriate for a public agency to produce information on tobacco rental rates if it can be done without great cost just as data on other agricultural products and inputs are now produced. Total resource efficiency probably could be increased as a result.

The market season lasts for about four months. Public agencies could be empowered to collect rental rate data from farmers. The agencies could publish and distribute weekly a summary of data collected on all contracts signed during the previous week, including pounds transferred, rental rate paid, and special terms under which transfer took place. If special terms exist for a contract, they should be mentioned in a reporting system because in these cases the cash price paid does not reflect the full price per pound of allotment.

If information is distributed widely, farmers will have a clearer picture of the tendencies in the market and they will try to adjust the quantity of resource to obtain an optimum allocation. No matter how perfect the information system is made, some variability in rental rates could be expected to exist. This is the case because the equilibrium rental rate can be expected to change in any given county from one year to the next. There is no device at this time that would provide for a shift from one year's equilibrium to the next year's equilibrium price without some uncertainty and variation during the transition period. Nevertheless, the provision of weekly information on rental rates paid might contribute to efficiency. This will be the case particularly if allotment rental is allowed to take place across county lines. The cost of information probably would rise substantially with an increase in the geographic size of the market.

Alternatively, a group of private brokers might provide market information and bring contracting parties together in an efficient manner. Some brokerage activity exists in some counties at a cost of 1 to 2 cents per pound. This is a rather high proportion of the rental rate but it is one indication of the relatively high private cost incurred by some of the persons in the quota transfer market. An additional private information system exists in the form of want-ads, which appear in the newspapers at rental price. Information obtained from advertisements is not completely satisfactory because it represents offers rather than contractual prices.

The purpose of this study was neither to measure the cost of information in the lease and transfer market nor to measure the cost of organizing a way of distributing information on rental rates by a public agency. It would be of great interest if further research was done to determine the saving in resources that might result from such a market organization.

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Agricultural Experiment Station

North Carolina State University
at Raleigh

J. C. Williamson, Jr., Director of Research

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