REPORT NO. 142

NOVEMBER, 1956

THE INFLUENCE OF SOME FACTORS ON PRICES IN THE PHOENIX COTTON MARKET

★ QUALITY

★ LOT SIZE

★ LOT UNIFORMITY

Agricultural Experiment Station

UNIVERSITY OF ARIZONA

Tucson, Arizona

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ACKNOWLEDGMENT

This is a report on one phase of the study SM-1, Regional Marketing of Cotton, Cottonseed and Cotton Products, in which the Experiment Stations of twelve cottonbelt states--Alabama, Arizona, Arkansas, Georgia, Louisiana, Mississippi, Missouri, New Mexico, Oklahoma, South Carolina, Tennessee and Texas--and the Agricultural Marketing Service cooperated. Studies similar to the one reported here have been conducted by the Experiment Stations of Louisiana, Mississippi, Missouri, New Mexico, Oklahoma, South Carolina and Tennessee, and the combined results will be released as a regional publication. Funds for this study were made available in part under the Research and Marketing Act of 1946.

The authors wish to acknowledge appreciation to the cotton buyers and sellers who furnished the information which made this study possible.

SUMMARY

From this study of the influence of selected factors upon prices in the Phoenix cotton market, the following observations can be made:

1. The level of prices for cotton in the Memphis market was quite accurately reflected to the Phoenix cotton market. In general, this reflection was more accurate and much more favorable towards the Phoenix market than was true in the early 1940's. After prices were adjusted for the locational disadvantage of the Phoenix market there appeared to be a general tendency during each of the three seasons for the Phoenix prices to exceed those in Memphis during the early part of the season and for the Phoenix prices to be discounted the most near the end of the season.

2. Premiums or discounts for quality in the Phoenix cotton market were generally closely related to those prevailing in the Memphis cotton market. Normally, the Phoenix cotton market reflected at least 60 percent of the Memphis premium or discount for quality. Frequently, 80 percent or more of the quality premium or discount prevailing in the Memphis cotton market was reflected in the prices in the Phoenix cotton market. There appeared to be no seasonal pattern to the accuracy with which premiums or discounts for quality in the Memphis market were reflected to the Phoenix market.

3. The size of the lot sold in the Phoenix market had no consistent effect upon the price paid for the cotton in the lot.

4. The degree of quality uniformity among the bales comprising a lot had no consistent effect upon the price paid for the cotton in the lot in the Phoenix market.

5. Normally, about 82 to 88 percent of the variance in prices among different lots of cotton sold in the Phoenix market on the same day could be explained by differences in quality. Differences in the size of the lots and the quality uniformity of the lots did not explain any significant portion of the remaining variation.

THE INFLUENCE OF SOME FACTORS ON PRICES IN THE PHOENIX COTTON MARKET

Norman E. Landgren and James S. St. Clair 1/

During the last ten years Arizona has developed into a major cotton producing state. Prior to 1947 annual cotton production in Arizona was normally less than 200,000 bales. By contrast, since 1950 the annual cotton crop in the state has never been less than 700,000 bales and one year exceeded 1,000,000 bales. Generally about 85 percent of the Arizona cotton crop is produced in the irrigated sections of Maricopa, Pinal and Pima counties. Commission buyers, merchants, mill buyers and salaried representatives of southern and eastern merchants buy cotton in this area. Most of the buyers have offices in Phoenix.

Although a large volume of cotton is sold annually in the Phoenix cotton market, it is not an organized spot market. There is no single location at which most of the cotton is sold. [Consequently buyers often do not have a complete knowledge of the quality and amount of cotton for sale on any given day.] A rather general practice in selling cotton in the Phoenix market is for growers to sell their cotton through their own buyer contacts, which are sometimes limited, or to sell through an agent who may solicit bids from only a few buyers before making the sale. In many cases this agent is an employee of the gin and oil mill company which has financed the production of the cotton. Frequently this company holds an option to purchase the cotton by equaling the highest bid received.

One of the main requirements of an efficient marketing system is that prices received by producers for a commodity and for the different qualities of the commodity should accurately reflect the ultimate consumers' preferences with regard to that commodity. A perfect reflection of consumers' preferences through the "pricing mechanism" results in the best allocation of productive resources as judged by consumers. In the "perfect market" of economic theory consumers' preferences are accurately reflected through prices. One of the assumptions made when referring to the "perfect market", however, is that all buyers have a knowledge of the amount and nature of the commodity for sale in that market and that communication between buyers and sellers is perfect. In an organized spot market, where buyers have a fairly complete knowledge of the quality and amount of cotton for sale at a given time and by bidding can transmit their interest in any particular lot of cotton to sellers, it appears that these requisites of a "perfect market" are at least partially fulfilled. With the method of selling cotton in the Phoenix market, buyers do not have complete knowledge of offerings on any given day and do not have communication with many sellers. It would appear, therefore, that the Phoenix market would somewhat less adequately fulfill the criteria for a "perfect market" than one of the large contral cotton markets. If this is true, cotton prices and premiums and

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discounts for quality at the Phoenix market would be expected to less accurately reflect consumers' preferences for cotton products back to producers than those of a large central cotton market.

There is considerable evidence that in the early 1940's the Phoenix cotton market met the needs of Arizona cotton producers rather poorly. During that period prices in the Phoenix market rarely were as high as those for similar quality cottons in the Memphis market, even after the prices had been adjusted for the locational disadvantage of the Phoenix market. 1/

The major problem, therefore, towards which this study was directed was to ascertain the efficiency with which the Phoenix cotton market reflects prices and premiums and discounts for quality prevailing in a large central cotton market. In addition, this study attempts to determine the effects which the size of the lot and the uniformity of the lot have on cotton prices in the Phoenix market.

Method and Procedure

Phoenix cotton prices and premiums and discounts for quality were compared with those prevailing in the cotton market at Memphis, Tennessee. The Memphis market was selected for the comparison because price quotations from the Memphis market cover a wider range of grades and staples than those from any other market, and since the volume of cotton traded in the Memphis market generally exceeds that of any other market, there was less probability of nominal quotations.

Price and quality data on cotton sales in the Phoenix market were collected during the three seasons, 1951-1952, 1952-1953 and 1953-1954. Because of the number of sales occurring daily it was impractical to obtain price and quality information on all or even a very large proportion. Therefore, data collected were restricted to a limited number of sales occurring on Thursdays, a day for which Memphis price quotations were available, throughout most of the marketing season. During the three seasons price and quality data were obtained on a total of 1,203 lots representing 51,867 bales of cotton sold in the Phoenix market. (See Appendix Table 1 for a breakdown of the number of lots and bales for which data were collected by week and by season).

Price and quality data in the local market were taken from the recapitulation sheets of sellers or first buyers. Prices recorded were "round-lot" prices and were fixed as points "on" or "off" the near active month New York futures price. 2/ By adding or deducting the points "on" or "off" the futures price to or from the futures price, the "round-lot" price expressed as cents per pound was obtained.

1/ Unpublished material prepared by and in the files of the Department of Agricultural Economics of the University of Arizona.

2/ A "round-lot" price is an average weighted price of the various grades and staples comprising a lot of two or more bales.

For the purpose of comparison, it was necessary to determine the "round-lot" price for the lot of cotton in Memphis had it been sold in that market. This was done by using Memphis price quotations to compute an average weighted price for the lot. To eliminate insofar as possible effects on the analysis due to changes in the price level of cotton, both the Phoenix "round-lot" price and the Memphis price evaluations of lots were expressed in all instances as plus or minus differences in points per pound from the price of Middling 15/16 inch cotton in Memphis.

EFFICIENCY OF THE PHOENIX MARKET IN REFLECTING THE LEVEL OF PRICES PREVAILING IN THE MEMPHIS MARKET

To appraise the efficiency with which Phoenix prices reflect the general price level of cotton prevailing in Memphis, it was necessary to compute an average weighted selling price of cotton in Phoenix for each day for which data were collected in the Phoenix market, and by applying Memphis price quotations to the grades and staples sold in Phoenix, compute an average weighted price for the cotton had it been sold in the Memphis market. To put the prices in the two markets on a comparable basis, it was also necessary to compute the "normal" price spread between the Memphis and Phoenix markets which could be expected to exist due to the locational advantage of one market over the other. Studies have shown that considerable Arizona cotton moves to export through west coast ports and gulf ports. Also, considerable Arizona cotton which is destined for domestic mills is stored for a time at gulf ports enroute. However, it has been assumed that the most important final destination of Arizona cotton was southeastern mills, mostly in the Carolinas. Likewise, it has been assumed that the bulk of cotton sold in the Memphis market was also destined for Carolina mills. Therefore, it would be expected that a "normal" price spread would exist between the Memphis and Phoenix markets which would be equal to the difference in the costs of moving cotton from Memphis and Phoenix to the Carolinas. These costs were estimated for the three seasons during which data for this study were collected (Table 1).

The total cost of moving cotton from Phoenix to Carolina mills was estimated as 248 points (2.48 cents) per pound for the 1951-1952 season compared with the estimated cost of 141 points (1.41 cents) per pound for moving cotton from Memphis to Carolina mills. For the 1952-1953 and 1953-1954 season, the estimated cost of moving cotton from Phoenix and Memphis to Carolina mills increased to 276 points (2.76 cents) per pound and 153 points (1.53 cents) per pound for the two markets, respectively. This increase was due mainly to increased freight rates and increased charges for services at the compress. It should be noted that there are no charges for "net gin loading" and "minimum storage" included in the total cost of moving cotton from Memphis to southeastern mills whereas charges for these services have been included in computing the total cost of moving cotton to these mills from Phoenix. The reason for this was that all Arizona cotton sales included in this study were sold f.o.b. gin yard whereas Memphis price quotations are for cotton stored uncompressed in warehouses.

TABLE 1. ESTIMATED COMPARATIVE COSTS OF MOVING COTTON TO CAROLINA MILL POINTS IN POINTS (100TH OF A CENT) PER POUND OF LINT COTTON a/

Item of Cost	1951-1952 Season		1952-1953 and 1953-1954 Seasons	
	Arizona to Carolina Mills	Memphis to Carolina Mills	Arizona to Carolina Mills	Memphis to Carolina Mills
Net Gin Loading	7		8	
Net Freight b/	159	83	176	90
Compression	28	20	32	23
Handling at Compress	15	5	18	7
Minimum Storage	6		9	
Hedging	4	4	4	4
Interest	5	5	5	5
Insurance	4	4	4	4
Commission	20	20	20	20
Total Cost	248	141	276	153

a/ Arizona prices are for cotton stored in the open on gin yards, whereas Memphis prices are quoted for cotton stored uncompressed in warehouses.

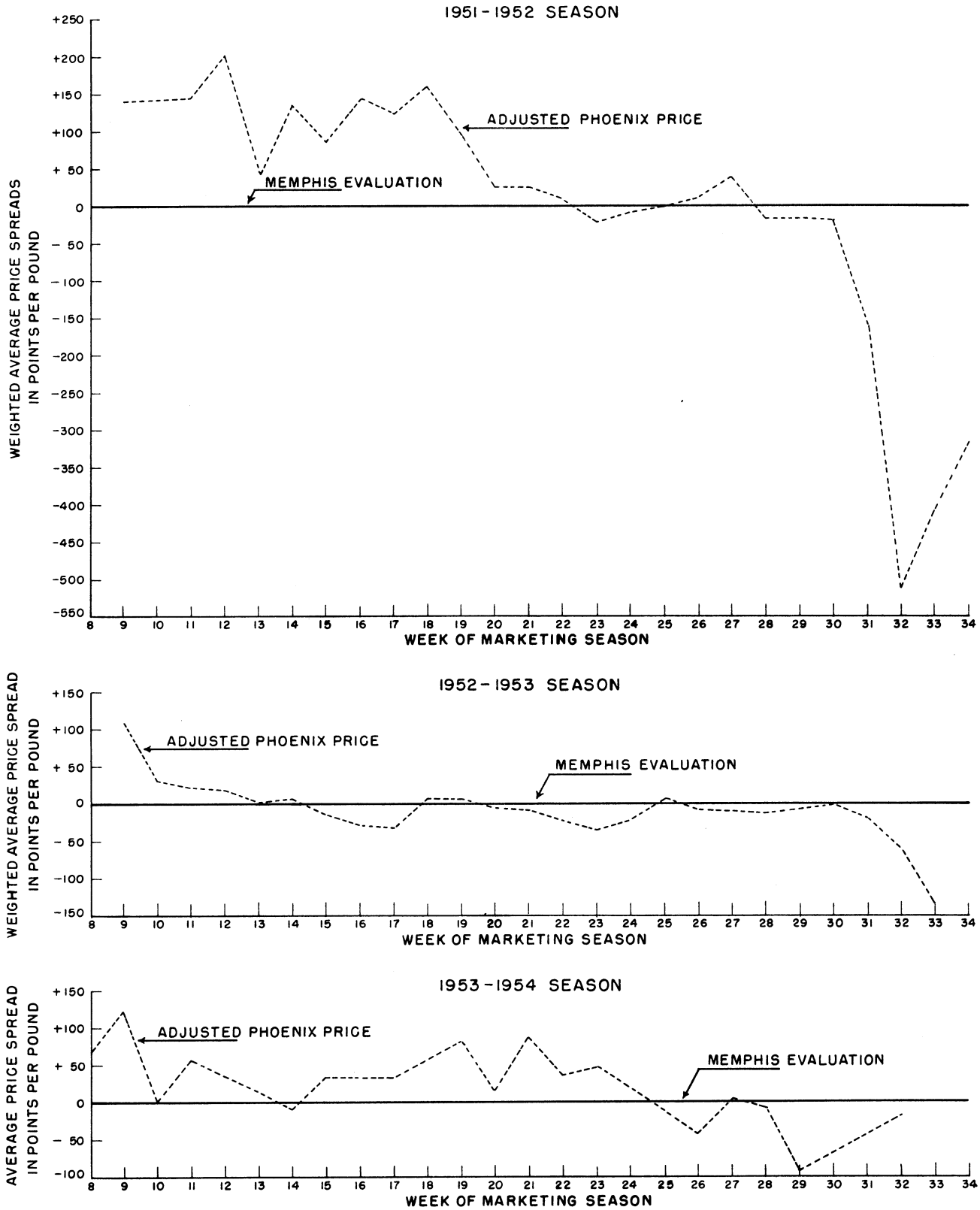
b/ Freight is from Coolidge, Arizona and Memphis, Tennessee to Greenville, S.C. Includes 3 percent federal tax.

By adding the difference in the costs of moving cotton from Phoenix and Memphis to Carolina mills (for the 1951-1952 season, 107 points per pound, and for the 1952-1953 and 1953-1954 season, 123 points per pound) to the average weighted Phoenix price, the expected "normal" price spread between the two markets was removed. This price, if the Phoenix market accurately reflected the level of prices in the Memphis market, would be equal to or very nearly approximate the computed Memphis price evaluation of the cotton sold in Phoenix. The relationships obtained for the three seasons are shown on Figure 1. As can be noted from Figure 1, the relationships between the adjusted Phoenix prices and the Memphis price evaluations were not uniform throughout the marketing season or from year to year.

From near the beginning of the 1951-1952 cotton marketing season until the last week in December, the average weighted Phoenix cotton prices, adjusted for locational disadvantage, consistently were higher than the average weighted Memphis price evaluations of the cotton sold in Phoenix. During this period the adjusted average weighted Phoenix prices ranged from 8 points a pound to 202 points a pound above the average weighted Memphis price evaluations. From the latter part of December until the second week in February, price levels in the two markets were generally about equal with each market occasionally showing the higher level. During the last four weeks for which price quality

Figure 1.

WEIGHED AVERAGE PRICE SPREADS BY WEEKS AND SEASONS BETWEEN COTTON SOLD IN THE PHOENIX MARKET AND THE MEMPHIS EVALUATION ADJUSTED BY DIFFERENCE IN COSTS OF MOVING COTTON FROM BOTH MARKETS TO SOUTHEASTERN MILL POINTS 1/



1/ Data were processed in such a way as to allow the computation of only simple average price relationships between the two markets for the 1953-1954 season.

data were obtained, price levels in the Phoenix market were considerably below those in Memphis--at one time the average weighted Phoenix price was more than 500 points below the average weighted Memphis price evaluation. This suggests that the generally low quality cotton sold during the latter part of the season was sharply discounted in the local market.

The Phoenix market very accurately reflected the levels of prices prevailing for cotton in Memphis during most of the 1952-1953 season. With the exception of the first day and last two days for which price and quality data were obtained during the 1952-1953 season, the spreads between the adjusted average weighted Phoenix prices and corresponding Memphis average weighted price evaluations never exceeded 36 points a pound. On nine of the 24 days for which data were collected, the spreads in price levels between the two markets were less than 10 points a pound. Near the end of the season when the bulk of cotton sold is of relatively low quality, the relationship of price levels in the two markets was similar to that observed for the 1951-1952 season inasmuch as the price levels in Phoenix again tended to be the lower.

Although the spreads in price levels between the Phoenix and Memphis markets during the early and latter parts of the season were not so pronounced, their relationship during the 1953-1954 season generally followed the pattern of the 1951-1952 season. On the days included in this study the average Memphis price evaluations exceeded the adjusted average Phoenix prices only once during the 1953-1954 season prior to mid-January, and then by only 10 points a pound. Prior to mid-January the adjusted average prices at Phoenix ranged from 0 to 123 points above those in Memphis. Most frequently, however, the price levels at Phoenix were 30 to 50 points a pound above those in Memphis. After mid-January, with the exception of one day, the Memphis price levels exceeded the Phoenix price levels by amounts ranging from 8 to 93 points a pound. As was true of the two preceding seasons, Phoenix price levels were the lowest as compared to those in Memphis near the end of the marketing season.

EFFICIENCY OF THE PHOENIX MARKET IN REFLECTING PREMIUMS AND DISCOUNTS FOR QUALITY IN THE MEMPHIS MARKET AND EFFECTS OF THE SIZE OF THE LOT AND THE QUALITY UNIFORMITY OF THE LOT ON PHOENIX COTTON PRICES

Perhaps the best measure of local market "pricing efficiency" is the measure of the accuracy with which the local market reflects in its prices premiums and discounts for quality prevailing in a large central market. The relationships of the adjusted average weighted Phoenix prices to the corresponding average weighted Memphis price evaluations as presented in the foregoing section have indicated only the accuracy with which the local market reflects the level of prices in the central market. The measure of quality premiums and discounts in addition indicates the adequacy of the local market in interpreting and reflecting back to producers consumers' preferences for different qualities of cotton as measured by prices for the various grades and staples at central markets.

An attempt was made in this study to determine the effects which the size of the lot and the uniformity of the lot have on cotton prices in Phoenix. Most of the cotton buyers in the Phoenix market buy on the orders of mills or large merchants. Cotton is usually purchased on the gin yards in lots of greatly varied size, normally ranging from one to several hundred bales. The lots are also greatly different with regard to the uniformity of the quality of the cotton making up the lot (See Appendix Tables 2 and 3). The buyer normally bears the costs of hauling the cotton to the compress where the cotton is generally assembled into large even running lots for shipment to mills. It would appear that certain economies would result from purchasing lots on the gin yard of considerable size inasmuch as near full loads for hauling would be assured, and bookkeeping transactions and problems associated with assembling the cotton into large even running lots for shipment to mills would be reduced. Also, it would appear that the purchase of lots within which the quality of the cotton was uniform would reduce much of the expense associated with the assembly function. It would seem likely that any economies gained by buyers through purchasing large or even running lots on gin yards would be at least partially reflected to producers in the prices paid for their cotton. The hypotheses tested in this study with regard to the effects of the size of the lot and the quality uniformity of the lot on the price of cotton in the Phoenix market were as follows: (1) as the size of the lot purchased increased, per pound price of the cotton comprising the lot would increase, other things being equal, and (2) as the quality of the cotton within the lot purchased more nearly approached perfect uniformity, per pound price of the cotton comprising the lot would increase, other things being equal.

Multiple correlation and regression analyses were used to appraise the accuracy with which premiums and discounts for quality were reflected from the Memphis market to the Phoenix market and to determine the effects which the size of the lot and the uniformity of the lot has on Phoenix cotton prices. Correlation and regression coefficients were not computed for the days for which price and quality data were obtained on less than ten lots or for days during which a large proportion of lots sold were single bale lots (See Appendix Table 1 for days, number of lots and number of bales included in the statistical analysis). Uniformity of the lot was dropped as a variable in the correlation and regression analyses for the 1953-1954 season. 1/

1951-1952 Season

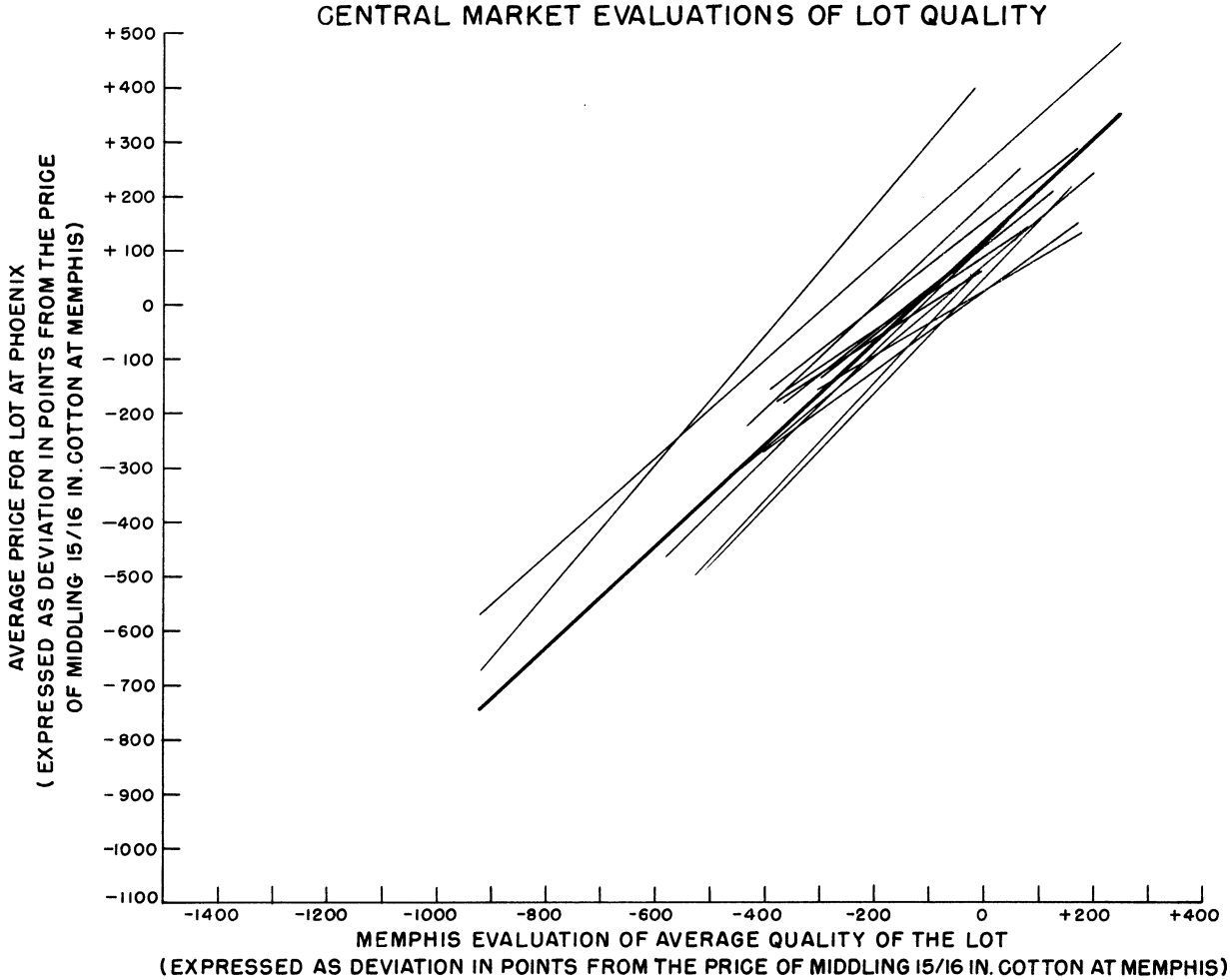
During the 1951-1952 season a difference in price of 100 points per pound between two qualities of cotton in the Memphis market was on the average accompanied by about 94 points per pound difference between the same two qualities in the Phoenix market. For example, if the average Memphis price of strict middling 1-1/16 inch cotton had been 100 points per pound above middling 1-1/16 inch cotton during the 1951-1952 season, the average price of strict middling 1-1/16 inch cotton in Phoenix would have been about 94 points per pound above that of middling 1-1/16 inch cotton. On the days observed, price differences for quality in the Phoenix market for each 100 points per pound price distinction in the Memphis market ranged from 60 to about 119 points.

1/ This variable was dropped from the statistical analysis for the 1953-1954 season because the procedure used in processing the original data did not allow calculation of standard deviations of lot quality.

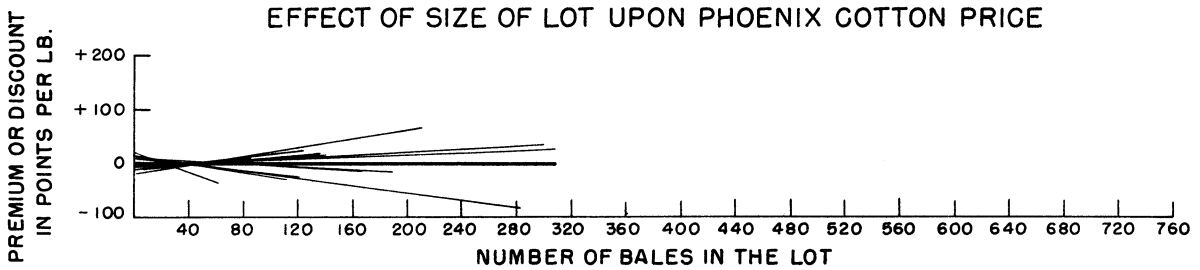
Figure 2.

1951-1952 SEASON

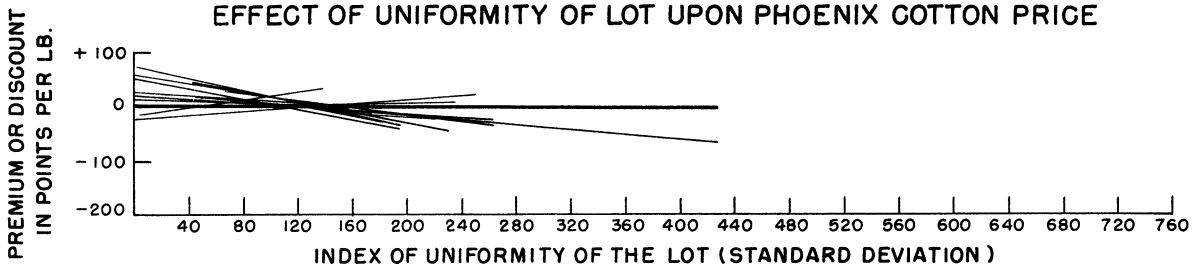
RELATIONSHIP BETWEEN PHOENIX PRICES FOR ROUND-LOTS OF COTTON AND CENTRAL MARKET EVALUATIONS OF LOT QUALITY



EFFECT OF SIZE OF LOT UPON PHOENIX COTTON PRICE



EFFECT OF UNIFORMITY OF LOT UPON PHOENIX COTTON PRICE



(NUMBERS REPRESENT A QUALITY RANGE IN POINTS ABOVE OR BELOW THE AVERAGE MEMPHIS EVALUATION FOR THE LOT WITHIN WHICH ABOUT TWO-THIRDS OF THE COTTON IN A LOT WOULD BE INCLUDED.)

Daily and season average relationships of premiums or discounts for quality in the Phoenix market to those prevailing in the Memphis market during the 1951-1952 season are shown on the upper-most figure of Figure 2. Each fine line represents the relationship for a single day. The heavy line represents the average relationship for the 1951-1952 season. The differences in the levels of the various lines indicate the differences in the average quality of the lots sold on different days. The slopes of the lines indicate the number of points distinction in price for quality in the Phoenix market for a given number of points distinction in the Memphis market. Although the relationships of premiums or discounts for quality in the Phoenix market to those in the Memphis market varied considerably during the season, there appeared to be no period within the season during which the relationships were either consistently high or low. The distribution of the percents of premium or discount for quality reflected from the Memphis cotton market to the Phoenix cotton market on the days studied during the 1951-1952 season is shown on the following table:

TABLE 2. DISTRIBUTION OF PERCENTS OF PREMIUM OR DISCOUNT FOR QUALITY IN THE MEMPHIS COTTON MARKET REFLECTED TO THE PHOENIX COTTON MARKET, 1951-1952 SEASON

Number of days (Thursdays for which correlations and regressions were computed)	Percent of premium or discount for quality in the Memphis cotton market reflected to the Phoenix cotton market
3	100 and over
4	90 - 99
1	80 - 89
4	70 - 79
3	60 - 69

The analysis of the relationship between price in the Phoenix market and the size of the lot indicates that small premiums were paid for larger lots on nine out of a total of fifteen days studied during the 1951-1952 season. These premiums ranged from about .04 of a point per pound to about .41 of a point per pound for each additional bale in the lot. On the remaining six days small discounts ranging from about .12 of a point per pound to about .96 of a point per pound for each additional bale in the lot were indicated (Figure 2). On the basis of these results it is not possible to detect any consistent relationship between price and the size of the lot in the Phoenix market. These inconsistent results may be due to an inadequate sample size and the possible effect of factors on price other than those included in this analysis.

Widely varied results between days were obtained in the correlation of the quality uniformity of the lot with the price paid for cotton in the lot (Figure 2). As would be expected, on twelve of the fifteen days studied small discounts were indicated as the quality

of the lot became less uniform. However, on the remaining three days small premiums were indicated as lots became less uniform in quality. The probability is rather high that the estimates of the premiums or discounts as related to quality uniformity of the cotton in a lot do not represent very accurately the true premiums or discounts made. This is also true of the estimate of the average relationship during the season. It can only be concluded from the data used in this study that quality uniformity of the lot had no consistent effect on the price paid for cotton in the lot during the 1951-1952 season.

The analysis for the 1951-1952 season indicated that about 82 percent of the variance in prices among different lots of cotton sold in the Phoenix market on the same day could be explained by differences in quality. Differences in the size of the lot and the quality uniformity of the lot did not explain any appreciable amount of the remaining variation.

1952-1953 Season

An average premium or discount for quality of about 78 points was paid in the Phoenix cotton market per 100 points price distinction between qualities in the Memphis market during the 1952-1953 season. This represented a somewhat less accurate reflection of quality premiums or discounts from the central market to the local market than was true for the 1951-1952 season. The daily relationships of Phoenix price differences for quality for each 100 points distinction in the Memphis market ranged during the 1952-1953 season from about 55 to about 124 points (Figure 3). On eight of the fifteen days for which regressions were computed, the Phoenix market reflected between 60 and 80 percent of the premium or discount for quality prevailing in the Memphis market. The Phoenix market reflected more than 100 percent of the Memphis premium or discount for quality on only one day of those studied during the 1952-1953 season. The distribution of the percents of premium or discount for quality reflected from the Memphis cotton market to the Phoenix cotton market are shown on Table 3. Although the relationships of premiums or discounts for quality between the two markets varied considerably during the 1952-1953 season, there again appeared to be no period in the season during which the relationships were either consistently high or low.

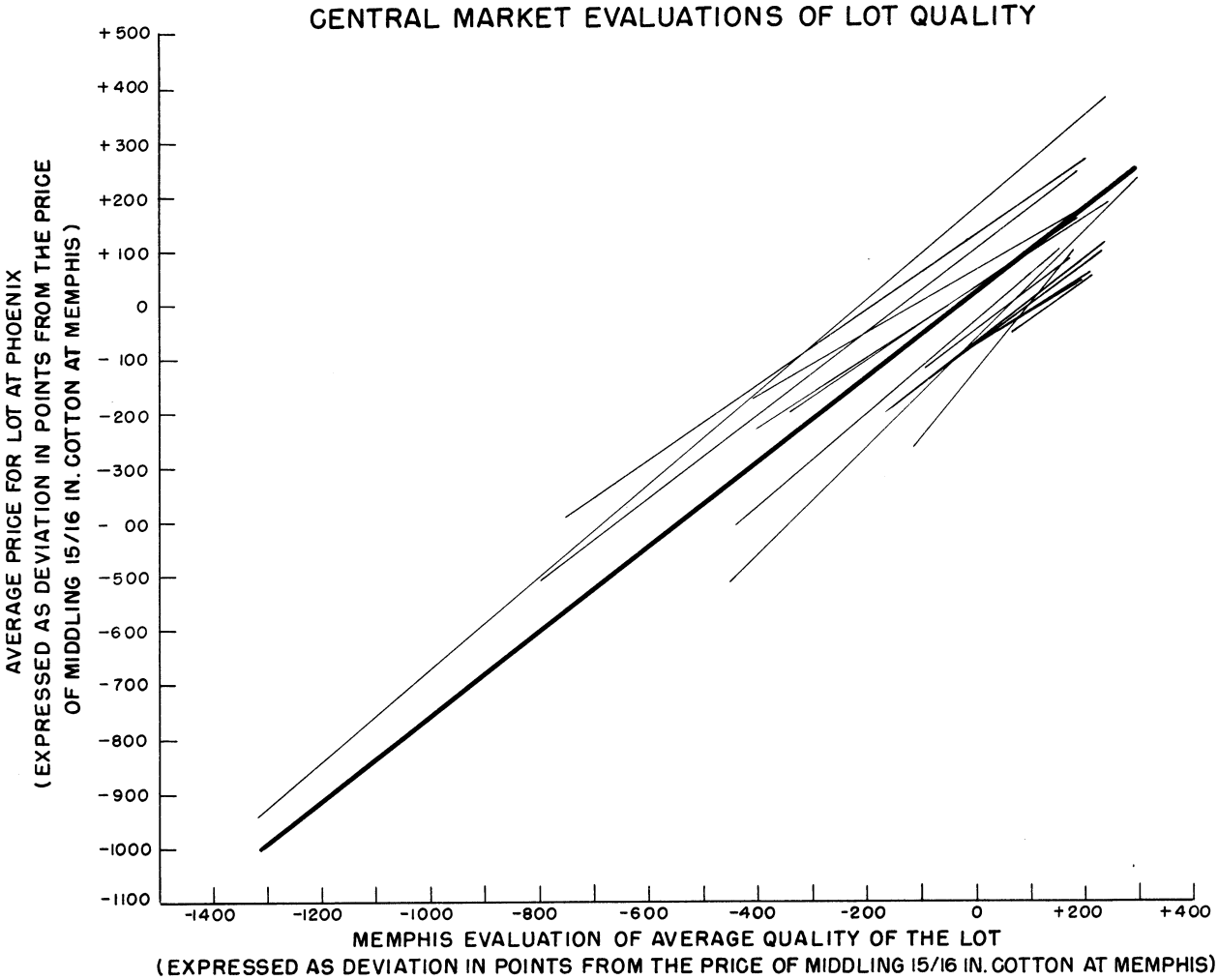
TABLE 3. DISTRIBUTION OF PERCENTS OF PREMIUM OR DISCOUNT FOR QUALITY IN THE MEMPHIS COTTON MARKET REFLECTED TO THE PHOENIX COTTON MARKET, 1952-1953 SEASON

Number of days (Thursdays for which correlations and regressions were computed)	Percent of premium or discount for quality in the Memphis cotton market reflected to the Phoenix cotton market
1	100 and over
1	90 - 99
3	80 - 89
4	70 - 79
4	60 - 69
2	50 - 59

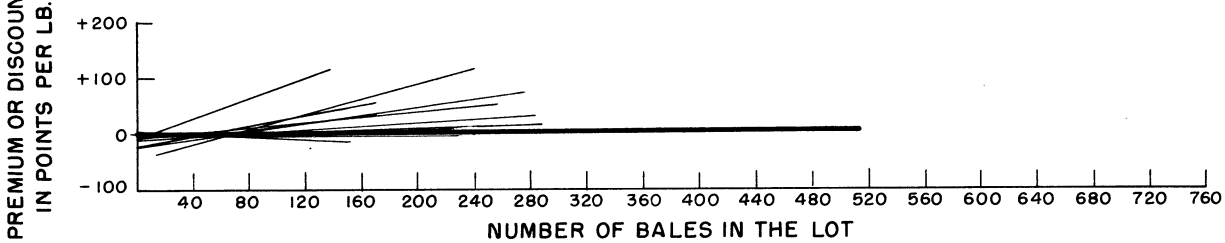
Figure 3.

1952-1953 SEASON

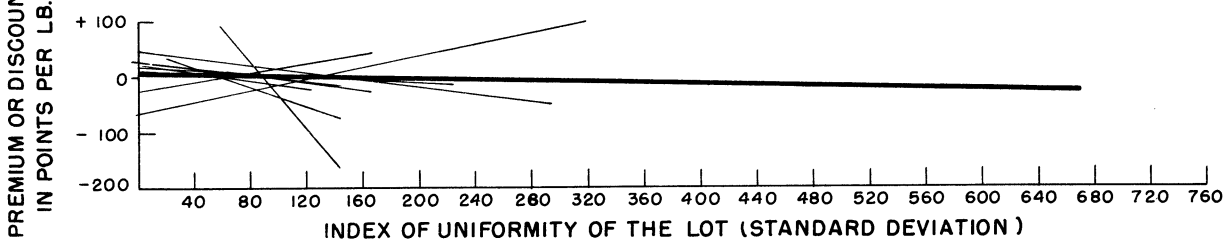
RELATIONSHIP BETWEEN PHOENIX PRICES FOR ROUND-LOTS OF COTTON AND CENTRAL MARKET EVALUATIONS OF LOT QUALITY



EFFECT OF SIZE OF LOT UPON PHOENIX COTTON PRICE



EFFECT OF UNIFORMITY OF LOT UPON PHOENIX COTTON PRICE



(NUMBERS REPRESENT A QUALITY RANGE IN POINTS ABOVE OR BELOW THE AVERAGE MEMPHIS EVALUATION FOR THE LOT WITHIN WHICH ABOUT TWO-THIRDS OF THE COTTON IN A LOT WOULD BE INCLUDED)

For the 1952-1953 season as a whole there appeared to be no consistent relationship between the size of the lot and the price paid for cotton in the lot (Figure 3). There was some indication that on eleven of the fifteen days included in this analysis premiums ranging from about .02 of a point per pound to about .92 of a point per pound were paid as the size of the lot increased one bale. On the remaining four days discounts ranging from less than .01 of a point per pound to about .14 of a point per pound for each additional bale in the lot were indicated. However, for most of the days the probability is rather high that the derived values do not accurately represent the true premiums or discounts. For two days the estimates of premiums at the rates of about .18 of a point per pound and about .24 of a point per pound for each additional bale in the lot may be considered as fairly reliable.

As in the 1951-1952 season, widely varied results were obtained from the correlations of the uniformity of lot quality with the price paid for the cotton in the lot (Figure 3). On all but two of the fifteen days for which regression and correlation coefficients were computed there was evidence that small discounts were made as the quality of the cotton comprising the lot became less uniform. For only four days, however, two on which discounts were indicated and the two on which premiums were indicated as the quality of the cotton comprising the lot became less uniform, may much confidence be placed in the estimates of the amounts of the premiums or discounts. There is no evident explanation for the inconsistent behavior between days of price as related to the quality uniformity of the lot other than that the sample sizes were inadequate to show a higher proportion of significant relationships or that other factors influencing prices were not included in this analysis and that such factors concealed the true effects of the quality uniformity of the lot on the price.

During the 1952-1953 season about 85 percent of the variance in prices among different lots of cotton sold in the Phoenix market on the same day could be explained by differences in quality. Differences in the size of the lot and the uniformity of the lot did not explain any appreciable amount of the remaining variation.

1953-1954 Season

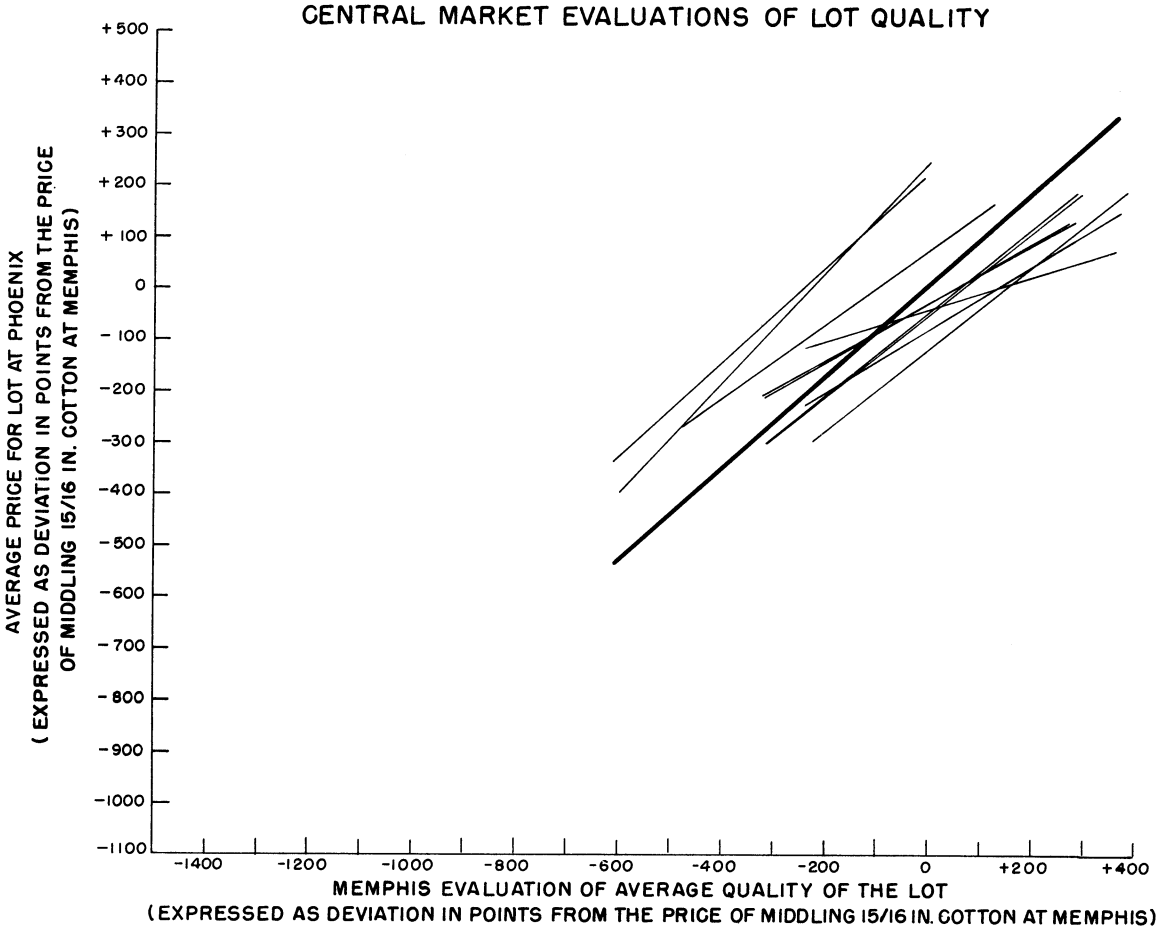
During the 1953-1954 season 100 points price distinction between qualities of cotton in the Memphis market was on the average accompanied by about 88 points price distinction between the same qualities in the Phoenix market. On the days for which regressions and correlations were computed the relationships between Phoenix price differences for quality for each 100 points difference in the Memphis market ranged from 32 to 108 points (Figure 4). The distribution throughout this range was fairly even (Table 4). There was no apparent period within the season when the relationship was either consistently high or low.

The analysis of the effect of the size of the lot on price paid for cotton in the lot during the 1953-1954 season resulted in essentially negative findings as was true for the 1951-1952 and 1952-1953 seasons. On seven of the ten days for which correlations and regressions were computed there was some evidence that small discounts ranging from about .02 of a point per pound to about .64 of a point per pound were made for each additional bale in the lot. On the remaining three days small premiums ranging from

Figure 4.

1953-1954 SEASON

RELATIONSHIP BETWEEN PHOENIX PRICES FOR ROUND-LOTS OF COTTON AND CENTRAL MARKET EVALUATIONS OF LOT QUALITY



EFFECT OF SIZE OF LOT UPON PHOENIX COTTON PRICE

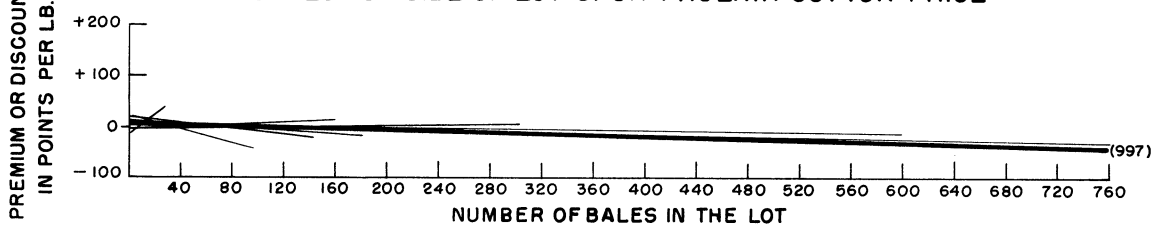


TABLE 4. DISTRIBUTION OF PERCENTS OF PREMIUM OR DISCOUNT FOR QUALITY IN THE MEMPHIS COTTON MARKET REFLECTED TO THE PHOENIX COTTON MARKET, 1953-1954 SEASON

Number of days (Thursdays for which correlations and regressions were computed)	Percent of premium or discount for quality in the Memphis cotton market reflected to the Phoenix cotton market
1	100 and over
1	90 - 99
2	80 - 89
2	70 - 79
1	60 - 69
2	50 - 59
0	40 - 49
1	30 - 39

less than .01 of a point per pound to about 1.85 points per pound were indicated for each additional bale in the lot (Figure 4). The range of the premiums and discounts and their generally small size, however, indicates that little statistical reliability can be placed in the result and that the variability was in all probability due to an inadequate sample size or factors other than those analyzed in this study.

During the 1953-1954 season, about 88 percent of the variance in prices among different lots of cotton sold in the Phoenix market on the same day could be explained by differences in quality. Differences in the size of the lot did not explain any appreciable amount of the remaining variation.

APPENDIX TABLES

TABLE 1. NUMBER OF BALES AND LOTS OF COTTON FOR WHICH PRICE AND QUALITY DATA WERE OBTAINED BY WEEK OF MARKETING SEASON, 1951-1952, 1952-1953, AND 1953-1954 SEASONS

Week of Marketing Season	1951-1952 Season		1952-1953 Season		1953-1954 Season	
	Number of Lots	Number of Bales	Number of Lots	Number of Bales	Number of Lots	Number of Bales
8	--	--	--	--	4 a/	73 a/
9	2 a/	55 a/	3 a/	188 a/	1 a/	19 a/
10	--	--	7 a/	295 a/	1 a/	85 a/
11	11	210	16	941	4	115 a/
12	7 a/	393 a/	14	766	--	--
13	36	643	12	1,087	10	548
14	23	1,124	9 a/	862 a/	12	468
15	12	256	35	1,203	16	1,158
16	52	2,182	55	2,515	15	604
17	34	1,431	19	2,013	47	3,224
18	23	1,133	25	1,351	--	--
19	49	1,252	12	1,352	30	881
20	9 a/	347 a/	7 a/	439 a/	16	722
21	17	1,129	12	816	7 a/	107 a/
22	23	1,144	3 a/	139 a/	2 a/	61 a/
23	12	1,134	7 a/	629 a/	7 a/	344 a/
24	2 a/	11 a/	42	3,183	16	430
25	16	535	37	2,766	9 a/	336 a/
26	5 a/	226 a/	47	2,134	25	289
27	15	438	52	1,498	19	155
28	7 a/	601 a/	21	843	4 a/	50 a/
29	17	691	--	--	9 a/	91 a/
30	12 b/	155 b/	50	534	--	--
31	25	687	24 b/	253 b/	--	--
32	4 a/	14 a/	7 a/	75 a/	1 a/	39 a/
33	4 a/	323 a/	3 a/	8 a/	--	--
34	12 b/	64 b/	--	--	--	--
Season Totals	429	16,178	519	25,890	255	9,799

a/ Data for these days excluded from the correlation and regression analyses because they represent less than 10 lots.

b/ Data for these days excluded from the correlation and regression analyses because they represent a preponderance of single bale lots.

TABLE 2. FREQUENCY DISTRIBUTION OF NUMBER OF BALES IN LOTS, 1951-1952, 1952-1953 AND 1953-1954 SEASONS

Number of bales in lot	1951-1952 Season		1952-1953 Season		1953-1954 Season	
	Number of lots	Percent of total No. of lots	Number of lots	Percent of total No. of lots	Number of lots	Percent of total No. of lots
0 - 9	144	33.57	162	31.21	73	28.63
10 - 19	65	15.15	76	14.64	50	19.61
20 - 29	47	10.96	45	8.67	47	18.43
30 - 39	32	7.46	41	7.90	17	6.67
40 - 49	23	5.36	34	6.55	5	1.96
50 - 59	27	6.29	25	4.82	12	4.71
60 - 69	15	3.50	20	3.85	10	3.92
70 - 79	16	3.73	14	2.70	5	1.96
80 - 89	10	2.33	13	2.50	8	3.14
90 - 99	9	2.10	12	2.31	4	1.57
100 - 109	11	2.56	11	2.12	6	2.35
110 - 119	7	1.63	10	1.93	0	--
120 - 129	6	1.40	5	.96	4	1.57
130 - 139	1	.23	4	.77	0	--
140 - 149	1	.23	3	.58	2	.78
150 - 159	3	.70	4	.77	2	.78
160 - 169	3	.70	7	1.35	1	.39
170 - 179	1	.23	4	.77	0	--
180 - 189	1	.23	3	.58	0	--
190 - 199	1	.23	3	.58	1	.39
200 and over	6	1.40	23	4.43	8	3.14

TABLE 3. FREQUENCY DISTRIBUTION OF INDEXES OF UNIFORMITY (STANDARD DEVIATIONS) OF LOTS OF MORE THAN ONE BALE SOLD ON DAYS FOR WHICH CORRELATIONS WERE COMPUTED, 1951-1952 AND 1952-1953 SEASONS

Index of Uniformity (Standard Deviation) (A quality range in points above or below the average Memphis evaluation for the lot within which about two-thirds of the cotton in a lot would be included)	1951-1952 Season		1952-1953 Season	
	Number of lots	Percent of total No. of lots	Number of lots	Percent of total No. of lots
0 - 9	27	7.74	24	5.69
10 - 19	14	4.01	6	1.42
20 - 29	10	2.87	19	4.50
30 - 39	10	2.87	20	4.74
40 - 49	19	5.44	36	8.53
50 - 59	17	4.87	23	5.45
60 - 69	10	2.87	25	5.92
70 - 79	25	7.16	15	3.55
80 - 89	20	5.73	28	6.64
90 - 99	22	6.30	20	4.74
100 - 109	25	7.16	30	7.11
110 - 119	26	7.45	19	4.50
120 - 129	17	4.87	26	6.16
130 - 139	20	5.73	18	4.27
140 - 149	18	5.16	18	4.27
150 - 159	11	3.15	18	4.27
160 - 169	18	5.16	12	2.84
170 - 179	9	2.58	13	3.08
180 - 189	3	.86	8	1.90
190 - 199	8	2.29	5	1.18
200 and over	20	5.73	39	9.24