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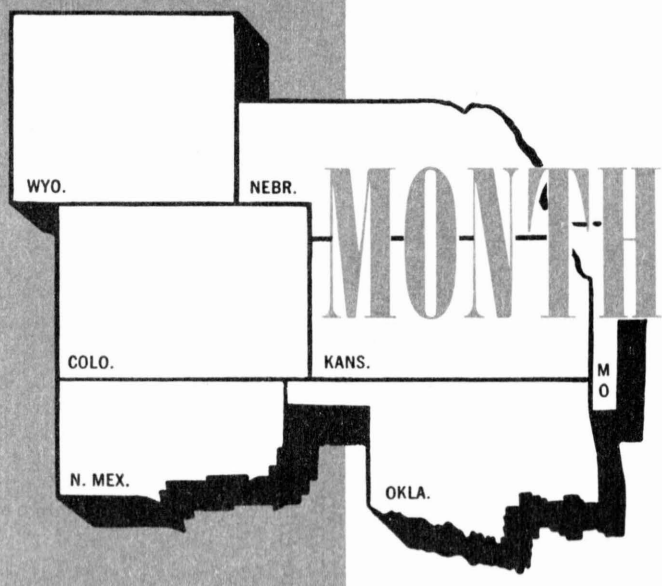

MONTHLY REVIEW

In This Issue

FEDERAL RESERVE BANK
OF KANSAS CITY

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Interpretation of

Size-Cost Relationships in Banking

An article in the last issue of this *Review* dealt with the relationship of size and costs at member banks in the Tenth Federal Reserve District. Based on data covering the period 1956-59 for a sample of about 270 District members, it was shown that ratios of costs to assets were lower for large banks than for small banks, after allowance was made for the influence on costs of various characteristics of the banks, such as the percentage of assets in the form of loans and the relative volume of time deposits. A major share of the cost economies of large-scale operations was traced to the wage and salary component of total expenses.

The February article left unopened several lines of investigation that are pursued in the following pages. An important question has to do with the effects on costs of bank characteristics which were not brought into the discussion. A second question deals with the possible sources of cost advantages at large banks. If cost economies are located mainly in the wage and salary component of total expenses, do they result from lower wage and salary payments per employee or from other sources? By extending the analysis in these directions, the present article seeks to refine further the interpretation of size-cost relationships in banking.

A convenient point of departure for the discussion to follow may be found in a summary of the method of approach used in the previous article and of the results obtained.

A Brief Review

To measure differences in costs among banks that are associated with size, it is necessary to make allowances for variations in costs that are due to other cost-determining influences. The statistical method of multiple regression and correlation analysis is ideally suited to this purpose, because it permits estimates of the separate influence of size and other factors that affect bank costs.

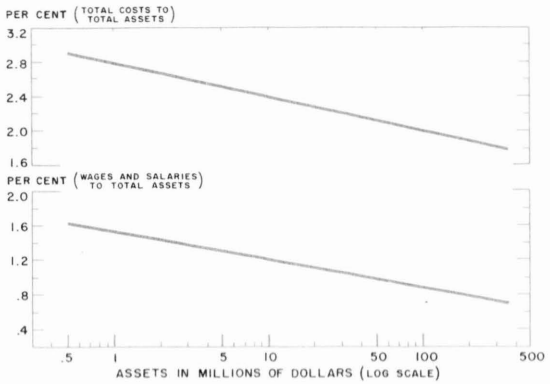
Experimentation indicated that differences in ratios of total costs to total assets among all sample banks over the period 1956-59 could best be accounted for in terms of six characteristics of the banks: bank size, the ratio of time to total deposits, the ratio of total loans to total assets, the ratio of securities other than U. S. Government issues to total assets, the ratio of consumer loans to total loans, and the percentage growth of assets between 1956 and 1959. The average relationship found between total costs (as a per cent of assets) and bank size, after allowing for effects on costs of the other five characteristics, is shown in the top panel of Chart 1. The bottom panel shows the comparable relation between wages and salaries (as a per cent of assets) and size among the sample banks.

The fall in total cost ratios with increasing bank size is associated mainly with economies in wage and salary expenses. The size-cost line in the bottom panel of the chart indicates a decline of .33 percentage points in the ratio of wages and salaries to total assets (in per cent) for each tenfold increase in size of bank. If it were possible to make accurate adjustments for wage and salary payments attributable to trust departments of the banks, the decline would be slightly larger. This is because a somewhat greater proportion of wages and salaries is accounted for by trust activities

Chart 1.

Relationship of Cost Ratios and Bank Size

Sample of Tenth District Member Banks, 1956-59



NOTE: The top panel of the chart is based on the equation: $X_1 = 1.377 - .394 \log X_2 + .0162X_3 + .0221X_4 - .0126X_5 + .0156X_6 + .0078X_7$, where X_1 is the ratio of total costs to total assets, and $X_2 \ldots \ldots X_7$ are the six characteristics of the banks in the order indicated in the text. All ratios are expressed in percentage terms; size is measured by assets in millions. The bottom panel of the chart is based on the equation: $X_1 = 1.108 - .327 \log X_2 + .0087X_4 - .0115X_5 + .0083X_6 + .0030X_7$, where X_1 is the ratio of wages and salaries to total assets, and $X_2 \ldots \ldots X_7$ are defined as above. The variable X_3, representing the ratio of time to total deposits, was omitted in the second equation for lack of statistical significance.

at larger banks in the District.

Trust activities, however, apparently do not account for a substantial share of wage and salary expenses even at the larger District banks. This is suggested by the fact that, on the average, trust departments accounted for less than 4 per cent of total earnings at District members with more than $50 million in assets during the period 1956-59, and for less than 2 per cent of total earnings at sample banks with $25-$50 million in assets. At still smaller banks, the fraction is correspondingly less. Inability to separate wage and salary payments attributable to trust activities from other wage and salary outlays thus does not affect seriously the behavior of costs in relation to bank size among District members.

Wage and Salary Payments per Employee

A question may be raised as to whether the decline in wage and salary ratios with increasing size of bank may reflect differences in average wage and salary payments per employee. This question may seem rather peculiar at first, since average salaries per officer and per nonofficial employee are widely believed to be higher at large banks. It is possible, nevertheless, that average payments per employee – without regard to official status – could be larger at small banks, since they have comparatively higher numbers of officers in relation to nonofficial employees.

The data in Table 1, showing average payments per employee by bank size, were gathered for a smaller sample of the 270 member banks included in the study. Calculations of average payments per employee were based on total annual wage and salary disbursements divided by the number of employees at year end. The figures do not represent average annual wages and salaries of full-time employees, because the number of employees included part-time workers.

Average annual payments per officer and per nonofficial employee are seen to increase sharply with rising bank size, but the ratio of employees to officers is much higher for the larger banks. The result is that average annual payments per person for all employees are virtually the same for all bank size groups. The decline in wage and salary ratios with increasing bank size shown in Chart 1 does not, therefore, simply reflect differing amounts of compensation per employee. Rather, the cost advantages of large banks are reflected in lower total numbers of employees per dollar of assets and a higher proportion of nonofficial

Table 1.

Estimated Average Payments Per Employee, By Bank Size

Sample of Tenth District Member Banks, 1959

Bank Size (Assets in millions of dollars)	Average Annual Payment per Person			Average Ratio of Nonofficial Employees to Officers
	Officers	Other Employees	All Employees	
0-10	$7,740	$2,580	$4,530	1.90
10-25	8,970	3,120	4,540	3.27
25-100	10,440	3,290	4,520	5.00
Over 100	11,690	3,550	4,500	7.76

employees. The number of total employees per $1 million of assets averages out to just over 2 for banks with more than $100 million in assets and to about 3.3 for banks with less than $10 million in assets.

Testing for Other Cost Influences

The next question to investigate is the possibility that the ability of larger banks to operate with smaller numbers of employees per dollar of assets may reflect characteristics of assets and liabilities among the sample banks that have not yet been considered. The fact that differences in costs among all sample banks were related to size and five other characteristics manifestly does not mean that there were no other factors affecting costs of the banks. It only implies that for technical reasons, the ability to identify additional sources of cost variation was limited.[1] Since this is the case, it is possible that by considering additional characteristics of the sample banks, a clue may be found as to the source of cost advantages enjoyed by larger District members.

Among the additional characteristics of assets and liabilities that might help to explain differences in costs among banks are three which merit detailed attention because they are rather closely associated with bank size. (1) Demand deposit liabilities of larger District member banks are comprised rather heavily of interbank balances. Interbank deposit liabilities are uncommon among District banks with less than $25 million in assets, but all larger sample banks have some correspondents among their deposit customers. If high ratios of interbank to total demand deposits tended to be associated with low ratios of costs to assets, this would help to account for the cost advantage enjoyed by larger banks. (2) Due mainly to differential reserve requirements between reserve city and country members, larger District banks hold a greater fraction of their liquid assets (cash and Government securities) in the form of cash. (3) Loan portfolios of larger banks in the District are more heavily weighted with business loans, while the concentration at smaller banks is in the area of nonguaranteed farm credits. This difference in asset structure would help to explain the cost advantages of large banks if business loans generally entailed lower administrative costs than extensions of credit to farmers.

Interbank Deposits

The influence on costs of differing relative amounts of interbank deposits may be ascertained by concentrating attention on cost differences among larger banks in the District. When this is done, the technical problem prohibiting inclusion of this characteristic of deposit structure in the statistical analysis for all sample banks is not encountered. Thus, for District banks with over $25 million in assets, it is possible to obtain a measure of the decline in costs with increasing bank size both before and after allowing for the influence on costs of differing ratios of interbank to total demand deposits.

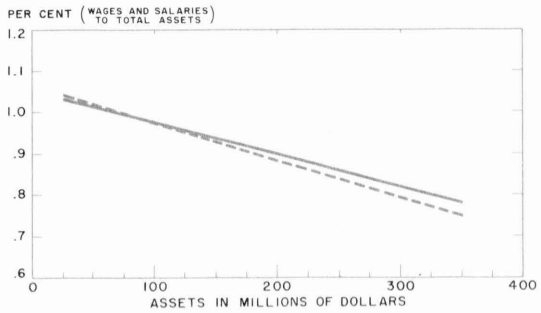
The dotted line in Chart 2 shows the average relationship between bank size and ratios of wages and salaries to total assets *before* removing the cost influence of differing ratios of interbank to total demand deposits among the larger banks. The solid line in Chart 2 shows the average relationship between wage and salary ratios and bank size *after* allowance for the cost effects associated with differing

[1] The inability to identify other cost-determining influences results, to some extent, from the fact that characteristics of the individual banks are intercorrelated. Consequently, only a limited number of independent variables can be included in the regression analysis without encountering problems of intercorrelation. The interpretation of size-cost relationships is affected importantly if a characteristic is omitted because of a strong intercorrelation with bank size. The discussion in this section deals with characteristics omitted from the regression analysis for this reason.

Chart 2.

Relationship of Wage and Salary Ratios and Bank Size

Sample of Larger Tenth District Member Banks, 1956-59



NOTE: The dotted line is based on the equation: $X_1 = .517 - .00090X_2 + .0151X_4 - .0176X_5 + .0038X_6 + .0028X_7$, where X_1 is the ratio of wages and salaries to total assets and X_2, X_4 . . . X_7 are defined as in the note to Chart 1. The solid line is based on the equation: $X_1 = .559 - .00079X_2 + .0157X_4 - .0145X_5 + .0036X_6 + .0023X_7 - .0045X_8$, where X_1 . . . . . X_7 are defined as above and X_8 is the ratio of interbank to total demand deposits in per cent. The multiple correlation coefficient is .77 for the first equation and .79 for the second.

In both equations, the variables X_6 and X_7 are not statistically significant at the 5 per cent level, but are included to maintain parallelism with the equations on which Chart 1 is based. Omitting these two variables would have resulted in a higher absolute value of the regression coefficient of the size variable in both equations, but by less than one standard error.

Size of bank is expressed in absolute terms, rather than in logs as for the equations underlying Chart 1, because there is no clear preference for a logarithmic measure either in terms of goodness or linearity of fit.

relative amounts of interbank demand balances.

Two implications may be drawn from the fact that the solid line is the less steeply sloped. First, high ratios of interbank deposits tend to be associated with low cost ratios, other things being equal, which accounts partly for the cost advantages enjoyed by larger banks in the District. But second, it is also evident that there are other sources of cost advantage accompanying larger size, since the size-cost line still is tilted downward after allowance has been made for the relatively lower costs associated with a high percentage of interbank demand deposits.

Other Characteristics of Asset Structure

The distribution of liquid assets between cash and Government securities, and differences in relative amounts of business and farm loans extended by large and small banks, seem to be much less important sources of cost advantage to larger District members. The influence on costs of these differences in asset structure may be tested by examining banks of approximately similar size, but with markedly different cost ratios, to see if cost differences among them are related to these aspects of loan structure and liquid asset holdings. If these characteristics of assets are not found to be significant in explaining cost differences between banks of similar size, it is unlikely that they are important in explaining differences in costs between banks in different size groups.

To obtain the data for Table 2, the sample banks were divided into five size classes. Within each size class, certain banks were selected because they had unusually high wage and salary expenses in relation to what was expected on the basis of factors identified in the statistical analysis described earlier as being important cost determinants. Other banks were selected because their wage and salary ratios were much lower than expected.[2] Average ratios of business loans to total loans, nonguaranteed farm loans to total loans, and cash to total liquid asset holdings then were computed for each of the separate groups of banks.

The reader should bear in mind, as the data in Table 2 are examined, that the asset ratios for individual banks within any given size class show wide variation. Therefore, it is meaning-

[2] Banks with extreme cost ratios were identified according to the value of the residuals (actual minus expected cost ratios) associated with the regression equation that underlies the bottom panel of Chart 1. The cutoff points used to establish extreme residuals were: (1) banks with $0-$5 million in assets—residuals exceeding 0.30 (in absolute value); (2) banks with $5-$10 million in assets—residuals exceeding 0.20; (3) banks with $10-$25 million in assets—residuals exceeding 0.15; (4) banks with $25-$50 million in assets—residuals exceeding 0.10; (5) banks with over $50 million in assets—residuals exceeding 0.10.

Table 2.

Cost Differences and Structural Characteristics

Sample of Tenth District Member Banks, 1956-59

Bank Size (Assets in millions of dollars)	Characteristics of the Banks—Average ratios of: Cash to Liquid Assets	Business Loans to Total Loans	Nonguaranteed Farm Loans to Total Loans
0-5			
High costs (12 banks)	38.7	9.0	49.5
Low costs (16 banks)	41.2	11.2	41.4
5-10			
High costs (12 banks)	37.2	23.9	25.6
Low costs (8 banks)	36.0	21.7	26.9
10-25			
High costs (9 banks)	40.6	28.0	21.6
Low costs (10 banks)	36.6	27.3	20.8
25-50			
High costs (8 banks)	40.0	38.2	3.7
Low costs (7 banks)	50.5	39.6	12.8
Over 50			
High costs (6 banks)	46.6	45.5	6.0
Low costs (5 banks)	50.8	46.3	3.5

ful to ask whether cost differences between the banks in any size class are related to the characteristics of their assets listed in the table. For example, ratios of business to total loans for high cost banks with assets of $0-$5 million run from zero to 35 per cent. Among low cost banks in that size class, the range is from 3 per cent to 36 per cent. For banks with over $50 million in assets, the range is from 35 per cent to 61 per cent for high cost banks and from 18 per cent to 70 per cent for the low cost group. Averaging these ratios is done to reveal any *systematic* association between the costs of banks in each size group and the character of their assets.

The first column of the table shows ratios of cash to total liquid assets. Average ratios do not differ greatly between high and low cost banks in the $0-$5 million group, and for the $5-$10 million group the difference is also small. More importantly, the high cost banks in the $5-$10 million group hold, on the average, a greater proportion of cash to total liquid assets. Since costs are expected to fall with an increasing proportion of cash assets, the ratio of cash to total liquid assets does not explain cost divergences for banks in this group. Similar reasoning also applies to cost differences of banks in the $10-$25 million class. Only in the two largest size groups, where the low cost banks hold the larger relative amounts of cash, do differences in ratios of cash to liquid assets help to explain cost differences among the banks. The ownership of cash as a liquid asset, therefore, does not appear to be a factor of fundamental importance in explaining why some banks' costs are different from others, and it could not be argued convincingly that the greater relative amount of cash assets held by larger District members accounts for more than a minor share of the cost advantages they enjoy.

Average ratios of business loans and nonguaranteed farm loans to total loans display no systematic association with cost differences among banks. High cost banks in some size classes have the higher average ratio of business to total loans, and in others, the lower ratio. The same is true of farm loan ratios. Thus, while large banks extend a substantially greater proportion of their loans to businesses and a smaller proportion to farmers than do small banks, this difference in the category of borrower is not by itself sufficient to account for the materially lower costs of larger District members.

On the basis of this evidence, it seems reasonable to conclude that the cost advantages enjoyed by larger banks in the District do not stem simply from differences in the division of assets between loans, securities, and cash, from the type of loans made by major class of borrower, or from differences in the class of depositor. Rather, there are other sources more intimately associated with size of bank which must account for the ability of larger banks to operate with lower numbers of total employees per dollar of assets, and with a higher percentage of nonofficial employees.

The Question of Relative Efficiency

It is possible that the cost advantages of larger banks stem mainly from their ability to perform activities of all kinds with greater efficiency. Certainly, a strong logical argument can be made for the view that increased size in banking permits the organization of banking functions along lines that are likely to add significantly to productivity. The greater use of mechanical and electronic equipment to facilitate the vast amount of bank accounting tasks is a case in point, but mechanization in the field of banking, made possible by recent innovations in electronic accounting and computing equipment, has yet to register its full effects at District member banks. How costs of District banks will be influenced by increased employment of such equipment—a development that is under way—remains to be seen.

A more important source of added efficiency in the past probably has been the much higher degree of functional specialization among bank employees made possible by larger-scale operations. No one observing the operations of a relatively large and a relatively small bank could fail to notice the far wider diversity of tasks performed by an officer or employee of the small bank. Indeed, at the very smallest member banks conducting business in the District—banks with assets of less than $1 million and a complement of only two or three total employees—tasks performed by the senior officer may include everything from comparatively routine maintenance of accounts to the highest level management decisions. At the larger banks, the more routine tasks are taken over by persons less broadly skilled in the field of banking—which accounts for the relatively higher percentage of nonofficial employees at larger banks—permitting the official staff to devote its attention increasingly to decision-making functions. It would hardly be surprising to find that the higher degree of specialization among employees at larger banks was reflected in lower bank costs.

Table 3.

Checking Account Activity at Kansas Banks, 1959

Size of Bank (Deposits in millions of dollars)	Average Balance per Account	Average No. of Total Items per Account per Month	Average No. of Total Items per $100 in Deposits per Month
Less than 1	$ 769	18.0	2.39
1-2	866	19.8	2.34
2-3	1,032	25.6	2.64
3-5	1,134	26.3	2.39
5-7½	1,046	28.3	2.63
7½-10	1,204	33.2	2.78
10-20	1,225	33.7	3.02
Over 20	1,917	59.6	2.45

NOTE: Total items include credit items to demand accounts, checks "on us," local clearing items, and out-of-town remittance items.

SOURCE: **1960 Report,** Bank Management Commission of the Kansas Bankers Association.

Average Size of Loans and Investments

There is one important difference, however, in the nature of large and small banks which prohibits ascription of all of the cost advantages of large-scale operations to greater efficiency in the performance of identical tasks. This is the fact that the cost of acquiring earning assets at small and large banks differs fundamentally by reason of disparities in the dollar amounts in which individual earning assets are acquired. This is especially important with regard to loans, since administrative costs per loan decline steeply with increasing size of loan, but it may also be true with respect to purchases of securities. Differences in the average size of certain types of loans—such as business loans—at large and small banks are especially great. In a survey of business loans at District member banks several years ago, banks with less than $10 million in assets reported business loans with an average size of less than $5,000. For banks with more than $100 million in assets, the average size was about $65,000, or more than ten times as large.

A similar principle does not necessarily hold, however, with respect to average size of deposits. For while the average dollar balance

per account increases with bank size, so also does the amount of activity per account. Data published by the Kansas Bank Management Commission show that, for banks in the state, checking account activity—measured in terms of numbers of items processed over a month—per dollar of demand deposits is not materially different for banks with over $20 million in deposits than for banks with less than $1 million in deposits. The relevant data are reproduced in Table 3.

The cost advantages of larger banks in the District, therefore, appear to result both from higher efficiency in the performance of regular banking functions comparable to those performed at small banks and from the acquisition of earning assets in larger dollar amounts. The opportunity to reduce costs in each of these ways is closely tied to size of bank, and the separate influence of each on costs cannot be evaluated from available data.

A finding that large banks are able to operate more efficiently than small banks should not be taken to imply that efforts to minimize costs are pursued less aggressively the smaller is the size of bank. For unless smaller banks were *uniformly* less energetic in their attempts to operate with maximum efficiency, cost ratios at the small banks would not only be higher, on the average, but they also would be expected to display a significantly larger relative variation from bank to bank. Measures of relative cost variation, shown in Table 4, do not reveal any systematic relationship between variations in costs and bank size. Thus, the comparatively greater efficiency of larger District members seems to stem, not from more consistent efforts to hold down costs, but from the opportunities presented by their larger size to organize their activities in ways that contribute to a larger output per employee.

Table 4.

Measures of Relative Cost Variation

Sample of Tenth District Member Banks, 1956-59

Bank Size (Assets in millions of dollars)	Measure of Relative Cost Variation
0-5	15.0
5-10	18.1
10-25	11.4
25-50	15.7
Over 50	18.6

NOTE: The measures of relative cost variation are determined from the residuals (actual minus expected cost ratios) around the regression equation that underlies the bottom panel of Chart 1. Residuals were averaged, without regard to sign, for each bank size group and expressed as a percentage of the regression estimate for the median bank size in each group.

Wheat Utilization—
Trends and Prospects

THE USE OF WHEAT has trended downward since 1945 while production has continued to increase. The cumulative effect of these opposing trends has been a doubling of wheat stocks. Year-end carryovers have increased to the point that they exceeded production for each of the past 2 years and a substantial increase is expected for this year. Most of these stocks are held by the Government and the cost of maintaining them has grown rapidly.

Some stock of wheat is necessary as a reserve in case of crop failures or national emergencies. Prior to the buildup of Government stocks, large quantities were held by farmers, grain traders, millers, and speculators. Year-end carryovers from 1921 to 1937 averaged 186 million bushels, or about one fourth the annual average production. A proportionate reserve in more recent years would have amounted to 250-300 million bushels—about half the average annual domestic requirement. Private grain storers might maintain this amount if the Government ceased storage operations, although its adequacy as a reserve is debatable. The reserve probably should be large enough to cover domestic needs through 1 or 2 years of poor crops. Also, it has been contended that reserves should be sufficient to cover export commitments made under the International Wheat Agreement and Public Law 480. Even under the broader definition, the substantial carryovers of recent years seem to be considerably greater than are needed for reserves.

The wheat surplus has continued to grow despite various efforts to curtail it. This article explores the patterns and trends in wheat utilization and seeks to project them through the coming decade. Such information may be helpful in evaluating the prospects for preventing further growth in the wheat surplus through increasing utilization.

Domestic Utilization

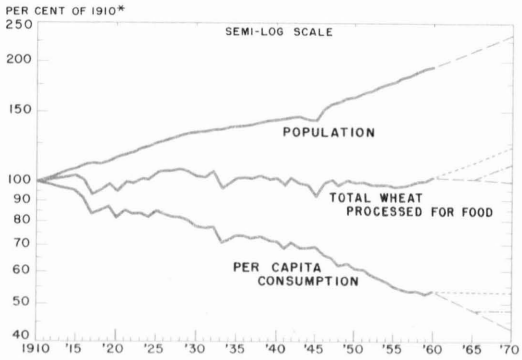
Domestic use of wheat increased fairly steadily from 1910 to 1943, largely because of increased use for feed, then declined to 1957. Since 1957, wheat usage has risen slightly and is currently about 13 per cent above the 1910 level. The primary use for wheat is for human food. Seed and livestock feed have each taken about one tenth of the total used domestically in recent years and an insignificant amount is used for industrial purposes.

HUMAN FOOD. Wheat used for human food has fluctuated around 500 million bushels since 1909. The accompanying chart shows that total use has been very stable, especially since World War II. Consumption per person decreased from 5.3 bushels in 1909 to 2.7 bushels in 1960, a decline of 49 per cent. However, population shifts almost exactly offset the effects of the dietary changes.

Wheat consumption appears to be related to standards of living. In comparing countries with different living standards, it has been observed that cereal consumption tends to increase with income in nations with low living standards. Also, there is a tendency to substitute wheat for other cereals in these countries as income rises. At some point, however, the use of wheat reaches a maxi-

Trends in Population and Wheat Processed For Food

Continental United States



* In 1910, population was 92.4 million, total wheat processed for food was 482 million bushels, and per capita consumption was 5.2 bushels.

NOTES: On a semi-logarithmic chart, equal slopes indicate equal rates of change.
Projections of percentage measures of wheat processed and consumed from 1960 to 1970 are indicated at high, low, and median levels.

SOURCE: U. S. Departments of Agriculture and Commerce.

mum and further increases in income are accompanied by shifts to noncereals, particularly livestock products. People demand a more varied diet as their incomes increase. The United States and other relatively affluent countries where wheat is the preferred cereal have experienced declines in per capita wheat consumption as their people became relatively more wealthy.

The lowest point that wheat consumption may reach is problematical. The Food Research Institute of Stanford University has estimated that wheat consumption might drop as low as 2 bushels per person—not a great deal below current U. S. consumption levels. With present incomes, the Nation's consumers tend to buy the foods they prefer. To the extent that wheat products are consumed through preference, per capita consumption probably can be maintained.

Efforts to increase domestic food consumption of wheat are being made by various private and public agencies. Research work is being carried out in the development and marketing of new products. For example, the U. S. Department of Agriculture is testing the distribution of frozen bread. Efforts also are being made through advertising to stimulate the use of wheat as food. While it is possible that these efforts may stem or even reverse the declining trend in per capita consumption, there is no clear evidence yet that they can do so.

In projecting per capita wheat consumption for the next decade, it seems difficult to justify an estimate higher than the current rate or lower than would be obtained by extending the trend line of the last half century. If these assumed extremes are used, the high estimate for 1970 would be about 2¾ bushels and the low estimate about 2¼ bushels. Alternatively, assuming a slight further decline and a leveling off about 1965, an intermediate estimate of about 2½ bushels would be reasonable. One of the recent population projections of the Bureau of the Census, assuming that the birth rate will remain constant at the 1955-57 level throughout the projection period, yields an estimate of 213.8 million people in 1970. Applying this population estimate to the per capita consumption estimates indicates that wheat processed for food in 1970 would amount to a high of 590 million, a low of 480 million, and a median of 535 million bushels.

OTHER DOMESTIC USES. A large quantity of wheat is used for feed, seed, industrial purposes, and shipment to U. S. territories, Alaska and Hawaii. Feed use has fluctuated considerably during the past 30 years. It reached a high of 511 million bushels in 1943, declined to 39 million bushels in 1957, and has risen slightly since that time. It seems to have stabilized around 50 million bushels in the past 3 years. Feed use seems unlikely to increase much unless price supports are altered to make wheat more competitive with other feed gains. Alternatively, the use of wheat as feed probably will not decrease much because

wheat is favored for poultry feed and there is usually a substantial quantity which is unfit for human consumption. Feed use in 1970 probably will be between 20 and 60 million bushels, with 40 million bushels appearing to be the most likely sum.

The amount of wheat used for seed has declined in recent years. Seeding rates have dropped but, more important, acreage seeded has declined. Yields per planted acre have increased significantly and probably will continue to increase as cultural practices and varieties are improved. Assuming a seeding rate of about 1 bushel per acre, a yield of 25 bushels per planted acre, and production equal to utilization, the total utilization projections summarized later in this article would require a maximum of 60 million, a low of 40 million, and a median of 50 million bushels of wheat for seed in 1970.

The remaining uses for wheat are minor. Industrial use has not exceeded 1 million bushels in any year since 1945 and there is little reason to expect any increase. Shipments to Alaska, Hawaii, and the various territories—which have averaged about 4 million bushels annually for the past 20 years—probably will change little in the foreseeable future.

Exports

Wheat is the world's leading food grain and is produced and consumed in nearly every country. Total production was 8.1 billion bushels in 1959, and it is estimated to have been 8.4 billion bushels for the 1960 crop. The Soviet Union and the United States are the largest producers—together accounting for more than a third of total world production. Furthermore, world wheat stocks are comparatively large. The four principal exporting countries—the United States, Canada, Argentina, and Australia — had 2.9 billion bushels available for export and carryover on October 1, 1960. This was about three times as much as they exported in the 1959 marketing year. France, also, usually exports significant amounts and the Soviet Union has become a major exporter in recent years. International trade in wheat, exclusive of trade within the Communist bloc, was 1.3 billion bushels in the 1959-60 fiscal year.

The United States is the leading exporter of wheat, accounting for about 38 per cent of the world wheat trade during the past decade. Many problems are involved in expanding wheat exports. The United States has been the only major exporter with private wheat trade in recent years, although Argentina began transferring its wheat trade to private hands in 1960. Most exporting countries and many importing countries have state trading monopolies. Price supports on wheat are common throughout the world. Import quotas and duties also are used frequently to protect local products from international competition. These circumstances have made it difficult for U. S. exporters to compete in world trade without subsidies.

COMMERCIAL EXPORTS. Shipments made through regular trade channels which involve foreign exchange credit are termed commercial exports. Substantially all commercial exports are made for dollars. Table 1 shows that sales for dollars have been overshadowed by noncommercial sales in recent years. Among the major difficulties involved in increasing commercial exports are lack of foreign exchange in many food deficit countries, large supplies of wheat in other exporting countries, and trade restrictions in some importing countries. The United States alone can do little to overcome most of these difficulties. Participation in the International Wheat Agreement represents a major effort to solve some of the commercial export problems.

THE INTERNATIONAL WHEAT AGREEMENT. The world wheat market has long been af-

Table 1.

Commercial and Government Wheat Exports — United States, 1948-59*

Bushels in Thousands

Item	Year beginning July 1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959†
Total exports:	502,559	298,470	365,573	474,715	317,190	216,512	273,634	345,564	548,558	401,762	442,106	506,644
Government programs:												
Quantity	376,011	256,790	172,968	159,341	29,605	100,544	158,025	240,700	375,000	245,430	302,116	372,970
Per cent of total	75	86	47	34	9	46	58	70	68	61	68	74
For dollars:												
Quantity	126,548	41,680	192,605	315,374	287,585	115,968	115,609	104,864	173,558	156,332	139,990	133,674
Per cent of total	25	14	53	66	91	54	42	30	32	39	32	26
Government exports by programs:												
P. L. 480												
Title I	.....	.....	.....	.....	.....	.....	23,802	94,300	200,500	178,035	230,820	301,214
Title II	.....	.....	.....	.....	.....	.....	15,991	11,900	12,200	14,290	10,861	10,677
Title III:												
Barter	.....	.....	2,619	16,924	3,938	9,964	46,458	66,700	86,900	9,501	20,154	23,745
Donations	.....	.....	.....	.....	.....	.....	.....	2,788	11,735	17,993	20,219	24,349
Marshall Plan	208,503	137,945	138,856	137,163	22,965	89,063	70,811	65,000	63,600	25,611	20,062	12,985
Army Civilian Supply	167,508	118,845	31,493	5,254	2,702	1,517	963	.....	.....	.....	.....	.....
Total	376,011	256,790	172,968	159,341	29,605	100,544	158,025	240,700	375,000	245,430	302,116	372,970

* Includes flour as wheat equivalent.
† Preliminary.
SOURCE: U. S. Department of Agriculture.

flicted by periodic gluts and deficits, accompanied by sharp price fluctuations. Efforts to establish an International Wheat Agreement date back to 1932. However, the first operational Agreement did not become effective until 1949. The initial Agreement was for a 4-year period, and it has since been extended three times for 3-year periods. The objectives of the Agreement are to assure markets for exporting countries and supplies for importing countries at stable and mutually agreeable prices. The Agreement stipulates basic minimum and maximum prices in terms of Canadian wheat in storage at a specified point.

The initial Agreement provided fixed quotas for the participating countries. However, the importing countries were bound only at the minimum price and the exporters only at the maximum price. The most recent Agreement specifies that each importing member country is to purchase from the exporting members a minimum percentage of its annual commercial imports of wheat and flour. These percentages vary from 30 to 100 per cent, the weighted average being about 70 per cent. Within the stipulated price range—the minimum up to the maximum — the importing members are committed to purchase their specified percentages from the exporting members. The exporting members are committed to sell as much as the importing members want to buy when the world price is within the Agreement range.

The 1949 Agreement was ratified by four exporting countries and 40 importing countries. The 1959 Agreement was signed by nine exporting countries and 30 importing countries. The Agreement covered about 60 per cent of the wheat and flour moving in world trade from 1949 to 1952—ranging from 525 to 581 million bushels. The quota dropped sharply to 389 million bushels in 1953 when the United Kingdom declined to join the renewed pact. The 1956 renewal provided for a total quota of only 295 million bushels.

The 1959 Agreement, which does not specify a given quantity, would result in the trading of about 470 million bushels on the basis of 1954 to 1957 trade figures.

EXPORT SUBSIDIES. Since the United States' support prices are above world market prices, American wheat can be moved into commercial export channels only by subsidy. The U.S. obligation under the International Wheat Agreement requires a substantial subsidy. In recent years, all commercial exports have been subsidized. Export subsidies averaged 62 cents a bushel during the period 1949 to 1956. More recently, a payment-in-kind program has been instituted. Under this program, export subsidies are paid in wheat from Government stocks rather than in cash. This program has the dual objective of encouraging commercial exports and reducing Government stocks.

PROSPECTS FOR COMMERCIAL EXPORTS. Commercial exports depend heavily upon Government policy. It seems appropriate to assume continued participation in the International Wheat Agreement and continued export subsidies so long as domestic prices are supported above world levels. However, it is also appropriate to assume that the United States will not risk serious international friction by expanding commercial sales aggressively either through higher subsidies or domestic support policies which might result in "dumping" operations. Presumably, the interests of other wheat exporting countries will be respected in future export policies.

Most commercial sales in recent years have been quota sales under the International Wheat Agreement. Table 1 shows that sales for dollars have varied between 42 million and 315 million bushels since 1948. A USDA projection in 1958 predicted commercial wheat exports of 200-300 million bushels for 1960 and about the same for 1975. However, in 1959, a new projection indicated exports of 150 million bushels for 1970. Dollar sales have averaged about 140 million bushels during the past 5 years. Under the assumptions stated above, commercial sales in 1970 seem likely to fall within a range of 100 million to 200 million bushels, with a median of 150 million bushels.

NONCOMMERCIAL EXPORTS. Shipments under Government programs that do not involve foreign exchange credit or dollar claims are termed noncommercial exports. These transactions include sales for local currencies, barter, donations to foreign governments, and gifts to individuals through private relief organizations. Large quantities of wheat were exported under the U. S. Army's civilian supply program, which provided for wheat and other foods to be given to people in occupied countries during and following World War II. After the war, several relief and rehabilitation programs were instituted, and sizable quantities of U. S. wheat were distributed through UNRRA and various private relief agencies. A billion bushels of wheat have been exported under the massive Marshall Plan and related aid programs. An even larger program has been developed under the Agricultural Trade Development and Assistance Act of 1954—Public Law 480.

PUBLIC LAW 480. This Act provides for a multiple-purpose program involving the disposal of surplus agricultural commodities and foreign aid for relief and economic development in underdeveloped countries. A recent amendment to the Act provides for long-range contracts with recipient countries so that they may integrate food shipments with their economic development plans. Public Law 480 has become a long-range program and it might be continued for other reasons even if it were no longer needed for surplus disposal.

Public Law 480 provides for several methods of distributing surplus commodities. The largest volume moves under Title I which authorizes sales for local currencies. Title II provides for donations to foreign governments to meet emergency relief needs. Title III provides for the bartering of surplus commodities for strategic and other materials produced abroad and also for donations through private charitable agencies such as CARE, UNICEF, and church organizations. The relative volumes of wheat moving under each of these programs are shown in Table 1.

A portion of the proceeds from Title I sales is earmarked for market development. The Foreign Agricultural Service, in cooperation with various American farm organizations, has undertaken several projects to expand the demand for American agricultural products abroad. These include trade fairs, demonstrations, technical aid to trade groups such as millers and bakers, consumer education, and other similar efforts.

A substantial portion of the proceeds from sales for local currencies is loaned to the recipient countries for economic development purposes. The process of capital formation in underdeveloped economies tends to exert strong pressures on food prices. Development projects increase local purchasing power and may at the same time reduce agricultural production by shifting labor out of agriculture. Food supplied under this program simultaneously reduces local inflationary pressures and helps finance economic development projects. Thus, by helping underdeveloped countries to build industries which will strengthen their trade positions, the program may help build permanent markets for American farm products.

PROSPECTS FOR NONCOMMERCIAL EXPORTS. Noncommercial exports depend upon Government policy even more than do commercial exports. It seems likely that Public Law 480 or some similar program will continue in the foreseeable future. Even if the United States manages to curtail its agricultural production, the exigencies of the "cold war" and the needs of the underdeveloped countries may prolong the noncommercial exportation of food and fiber indefinitely. The demand for expansion of economic aid to low-income countries is likely to remain strong. It may be simpler to finance such a program with surplus commodities than with international credit, particularly during periods in which balance of payments problems prevail.

Noncommercial wheat exports declined from 376 million bushels in 1948 to 29 million bushels in 1952, but returned to the 1948 level in 1956 and again in 1959. They have averaged about 300 million bushels for the last 5 years and there are some indications of further increase. A recent Title I agreement with India calls for shipment of 587 million bushels of wheat over the next 4 years. Additional long-term agreements with other countries are expected to follow. The Foreign Agricultural Service recently estimated that the underdeveloped countries will need to import 150 million bushels more wheat in 1970 than the 300 million bushels they have been importing in recent years. However, it seems likely that some of this will be supplied by other countries, especially by the Soviet Union. Also, the foreign exchange positions of the underdeveloped countries may improve to the point that these countries can increase their commercial imports. If present Government policies continue, noncommercial exports seem likely to fall within a range of 300 to 450 million bushels annually for the foreseeable future, with a most likely estimate for 1970 of 375 million bushels.

Summary of Projections

The projections for wheat utilization in 1970 are summarized in Table 2. The median estimates indicate slight increases in domestic use

Table 2.

Projected Wheat Utilization for 1970

Million Bushels

	High	Low	Median
Domestic Utilization:			
Human food	590	480	535
Livestock feed	60	20	40
Seed	60	40	50
Industrial use	1	1	1
Shipments to territories	4	4	4
Total Domestic	715	545	630
Exports:			
Commercial	200	100	150
Noncommercial	450	300	375
Total Exports	650	400	525
Total Utilization	1,365	945	1,155

and in exports as compared with recent years. The range in estimates of total utilization from 945 million to 1,365 million bushels appears quite large. However, it is easy to conceive of changes in the international situation or Government policy which would result in figures either above or below these limits. On the other hand, a radical change in one factor may be offset by an opposite change in another. Offsetting changes seem to be more likely than additive changes in the same direction because the size of many of these figures is determined largely by Government policy. Thus, a substantial increase in domestic use or commercial exports might be accompanied by a reduction in noncommercial exports.

Wheat carryover stocks could continue to increase if present conditions were extended. The national wheat allotment cannot be set lower than 55 million acres under the present law. This acreage could produce 1,375 million bushels if the yield averaged 25 bushels per acre as previously assumed. Taking the projected wheat utilization levels in comparison, carryover stocks would remain high at best and increase rapidly at worst. If the median utilization estimate and the 25-bushel yield occurred, only 46.2 million acres of wheat would be needed to balance production and utilization.

BANKING IN THE TENTH DISTRICT

District and States	Loans				Deposits			
	Reserve City Member Banks		Country Member Banks		Reserve City Member Banks		Country Member Banks	
	January 1961 Percentage Change From							
	Dec. 1960	Jan. 1960	Dec. 1960	Jan. 1960	Dec. 1960	Jan. 1960	Dec. 1960	Jan. 1960
Tenth F. R. Dist.	−4	+5	†	+16	−1	+7	+1	+7
Colorado	−3	−1	†	+13	−3	+5	†	+6
Kansas	−3	+3	+2	+25	+1	+5	+1	+10
Missouri*	−5	+10	†	+8	−2	+9	+2	+5
Nebraska	−2	+3	+3	+19	−2	+3	+2	+5
New Mexico*	**	**	−3	+5	**	**	†	+4
Oklahoma*	−4	+8	−4	+16	+3	+11	†	+8
Wyoming	**	**	+1	+9	**	**	−1	+5

*Tenth District portion only. **No reserve cities in this state.
†Less than 0.5 per cent.

PRICE INDEXES, UNITED STATES

Index		Jan. 1961	Dec. 1960	Jan. 1960
Consumer Price Index	(1947-49=100)	127.4	127.5	125.4
Wholesale Price Index	(1947-49=100)	119.8	119.5	119.3
Prices Rec'd by Farmers	(1910-14=100)	241	242	232 r
Prices Paid by Farmers	(1910-14=100)	301	298	299

r Revised.

TENTH DISTRICT BUSINESS INDICATORS

District and Principal Metropolitan Areas	Value of Check Payments	Value of Department Store Sales
	Percentage change—1961 from 1960	
	Jan.	Jan.
Tenth F. R. Dist.	+12	+4 p
Denver	+16	+7 p
Wichita	+4	−9 p
Kansas City	+12	0 p
Omaha	+12	+34
Oklahoma City	+13	−4 p
Tulsa	+10	−3

p Preliminary.