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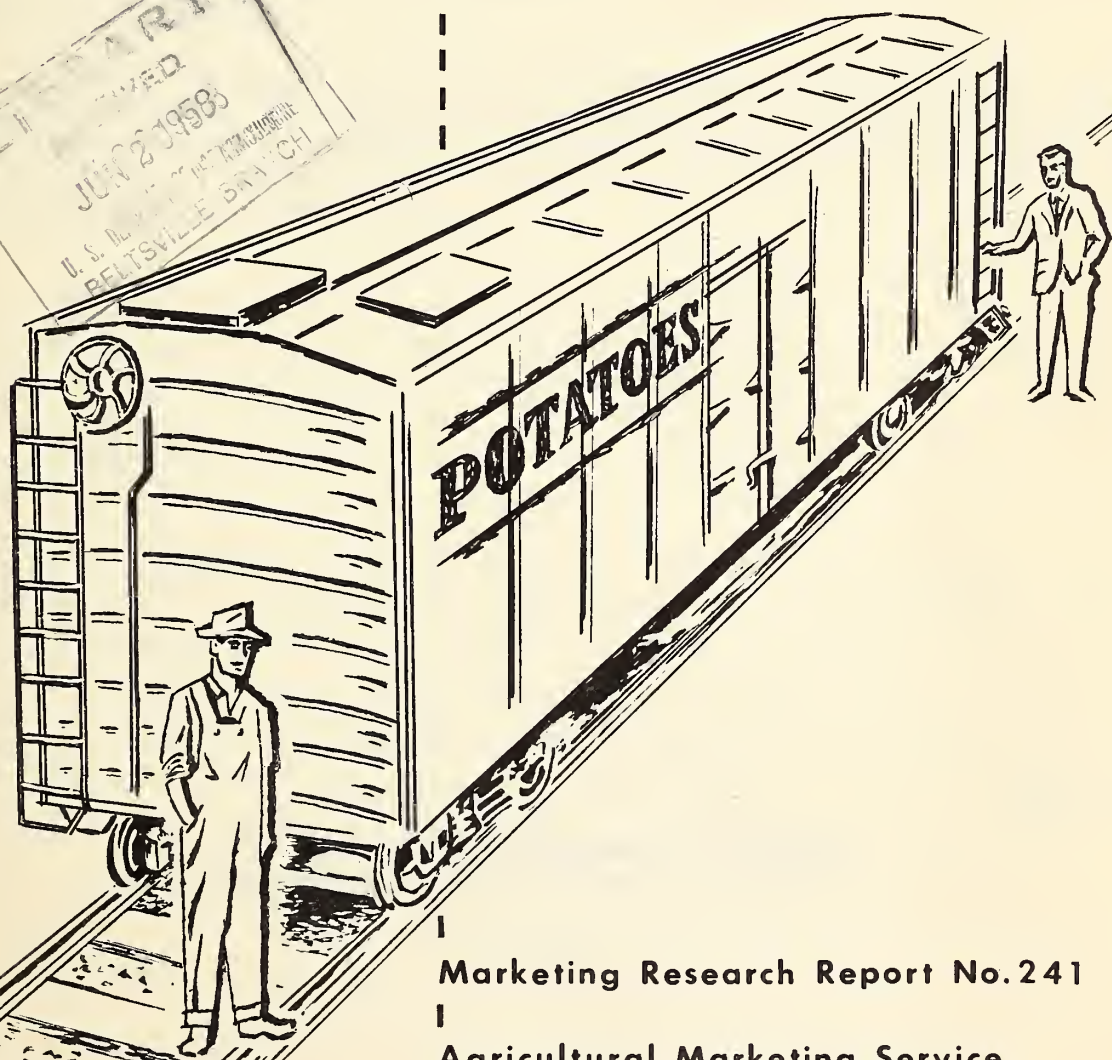
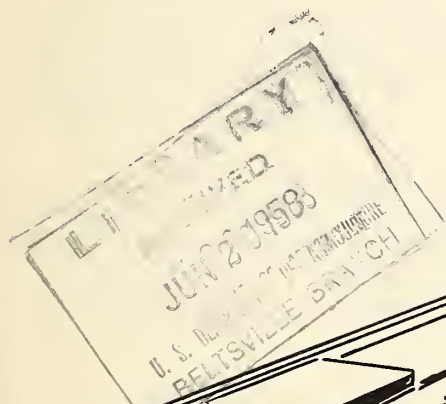
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the ECONOMIC IMPORTANCE of FUTURES TRADING in POTATOES



Marketing Research Report No. 241

Agricultural Marketing Service
Marketing Research Division

U. S. DEPARTMENT OF AGRICULTURE
Washington, D. C.

PREFACE

A study of the economic importance of futures trading to the production and marketing of potatoes was initiated in view of widespread interest throughout the potato industry and because of recommendations of the Department Potato Research and Marketing Advisory Committee.

This study was coordinated with the work on potato futures trading done by the Maine Agricultural Experiment Station as a phase of the Northeastern Regional Potato Marketing project (a study of the factors affecting the quality, price, and sales of potatoes). Since practically all futures trading is done in Maine potatoes, this report deals with potato futures trading in Maine only. In conducting the study, information was obtained directly from packers and shippers, potato brokers, credit agencies, fertilizer and machinery companies, and from secondary sources. Most of the firms and agencies contacted were located in Aroostook County, Maine, the area where the bulk of the Maine potato crop is produced.

Professor Charles H. Merchant, Head, Department of Agricultural Economics, University of Maine, assisted with the arrangements for conducting the field work, and reviewed the manuscript. William N. Garrott, CSS, U. S. Department of Agriculture, formerly of AMS, assisted materially with the collection of the data presented in this report.

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SUMMARY AND CONCLUSIONS

Futures trading in Maine potatoes developed over the years as part of the overall cash market for potatoes. The bases for this trading began to develop about 1871 when cash potato forward contracts between growers and buyers were first used. These contracts enabled growers to obtain short-term capital and to reduce the amount of price and market uncertainty involved in growing and marketing potatoes, and provided the framework for beginning the organized futures trading in potatoes on the New York Mercantile Exchange in 1941.

Futures trading in relation to financing the production and marketing of Maine potatoes: Some Maine potato growers use potato futures contracts to obtain short-term loans from banks with which to purchase such items as fertilizer, seed, and spray material. During the 1954-55 season, 9 of the 21 credit agencies contacted in Aroostook County made loans to growers on the basis of sales of potato futures contracts. Such loans for 7 of these 9 agencies totaled \$811,910 for the 1954-55 season and represented approximately 8 percent of the maximum amount of grower loans outstanding made by these 21 credit agencies during the season. Also, in evaluating the importance of futures trading in grower financing, consideration should be given to the relationship of loans obtained on futures contracts to the total amount that a grower is able to borrow. These secondary effects are important even though they cannot be expressed as quantities.

Fertilizer companies also are sources of credit for Maine growers. Five of the six fertilizer agencies contacted in Aroostook County reported credit sales of fertilizer to Maine growers on the basis of future-cash forward contractual arrangements. During the 1954-55 season, such sales amounted to nearly \$253,000. This amount was hedged with sales of 514 potato futures contracts and involved 78 growers. For the individual fertilizer companies, the total value of fertilizer sold on the basis of futures contracts ranged from \$2,000 to \$100,000.

The use of futures contracts by potato dealers: Forty-two potato dealers in Aroostook County, Maine, were interviewed concerning their use of futures trading during the 1954-55 season. These 42 dealers were selected so as to be representative of all potato dealers. During the 1954-55 season, 37 of these dealers made street purchases and 15 of these 37 offset part of such purchases with sales on the New York Mercantile Exchange. Eleven of these 15 firms sold 2,204 potato futures contracts as hedges against purchases of 7,000 cars of potatoes.

Twenty of the 42 dealers interviewed acquired part of their 1954-55 supply through forward contract purchases from growers. In turn, 14 of these 20 dealers offset forward purchases with sales of an equivalent quantity of potato futures contracts on the New York Mercantile Exchange.

Information obtained from 19 of these 20 dealers showed that they advanced growers over 1 million dollars on forward contract in the form of cash and

materials during the 1954-55 season. Of this amount, 68 percent was in the form of fertilizer and materials and 32 percent in the form of cash. The amount advanced per individual dealer ranged from \$1,200 to over \$400,000.

In addition to making sales of potato futures in the manner described, potato dealers and others may purchase potato futures contracts to offset sales of potatoes or potato products for deferred delivery. These forward sales are made in advance of purchasing the actual potatoes to cover such sales. Generally, this involves a purchase of futures contracts simultaneously with the negotiation of fixed price forward sales of either potatoes or potato products. The use of futures trading in this way is particularly suitable for those firms such as seed dealers and potato processing firms which customarily make forward sales of potatoes or processed potato products.

Futures trading in relation to market information: The New York Mercantile Exchange brings together in a single market much of the available data concerning the demand for and supply of potatoes. Such information is available to both actual and potential traders for use in buying and selling. Also, prices at which transactions are made and bids and offers on the Exchange are made public. The price information is helpful to growers and others in enabling them to determine the market value of potatoes at the time of purchase or sale. The prices established on the New York Mercantile Exchange have, at times, been subject to the influence of manipulation. In such circumstances, the prices established on the Exchange are temporarily distorted away from freely competitive values with possible short-time benefits or losses to growers and others.

The relationship between cash and futures prices: Cash and potato futures prices are largely determined by the same group of supply and demand factors. Available information indicates that changes in cash prices of potatoes at Maine shipping points are generally associated with similar changes in the prices of potato futures contracts on the New York Mercantile Exchange. For example, a comparison of changes in cash and potato futures prices for intervals of 6 trading days, for the period October 1956-May 1957, indicated that about 60 percent of the changes in cash prices were associated with similar changes in potato futures prices. Similar comparisons for intervals of 10 days indicated a 70-percent association.

Futures trading is an integral part of the overall production and marketing of potatoes, and is used by a number of producers, dealers, and others at all levels of trade. The information obtained in this study reveals that futures trading serves the following specific business purposes: (1) Assists producers and others to obtain cash loans and materials needed in production, (2) provides a mechanism for partially offsetting risk associated with price and market uncertainty, (3) brings together a wide variety of supply and demand information for use by potential and actual traders, (4) aids in the dissemination of information on potato prices for use in buying and selling, and (5) provides growers and others with a continuous market and thereby enables them to take advantage of favorable price levels at any time.

THE ECONOMIC IMPORTANCE OF FUTURES TRADING IN POTATOES

By William T. Wesson, agricultural economist
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INTRODUCTION

Representatives of the potato industry, particularly those involved in production and marketing, have expressed considerable interest as to the possible effects of futures trading in potatoes on the production and marketing of potatoes. Some individuals in the industry are of the opinion that futures trading operates to the disadvantage of the potato industry, whereas others express the opposite view. Beginning in December 1955, the Special Subcommittee on Futures Trading in Perishable Commodities of the House Committee on Agriculture began holding hearings to study the effect of futures trading on the marketing of perishable commodities, specifically, onions and potatoes.

Because of the interest expressed by various groups, the U. S. Department of Agriculture made a study of futures trading in potatoes and their importance to the production and marketing of potatoes.

In the conduct of the study, primary consideration was given to the nature and extent to which futures trading is involved in financing growers and others in the potato industry. Secondary consideration was given to (1) factors underlying the development of futures trading in potatoes, (2) the relationship of futures trading to procurement and pricing of potatoes, (3) cash and potato futures price relationships, and (4) the terms of potato futures contracts.

Organized futures trading in potatoes began in 1931 on the Chicago Mercantile Exchange. The Chicago futures contracts permitted delivery of potatoes grown in Maine and in Washington and Idaho. Currently, delivery on the Chicago contract is limited to potatoes grown in Idaho. In 1941, potato futures contracts were established on the New York Mercantile Exchange. The New York contract limits delivery to potatoes grown in Maine. Of the two exchanges for futures trading in potatoes, the New York Mercantile Exchange is the one of primary importance. For example, during the 12-year period, 1945-56, 88.7 percent to 99.9 percent of the total annual volume of futures trading in potatoes on the two markets was done on the New York Mercantile Exchange (table 1). In every year except one during this period, sales on the New York Mercantile Exchange accounted for over 95 percent of total sales. For this reason, this report deals primarily with futures trading as it relates to Maine potatoes.

Table 1.--Volume of futures trading in potatoes, New York and Chicago Mercantile Exchanges, 1945-56

Year beginning June	: Volume of trading :			: Percentages of total :		
	: New York : Mercantile : Exchange :	: Chicago : Mercantile : Exchange :	: Total	: : New York : Chicago : Total	: : Chicago : Total	: : Total
	: <u>Carlots</u>	: <u>Carlots</u>	: <u>Carlots</u>	: <u>Percent</u>	: <u>Percent</u>	: <u>Percent</u>
1945	4,794	609	5,403	88.7	11.3	100.0
1946	15,356	187	15,543	98.8	1.2	100.0
1947	28,548	19	28,567	99.9	.1	100.0
1948	9,013	6	9,019	99.9	.1	100.0
1949	7,367	38	7,405	99.5	.5	100.0
1950	2,276	104	2,380	95.6	4.4	100.0
1951	16,254	240	16,494	98.5	1.5	100.0
1952	120,902	1,767	122,669	98.6	1.4	100.0
1953	64,195	1,025	65,220	98.4	1.6	100.0
1954	199,940	580	200,520	99.7	.3	100.0
1955	123,781	181	123,962	99.9	.1	100.0
1956	140,333	121	140,454	99.9	.1	100.0

Commodity Exchange Authority.

DEVELOPMENT OF FUTURES TRADING IN MAINE POTATOES

Since futures trading in Maine potatoes did not develop as an independent type of activity but rather as a part of the overall market for potatoes, this analysis is oriented toward showing how the overall market for potatoes developed with particular emphasis upon futures trading.

The evolution of futures trading in potatoes apparently follows the same pattern of development as other commodities. ^{1/} Organized futures trading is preceded by the buying and selling of deferred delivery contracts or time contracts as they are sometimes called. If the volume of trade in such forward contracts grows large enough to warrant further standardization of contract terms, consideration is given as to the feasibility of trading a more highly standardized version of such contracts on one of the commodity exchanges. Should these steps result in the establishment of a futures contract and the opening of trade under the formalized exchange rules, the contracts are called "futures" and hence futures trading begins. The important part of this development for potatoes took place mainly from about 1900 to 1940, during which the foundation was established for the beginning of potato futures trading on the New York Mercantile Exchange in 1941.

^{1/} For example, development pattern with respect to forward contracting is virtually the same for the grains, cotton, eggs, and potatoes.

Commercialization of Potato Production

Aroostook County, the principal production area in Maine, ^{2/} was part of a diversified noncommercial farming area until 1870 when the pattern of agriculture in the county began to shift in the direction of specialization in potato production. ^{3/}

The change of the Aroostook area from a diversified pattern of farming to the production of potatoes for the market resulted from a combination of factors, each of which facilitated the opening of the previously isolated area to commercial trade channels. More important among these were: (1) the development of a local demand for potatoes for the manufacture of starch, (2) the development of all-weather roads, railroads, and water transport to the point where the Aroostook area was linked by transportation with New England and eastern markets, (3) new and improved communication facilities linking the area with buyers located in distant markets, (4) the introduction of grade standards, although quite crude, enabling potatoes to be bought and sold on the basis of description, and (5) the comparative advantage of the area for potato production.

The foregoing factors provided Aroostook growers with a tremendous market potential for potatoes. However, in order to take advantage of this new market opportunity, additional capital was needed to finance the necessary increase in potato production and marketing facilities and services. The extent and rate at which the market could be developed depended on how much and how quickly capital could be made available.

Shortage of Capital and Forward Contracting

The raising of short-term production capital presented a major problem. The previously commercially isolated Aroostook area of diversified agriculture had not enabled growers to accumulate sufficient capital reserves. The local credit institutions were not adequate to finance the needed increases in the production and marketing of potatoes. Some capital was available from the large capital markets on the East Coast, but at very high interest rates. Confronted with such a scarcity of capital, Aroostook growers turned to starch factories, fertilizer and machinery companies, and potato buyers or dealers as sources from which to obtain production financing. The growers were able to obtain short-term capital from these firms, but in many instances they were required to sell potato forward contracts to the firm providing the financing.

^{2/} According to the 1950 census, approximately 90 percent of Maine's 1949 potato crop was produced in Aroostook County.

^{3/} The material in this section concerning the historical development of the Aroostook County, Maine, area is based, in a large part, on an unpublished study entitled, "The Development of the Potato Marketing System in Aroostook County, Maine," by Clarence J. Miller, Harvard Studies on Marketing Farm Products.

Roughly comparable practices of contract selling have been employed for a number of other processed fruits and vegetables. Under the forward contractual arrangements, Maine growers contracted at or near the time of planting in the spring to sell part of their expected potato production at fixed prices, delivery to be made at or following harvest in the fall. The price to be received by the grower was determined at the time of contract negotiation, with both delivery and payment being deferred. These contracts were referred to by the trade as "cash potato futures" and in some instances simply as "futures." Thus, the use of forward contracts in potatoes apparently came about in part because Aroostook growers considered it the best alternative for obtaining short-term capital and because processors and other buyers found this to be an advantageous means of obtaining potatoes. Through this mechanism growers were able to supplement their own rather limited financial resources and could begin producing potatoes primarily for the market rather than for home consumption. It also seems reasonable to suppose that growers were interested in selling their crop forward because such sales reduced both price and market uncertainty.

The use by growers of potato forward contracts to obtain short-term financing apparently began in 1871 with the establishment of the first starch factory in Aroostook County. ^{4/} Growers and representatives of the starch factory entered potato forward contracts at or near the time of planting under the terms of which the growers agreed to sell to the starch factory a specified part of their potato production at a fixed price, delivery of the potatoes to be made at or following the harvest the following fall. In turn, the starch factory agreed to advance growers a certain amount of capital at the time of entering the contract and, upon delivery of the potatoes, to pay the grower the difference between the contract price and the amount of capital already advanced. The following is cited as evidence of this practice: ^{5/}

"Contracts were used between starch factory and the farmers in the surrounding neighborhood, and these contracts ran for several years. These first commercial acreages of potatoes were rather small per farm, not many being over 10 acres. In many cases the factory owner advanced money to farmers to enable them to plant the necessary acreage."

Potato forward contracts, as a means for providing short-term financing, appear to have been first used extensively around 1900 and later. By 1900 there had developed a substantial demand for Maine potatoes in eastern markets for table stock and seed. Potato production in Maine took a decided upward trend and consequently reflected a similar upturn in the demand for capital (fig. 1). A substantial part of the capital needed to finance the increase in production was provided by fertilizer and machinery companies, potato buyers,

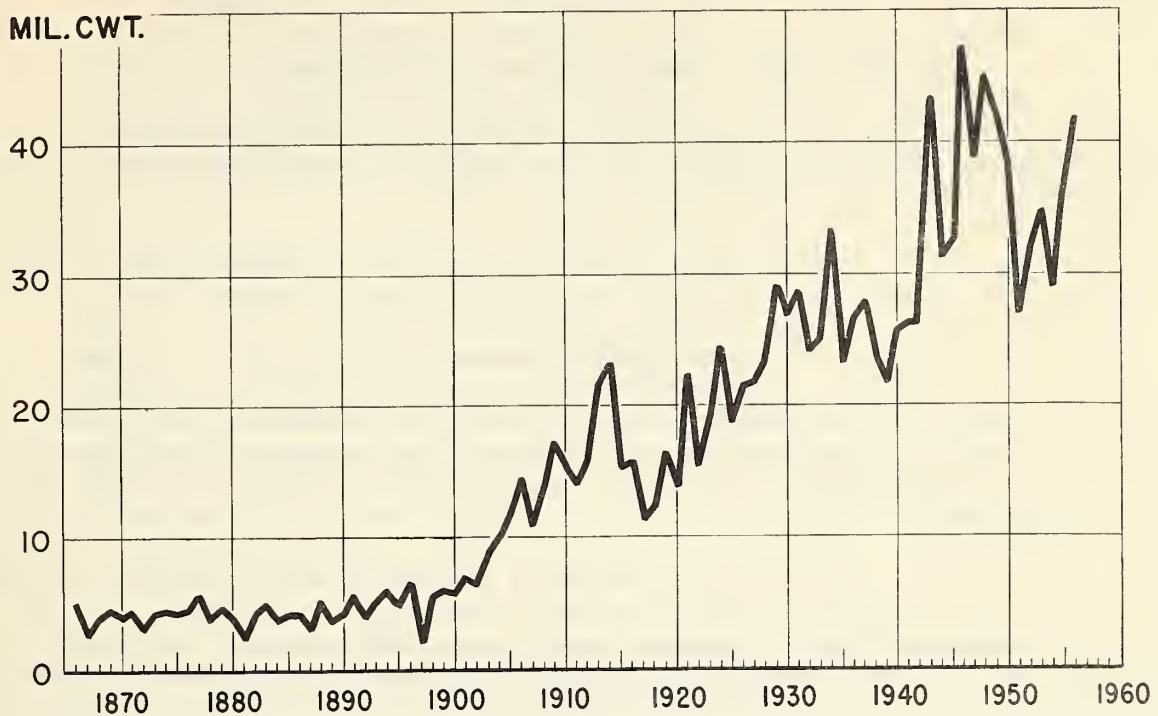
^{4/} Although there is not sufficient evidence to establish this point conclusively, the available information strongly suggests that starch factories financed growers through cash-potato forward contracts.

^{5/} See reference in footnote 3.

PRODUCTION OF POTATOES IN MAINE

1866-1956

MIL. CWT.



AMS NEG. 6085-58(4)

Figure 1

and dealers. This was achieved to some extent through forward contract negotiations with growers. Examples of the nature and importance of such contracts in providing short-term requirements follow. 6/

"In the decade after 1900, the half dozen fertilizer companies operating in Aroostook extended almost all of the fertilizer credit that was given in the county. They sold fertilizer on open book accounts to their agents in the county, and the agent in turn sold an open book account to the farmer. Since many fertilizer sales agents were also potato shippers, it was not difficult to start combining the two operations--advancing fertilizer on time and getting future potato contracts. The agent would contract with the farmer for a certain number of barrels of potatoes at a given price. These would pay for the fertilizer. Although there was some risk involved, the agent did not usually lose so long as ordinary variations in price were involved. The farmer needed the fertilizer badly and the price allowed for potatoes would usually be relatively low. The farmer would assume this cost on the part of his acreage in order to get the necessary supplies for his whole acreage.

6/ See reference in footnote 3.

"Fertilizer and machinery companies eventually began to give credit direct to the grower in return for a contract, instead of operating through the medium of their agents, as they had formerly done. They accepted future contracts for potatoes at a definite allowance per barrel (whether specified in the contract or merely implied) in return for credit furnished the grower to buy machinery and fertilizer. With such contracts, in poor years, the companies had some trouble in collecting from the farmers. However, since contracts were made for around 90 cents or \$1 per barrel, in most years the creditor would find them worth holding . . .

"The other credit source used by farmers was that extended by the dealer. The dealer thus assured himself of a supply source, while the farmer could use the cash for production expenses, such as labor costs. If a grower during the growing season experienced a shortage of capital, he might apply to the fertilizer and machinery companies. He might also sell a futures contract for a portion of his crop to a shipper or neighbor, receiving a cash advance with which to continue his farming operations. The holder could discount this contract at the local bank."

Although somewhat fragmentary, the above information is sufficient to indicate that forward trading in Maine potatoes developed in response to a combination of considerations. Important among these was the need for short-term capital and for means for reducing the extent of price and market uncertainty confronting growers.

Forward Contracting As It Relates to Organized Futures Trading

The type of forward contracts which Maine growers began using around 1870 and have continued to use since is illustrative of the type of trading that generally precedes organized futures trading. Dealing in cash potato forward contracts involves the conduct of exchange directly by the parties to the transaction. This is in contrast to organized futures trading such as that conducted through the facilities of the New York Mercantile Exchange. There the Exchange acts as an intermediary between buyer and seller; the terms of the contract are highly standardized, and the entire exchange process is very impersonal insofar as buyer and seller relationships are concerned.

The period between the beginning of trading in cash forward contracts and the time organized futures trading begins varies among commodities. For Maine potatoes, this involved the period from about 1871 to 1941. From 1941 to 1951, the volume of futures trading was relatively small. However, during the 5 years 1952-56 the volume on the New York Mercantile Exchange has averaged almost 130,000 carlots (table 1). Compared with cotton and grains, organized futures trading in potatoes is a recent development. The increased volume of potato futures trading activity in recent years indicates perhaps an increased understanding and familiarity on the part of the potato industry with the operations of the New York Mercantile Exchange.

POTATO FUTURES CONTRACTS AND ORGANIZATIONAL FEATURES OF THE
NEW YORK MERCANTILE EXCHANGE

Delivery Terms of Potato Futures Contracts

Strictly speaking, the terms of potato futures contracts include all of the rules and regulations established by the New York Mercantile Exchange concerning trading in potato futures contracts. ^{7/} However, the analysis here is limited to the delivery terms of potato futures and refers to the 1956-57 season unless otherwise stated.

What is Deliverable

The contract unit is 1 carlot of 900 50-pound bags of Maine-grown potatoes weighing 45,000 pounds net with a tolerance of 50 bags either way at the time of delivery. However, in the case of the November 1958 and subsequent future contract months the contract unit is 1,000 50-pound bags. The potatoes delivered must conform to United States Standards for potatoes as promulgated from time to time by the Secretary of Agriculture.

The basic or standard contract grade is U. S. No. 1, size A, 2-inch minimum of Maine-grown Katahdin-Chippewa type, and/or Kennebec potatoes in straight carloads. ^{8/} In lieu of delivering the basic grade, sellers are permitted to deliver U. S. No. 1, size A, 2-inch minimum Green Mountain potatoes at a 10-percent discount below the previous settlement price of the basic grade. In addition, sellers may deliver U. S. commercial size A of Maine-grown Katahdin, Chippewa-type, Kennebec, or Green Mountain at a discount of 75 cents per 100 pounds. The range of substitution possibilities for sellers is summarized in table 2.

Potatoes delivered on futures contracts must be inspected (unrestricted inspection) by the Federal-State Inspection Service at point of origin in Maine and reinspected at the future contract delivery point by the United States Department of Agriculture. The Department issues a delivery certificate on which is given the date, time of final inspection, grade, car number or lot number, and signature of the official inspector at delivery point. The life of the inspection certificate is 3 full days after the day of inspection.^{9/}

^{7/} Commodity Exchange Authority, "Futures Trading in Potatoes, 1954-55." U. S. Dept. Agr., Nov. 1955.

^{8/} The basic grade, sometimes referred to as the standard contract grade, is the grade from which premiums and discounts are calculated for deliveries of other grades. Thus, the basic contract grade is deliverable at par. Note that the basic grade for the potato futures contracts includes three varieties.

^{9/} The inspection at delivery point must be made within 14 days after date of arrival, except during the month of May when inspection must be made within 10 days after arrival. Provisions are also made whereby the Mercantile Exchange can make inspection in circumstances where it is not possible for the U. S. Dept. Agr. to do so in the manner described.

Table 2.--Potato futures contracts: Grades and varieties deliverable on the New York Mercantile Exchange, and price differentials permitted for delivery substitutions

Grade	:	Variety	:	Discount per cwt.
U. S. No. 1 <u>1/</u>	:	Katahdin	:	0
U. S. No. 1 <u>1/</u>	:	Katahdin-Chippewa-type	:	0
U. S. No. 1 <u>1/</u>	:	Kennebec	:	0
U. S. No. 1 <u>1/</u>	:	Green Mountain	:	<u>3/</u> 10
U. S. Commercial-type <u>2/</u>	:	Katahdin	:	75
U. S. Commercial-type <u>2/</u>	:	Katahdin-Chippewa-type	:	75
U. S. Commercial-type <u>2/</u>	:	Kennebec	:	75
U. S. Commercial-type <u>2/</u>	:	Green Mountain	:	75

- 1/ Size A, 2-inch minimum.
- 2/ Size A.
- 3/ Discount is in terms of percent.

The terms of potato futures contracts are subject to the provisions of the Maine Marketing Agreement and Order. This prescribes the grades, sizes, quality, and varieties of potatoes that may be shipped out of Maine during its marketing season or fractional part of the season. As applied to table stock potatoes, the 1957-58 regulation prohibits the shipment of potatoes out of Maine during the period September 23, 1957-July 12, 1958, both dates inclusive, except (1) potatoes of round white and red skin varieties that meet the requirements of U. S. No. 1 grade or better, $2\frac{1}{4}$ -inch minimum and 4-inch maximum size, and 90 percent "fairly clean"; (2) Long Varieties of U. S. No. 2 grade or better with 5-ounce minimum weight--generally fairly clean to mostly clean or; (3) U. S. No. 1 grade or better size A, 2-inch minimum 4-ounce maximum weight 90 percent fairly clean.

The Maine Marketing Agreement and Order prescribes the grades, sizes, and varieties of potatoes that may be shipped out of Maine. Therefore, it limits the supplies available for delivery on potato futures to those grades, sizes, and varieties that may be shipped out of the State. In this connection the rules of the New York Mercantile Exchange provide for adjustment of the terms of potato futures contracts in case of conflicts between them and Government regulation, such as the Maine Marketing Agreement and Order. The following excerpt from Exchange rule 81-A covers this point: "In connection with the potato futures contract, if any governmental agency issues an order, ruling, directive, or law that conflicts with the requirements of these rules, such orders, ruling, directives or law shall be construed to take precedence and become part of these rules and all open and new contracts shall be subject to such governmental orders."

The kinds of potatoes inspected for delivery on the New York Mercantile potato futures contracts, by variety, grade, and size during the 2 seasons, 1953-54 and 1954-55, are presented in tables 3, 4, and 5.

Table 3.--Carlots of potatoes inspected for delivery on the New York Mercantile Exchange, by grade, 1953-55 seasons

Grade	Season	
	1953-54	1954-55
	<u>Carlots</u>	<u>Carlots</u>
U. S. No. 1, Size A, 2-inch minimum ...:	941	1,141
U. S. No. 1, 2 $\frac{1}{4}$ -inch minimum	5	95
U. S. Commercial, 2-inch minimum	1	---
U. S. No. 1, 2 $\frac{1}{2}$ -inch minimum	1	---
U. S. No. 1, 3 $\frac{1}{2}$ -inch minimum	2	---
<u>1/</u>	36	150
Total	986	1,386

1/ Grade not available.

Table 4.--Carlots of potatoes inspected for delivery on the New York Mercantile Exchange, by variety, 1953-55 seasons 1/

Grade	Season	
	1953-54	1954-55
	<u>Carlots</u>	<u>Carlots</u>
Katahdin	371	1,063
Kennebec	378	232
Chippewa	14	9
Katahdin-Chippewa	108	77
Green Mountain	113	---
Round White	1	2
Teton	---	1
Kennebec-Chippewa-Katahdin	1	2
Total	986	1,386

1/ The fact that potatoes are inspected for delivery does not necessarily mean that they will be delivered. Individuals may order inspection in anticipation of settling all or part of their contracts by delivery but later decide to settle by offset instead. As is the case for other commodities, the number of potato future contracts settled by delivery represents a relatively small proportion of the total volume of trading. For further information on this point, see p. 7 of reference in footnote 7.

Table 5.--Maine Potatoes submitted for inspection, New York Mercantile Exchange, by size, 1953-55 seasons

Size of Potatoes	Season	
	1953-54	1954-55
	<u>Carlots</u>	<u>Carlots</u>
<u>Inches</u>		
2 $\frac{1}{4}$ + $\frac{1}{4}$	977	1,284
2 $\frac{2}{3}$ + $\frac{1}{4}$	2	4
2 $\frac{2}{3}$ - 3 $\frac{1}{4}$ $\frac{1}{4}$	3	---
2 $\frac{2}{3}$ - 3 $\frac{2}{3}$ $\frac{1}{4}$	1	---
2 $\frac{2}{4}$ - 3 $\frac{2}{4}$ $\frac{2}{4}$	1	---
3 $\frac{2}{3}$ - 4 $\frac{1}{2}$ $\frac{2}{4}$	1	---
2 $\frac{2}{3}$ - 3 $\frac{2}{4}$	---	2
2 $\frac{1}{4}$ - 2 $\frac{3}{4}$ $\frac{2}{4}$	---	1
2 $\frac{1}{4}$ - 3 $\frac{2}{4}$	---	1
Not available	1	94
Total	986	1,386

- $\frac{1}{4}$ 60 percent or more were this size.
- $\frac{2}{4}$ 55 to 90 percent were of this size.

Sellers of potato futures contracts tend to deliver the grade(s) of potatoes that are, from their standpoint, the most overvalued relative to the "cash market." During the 1953-54 and 1954-55 seasons, U. S. No. 1, size A, 2-inch minimum represented about 95 percent of the total of 986 cars of potatoes inspected for delivery on futures on the New York Mercantile Exchange in the 1953-54 season and about 82 percent of the 1,386 cars inspected for delivery during 1954-55. There were 51,009 carlots of potatoes shipped from Maine during the 1953-54 season and 40,835 carlots during 1954-55.

The factor "size" as applied to potato standards has to do with the size of potatoes in inches and the proportion that different sizes are of the total lot. Data were obtained as to the "potato size" most prevalent for potatoes inspected for delivery on futures (table 5).

When Delivery Is Made

Transactions in potato futures may be conducted in any of the months November through May except December and February. Trading in any of these months may be opened by the Clearing House Committee or the Business Manager. Generally, trading in individual months is opened 11 months in advance of its maturity. For example, in December 1956, individuals could buy or sell potato futures for November 1957. Trading in a maturing contract may be from the first business day of the month up to and including the close of trading on

the sixth day prior to the last business day of the month. 10/ A seller who wishes to settle by delivery must issue a delivery notice which, according to the rules of the New York Mercantile Exchange, goes to the buyer with the "old-est" market position. The seller, rather than the buyer, has the right to select the day of delivery within the delivery month. However, in case there are contracts still outstanding after the close of trading, deliveries of potatoes in settlement of such contracts may be made on any business day through the last business day of the month.

Where and How Delivery Is Made

Up to and including the May 1958 contract, delivery on the New York Mercantile Exchange potato futures contract may be made in a "specified delivery district" in New York City. Specifically, delivery shall be in refrigerator cars on track in Harlem River Yards, New York City, and all cars delivered must allow one reconsignment to buyer on day of delivery at the through rate. Delivery also may be made in Exchange-approved public cold storage warehouses in greater New York City except Staten Island (known as the Borough of Richmond). Alternatively, delivery may be made in Exchange-approved public cold storage warehouses in Jersey City, N. J. However, potatoes delivered in approved warehouses must carry storage-in-transit privileges as permitted by the railroads. According to the Commodity Exchange Authority, because of excessive cost, potatoes have not been delivered from cold storage warehouses in recent years. 11/

Beginning with the November 1958 contract and subsequent contract months thereafter, on-track delivery is permitted in Boston, Mass., rather than at the Harlem River Yards, New York City. In the case of Boston delivery, the purchaser is allowed the difference in freight rate to Boston and to New York from the point of origin. Also the buyer is allowed one reconsignment on day of delivery at the through rate. Delivery also may be made in Exchange-approved public cold storage warehouses (1) in greater New York City excluding Staten Island, or (2) in Jersey City. In either of these cases, delivery must carry storage-in-transit privileges as permitted by the railroads.

New York Mercantile Exchange Safeguards to the Contract

Buyers and sellers of potato futures contracts may not know, nor do they need to know, the personal identity of one another. Nevertheless, a seller of potato futures is reasonably sure that the buyer will carry out his obligation to pay money in the future (money debt). Likewise, the buyer of futures is sure that the seller will carry out his obligation to deliver potatoes (potato debt).

10/ In the case of the November 1958 potato futures contract trading in that contract shall cease at the close of the seventh business day of that month. Also, no delivery notices shall be issued on the November 1958 contract until after trading therein has ceased.

11/ See p. 26 of reference in footnote 7.

This is achieved through a combination of arrangements that constitutes what is considered as a trading mechanism for safeguarding performance by the parties to potato futures contracts. The heart of this system is the Clearing House which is part of the New York Mercantile Exchange and operates under the rules of the Exchange. It is set up for the purposes of (1) clearing money accounts (debt and credit) for its members, and (2) guaranteeing performance of all potato futures contract obligations (payment and delivery) cleared by its members. In guaranteeing performance of a member, who must also be a member of the New York Mercantile Exchange, the Clearing House thereby assumes responsibility for performance on all purchases and sales of potato futures contracts. It becomes, in effect, the buyer for all sales of potato futures and the seller to all purchasers of potato futures.

Each clearing member of the New York Mercantile Exchange must maintain margins on his transactions and transactions of his customers, and file reports of their transactions. This amounts to \$150 per contract on a clearing member's net interest with the Clearing House and \$150 per contract on straddles. During periods of unusual market activity, the Clearing House may raise the margin requirement above these amounts.

The New York Mercantile Exchange requires that its members impose minimum margin requirements on their customer--referred to as "customer margins." Under these rules, customers are required to make a cash deposit of \$195 for hedging transactions, and \$240 for speculative transactions. ^{12/} In the case of significant changes in prices, the customer is subject to calls for additional margins should prices move against him. If the customer fails to make the additional margin deposits, the Exchange member (broker) has the right to liquidate the customer's position in futures.

The foregoing brief description covers the main features of the New York Mercantile Exchange that have to do with safeguarding the performance of contract obligations assumed by buyers and sellers of potato futures. Although traders are provided substantial assurance that contract obligations will be fulfilled, it is possible for default, on contract delivery to occur. In such circumstances, the defaulting party is subject to penalty.

Costs of Trading Potato Futures

The costs of trading potato futures contracts on the New York Mercantile Exchange can be considered from the standpoint of the actual dollar cost of making certain types of transactions or settlements or the cost of achieving the same results through private negotiation.

The cost to the individual buyer or seller of potato futures varies, depending on the nature of the services involved. In a simple purchase or sale of futures to be followed later by an opposite transaction, the individual pays the broker or commission house a fee referred to as "commission." The

^{12/} The initial margin requirement applicable to customer transactions as of February 21, 1958 is \$200 for both speculative and hedging transactions.

commission rates for a purchase and sale (round turn) of potato futures are members \$9.00 per contract, and nonmembers \$18.00 per contract. In addition, the Clearing House charges a clearing fee on potatoes of \$1 for each car sold and \$1 for each car purchased. Thus, the cost to a nonmember of the New York Mercantile Exchange for a purchase (sale) of futures and the subsequent offset settlement involving a sale (purchase) of futures is \$20. This amount represents the commission plus clearance fees.

The dollar cost of making or receiving delivery of potatoes on futures contracts is much larger than for settlement by offset. The costs of delivering and receiving potatoes on potato futures contract on the New York Mercantile Exchange (1956-57) follow:

<u>Delivering:</u>	<u>Amount</u>
Commission (nonmember) to sell a futures contract and deliver	\$18.00
Clearing House fee	2.00
Service charge to the carrying broker	7.50
USDA inspection on loading car in Maine	6.50
Reinspection in New York	<u>10.00</u>
Total per contract	\$44.00

<u>Receiving:</u>	
Commission (nonmember) to buy a futures contract and accept delivery	\$18.00
Clearing House fee	2.00
Service charge to carrying broker	<u>7.50</u>
Total per contract	\$27.50

Based on 45,000 pounds of potatoes per car, the cost of making delivery on potato futures contracts, exclusive of freight, is about 9.8 cents per cwt., whereas the cost of receiving delivery is about 6 cents per cwt.

Through private negotiation, it is possible for individuals to achieve results virtually identical to those realized from organized futures trading on the New York Mercantile Exchange. This can be achieved by employing private contracts with terms identical with those traded on the New York Mercantile Exchange. However, when it comes to the question of the relative efficiency of achieving like results, it seems reasonable to suppose that the advantage is decidedly in favor of organized trading on the Exchange.

In private negotiation, for example, a Maine potato grower who, at the time of planting, wants to contract to sell a carlot of potatoes for delivery the following November faces the following problems: (1) Finding a buyer interested in buying potatoes for November delivery, (2) selecting means for and negotiating the terms, and (3) obtaining information as to the financial integrity of the buyer. Likewise, the potential buyer of the grower's November

contract is confronted with identical problems with respect to his relationship with the grower. The resolving of these problems so as to bring buyer and seller together is time consuming and costly to both parties.

As an alternative, the grower (seller) and buyer can negotiate with each other through the facilities of the New York Mercantile Exchange. This would entail a sale by the grower of November potato futures.

In choosing futures as an alternative, the grower and buyer do not escape the types of cost items mentioned in private negotiations. Costs of the same type are involved whether individuals negotiate privately or through the Exchange. However, in negotiation through the Exchange, the grower and buyer, in effect, contract with the Exchange and its affiliated trade service agencies for service in handling problems that they would have to handle individually in the case of private trading. The matter of locating buyers, for example, is taken care of by the Exchange as it provides a central place for trading. The problem of each party having to investigate the financial integrity of the other is resolved by the elaborate safeguards for contract performance which already have been discussed. The Exchange and trade service associations charge a fee for this service of bringing buyer and seller together.

It seems reasonable to expect that the comparative cost of trading potato futures on the New York Mercantile Exchange is decidedly lower than the cost of achieving the same results through private negotiation since the Exchange is highly specialized in supplying such services.

FUTURES TRADING AS IT RELATES TO THE FINANCING OF PRODUCTION AND MARKETING OF MAINE POTATOES

Futures trading contributes to the short-term financing of the production and marketing of Maine potatoes in that it enables growers, dealers, and others to obtain loan capital in the form of either cash or materials. By hedging part of their expected potato production or inventories of potatoes on hand with sales of an equivalent quantity of potato futures contracts, growers and others can, from the point of view of some credit agencies, raise their credit rating above what it would be in the absence of hedging. Consequently, through hedging they are able to obtain larger loans or make larger purchases of supplies on credit than otherwise with any given amount of their own capital.

General Considerations Involved in Obtaining Loans Through Futures Trading

Growers use potato futures contracts as collateral to obtain short-term loans from banks with which to purchase such items as fertilizer, seed, spray material, and similar items needed in the production and harvesting of potatoes. However, loans are not granted solely on the basis of sales of futures contracts. Generally, the sale of potato futures contracts is simply one of several considerations that banks take into account in deciding the size of loan to make to a

particular grower. From the bank's point of view, a grower who sells potato futures contracts on the New York Mercantile Exchange to offset or hedge part of his expected crop thereby increases his ability to repay his loan above what it would be in the absence of hedging. The hedge in effect raises the grower's credit rating with the bank.

In placing part of its assurance of repayment of loans by growers on sales of potato futures contracts, the bank is necessarily confronted with three types of risks. First, it makes the loan on the assumption that the grower will retain the hedge for a period that is consistent with the bank's interest. For example, if the bank makes the loan today on the basis of so many potato futures contracts sold at a certain price, its assurance of repayment could be materially lessened should the grower liquidate his position--that is, purchase a futures contract to offset the one previously sold as a hedge without the bank's permission or knowledge. In order to protect itself against this sort of risk, it is customary for banks in Maine to require that the sale of futures contracts be done jointly, in the name of the grower and the bank. Banks handle this by instructing the broker not to liquidate the grower's hedge sales of potato futures contracts without its express permission. Banks retain such control over the liquidation of futures contracts sold by growers as hedges against the forthcoming potato crop and against potatoes in storage. 13/

Second, the bank must reckon with the possibility that the grower may have either a complete or partial crop failure. Should that occur, the grower would be left with a firm obligation to deliver potatoes or their financial equivalent on futures contracts but would have no potatoes to deliver. Consequently, the bank's chance of collecting from the grower in these circumstances is materially reduced. In practice, banks take this risk into account by requiring, in most instances, that the grower limit the amount of hedging to one-third of his expected crop. However, the quantity limitation does not apply to potatoes on hand except in those circumstances where the bank is concerned over the "keeping quality" of the potatoes. In that case, limits as to the proportion of stocks hedged may be prescribed; however, these can be expected to be more liberal than those for hedging a growing potato crop.

Third, banks must take into account the fact that buyers and sellers must guarantee their performance on the contract to the extent of making an initial deposit of margin in cash. In February 1958 this deposit was \$200 per futures contract (per carlot) for both hedging and speculative transactions. Margin deposits must be made at the time of selling futures contracts. Subsequently, should the price of futures increase, the grower (seller) is required to put up additional margin--called maintenance margin--and should prices go down, the buyer is required to put up additional margin. In case a buyer or seller

13/ For commodities such as grains and cotton, the loaning bank holds the warehouse receipt as collateral for loans and, hence, does not need to control the liquidation of cotton and wheat futures contracts. However, in the case of potatoes there are no warehouse receipts comparable to those for grain and cotton.

fails to deposit the necessary margin money, his contract is subject to immediate liquidation. Thus, in loaning money on the basis of sales of potato futures contracts, the bank is confronted with the possibility that the "hedge" sale will be liquidated because of the grower's inability to provide the cash necessary to cover the margin requirements in the event the price of futures undergoes a substantial rise. To guard against this risk, it is customary for banks in Maine doing this type business to include as part of the negotiation with growers an agreement whereby the bank agrees to supply whatever cash is needed to provide margin requirements. The bank customarily charges the grower interest on the amount required for that purpose. This amounts to a loan to the grower of the cash required for margins. In so doing, the bank is assured that the grower's hedge will not be subject to forced liquidation because of the lack of cash to meet margin requirements.

The level of prices at which the grower is able to sell futures as a hedge is important to both the grower and the lending bank. On the one hand, it is to the grower's interest to sell futures at as high a price as possible so as to assure himself the cost of production plus a margin of profit for his services in producing the potatoes. ^{14/} Likewise, the higher the grower's return, the greater the bank's chances for collecting from the grower. It is to the interest of both the bank and the grower to sell potato futures contracts at prices that will reflect the cost of producing the potatoes and carrying them to the future contract delivery month plus a profitable return to the grower. ^{15/}

In arriving at the selling price of potato futures contracts, growers should take into account that the New York Mercantile Exchange price refers to the per cwt. price for potatoes in New York rather than to Maine shipping point prices. If a grower settles his futures contract by delivery, he will have to pay the cost of preparing and shipping the potatoes to New York. The amount of this cost varies from time to time because of changes in freight rates and other items of cost, and depending upon the nature and extent of services required. The items of cost involved generally include freight, heating service, bags, inspection, labor, papering, paper and twine. Generally, Maine growers sell their potatoes for delivery at the nearest Maine shipping point and settle their futures contract by offset rather than by delivery of potatoes to New York. To translate the Exchange price to prices that growers can receive at Maine shipping point(s), it is necessary to subtract from the Exchange price the various costs involved in preparing and shipping potatoes from Maine to the potato futures contract delivery point. For example, if the price of March futures on the New York Mercantile Exchange is \$2.85 per cwt. and the shipping cost is \$1.20 per cwt., then the grower price at Maine shipping point is \$1.65 per cwt.

^{14/} This is not intended to mean that the prices at a given time are determined by the cost of production. They are determined, of course, by supply and demand forces.

^{15/} This does not mean that the grower will necessarily make delivery of the potatoes on futures contract. Generally, he will, at the time of selling the actual potatoes, liquidate his former sales of futures by offset, that is, by purchasing a future for the same contract month he previously sold.

Growers' Use of Futures to Obtain Financing

Financing by Banks and Other Credit Agencies

Some credit agencies supply growers with cards on which is printed a series of Mercantile prices and a corresponding series of prices representing the Maine shipping point delivery equivalents. With the price card, the growers can immediately translate the prices on the New York Mercantile Exchange at a given time in terms of prices for potatoes delivered at a designated shipping point in Maine. Consequently, the grower knows the price he will receive for the actual potatoes when he hedges at different Exchange prices. An example of a typical price card supplied by Maine credit agencies during the 1955-56 season is shown below.

Price Card

Mercantile price		Net return				
quotation	:	Per barrel	:	Per cwt.	:	Per carload of
per cwt.	:	expense paid	:	:	:	272 barrels
	:		:		:	
<u>Dollars</u>	:	<u>Dollars</u>	:	<u>Dollars</u>	:	<u>Dollars</u>
2.30	:	1.88	:	1.14	:	511.36
2.40	:	2.05	:	1.24	:	556.24
2.50	:	2.21	:	1.34	:	601.12
2.60	:	2.38	:	1.44	:	646.00
2.70	:	2.54	:	1.54	:	690.00
2.80	:	2.71	:	1.64	:	735.76
2.90	:	2.87	:	1.74	:	780.64
3.00	:	3.04	:	1.84	:	825.42
3.10	:	3.20	:	1.94	:	870.00
3.20	:	3.37	:	2.04	:	915.28
3.30	:	3.53	:	2.14	:	960.16
3.40	:	3.70	:	2.24	:	1,005.04

The figures in the first column indicate that a grower who sells a futures contract on the Exchange at \$2.30 per cwt. will net \$1.88 per barrel, \$1.14 per cwt., or \$511.36 per carload, all expenses paid. From the \$2.30 figure, \$1.16 per cwt. is deducted to cover the expenses such as cost of bags, labor, heat, brokerage, transportation, and inspection.

Information was obtained from 21 credit agencies located in Aroostook County concerning the nature and extent to which they made loans to potato growers. These included most of the commercial banks and credit agencies in the county. In interpreting this information it is well to keep in mind that these data relate to the 1954-55 season. Similar data are not available for

other years; consequently, there is no basis for indicating the relative importance of futures trading in financing during the 1954-55 season as compared with other seasons. The extent to which Maine growers and others used potato futures contracts to obtain loans during the 1954-55 season may have been influenced by the relatively low prices and incomes received for the 1953-54 potato crop. These and other factors that indicate the position of the 1954-55 season relative to other crop years are given in table 6.

In order to show the relative importance of futures trading in the total bank financing of growers, data were obtained from each agency as to the maximum amount of loans that were outstanding with growers at any one time during the 1954-55 season and also the proportion of such loans that were made on the basis of futures contracts (table 7).

Of the 21 credit agencies included in table 7, 9 (or almost one-half of them) made loans to growers on the basis of grower sales of potato futures, whereas the remainder did not. Data as to the amount of money loaned growers on futures contracts were obtained from 7 of the 9 credit agencies requiring sales of futures contracts. During the 1954-55 season, these 7 credit agencies loaned growers a combined total of \$811,910 on the basis of sales of potato futures. ^{16/} This amount represented approximately 8 percent of the total of \$9,827,253 (table 7) that the 21 credit agencies had outstanding with growers during the 1954-55 season, and is one indication of the importance of futures trading in enabling Maine potato growers to obtain short-term production loans from banks. However, the quantity of money loaned on the basis of futures tends to underestimate the importance of futures trading in this respect. This is because it gives no consideration to the effects that futures sales may have on the total amount that the grower is able to borrow from the bank. Several of the banks contacted indicated that such effects were of primary importance in that their decision to finance some growers for a particular season was, in some instances, contingent on the grower's sale of futures to the extent of covering a certain fraction of the loan. Thus, the fractional coverage by sales of futures may be linked directly to the overall borrowing ability of the grower. There is, of course, no way of quantifying the effects of futures transactions on the ability of growers to borrow; nevertheless, they should not be overlooked.

The amount that credit agencies are willing to loan Maine potato growers on the basis of sales of futures contracts varies directly, as is true for bank lending in general, with the bank's evaluation of the individual grower as a credit risk. Having satisfied itself as to the general credit rating of the grower, it is then customary for banks to tie the size of the loans that they make on the basis of sales of futures contracts to either an acre valuation or a carlot valuation. In both cases, the bank usually establishes a rule of thumb maximum amount that it will loan the grower on either an acre or carlot basis. For example, some banks try to limit the per acre loan before digging

^{16/} This amount was loaned to 135 growers, and represents about 5½ percent of the 2,399 growers receiving loans from the 21 credit agencies contacted.

Table 6.--Maine Potatoes: Production, farm disposition, price and value, 1944-56 crops

Year	Production cwt.	Total used for seed 1/	Disposition				Sold 2/	Season aver- age price per cwt. received by farmers	Value of produc- tion	Value of sales
			Used on farms For seed	where For	grown household: use	and loss: use				
1944	31,334	1,000	1,000	1,000	1,000	1,000	Dollars	1,000	1,000	
1945	32,729	3,010	1,204	1,253	428	28,449	2.20	68,936	62,588	
1946	47,041	3,350	1,340	982	396	30,011	2.13	69,823	64,024	
1947	39,060	3,013	1,295	1,882	420	43,444	1.80	84,674	78,200	
1948	45,045	3,217	1,351	1,367	347	35,995	2.42	94,395	86,987	
1949	42,228	2,708	1,029	2,432	347	41,237	2.53	114,114	104,467	
1950	38,016	2,693	1,346	2,365	346	38,171	1.65	69,676	62,982	
1951	27,000	2,130	1,044	1,749	315	34,908	1.29	49,041	45,031	
1952	32,007	3,046	1,462	1,134	254	24,150	3.03	81,810	73,174	
1953	34,839	3,352	1,743	1,504	265	28,495	2.17	69,455	61,834	
1954	29,046	3,240	1,555	1,324	258	31,702	0.74	25,781	23,459	
1955	35,814	2,919	1,897	2,265	223	24,661	2.15	62,449	53,021	
1956	41,748	2,958	1,538	1,110	200	32,966	1.77	63,391	58,350	
		2,981	1,312	3,423	172	36,841	1.21	50,515	44,578	

1/ Includes seed purchased and seed used on farms where grown.

2/ Consists of potatoes sold for all purposes including food, seed, processing, livestock feed and in 1949 and 1950 purchases by the Government under price support program.

Table 7.--Maximum amount of production loans outstanding with Maine potato growers grouped according to size of loans, 21 credit agencies located in Aroostook County, Maine, 1954-55 season

Size of grower loans outstanding	Number of Credit agencies	Maximum amount of loans outstanding ^{1/}	Growers receiving loans
Dollars	Number	Dollars	Number
Less than 100,000	2	157,990	33
100,000 - 199,999	2	249,000	127
200,000 - 299,999	2	416,000	121
300,000 - 399,999	5	1,668,413	412
400,000 - 499,999	1	470,000	123
500,000 - 599,999	3	1,550,889	299
600,000 - 699,999	2	1,363,721	516
Over 700,000	4	3,951,240	768
Total	21	9,827,253	2,399

^{1/} Maximum amount of production loans outstanding refers to the largest volume of loans outstanding at any one time during the 1954-55 season. It should not be confused with total loans made during the 1954-55 season. The latter figure would generally be much larger.

to \$110 to \$125. Others may express the limit in terms of a maximum amount loaned per bushel or barrel. In relating the size of loan to carlot valuations, the amount loaned per car during the 1954-55 season by the 7 credit agencies which made loans on the basis of sales of potato futures contracts ranged from an average of about \$400 to \$1,500 per car. ^{17/} Information for these 7 agencies as to the amount of loans, number of growers, and the average size of loan per car for the 1954-55 season is summarized in table 8.

Financing by Fertilizer and Machinery Companies

Next to commercial banks, fertilizer and machinery companies are among the important sources of credit for Maine potato growers. Most, if not all, of these agencies sell either fertilizer or machinery to growers on credit. A supplier of fertilizer on credit makes what is, in effect, a loan to the potato enterprise; he helps finance potato production and becomes a part-owner of the process.

Futures trading is an integral part of the system through which several fertilizer companies operating in Aroostook County, Maine, sell fertilizer to Maine growers on credit.

^{17/} The cash required to provide margin deposits for futures contracts is generally included as a part of the loan.

Table 8.--Average size of loans made to potato growers on the basis of sales of potato futures contracts by 7 credit agencies, Aroostook County, Maine, 1954-55 season

Credit agency classified according to size loan group	Credit agencies	Total amount loaned	Quantity of potatoes	Average amount loaned per carlot	Growers concerned
<u>Dollars</u>	<u>Number</u>	<u>Dollars</u>	<u>Carlots</u>	<u>Dollars</u>	<u>Number</u>
Under 50,000	4	149,430	193	774	20
50,000 - 100,000 ...	3	662,480	845	784	115
Total	7	811,910	1,038	782	135

Typically, a grower who expects to plant, say, 30 acres of potatoes will need approximately 30 tons of fertilizer. This amount, figured at an estimated cost of about \$70 per ton in 1955, comes to \$2,100. ^{18/} Assuming that a grower desires to purchase this amount of fertilizer on credit, he can do so by entering into the following type of arrangement with a fertilizer company. On the basis of prices on the New York Mercantile Exchange, the fertilizer company and grower enter potato forward contracts for a quantity of potatoes equal in value to the fertilizer, or \$2,100. For example, if in May 1955, the March 1956 futures contract was selling at \$2.80 per cwt., the fertilizer company would offer the grower \$2.80 per cwt. for U. S. No. 1 potatoes less the cost of shipping potatoes from a Maine shipping point to New York. If we assume that shipping costs amount to \$1.20 per cwt., then the price to the grower is \$2.80 less \$1.20, or \$1.60 per cwt. At this price, it will require about 3 carlots of 450 cwt. per car to cover the \$2,100.

Simultaneously, with its forward contract with the grower for \$1.60 per cwt., the fertilizer company sells 3 March futures on the Mercantile for \$2.80. Thus, the fertilizer company offsets or hedges its forward potato contract with the grower by selling a corresponding quantity of potato futures contracts. When the delivery month arrives (March, in this example) the fertilizer company furnishes or makes arrangements for the bags and instructs the grower to load the 3 cars with U. S. No. 1 potatoes. Upon sale of the potatoes in regular cash channels, and generally this will have been done before the grower receives instruction to load the cars, the fertilizer company liquidates its sales position in futures by buying three March futures contracts.

In the illustrative example, the fertilizer company is the seller of potato futures contracts on the New York Mercantile Exchange rather than the grower. In other instances, however, the equivalent is achieved through

^{18/} Fertilizer companies generally maintain a certain ratio between the quantity of fertilizer advanced and the quantity of potatoes expected to be received. During the 1954-55 season, this was generally 10 tons of fertilizer to a carlot of potatoes.

arrangements in which the grower, in addition to contracting to sell the dealer potatoes on forward contracts, is also a partner-seller of futures contracts with the fertilizer company. Under the latter arrangement, the grower's cash forward sale of potatoes to the fertilizer company is hedged on the Exchange in the name of both grower and fertilizer company. Likewise, the fertilizer company, rather than the grower, agrees to provide the necessary margin deposits to cover the futures contracts sold.

The types of grower-fertilizer company financing that are based on futures contracts represent some variant of the two methods described. Just as the bank is concerned over the ability of growers to repay money loans, the fertilizer company that sells fertilizer on credit is concerned with the grower's ability to pay off the fertilizer debt. Through the futures-forward contract arrangement described, the fertilizer company is substantially guaranteed payment for the fertilizer and, consequently, can sell a larger quantity of fertilizer than it could in the absence of futures trading arrangements. In this respect, however, it is important to see that the fertilizer company advances the fertilizer to the grower on what is equivalent to an ordinary loan of money. Instead of loaning the grower the money to buy the fertilizer, the company loans the fertilizer directly.

In order to determine the importance of futures trading in financing the credit purchases of fertilizer and machinery by Maine potato growers, information as to the extent of such financing was obtained from 6 fertilizer companies and 8 farm machinery companies.

With one possible exception, no instances were found where machinery companies sold equipment to growers on credit that involved the future-forward contractual arrangement described above. Most machinery was financed along the more conventional lines, that is, one-third down and chattel mortgage on the machinery for the balance.

In the case of fertilizer, however, 5 of the 6 companies interviewed made credit sales of fertilizer to growers on the basis of the future-cash forward contractual arrangements. The total sales of fertilizer made by the 5 companies on the basis of future contracts during the 1954-55 season amounted to \$252,791. This sales value of fertilizer was hedged with sales of 514 potato futures contracts on the New York Mercantile Exchange and involved a total of 78 Maine potato growers. For the individual fertilizer companies, the total value of fertilizer sold on the basis of futures contracts ranged from \$2,000 to \$100,000.

Futures Trading As It Relates to the Operations of Potato Dealers

The terms "potato dealer" and "packer and shipper" are used interchangeably in this study to refer to a group of firms which constitutes the primary sales link between the grower and the wholesale distributing firms. They are the middlemen merchants, so to speak, who acquire potatoes at the grower level, either by production or purchase or both and sell to wholesale distributors, seed buyers, and processing outlets. In addition to selling potatoes for their

own account, many dealers operate as potato brokers, that is, buy and sell potatoes for others (generally growers) on commission.

Potato dealers in Maine use futures trading in connection with their activities in the production and marketing of potatoes. Among such uses is that of financing potato growers. In view of the importance of futures trading in the potato production and marketing activities of this group of firms, a rather comprehensive inquiry was made of (1) the methods and practices of potato dealers and the way in which futures trading is related to them, and (2) the nature and extent to which dealers use futures trading to finance growers. In the conduct of this inquiry, the information obtained and analysis that follows are based on a sample of 42 dealers located in Aroostook County, Maine. 19/

Methods and Practices

With respect to the total quantity of potatoes handled during a given season, Maine dealers acquired potatoes from the following sources: (1) By production from their own or leased land, (2) by production on a share-contract arrangement (under this arrangement, the dealer usually furnishes the seed, fertilizer, spray material, and receives one-half of the potatoes harvested), (3) by spot purchases from growers--referred to by the trade as "street purchases," and (4) by purchases from growers on forward contracts.

Of the 42 dealers included in the survey, 29 grew part of the potatoes handled either on their own or leased land. During the 1954-55 season, these 29 firms had a combined acreage of 5,482 (table 9).

Fifteen of the 42 dealers acquire potatoes by share-contract with growers and, during the 1954-55 season, had a combined contract acreage of 2,205. Data on the distribution of this acreage among the 15 firms are given in table 10.

The most prevalent of the four methods used by dealers in acquiring potatoes was street purchases from growers. 20/ Thirty-seven of the 42 dealers

19/ This sample of 42 dealers was drawn from a list of about 1,000 firms representing most, if not all, of the dealers operating in Aroostook County, Maine. In drawing the sample, the dealers listed were arrayed according to the volume of potatoes submitted for inspection during the 1954-55 season. This array was, in turn, divided into 5 size groups and samples drawn from each of the 5. The size groups and the number of dealers selected from each size group follows: (1) 5 dealers were selected from the group that submitted 583 to 769 cars of potatoes for inspection during the 1954-55 season, (2) 9 from the 277 to 448 car size group, (3) 9 from the 165 to 276 size group, (4) 8 from the 89 to 158 size group, and (5) 11 from the 27 to 89 size group.

20/ The term "street purchases" refers to potatoes brought in and sold from day to day.

Table 9.--Maine potato dealers classified according to size of planted acreage, 1954-55 season

Planted acreage	Dealers	Total acreage
<u>Acres</u>	<u>Number</u>	<u>Acres</u>
Under 50	2	60
50 - 99	9	641
100 - 149	5	618
150 - 199	2	325
200 - 249	1	240
250 - 299	3	788
300 - 349	1	300
350 - 399	3	1,110
400 and over	3	1,400
Total	29	5,482

Table 10.--Maine potato dealers classified by size of contract acreage, 1954-55 season

Acreage under contract	Dealers	Total acreage
<u>Acres</u>	<u>Number</u>	<u>Acres</u>
Under 50	6	156
50 - 99	2	104
100 - 149	2	200
150 - 199	1	195
200 - 249	2	449
250 and over	2	1,101
Total	15	2,205

contacted used this method to obtain part of their 1954-55 volume. Moreover, futures trading is, for some dealers, an integral part of their street purchase operation. The distribution of street purchases among the 37 dealers is given in table 11.

Some Maine potato dealers offset, that is, hedge their street purchases of potatoes with sales of potato futures contracts on the New York Mercantile Exchange. This use of futures trading for potatoes is comparable to its use in grains and cotton. Futures trading arrangements in potatoes provide individuals with the opportunity to accumulate inventories of potatoes at or

Table 11.--Maine potato dealers classified according to size of "street purchase" of potatoes, 1954-55 season

Purchase	Dealers	Total purchases
<u>Cwt.</u>	<u>No.</u>	<u>Cwt.</u>
Under 50,000	11	212,149
50,000 - 99,999	7	484,274
100,000 - 149,999	3	370,837
150,000 - 199,999	3	539,962
200,000 - 249,999	4	881,718
250,000 - 299,999	3	834,570
300,000 and over	6	3,432,412
Total	37	6,755,922

following harvest and simultaneously offset such purchases with sales of a corresponding quantity of potato futures contracts. During the interval of the futures hedge, the potatoes can be stored. Subsequently, as the potatoes are sold to terminal market receivers and others further along in the distribution channel, an equivalent quantity of potato futures contracts can be purchased so as to cancel those previously sold. In this way, the desired quantitative relationship between actual potatoes on hand and the size of the position in futures can be maintained.

The use of the New York Mercantile Exchange to offset street purchases of potatoes in the manner described is limited, for the most part, to potato dealers located in the Maine area. 21/

"Traders located in Maine held just over half of both the reported long and short hedging commitments, on the basis of average commitments in the period February 28, 1954, through May 15, 1955. Traders in New York held approximately 10 percent of reported long hedges and one-quarter of reported short hedges. Traders in New York held approximately three-quarters of both long and short reported speculative commitments in 1954-55 crop futures on the average.

"In some instances a hedger's interest in potatoes is only partially indicated by a geographic classification based upon his principal place of business. A firm in New York City, for example, in addition to merchandising activities in that city, may have interests in the growing and shipment of potatoes from Maine, and similar interests in other areas. A firm in Maine may also have interest in the merchandising of potatoes in eastern cities, and possibly in the growing of potatoes in other areas."

21/ See reference in footnote 7.

To some extent, however, it is used in this manner by terminal market buyers; this is discussed on page 32. In the case of potato dealers, 15 of the 37 which made street purchases during the 1954-55 season offset part of such purchases with sales of potato futures contracts, whereas 22 reported that they did not. Data concerning the quantity of potatoes offset with futures during the 1954-55 season were obtained from 11 of this group of 15 firms. This number sold a combined total of 2,204 potato futures contracts (each futures contract represents a carlot) against street purchases of approximately 7,000 cars of potatoes. Thus, the 11 firms used futures to offset approximately 30 percent of their combined street purchases of potatoes during the 1954-55 season. The number of potato futures contracts sold to offset street purchases for the 11 firms during the 1954-55 season is given below:

<u>Potato dealer</u>	:	<u>Potato futures</u>
<u>Code number</u>	:	<u>contracts sold</u>
1	:	44
2	:	200
3	:	750
4	:	15
5	:	120
6	:	55
7	:	20
8	:	50
9	:	20
10	:	910
11	:	20
12	:	<u>1/</u>
13	:	<u>1/</u>
14	:	<u>1/</u>
15	:	<u>1/</u>
<hr/>		
Total		2,204

1/ Data not obtainable.

Finally, potato dealers obtain part of their potato supplies through forward contracts with growers. Under these arrangements, dealers, and growers enter contracts, usually around the time of planting, in which the grower agrees to deliver a specified quantity and quality of potatoes to the dealer at harvest or within some period thereafter. The price received by the grower is fixed at the time of negotiating the forward contract but payment by the dealer is deferred until delivery of the potatoes.

During the 1954-55 season, 20 of the 42 dealers contacted acquired part of their supply through forward contract purchases from growers. Data showing the distribution of forward contract purchases among the 20 firms for the 1954-55 season are given in table 12.

Table 12.--Maine potato dealers classified according to size of forward contract purchases, 1954-55 season

Cwt.	No.	Cwt.
Under 10,000	7	40,987
10,000 - 19,999	1	13,200
20,000 - 29,999	3	66,825
30,000 - 39,999	1	33,000
40,000 - 49,999	1	41,250
50,000 and over	7	1,128,900
Total	20	1,324,162

During the 1954-55 season, 14 of the 20 dealers offset their forward contract purchases from growers by selling an equivalent quantity of potato futures contracts on the New York Mercantile Exchange. For example, a dealer may contract with a grower, say, in May for delivery of a carlot of U. S. No. 1 potatoes the following November and simultaneously sell a November potato futures contract on the Mercantile Exchange.

Data as to the quantity of potato futures contracts sold to offset forward contract purchases from growers were obtainable from only 7 of the 14 dealers. During the 1954-55 season, these 7 dealers sold 1,722 potato futures contracts on the New York Mercantile Exchange to offset forward purchases from growers.

Use of Futures Trading by Dealers to Finance Growers

Potato dealers use futures trading to finance growers in ways quite similar to those already described in the case of fertilizer companies (see p. 20). They advance growers cash or materials (fertilizer, spray, seed, etc.) at the time of planting or during the growing season. Such advances are frequently made as part of a cash forward contract in which the grower agrees to deliver the dealer a specified quantity of U. S. No. 1 potatoes of a certain variety at a specified future date. The price is fixed at the time of negotiating the contract and is generally based upon the then prevailing price of potato futures contracts on the New York Mercantile Exchange.

It is standard practice in Maine for the purchaser of potatoes on forward contracts, dealers in this case, to pay the grower approximately \$200 per carlot of potatoes at the time of contract negotiation. Maine growers think of the \$200 advance as a sort of downpayment by the buyer. Strictly speaking, however, the \$200 represents a loan of that amount to the grower during the period of the contract at the end of which the grower repays in potatoes

rather than in cash. The grower makes no direct payment of interest as such to the dealer for use of the \$200 during the period but, nevertheless, pays interest indirectly in that it is necessarily reflected in the price that he receives for the potatoes. The dealer cannot be expected to forego the use of the \$200 without some compensation and, hence, he will take this into consideration in the price he agrees to pay the grower. In advancing the grower \$200 on the forward contract, the dealer thereby becomes a "banker" or lender of funds as well as a buyer of potatoes.

Beyond the standard \$200 requirement, dealers frequently make additional advances to growers either in cash, production materials, or some combination of the two. Just as was noted above for the \$200, all such advances represent the equivalent of a loan of money to the grower during the interval between his receipt of the money or materials and the future delivery date of the potatoes.

With the exception of the \$200 that most buyers pay sellers of cash forward potato contracts, there are apparently no standards as to the amount of cash or material that a dealer will advance growers. Generally, the amounts will vary among different dealers and growers. The greatest degree of standardization is in the advance of fertilizer. In this connection, during the 1954-55 season dealers advanced up to 10 tons of fertilizer against a forward contract purchase of 1 carlot of potatoes. ^{22/} In the case of cash advances, most dealers stated that they generally did not advance more than one-half of the value of the forward contract.

During the 1954-55 season, dealers made advances of fertilizer and materials on forward contracts at a ratio of roughly 2 to 1 as compared with cash. The 19 dealers from whom data were obtainable advanced growers \$1,115,865 in cash and materials on forward contracts during the 1954-55 season. Of this amount, \$759,774, or about 68 percent was in the form of fertilizer and materials and \$356,091, or 32 percent, in the form of cash. The total amounts advanced per dealer ranged from \$1,200 to over \$400,000.

Nine of the 20 dealers stated that they customarily offset their forward contract purchases from growers with sales of an equivalent quantity of potato futures contracts on the New York Mercantile Exchange. Data as to quantity of potato futures contracts sold during the 1954-55 season to offset forward contract purchases of potatoes were obtained from six dealers. This number sold 1,282 potato futures contracts against their 1954-55 forward purchases from growers.

THE USE OF POTATO FUTURES CONTRACTS IN PROCUREMENT AND PRICING OF POTATOES

The discussion so far has been concerned with the way firms use futures trading in the accumulation of potato inventories. Firms also may use potato futures contracts in connection with sales of potatoes or potato products for

^{22/} At the fertilizer price of \$65 to \$70 per ton, this amounts to \$650 to \$700 per carlot.

deferred delivery in advance of having purchased the potatoes to cover such sales. This use of futures trading involves a purchase of futures contracts to offset the forward sales contracts. For instance, some dealers contract to sell a specified quantity and quality of seed potatoes at firm prices several months in advance of buying the seed to cover the forward sale. Against such sales to seed buyers the dealer purchases an equivalent quantity of potato futures contracts for delivery at a time that coincides as closely as possible with the time at which he expects to purchase the seed potatoes to fill the seed buyer's order.

In a forward transaction of this kind, the dealer contracts to deliver to the buyer seed potatoes of a highly specialized type, whereas the potatoes deliverable on the Mercantile contract may fall within a rather wide range of quality. Because of the uncertainty as to the quality of potatoes that he will receive should he take delivery on the Mercantile contract, the dealer will generally settle his futures contract by offset and acquire the seed potatoes to cover his forward sale by private contract.

It may appear odd that the seed dealer buys futures at all in this situation. Why doesn't he match his forward sale of seed with a forward purchase of seed from a grower and not bother with futures? The latter procedure is quite feasible provided the dealer can find seed growers who are willing to sell forward at the same time that seed buyers wish to buy. This sort of situation does not always prevail. Instead, it is not unusual for dealers to be confronted with a large number of seed buying orders at the very time that growers are reluctant to sell. In this sort of situation the dealer, if he is to keep his seed customers, must be prepared to quote prices at which he is willing to deliver seed potatoes, say, 3 or 6 months hence. But how is he to know what sales price to quote when he doesn't know the cost of the seed?

The New York Mercantile Exchange provides the dealer a way out of this dilemma in that the price of potato futures contracts on the Exchange reflects the relative price at which the dealer can purchase seed. This being the case, the dealer can use the Exchange price as a basis for quoting his sales price for seed potatoes. In order to follow through in this manner, the dealer must cover his sales of seed potatoes with a purchase of an equivalent quantity of Exchange contracts. Subsequently, as he acquires the seed potatoes from growers, he liquidates his position in futures by sales of the futures previously purchased against forward sales to seed buyers.

Illustrative of this type use of futures trading is the following statement of a seed dealer: 23/

23/ Statement made by Fred Warman, potato dealer, Presque Isle, Maine. Hearings Before a Special Subcommittee of the Committee on Agriculture, House of Representatives, 84th Congress, 1st Session, Futures Trading, Part 1. December 6 and 7, 1955.

"I find the New York Mercantile a great aid in my business. There're two reasons for this. At times growers in the localities where we work will get a collective urge to buy seed. You gentlemen know if you are going to keep a customer when he calls you for a price, you're going to pretty well have to give him that price; or if he doesn't buy it from you, he'll go to some other locality. There are many other localities that furnish seed--in New Brunswick, Prince Edward Island, Michigan, New York State--so when our customers call us, we feel obliged to quote them a price. Often they accept those prices, and at that time we might find a great reluctance on the part of the Aroostook grower to sell. We can't criticize him for that because he has not yet produced his crop. He doesn't know whether it will pass certification, and he might think the market might well be higher, which could very well be.

"Well, I could very well find myself, along with other seed dealers here, in the position of taking on orders for 50 or a hundred cars of potato seed. Those orders are coming so much faster than we can go out and cover them with the growers; therefore, there's only one place we can go and immediately cover those sales, keeping in mind that the price on the Mercantile is always relative to the price of actual potatoes.

"Another reason why I find it at least--and I'm sure other people do--a great advantage, is that so many of our seed customers will want to buy a specific lot of potatoes, or potatoes with certain specifications. Perhaps they will want some seed that has been through the Florida test. The Florida test doesn't become available until about the 1st of February. Through the summer we might be selling something with, oh, certain specifications as regard to Florida test. There is no way in the world that we can buy those and be sure that we are adequately covered. So we take on these orders at times, not always, and cover them on the Mercantile. As soon as we can buy those actual potatoes to cover this order, we liquidate our hedge."

The purchase of futures to offset forward sales of potatoes in the manner described is thus significant in the procurement of potatoes to cover forward sales commitments. Its importance in this respect has to do with the pricing rather than physical aspects of procurement. Of the 42 dealers contacted, 8 stated that they sometimes purchased Mercantile contracts to cover forward sales commitments of potatoes. During the 1954-55 season, 5 of these firms used the Exchange to cover forward sales of about 215 cars of potatoes.

The points made with respect to dealers using futures to offset forward sales of potatoes apply equally well to forward sales of potato products by processors. For example, processors sometimes are asked the price at which they will sell a specified quantity of french fried potatoes for delivery, say, 3 to 6 months hence. Since potatoes are one of the major items of cost in french fries, information as to the cost of potatoes is important to the processor in quoting sales prices for french fries. Just as in the case of dealers

selling seed forward, the processor has two alternatives for arriving at his purchase price for potatoes and his basis for quoting prices for french fries. He can purchase potatoes at the firm's prices on forward contract with growers. Alternatively, he can buy potato futures on the New York Mercantile Exchange.

The way in which this use of potato futures is tied in with the potato processing business is brought out quite clearly in the following statement of a processor: 24/

"We're seasonal vegetable canners, canning peas, string beans, and corn; and we produce in the potato field quick frozen French fries and such byproducts of freezing as patties and puffs and mashes. We dehydrate potatoes and produce potatoes to flour and meal from the dehydrated potatoes. And we're canners of small potatoes.

". . .The reason that we're interested in the mercantile is that we find it necessary, of course, to give customers a firm price on the various potato products that we manufacture.

"Along in the late summer and early fall, the customers come in with orders for firm amounts at firm prices. And that leaves us in a position of not knowing exactly what our raw material will cost us. We never have gone out to the farmers in the spring with contracts, because we felt that in most cases the contracts were written at a very low level, and when we do contract direct, if we did, we would have the problem of never knowing whether the potatoes which the producer delivered would meet the specifications of our quality control people. It's necessary for us to have high specific gravity and low sugar, and we prefer to be in a position of deciding at the time of delivery with the producer whether or not the potatoes will be acceptable. So that leaves us in a position of either having to use the mercantile as a hedge, or going out and buying from the trade loaded cars. We have in the past bought a good many loaded cars with specified delivery periods. The great difficulty with that is that if you are going to operate a true hedge, you should, of course, liquidate your hedge as fast as you acquire the actual potatoes. And the opportunity for selling loaded cars at the time of buying your potatoes isn't always very good. Actually there may not be much of a market. In the case of the mercantile, of course, you can always liquidate as fast as you acquire your actual raw stock.

"So from our standpoint as a processor who uses up to as many as a thousand cars of potatoes a year, we feel that the mercantile exchange has a very definite place, and every year we use it to a greater or lesser extent. At the moment, we've only acquired something like 50 or 60 percent of our actual requirements for

24/ Statement by Donald W. Reed of H. C. Baxter & Bros., Pittsfield, Maine. Hearing Before a Special Subcommittee of the Committee on Agriculture. See reference in footnote 23.

the year, and we're long in the late months on a part of the quantity which we have acquired, which should assure us of procurement of our raw material at about current prices."

Information as to the extent to which processors purchase futures to offset forward sales of manufactured potato products is not available. Fragmentary information on this point suggests that the practice is rather common. Such use of the mercantile is more typical for processors who make forward sales of potato products in advance of their having purchased the raw material (potatoes) to cover such sales.

In considering the economic implications of the purchase of futures to offset forward sales, whether it be seed potatoes or manufactured products, attention is called to the more specialized enterprise position which results for the dealer or processing firm. A processing firm, for example, negotiates a price for the forward delivery of french fries. Simultaneously, it fixes within narrow limits the primary ingredient cost by purchasing the appropriate quantity of potato futures on the Exchange. In brief, the processor assumes a price spread by his simultaneous purchase of potato futures and a sale of french fries forward. In so doing, the gross return to the firm for processing french fries is closely approximated by the size of the price spread assumed. In other words, the net effect to the processor is that of enabling him to specialize in selling processing service at relatively fixed prices. The price for such services is partially represented by the difference between the price of french fries and the price of potato futures. ^{25/} In the absence of futures trading arrangements, or devices that achieve the equivalent, the processor has no way of fixing his return for processing service in advance of his actually providing the service. Consequently, it also is not possible for the processor to specialize to the same degree as is the case in using futures contracts. It is in this sense that the processor can use potato futures contracts to achieve a more precise selection of enterprise position.

Wholesale Receivers

The so-called "wholesale receivers" located in large terminal markets, such as New York and Boston, among other things, buy potatoes for their own account and resell to jobbing and retail outlets. Available information suggests that these firms do not make extensive use of the Mercantile Exchange. Apparently this is because of the rapid turnover of their business and the absence of large accumulations of supplies. The use of futures by such firms is made, for the most part, in those circumstances where they have considerable difficulty in matching buying and selling orders. For example, a terminal market

^{25/} This is because potatoes represent only part of the cost of manufacturing french fries. In order to fix completely the gross margin for processing french fries, the processor would have to contract the purchase at fixed prices of all inputs required simultaneously with his forward sale of french fries.

dealer may, because of competition at the f.o.b. point, find it desirable to make f.o.b. purchases of potatoes even though there is little buying activity in the terminal market where he expects to sell. To guard against such market uncertainty in the terminal market, the dealer may sell futures against f.o.b. purchases. Subsequently, as buying activity improves in the terminal market, the hedges are lifted and the potatoes sold through normal outlets. Likewise, dealers may find it advantageous to sell potatoes forward to terminal market firms at times when they have difficulty buying potatoes in the production area. In these circumstances, they can hedge forward sales with purchase of potato futures. Subsequently, when buying conditions improve in the production area, the purchase of futures can be replaced with purchase of potatoes f.o.b. country points.

CASH-FUTURES POTATO PRICES

In this section, an attempt is made to indicate (1) the significance of futures trading to market information, (2) the relationship of potato futures prices to the structure of market prices, and (3) some of the more basic relationships between cash and futures prices.

Important studies in this area are those of the Commodity Exchange Authority ^{26/} and the University of Maine. ^{27/} The Commodity Exchange Authority study deals with such topics as (1) trends in cash potato prices, (2) futures and cash price variability, (3) futures prices, and (4) the supply and price situation in 1954-55. The University of Maine report gives attention to (1) prices of futures contracts, (2) the effects of futures prices on planted potatoe acreage, and (3) factors determining cash and potato futures prices.

The Importance of Information on Futures Prices

One of the important functions performed by the New York Mercantile Exchange, along with associated trade organizations, is to bring together in a single market much of the available data concerning the factors affecting the demand for and supply of potatoes. This information is made available to potential traders in the market. Also, the prices at which transactions are being made, and the bids and offers are quickly transmitted from the Exchange to all interested segments of the potato industry as well as to the public in general.

The significance of providing such information on supply, demand, and prices has to do with the competitive character of the potato market. Specifically, one of the requirements of freely competitive markets is that "there must be knowledge on the part of each buyer and seller of the prices at which transactions are being carried on, and of the prices at which other buyers and

^{26/} See reference in footnote 7.

^{27/} The Maine Potato Industry and the New York Mercantile Exchange, Maine Extension Service, Pamphlet 53. July 1957.

sellers are willing to buy or sell. It means also that there must be opportunity to take advantage of that knowledge."^{28/} When so visualized, the New York Mercantile Exchange is a factor that tends to increase the extent of competition in the potato market. The specific reasons are: First, the supply and demand information is made available to a large number of potential and actual buyers and sellers and thereby makes possible a much broader market and increased liquidity. Second, the widespread distribution of price information tends to reduce the difference among buyers and sellers with respect to knowledge of market values. Illustrative of this second point is the amount of knowledge that Maine growers now have with respect to prices. For example, it is a simple matter for them to ascertain the prices and bids and offers made on the Exchange during the day. On the basis of such information, growers and other sellers can determine fairly accurately the market value of their potatoes and, consequently, are better informed in their sales negotiations. The importance of such price information to growers and others is indicated by the following statement of a Maine potato dealer: ^{29/}

"They have seen the tremendous advantages offered by the hedge principle, the only way outside of direct Government support that this industry has ever been able to determine an indication of price for its product before it is definitely committed to its growth. To me that is a tremendous step. Up until the advance of the exchange and the hedging principle being used as it is now, no farmer in this area had any idea what price he would obtain for his product until he was committed, until his investment was made . . .

"It is of utmost importance to him that some determination of price be made before he must commit himself to this extent. These people, these members of the council, also receive the advantage of a public auction type of pricing. There are no secrets in quotations based on the free trading that is possible, and, in fact, is mandatory on the exchange. All quotations of trading are placed on public outcry. The growers in this county, particularly the State in general, have never been better supplied with actual, accurate price information. Nobody can take advantage of a grower when New York Mercantile Exchange quotations are available, and they are available."

The foregoing advantages of price information are realized to the extent that prices are determined by freely competitive market forces. Previous studies indicate that the prices established on the New York Mercantile Exchange at times have been influenced by manipulation. ^{30/} In such circumstances, the prices established are distorted away from freely competitive values with possible short time benefits or losses to growers and others.

^{28/} Boulding, Kenneth E., Economic Analysis, Rev. Ed. 809 pp. New York. p. 50. 1948.

^{29/} Statement made by Gordon Robertson, potato dealer, Caribou, Maine. Hearings Before a Special Subcommittee of the Committee on Agriculture, House of Representatives, 84th Congress, 1st Session, Futures Trading, Part I. December 6 and 7, 1955.

^{30/} See pp. 90-94 of reference in footnote 7.

Futures Prices and Price Structure

In examining cash-future potato price relationships, it is necessary first to consider the nature of the price structure for Maine potatoes and, in particular, the way in which potato futures prices are tied in with that structure. In this connection, no attempt is made to identify the complete price structure for Maine potatoes except to the extent necessary to establish the point that futures prices are an integral part of the overall structure.

The phrase, "price structure," is used here to refer to the form, place, and time dimensions of potato prices. Any potato price established in the market can be expressed in terms of form, place, and time. The cash price of U. S. No. 1 potatoes at Presque Isle, Maine, on October 1, for example, in terms of structure, provides form (U. S. No. 1 potatoes in raw form), place (Presque Isle), and time (October 1).

Starting with the price of potatoes of a single form, at a single location, and time, it is possible to expand any of these three dimensions of price structure by including additional prices. The "form" dimension may be increased by including prices for potato chips, french fries, flakes, etc. Similarly, the location dimension may be expanded by including prices for potatoes located at several points. Because of the separation of production areas from consumption, the price structures of most commodities are multidimensional in place. Likewise, the fact that consumption is spread over time gives rise to price structures with multitime dimensions.

The prices of potatoes at two geographic locations are parts of the same price structure or market to the extent that arbitrage is effective between them. ^{31/} The effectiveness of arbitrage is evidenced by the degree to which the differences in the prices at the two points approximate rather consistently the cost of transporting potatoes between the two points. Thus, we may regard Presque Isle, Maine, and New York City as parts of the same price structure since potatoes generally move from Presque Isle to New York. Moreover, in normal times the price of potatoes in New York tends to be greater than the Presque Isle price by an amount approximately equal to the freight cost per cwt. for shipping potatoes from Presque Isle to New York. The shipping cost is about 75 cents per cwt. ^{32/} Therefore, when the price in Presque Isle is, say, \$1.60 per cwt., we should expect the price in New York to be \$2.35. However, if the price in New York were only \$2.30 while the price in Presque Isle were \$1.60, it would not pay anyone to buy potatoes in Presque Isle and ship them to New York at these prices. Thus, the movement of potatoes from Presque Isle to New York might be halted temporarily until the supply and demand forces

^{31/} Arbitrage may be defined as the process of changing the value of one's possession by buying an asset or the rights to an asset at one time or place and selling it or them at another time or place.

^{32/} The freight cost is 71 cents per cwt. and heater service is 4 cents making a total of 75 cents per cwt. This freight cost refers to the 1954-55 season.

operating at the two points reestablish the 75-cent shipping parity. Assuming the absence of barriers to movement of potatoes from Presque Isle to New York, the prices at the two points are determined by the same general supply and demand conditions. This is but another way of saying that under such conditions, potato prices at Presque Isle and New York are part of the same price structure or market.

The remarks so far have had reference to the structure of the so-called "cash" potato prices. Potato futures prices also constitute a price structure in the above sense. The prices established in buying and selling potato futures contracts refer specifically to potatoes of a specified quality, a given location, and time. The dimensions of price structure apply to futures prices because of the nature of the contract terms. The terms of the potato futures (1956-57) contract call for delivery of U. S. No. 1, size A, 2-inch minimum of Maine grown Katahdin, Katahdin-Chippewa type, or Kennebec potatoes; the unit of trade is a carlot of 900 bags containing 50 pounds each; the place of delivery is in refrigerated cars on track in Harlem River Yards, New York City; the time of delivery is during any of the calendar months November to June. (For further details of contract provisions and recent modifications, see p. 7.) Thus, by the very nature of the terms of the potato futures contract, it can be seen that the prices established in trading necessarily refer to the price of potatoes located at New York at specified delivery dates. Accordingly, potato futures prices constitute a price structure the same as cash potato prices.

In terms of the concept of price structure developed so far, attention is called to the time dimension of the future price structure. There we find multidelivery dates which are represented by the different calendar months of delivery, such as November futures, March futures, etc. At any given time, it is possible to buy or sell potatoes for seven different delivery dates. ^{33/} Consequently, the time dimension of the potato futures price structure includes potato prices for seven different delivery dates (table 13).

The difference between the prices of any two of the potato futures contracts (see right-hand column of table 13) represents a charge for carrying potatoes between the two delivery dates. ^{34/} For example, on October 4 the carrying charge from November to December was 20 cents per cwt. (\$2.55-2.35), and from November to March it was 90 cents per cwt. (\$3.25-2.35). These price spreads between futures may at times exceed or fall below the actual cost of storing potatoes for the periods involved between futures.

^{33/} Trading in December and February was discontinued in June 1957, leaving only 5 delivery months for potato futures.

^{34/} Just as there are costs of transporting potatoes from one place to another, there are costs of transporting potatoes from one time to another. Charges for the transport of potatoes from Presque Isle to New York have to be paid and, likewise, for the transport of potatoes from, say, October to March. Potatoes are transported from one time to another through storage.

Table 13.--Closing prices of potato futures contracts on the New York Mercantile Exchange, October 1 and 4, 1954, and the price differences between futures on October 4

Year and futures month	Closing prices per cwt.		October 4 price differences
	October 1	October 4	
	Dollars	Dollars	Dollars
1954:			
November	2.24	2.35	---
December	2.42	2.55	Nov.-Dec. -- \$0.20
1955:			
January	2.67	2.84	Dec.-Jan. -- 0.29
February	2.88	3.08	Jan.-Feb. -- 0.24
March	3.07	3.25	Feb.-Mar. -- 0.17
April	3.13	3.33	Mar.-Apr. -- 0.08
May	3.16	3.40	Apr.-May -- 0.07

Up to this point in the discussion of price structure, an attempt has been made to show that both cash potato prices and potato futures prices represent price structures in that they both can be expressed with respect to form, place, and time. At this point, the question is raised as to whether the cash potato price structure and the futures price structure are independent of one another or are they so integrated as to justify considering the two as parts of the same structure. The answer to this question involves the same kind of problem and analysis that was raised earlier with respect to whether cash potato prices at two geographic points represent separate or the same price structures. There it was concluded that they should be considered as parts of the same price structure, provided there was free movement of potatoes between the two locations and that arbitrage was effective between the two points.

The extension of this reasoning to the integration of cash and futures prices means that arbitrage would have to be effective between cash and futures prices and, further, that there would be free movement of stocks (potatoes) to implement the operation of arbitrage. Based on these considerations, it follows that cash and futures prices are integrated and do, in fact, constitute a single price structure or market. This integration is achieved because of the following two general conditions which, for the most part, are satisfied: First, the Exchange facilities, particularly the terms of the contract, permit arbitrage between cash and futures contracts--more popularly known as "hedge selling" and "hedge buying." Second, if there is a need to implement arbitrage with potato supplies, this can be done since all buyers and sellers of potato futures have the right to settle their contracts by delivery of potatoes. In practice, only a small proportion of the total contracts outstanding are settled by delivery.

Most are settled by offset rather than delivery. However, the important point is the fact that sellers and buyers have the right to settle by delivery, the end result of which is to link or integrate cash and futures potato prices into the same price structure or market. To say that cash and futures prices are part of the same price structure is but another way of saying that cash and futures prices are determined by a common set of supply and demand conditions.

Cash and Futures Prices in Relation to
Supply and Demand Factors

Cash and potato futures prices are largely determined by the same group of supply and demand factors--this is shown by comparing the frequency, size, and directional consistency of changes in cash and potato futures prices over time. Available information indicates that large changes in cash prices of potatoes at Presque Isle, Maine, are generally associated with similar changes in the prices of potato futures contracts on the New York Mercantile Exchange. The nature of this cash-futures price relationship for 1956-57 is indicated in figure 2.

Figure 2 shows the prices of the near active potato futures and prices for potatoes at Presque Isle, Maine, just before and during the delivery month, for the period 1956-57. The difference in the level of cash and futures prices reflects a transportation differential between Presque Isle and New York of about 83 cents per cwt. ^{35/} In other words, the Presque Isle price plus 83 cents represents the New York equivalent cash price for potatoes. However, the New York cash potato price derived in this manner, except for short intervals, is slightly higher than the potato futures prices on the New York Mercantile Exchange. A price relationship of this character, that is, futures prices at a slight discount relative to cash prices at the contract delivery point, is not uncommon for some of the other commodities traded on futures contracts. Such price differences arise for a number of reasons, the principal ones of which are: (1) Slight differences in the quality or quantity to which cash and futures prices refer, (2) delivery costs that are involved in settling futures contracts by delivery, and (3) the prices of cash and futures may differ because they refer to delivery of commodities at slightly different delivery dates.

The extent of association between the prices of cash and potato futures contracts, and evidence that the two sets of prices are determined by substantially the same supply and demand conditions, is revealed in a simple correlation of changes in cash and potato futures prices over selected periods of time. Accordingly, a simple correlation was made between changes in cash prices of potatoes (various varieties, mostly Katahdin-type U. S. No. 1's, 2 $\frac{1}{4}$ -4 inch) at Presque Isle, Maine, and changes in prices of potato futures contracts for the near active month. The price changes employed were for intervals of 6 and 10 trading days and for the 2 periods, October 2, 1956, through May 22, 1957, and October 4, 1954, through May 20, 1955.

^{35/} This consists of freight rate plus 3 percent transportation tax.

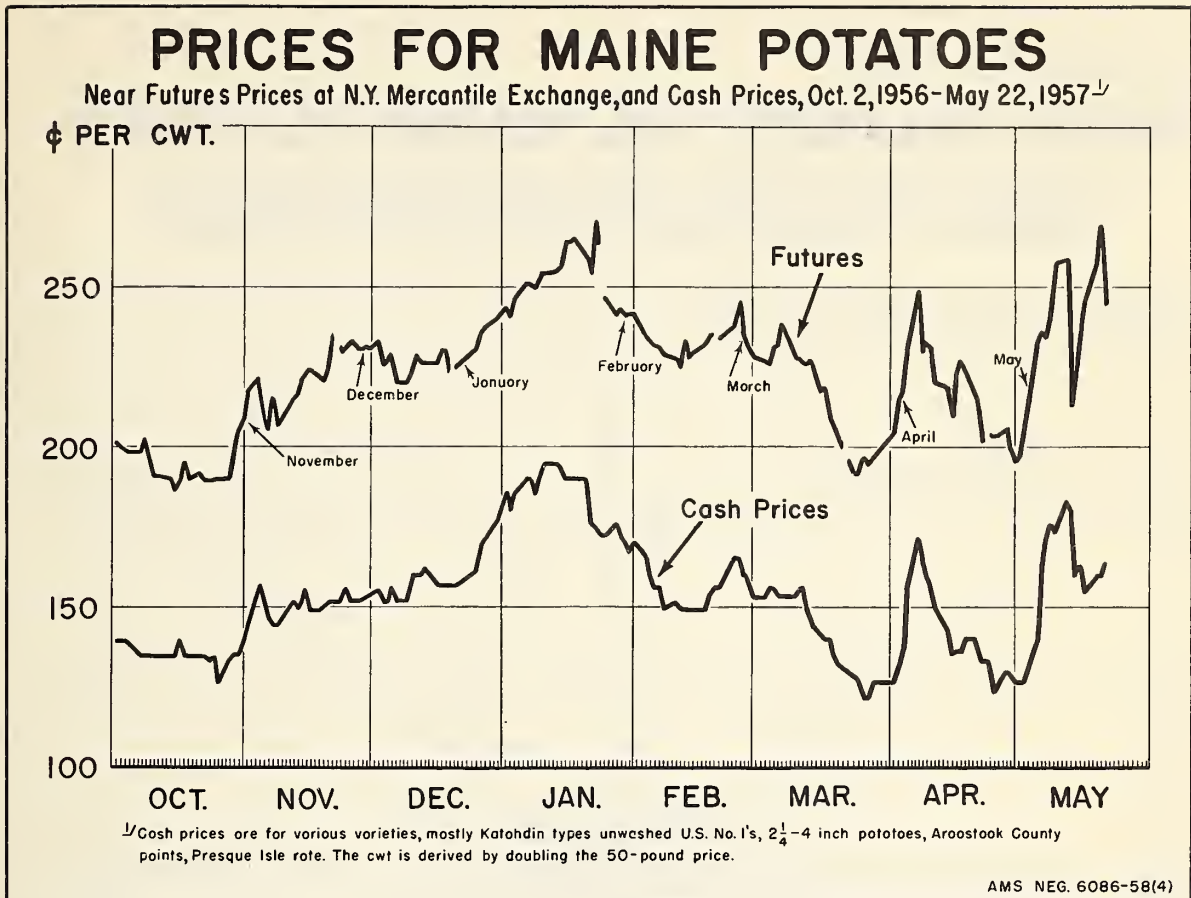


Figure 2

During the period, October 2, 1956 to May 22, 1957, inclusive, changes over 6-trading day periods in cash prices of potatoes at Presque Isle, Maine, when related to similar changes in the price of potato futures for the near active month, resulted in a correlation coefficient of 0.77 (fig. 3). This says, in effect, that about 60 percent of the changes in cash prices are associated with similar changes in futures prices. The equation for the line of regression, $y = -0.815 + 0.846x$, indicates that a change of 1 cent per pound in the price of potato futures is associated, on the average, with 0.846 cents per pound change in the same direction of the cash prices of potatoes at Presque Isle, Maine. ^{36/}

As noted above, a simple correlation was also made of changes in cash prices of potatoes over 10-trading day periods at Presque Isle, Maine, and changes in the price of potato futures on the New York Mercantile Exchange for the near active month. Such analysis for the period, October 2, 1956 through May 22, 1957, resulted in a correlation coefficient of 0.83 (fig. 4). Thus, about 69 percent of the changes in cash potato prices at Presque Isle,

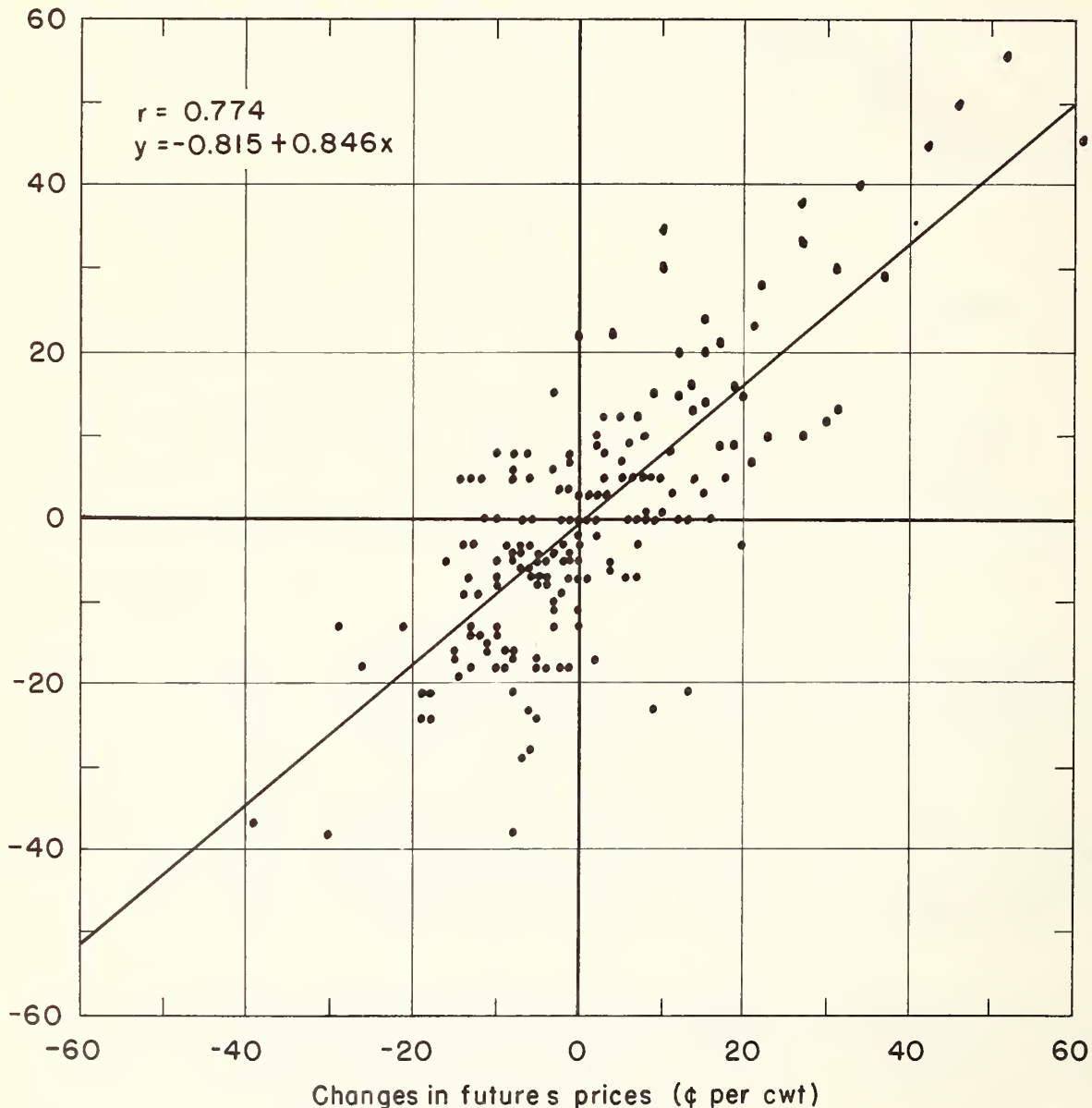
^{36/} Based upon a valid test for significance of the "r" coefficients, it was found that the coefficients obtained differed significantly from zero at the 0.01 probability level.

6-Trading-Day Periods

PRICE CHANGES FOR MAINE POTATOES

Changes in Futures (Closing) Prices for the Near Month, New York Mercantile Exchange, and Cash Prices, Oct. 2, 1956-May 22, 1957^{1/}

Changes in cash prices (¢ per cwt)



^{1/}Prices for various varieties mostly Katahdin type unwashed U.S. No. 1's
2 1/4 - 4 inch potatoes, Aroostook County points, Presque Isle rate.

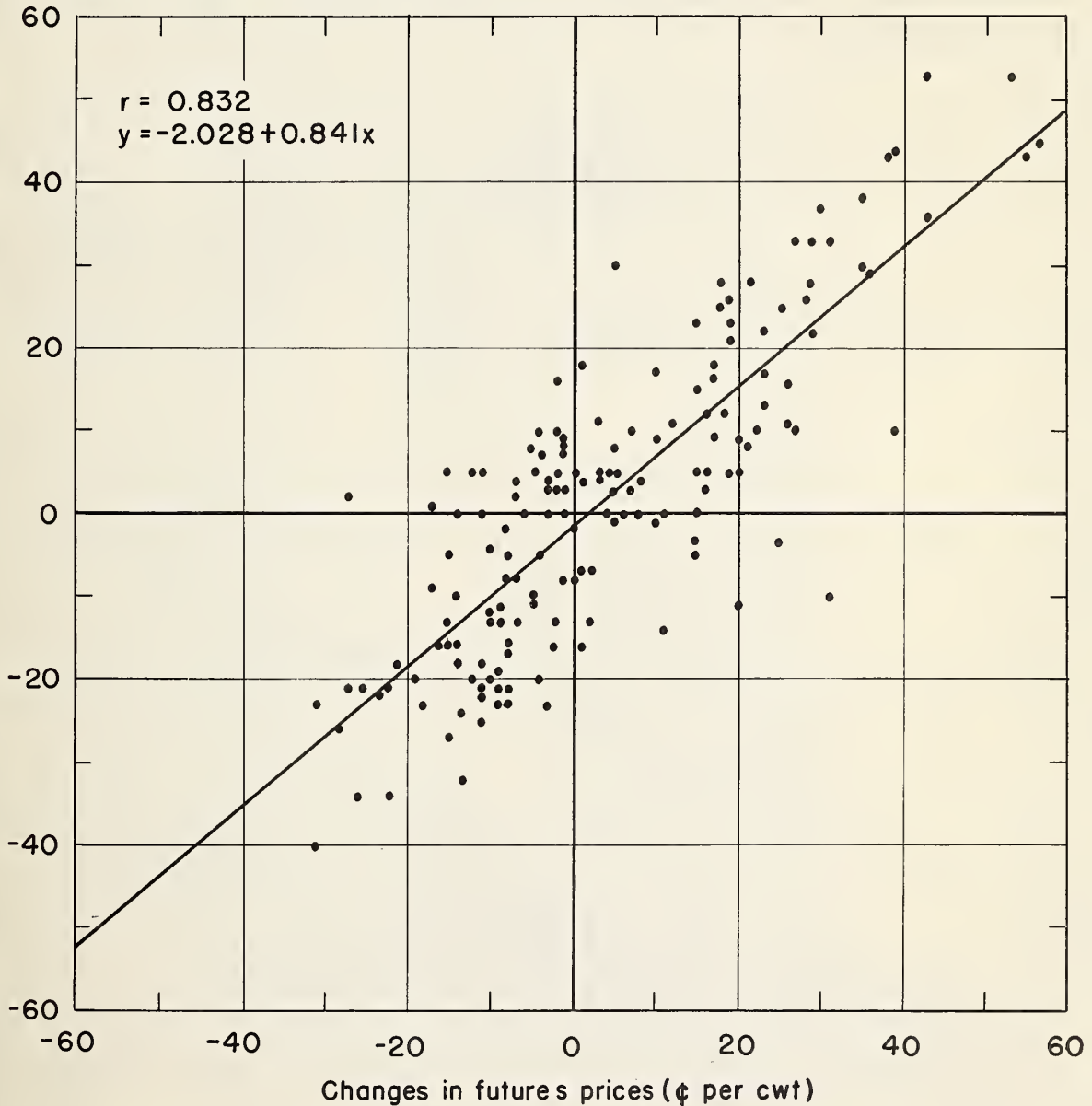
Figure 3

10-Trading-Day Periods

PRICE CHANGES FOR MAINE POTATOES

Changes in Futures (Closing) Prices for the Near Month, New York Mercantile Exchange, and Cash Prices, Oct. 2, 1956-May 22, 1957¹

Changes in cash prices (¢ per cwt)



¹ Prices for various varieties mostly Kotohdin type unwashed U.S. No. 1's
2¹/₄ - 4 inch potatoes, Aroostook County points, Presque Isle rote.

Figure 4

Maine, are associated with similar changes in prices of potato futures contracts on the New York Mercantile Exchange. The regression equation, $y = -2.028 + 0.841x$, indicates the following relationship between cash and potato futures prices: Each change of 1 cent per pound in the price of potato futures contracts is associated with a change in the same direction of 0.841 cents per pound in the cash price of potatoes at Presque Isle, Maine.

In the case of the 1954-55 season, the 6-day trading period price comparisons resulted in a correlation coefficient of 0.806 and a regression equation of $y = -1.229 + 1.243x$. The 10-day trading period for the 1954-55 season resulted in a correlation coefficient of 0.867 and a regression equation of $y = 0.149 + 0.967x$.

The important point emphasized by the above correlation coefficients is the high interrelationship between cash and futures prices. Futures prices tend to respond more quickly to new information on supply and demand conditions than do cash prices. For this reason, comparisons of changes in cash and futures prices for short periods--a day, for example--may not reveal a high degree of association. However, the degree of association between changes in cash and futures prices tends to increase as the period of comparison is lengthened. This explains why the correlation coefficients obtained in price comparisons for periods of 10 trading days were higher than those obtained from periods of 6 trading days.

