

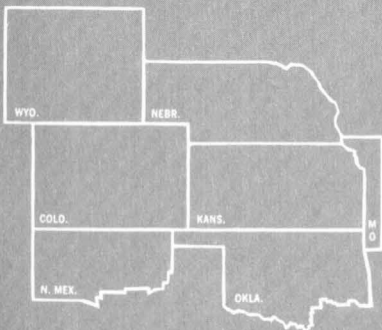


# *monthly review*

APRIL 1970

An Alternative Approach  
To Liquidity: Part III . . . . . page 3

Cattle Feeding in the Tenth District:  
Development and Expansion . page 13



FEDERAL RESERVE BANK OF KANSAS CITY

*Subscriptions to the MONTHLY REVIEW are available to the public without charge. Additional copies of any issue may be obtained from the Research Department, Federal Reserve Bank of Kansas City, Kansas City, Missouri 64198. Permission is granted to reproduce any material in this publication.*

# An Alternative Approach To Liquidity

By Robert E. Knight

Prevailing theory throughout most of the postwar period has stressed that commercial banks should maintain adequate liquidity primarily by holding short-term securities which can be sold readily with little loss of principal. Part I of this article, which appeared in the December 1969 *Monthly Review*, examined the postwar decline in bank liquidity as implied by standard indicators, and then turned to an analysis of the techniques of liability management which larger banks have utilized in recent years to augment their liquidity positions. First to be considered was the market for negotiable certificates of deposit.

From a very small base in 1961, large denomination CD's grew rapidly to become the second most important money market instrument by volume. Major banks soon learned that the supply of funds offered for CD's was very sensitive to changes in offering rates and that their ability to influence flows of time deposits could constitute an important source of liquidity. If additional funds were required to make loans or to meet deposit withdrawals, the rate on CD's could be raised; if fund inflows exceeded the bank's needs, the rate could be lowered.

The ability of banks to acquire funds by issuing CD's, however, is limited by Federal Reserve Regulation Q ceilings. When money market interest rates exceed the maximum rates payable, banks have difficulty attracting

CD's and have generally experienced a runoff. During such periods, purchasers withdraw money to invest in higher yielding securities. Partly because the CD market cannot serve as a source of liquidity at all times and partly because rising interest rates have prompted banks to economize on their holdings of excess reserves, banks have developed alternative sources of liquidity.

The second article in this series, which appeared in the February 1970 *Monthly Review*, considered bank borrowings of Eurodollars. During 1969, Eurodollar borrowings constituted the most important nondeposit source of funds to banks. Although transfers of funds to Eurodollar deposits and borrowings of Eurodollars by U. S. banks have little effect on the reserve base of the U. S. banking system, the ability of banks to convert deposits into borrowings tended originally to reduce required reserves, making possible an expansion of bank credit. Money market banks were also able to use Eurodollar sources to meet a significant share of their CD losses. However, during the fall of 1969, the Board of Governors became convinced that large banks were using the Eurodollar market to deflect the impact of restrictive monetary policies to other banks. Marginal reserve requirements on Eurodollar borrowings were imposed. By requiring banks to hold a 10 per cent reserve against additional borrowings, the Board increased the cost of Eurodollar funds to banks, but did not prevent

banks from seeking liquidity from this source. The effects of the marginal reserve requirements on monetary and credit expansion, however, depend on the deposit shifts which occur. If banks increase borrowings from Eurobanks which hold reserves as demand deposits in U.S. commercial banks, an expansionary influence on bank credit would occur but the money supply would be reduced. Alternatively, if the Eurodollar borrowings are made possible by a transfer of funds from a U. S. bank time deposit to a deposit in a Eurobank, the effect on both bank credit and the money supply would be contractionary.

In this article, several additional nondeposit sources of funds are considered. These include short-term promissory notes, Federal funds, and issues of commercial paper.

#### SHORT-TERM PROMISSORY NOTES

The fear that money market rates might someday rise above the maximum rates payable on certificates of deposit, cutting off this source, prompted banks to search for alternative means to acquire loanable funds. Early in September 1964, First National Bank of Boston announced that it would seek operating funds by issuing short-term promissory notes. These unsecured notes were negotiable and were offered in maturities to suit large investors. Several other large banks shortly followed suit, and First Boston Corporation agreed to make a secondary market in the notes.

The promissory notes were designed to appeal to investors who might normally acquire large CD's. Both negotiable and nonnegotiable notes were sold directly to corporations, state and local governments, and wealthy individuals in denominations of \$1 million or more. Although the range of maturities varied from 30 days to three years, the negotiable notes typically matured within one year while nonnegotiable notes matured in 60 days or less. No specific assets were pledged as collateral for this type of borrowing, but the notes were usually backed

by the general assets of the bank. Banks were able to issue notes at rates equal to or below those on CD's of comparable maturities.

For purchasers, the promissory notes were quite similar to CD's; but for issuing banks, they possessed several distinct advantages. Since the Board of Governors of the Federal Reserve System had ruled for the time being that notes would not be considered as deposits, banks were not required to hold reserves or to pay FDIC insurance fees on issues. In 1965, this savings was equal to approximately 19 or 20 basis points. Considerably more important, however, was the fact that notes were not subject to Regulation Q ceilings prescribing the maximum rates payable on deposits. This feature meant that if money market interest rates ever rose above the ceilings, making the sale of CD's impossible, banks could substitute promissory notes to avert a runoff of funds. As a result, notes tended to represent a much more reliable source of funds than the CD market.

Relatively few banks issued promissory notes and the total amount outstanding remained comparatively small. Accurate figures are not available, but estimates place the volume outstanding in late 1965 at about \$500 million. A number of factors were responsible for the limited growth of this new money market instrument. First, from 1964 through the first half of 1966, money market interest rates never rose significantly above Regulation Q ceilings so banks were always able to issue CD's. The need for substituting notes never became urgent. Second, New York State banking laws had been interpreted to mean that banks were prohibited from issuing the promissory notes.<sup>1</sup> The inability of several of the larger money market banks to issue marketable notes undoubtedly slowed the development of an active secondary market. Finally, Federal Re-

---

1/ Ultimately the New York State Banking Department permitted the issuance of nonnegotiable notes in denominations of \$1 million or greater.

serve officials indicated that they did not feel it was appropriate for banks to circumvent deposit regulations in this fashion. The future status of notes consequently remained uncertain.

During mid-1966, the Board of Governors permitted a runoff of CD's to occur by allowing money market interest rates to rise above the maximum rates payable on certificates. To prevent banks from substituting promissory notes for CD's on a large scale, Regulations D and Q were immediately amended to make short-term notes subject to reserve requirements and the interest rate restrictions on deposits. These actions made short-term notes a source of funds which was no more reliable than the CD market in times of monetary stringency and largely removed the incentive for banks to issue notes. Although short-term promissory note issues by banks never became very significant, they represent one of the earlier attempts to acquire liquidity by purchasing funds.

In adopting the amendments to Regulations D and Q, the Board specifically exempted from the definition of deposits all funds obtained by banks through the issuance of notes if the notes had an original maturity of more than two years and were expressly subordinated to the claims of depositors. Several banks have utilized this loophole recently to acquire loanable funds. Negotiable capital notes in denominations as small as \$100 and with maturities of slightly more than two years have been issued. These capital notes possess all of the advantages which banks expected to realize by issuing short-term promissory notes. While the amount of funds which banks have acquired this way does not presently appear to be large, the Board of Governors has recently proposed to limit the ability of banks to acquire funds by this method.<sup>2</sup>

### FEDERAL FUNDS

In recent years, the Federal funds market has become both a short-run and a cyclical source of liquidity for banks. Federal funds are commonly used to refer to reserve balances

at the Federal Reserve which have been borrowed or lent for short periods; but technically, any immediately available funds which have been lent for one business day could be classified as Federal funds. The most important segment of this market allows banks with excess reserves — reserves above the minimum required by law — to lend them temporarily to banks experiencing reserve deficiencies. In the simplest case, the transaction may be effected by having the selling bank telephone the transit department of its Federal Reserve Bank to request that a given amount of reserve funds be transferred from its balance to the reserve account of the purchasing bank. The transfer will occur immediately. On the following day, the entries will be reversed by the borrowing bank. Payment of interest is generally handled separately by issuing a cashier's check payable to the lending bank. Federal funds transactions may be arranged directly by the purchasing and selling banks, but in recent years intermediaries have become increasingly important. In addition to several funds brokers in New York City, large correspondent banks often bring buyers and sellers together. Loans typically are for overnight, but they are frequently renewed. Most transactions are unsecured.

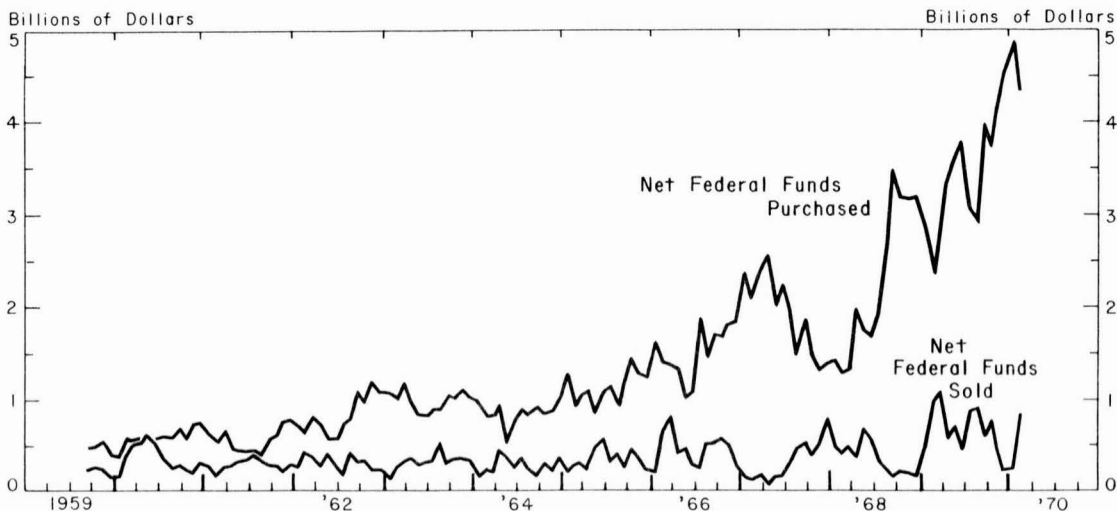
Another important segment of the market is the lending of funds to Government securities dealers. A common arrangement is for dealers requiring short-term financing to sell securities to a bank with an agreement to repurchase

---

2/ The Board of Governors has been concerned that the issuance of these subordinated obligations by banks to acquire deposit type funds may impair the effective application of Regulations D and Q. On March 2, 1970, therefore, the Board released proposed amendments to both regulations designed to distinguish between deposit type funds and true capital funds. Under the proposal, a capital note or debenture issued after March 9, 1970, would be exempt from reserve requirements and interest rate ceilings only if it (1) has an original maturity of more than five years; (2) is expressly subordinated to the claims of depositors and is unsecured; (3) expressly states that it will not be eligible as collateral for a loan by the issuing bank; and (4) is issued in denominations not less than \$20,000.

Although the Board's proposal specifically lists several possible exceptions to the proposed regulations, the general effect of adoption would be to prevent banks from escaping interest rate ceilings on deposits by issuing small denomination capital notes with maturities of just over two years.

**Chart 1**  
**NET INTERBANK PURCHASES AND SALES OF FEDERAL FUNDS**



NOTE: Data are based on purchases and sales of 46 large banks.  
 SOURCE: Federal Reserve System.

them at a predetermined price on the following day or at the maturity of the contract. The bank purchasing the securities may transfer its excess reserves to the reserve account of the dealer's bank, which in turn will credit the dealer's account. On the following day when the dealer repurchases the securities, the transaction will be reversed. The volume of Federal funds lent Government securities dealers by banks is considerably less than the amount traded between banks, but the amount at times has approached \$2.5 billion.

The Federal funds market began to develop during the 1920's, but it largely withered during the 1930's and 1940's when banks held large amounts of excess reserves and interest rates were low. Since 1950, trading has again become quite active, although comparatively few banks have been frequent participants. Estimates suggest that about 35 per cent of all Federal funds transactions are accounted for by 46 large money market banks. While a substantial and fluctuating number of banks may enter the market to sell, the group of banks which accounts for the

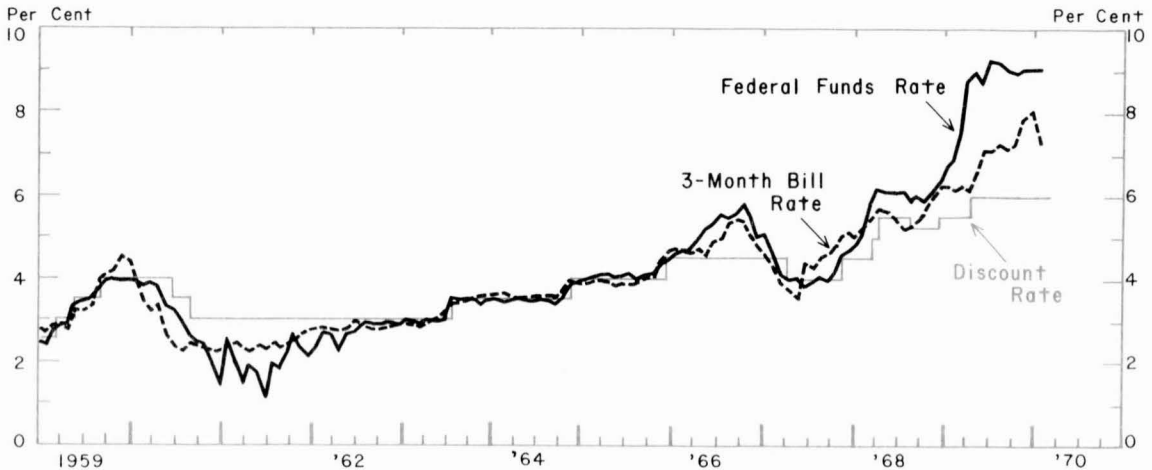
largest volume of purchases is relatively small and stable.

In 1950, the daily volume of Federal funds purchases averaged between \$190 and \$250 million; in 1953, between \$350 and \$425 million; and in 1957, between \$620 and \$680 million. Subsequent growth in Federal funds transactions from late 1959 to the present can be seen in Chart 1.<sup>3</sup> The average daily net purchases of Federal funds by the 46 large banks included in the series rose gradually from about \$500 million in late 1959 to well over \$1 billion by late 1965. The volume of net purchases rose sharply with the monetary stringency

3/ The actual growth in net Federal funds transactions may be considerably understated by the chart. During the early 1960's, estimates suggested that total purchases of Federal funds by the 46 reporting banks included in the series accounted for approximately four-fifths of gross purchases of Federal funds. More recent estimates place the proportion of total purchases by these banks between 30 and 40 per cent. If the ratio of net to gross purchases had remained the same over this period, the growth in net transactions would be understated by fully 50 per cent. However, as more banks have become intermediaries, the ratio of net to gross transactions has undoubtedly fallen but by an undetermined amount.



**Chart 2**  
**SELECTED MONEY MARKET INTEREST RATES**



NOTE: Federal funds and Treasury bill rates are averages of daily and weekly figures, respectively. The discount rate is for the Federal Reserve Bank of New York.  
 SOURCE: Federal Reserve System.

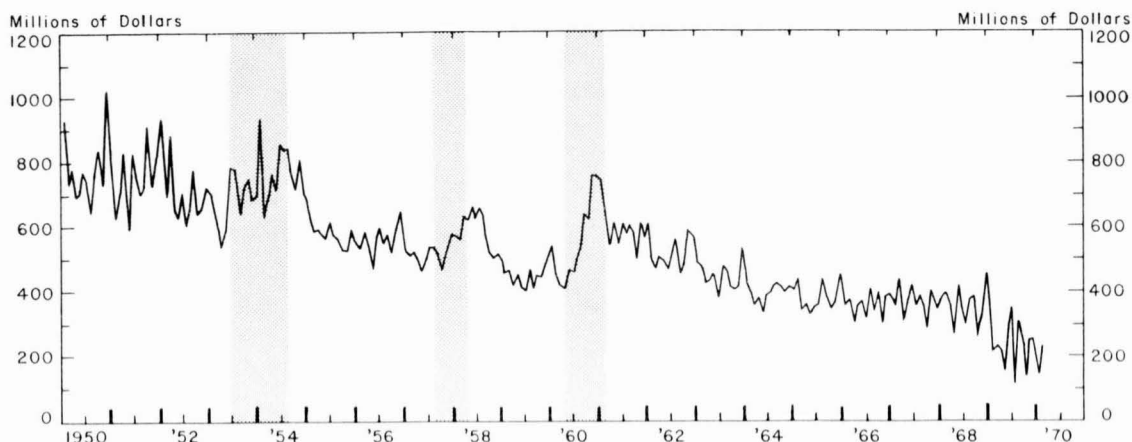
during the latter half of 1966, subsided in late 1967 and early 1968, and again increased sharply. The chart also shows that net Federal funds sold by large banks have almost always been substantially less than purchases, indicating that on balance the large banks have acquired funds from smaller country banks. Net sales of Federal funds by the money market banks, moreover, have not grown proportionately to purchases.

The postwar growth of the Federal funds market is due to a variety of factors which have affected both purchasing and selling banks. Since excess reserves are nonearning assets, the generally rising trend of interest rates has caused many banks to economize on their holdings of excess reserves by lending them in the funds market. In addition, the size of possible transactions in Federal funds has declined sharply, opening the market to an increasing number of banks. Prior to 1966 sales or purchases in amounts as small as \$500,000 were relatively uncommon; the typical trade involved a multiple of \$1 million. Small country banks have typically held excess reserves, but the size limitation on

transactions had largely prevented them from entering the market. To assure themselves of a more steady supply of funds, larger banks began in recent years to act as intermediaries for their country correspondents in buying and selling Federal funds. Today sales as small as \$50,000 are not uncommon and as banks have gained greater familiarity with the market, they have become more frequent participants. The change in reserve computation procedures introduced in September 1968 by the Federal Reserve has undoubtedly contributed to the expansion of the market by permitting banks to manage their reserve positions more closely. Banks now calculate required reserves on the basis of deposits held two weeks earlier rather than on current deposit levels.

An alternative to the Federal funds market for banks accumulating excess reserves is the purchase of short-term securities. However, if the excess is expected to last only two or three days, the interest which could be earned on the securities might not be sufficient to pay the costs of buying and selling. Chart 2 shows, moreover,

**Chart 3**  
EXCESS RESERVES AT ALL MEMBER BANKS



NOTE: Shaded areas represent periods of business cycle contractions as designated by the National Bureau of Economic Research.  
SOURCE: Federal Reserve System.

that in recent years the return on Federal funds has often exceeded that which could be earned on 3-month Treasury bills.

Similarly, a bank with a reserve deficit that is expected to reverse itself shortly has several possibilities. It may purchase Federal funds, borrow at the Federal Reserve discount window, or sell Government securities. While the Fed will generally lend to banks experiencing temporary reserve deficiencies, it does not encourage frequent or large borrowings. Banks using the discount window often or extensively, moreover, may be subject to a Federal Reserve review of their portfolio policies. Banks have often found this review uncomfortable. For these reasons banks have generally been reluctant to turn to the discount window to meet deficiencies. A sale of Treasury bills, on the other hand, followed by a repurchase several days later, is often a more expensive way to acquire funds temporarily than is the Federal funds market.

Until 1965, it was generally assumed that Federal funds would never trade among banks at a rate of interest which exceeded the discount rate. No bank, it was maintained, would

acquire Federal funds when it could borrow more cheaply at the Federal Reserve. During 1965, however, a few money market banks discovered that by offering rates slightly in excess of the discount rate, they were able to tap a large volume of funds on a relatively permanent basis. Since the Federal funds rate was generally greater than the rate which could be earned on money market securities, but less than the rate which could be earned on loans, some banks — mainly smaller country banks — became consistent lenders to the Federal funds market, while a few others became permanent buyers. The banks that borrowed the funds could use them to expand loans. For sellers of funds the market appears to have become an alternative to investment in money market securities.<sup>4</sup>

The ability of money market banks to acquire loanable funds from the Federal funds

4/ A comparison of broad movements in interest rates and in net purchases of Federal funds, shown in Charts 1 and 2, indicates that in recent years when purchases are increasing, the effective rate on funds tends to exceed the bill rate. By offering higher rates, money market banks are able to induce other banks to substitute Federal funds sales for security holdings. Conversely, when net purchases are declining, the bill rate tends to exceed the rate on Federal funds.



market on a long-term basis constitutes a significant new technique both for liability management and for bank liquidity. During recent periods of restrictive monetary policies, money market interest rates have risen above the maximum banks were permitted to offer on CD's and banks experienced a loss of deposits. By raising the offering rate on Federal funds, those banks experiencing the most severe loss of deposits have been able to obtain a significant volume of funds, partly offsetting the contractionary effect which would otherwise occur in their loans and investments. At times, borrowings of Federal funds by some banks have exceeded required reserves by a significant margin. When the need for funds becomes less urgent, the amount acquired can be reduced and the effective rate on transactions may fall.

The Federal funds market provides banks with a partial means to satisfy both short- and long-run needs for liquidity. In the short run, Federal funds are a source of liquidity to both buying and selling banks. Since the seller must decide daily whether to renew a transaction, Federal funds are perhaps second only to excess reserves in providing liquidity. Banks experiencing reserve deficiencies which are expected to last only a few days, on the other hand, may readily borrow funds. By transferring reserves, the banking system is able to adjust smoothly to differences in the flows of funds and to random shifts of deposits which are likely to be offsetting at different banks. Such actions tend not only to create greater efficiency in the use of reserves but also to distribute the effects of monetary policies more evenly throughout the banking system. Total reserves and the lending potential of the banking system do not change. However, by reducing the need to hold excess reserves, the Federal funds market permits banks to increase deposits and credit more than would otherwise be likely to occur.

In general, banks which have borrowed Federal funds in large amounts on a long-

term basis have used them to expand loans. In a sense, the market permits money market banks to borrow loanable funds from other banks. While such actions do not change the reserve base, they tend to shift the distribution of total bank credit from country to money market banks. Nevertheless, if bank holdings of excess reserves were highly sensitive to variations in the rate of interest on Federal funds, the market would facilitate an expansion in actual bank credit. Chart 3 shows, however, that despite a downward trend, cyclical movements in excess reserves have generally been small. Bank holdings of excess reserves declined sharply in 1969 as interest rates increased, but remained remarkably stable during the 1966 credit crunch. Both periods recorded sharp increases in the amount of Federal funds traded. It would appear that the Federal funds market has allowed banks to redistribute reserves and bank credit, but has not greatly facilitated aggregate bank credit expansion.<sup>5</sup>

#### COMMERCIAL PAPER

Another method which commercial banks have used to acquire loanable funds is the

<sup>5/</sup> During the monetary restraint of 1969, a significant innovation occurred in the Federal funds market. To encourage major customers to maintain larger deposits than might otherwise be necessary, several large banks agreed to channel a portion of the excess funds held by corporations and wealthy individuals into the Federal funds market. For example, if a corporation's deposit balance on a given day exceeded the amount required to meet clearings and compensating balance requirements, the bank would sell the excess in the Federal funds market. Since the Federal funds rate was among the highest of money market rates, the return which could be earned on such transactions generally exceeded the amount the investor could earn on other short-term investments. In return for the service the customer would agree either to maintain a larger deposit in the bank or to split the profits derived from the sale of funds with the bank. Such practices are similar to those in which large banks regularly place excess correspondent balances held by smaller banks in the Federal funds market.

The Board of Governors, however, took a dim view of the practice of extending access to the Federal funds market to nonfinancial corporations. In the eyes of some, this was equivalent to paying interest on demand deposits, which is prohibited. In September 1969, the Board proposed to bring within the scope of Regulations D and Q member bank liabilities on all Federal funds transactions except those with a bank and its subsidiaries, various government institutions, or security dealers in some cases. The amendments, which became effective in February 1970, closed the Federal funds market to the customers of banks.

sale of commercial paper through their holding companies, affiliates, or subsidiaries. Commercial paper is essentially a short-term promissory note, often unsecured. In 1966, money market interest rates rose above the ceilings banks were permitted to offer on time deposits, and it became apparent that banks might attempt to substitute sales of short-term promissory notes for CD's to avert a loss of funds. The Board of Governors promptly amended Regulations Q and D to provide that funds obtained from bank issues of short-term notes would be subject to the same restrictions as deposits. As a result, banks themselves are not permitted to offer rates in excess of Regulation Q ceilings on issues of short-term notes. This provision has largely precluded the possibility in recent years for banks to issue short-term notes directly during periods of restrictive monetary policy.<sup>6</sup> However, bank holding companies, their non-bank subsidiaries, and subsidiaries of member banks were not covered explicitly by these restrictions, and during 1969 commercial paper issues by these bank related organizations provided an important source of liquidity to banks.

The issues of commercial paper have been designed to appeal to short-term investors. Most placements have been direct but several have been sold through dealers. Since commercial paper rates during much of 1969 were below those on Federal funds or Eurodollars, the issues represented a relatively attractive method of acquiring additional funds. The amount of commercial paper issued by bank related organizations grew rapidly. From about \$800 million in May 1969, the amount outstanding rose to over \$6 billion in March 1970. (See Table 1.)

The technical aspects of these transactions have differed widely among organizations. Normally most of the funds acquired through com-

6/ The Board's 1966 amendments, however, exempted notes issued with an original maturity of more than two years and expressly subordinated to the claims of depositors. During 1969 and early 1970 several banks were able to skirt the intent of the amendments by issuing subordinated capital notes with maturities just over two years.

**Table 1**  
**COMMERCIAL PAPER ISSUED**  
**BY BANK AFFILIATES\***  
**(Billions of dollars)**

Date	Amount Outstanding
<b>1969</b>	
May 28	\$0.81
June 25	1.25
July 30	1.86
August 27	2.21
September 24	2.48
October 29	3.64
November 26	4.07
December 31	4.21
<b>1970</b>	
January 28	5.43
February 25	5.97
March 25	6.08

\* Includes commercial paper issued by a bank holding company or other bank affiliates and reported by weekly reporting banks. Figures exclude direct financing activities of corporations which own banks.  
SOURCE: Federal Reserve Bank of New York.

mercial paper sales by holding companies have been used to purchase loans or investments from the portfolio of the bank. As a result, banks are able to obtain additional funds for lending. In the case of commercial paper issued by bank subsidiaries and other affiliates, the proceeds are often used to finance a separate activity such as a finance or mortgage servicing company without placing any additional drain on the bank's own funds. Some banks, however, have arranged for loan applicants to borrow directly from the bank affiliates rather than from the bank. Under any circumstances, the effects of these transactions are similar. Demand deposits may initially decline as purchasers pay for the commercial paper, but will increase as the bank uses the funds to make loans. Total deposits, bank reserves, and the money supply, therefore, are not likely to change. However, an expansion in bank (or bank related) credit is made possible in an amount equal to the volume of commercial paper sold.<sup>7</sup>

Since the Board of Governors believed that such sales of commercial paper were tending to frustrate the restrictions governing the pay-

ment of interest on deposits, in October 1969 the Board proposed to make the sale of commercial paper by bank holding companies or their nonbank affiliates subject to Regulation Q interest rate ceilings if the proceeds of the issue were used to supply funds to the bank. However, the Board subsequently issued a new proposal designed to make member banks hold a 10 per cent reserve requirement against funds received from the issuance of commercial paper by an affiliated corporation or trust to the extent such funds are channeled to the bank.<sup>8</sup> The initial proposal would largely have prevented bank related organizations from obtaining funds for bank use by issuing commercial paper whenever money market interest rates exceeded Regulation Q ceilings, but the modified amendment simply increases the cost of such funds. Funds obtained by banks through the sale of loans or securities to affiliated organizations will be subject to the reserve requirement if the organization obtained the funds by issuing commercial paper. However, if banks were to direct customers to borrow from the non-bank affiliates directly, the transaction might not be subject to reserve requirements.

A final decision concerning adoption of the amendments has yet to be announced. Although the initial proposal was released on October 29, 1969, the sale of bank related commercial paper has continued to mount steadily. Since November, commercial paper issued by bank

related organizations has increased \$2.3 billion, or by nearly 65 per cent.

The Board also announced on October 29 that it considered obligations issued by subsidiaries of member banks to be subject not only to reserve requirements but also to the interest rate restrictions on deposits. Almost immediately, however, the Board relaxed its position by temporarily suspending interest rate ceilings and by granting Reserve Banks the right to waive penalties for reserve deficiencies resulting from the October 29 announcement to the extent that the amount of commercial paper issued by member bank subsidiaries did not exceed the amount outstanding on October 29. Accurate statistics on the amount of such commercial paper affected are not readily available, but the total is believed to be considerably less than that issued by holding companies and their subsidiaries.

#### CONCLUSION

During recent years banks have increasingly turned to liability sources of liquidity to make loans and to meet deposit withdrawals. In periods of comparatively easy monetary policy, money market banks have been able to obtain a large amount of funds by issuing negotiable certificates of deposit and to a lesser extent by borrowing Eurodollars and Federal funds. During the restrictive policies of 1969 and early 1970 these banks tended to rely on commercial paper, Eurodollars, Federal funds, capital note issues, sale of loans and securities, and borrowings at the discount window as sources of liquidity.

In this article the Federal funds market and bank issues of commercial paper and promissory notes were considered. The Federal funds market has served both as a short- and long-run source of liquidity for banks. By borrowing and lending reserves, the banking system is able to adjust smoothly to differences in the flows of funds and to random shifts of deposits which are likely to be offsetting at different banks. The funds market has also allowed some

7/ These conclusions are based on the assumption that purchasers of the commercial paper make payment by drawing on existing demand deposits. However, if payment is made with a maturing CD, the transfer of funds from time to demand deposits will increase required reserves. Nevertheless, by pursuing a line of reasoning similar to that developed in Part I of this series, it can be shown the short-run effect will remain expansionary. On balance, both the money supply (narrowly defined) and bank (and bank related) credit will increase.

8/ The Board's proposal specifically stated: "The main purpose of the proposed amendments is to apply a 10 per cent reserve requirement to funds received by member banks as the result of issuance of obligations commonly described as commercial paper by a corporation or trust that (1) majority-controls the member bank, (2) is majority-controlled by persons who also majority-control the member bank, or (3) is controlled by trustees for the benefit of shareholders of the member bank."

money market banks for extended periods to acquire funds which have been used to expand loans and to meet deposit withdrawals. Since transactions in Federal funds, however, do not affect the size of the reserve base of the banking system, they do not increase potential bank credit expansion.

Banks have also been able to acquire loanable funds by selling capital notes and by issuing commercial paper through subsidiaries and affiliates. In either case deposits will initially decline as purchasers pay for the securities, but

will increase as banks use the funds to make loans. Since funds obtained by these methods have not been subject to reserve requirements in the past, an expansion of bank (and bank related) credit has been possible in an amount equal to the volume of commercial paper and capital notes sold.

The concluding article in this series will examine additional sources of liquidity and will assess the significance of bank liability management during the recent period of monetary restraint.

# Cattle Feeding in the Tenth District: Development and Expansion

By Gene L. Swackhamer and Blaine W. Bickel

**B**ecause of the importance of the cattle industry to the Plains states, there have been many fine studies of this industry. However, due to the extent and rapidity of changes in cattle feeding, continued study is necessary. In an attempt to better identify prevailing practices and problems, a survey of large-scale feedlots in the Tenth Federal Reserve District was made. Answers were sought for such questions as: Is there evidence of overexpansion of feedlot capacity? The shortage of what resources appear to be most limiting to future growth? Are new and expanding feedlots adequately capitalized?

Although it is doubtful that the final word can be given to these questions, the information in this and subsequent articles is designed to be beneficial to readers interested in cattle industry developments.

The livestock industry has grown in importance in the Tenth Federal Reserve District, and District states account for an increasing share of the Nation's cash receipts from the sale of cattle and calves. In 1958, farmers and ranchers in the seven states comprising the Tenth District<sup>1</sup> received over \$3 billion from the sale of livestock and products — nearly 16 per cent of total cash receipts from livestock and products in the United States. Of this amount, \$2.4 billion represented receipts from the sales of meat animals (22 per cent of the

U. S. total), and \$1.85 billion of this amount was from the sale of cattle and calves (25 per cent of the U. S. total). Thus, in 1958, farmers and ranchers in District states were receiving one of each four dollars derived from the sale of cattle and calves.

Since 1958, change has been dramatic. Farm income data for 1968, the most recent available giving commodity and state detail, revealed that gross cash receipts to District states from livestock and products exceeded \$5.4 billion, or 21 per cent of the U. S. total. Cash receipts from the sale of meat animals exceeded \$4.7 billion (31 per cent of the U. S. total), and receipts from cattle and calves exceeded \$3.9 billion (35 per cent of the U. S. total). In the 10 years 1958-68, cash receipts from cattle and calves almost doubled in District states, and the relative share of District producers rose from 25 per cent to 35 per cent of the U. S. total. Since demand for livestock and products also grew during these years, the shift in relative importance of the cattle industry to the Plains states did not completely represent gain at other areas' expense, but the transition has been rapid, and the trend toward continued relative gains seems likely.

The magnitude of the shift can be seen further when it is realized that, of the \$3.9 billion growth in cattle and calf receipts in the United States during the 1958-68 decade, \$2.1 billion — or 53 per cent — accrued to Tenth District producers.

Tenth District states have always been a major source of stocker and feeder cattle, but

---

<sup>1</sup>/ Colorado, Kansas, Nebraska, Wyoming, and most of Oklahoma, the northern half of New Mexico, and the western tier of Missouri counties.

the growth illustrated in the preceding numbers represents the establishment of a large-scale cattle-feeding industry. Now, nearly one-third of all cattle on feed in the Nation are in Tenth District states, compared with only one-fourth 10 years ago. The rate of growth is twice that of the remainder of the United States.

A comparison of numbers on feed on January 1 for recent years further reveals the dramatic increase in fed-beef production. Numbers of cattle on feed in the Tenth District increased by 129 per cent between 1960 and 1970, compared with a 68 per cent increase for the remaining major feeding states. New Mexico, Oklahoma, and Kansas led District states in percentage increases during the past decade—with each exhibiting increases in excess of 200 per cent. In absolute numbers, Nebraska led District states with an increase of 822,000 head, followed by Kansas with 617,000, from January 1, 1960, to January 1, 1970.

Change was accelerating at a much faster rate at the end of the 1960's than when the decade began. Nineteen per cent more cattle were on feed in District states on January 1, 1970, than on January 1, 1968. The increase in Kansas was 46 per cent over this same two-year period. Nationally, the same trend was evident — with the 22 major feeding states (which include all Tenth District states except Wyoming) showing an 18 per cent increase since 1968; and with Texas leading with a 75 per cent increase. Between 1960 and 1970, Texas experienced a phenomenal 471 per cent increase in numbers on feed.

Increases in the traditional feeding states of the Corn Belt have been much slower. During the 1960's, Illinois experienced only a 10 per cent increase in cattle on feed, while Iowa — the most important feeding state in the Corn Belt — increased 47 per cent. Indiana, Michigan, and Ohio had increases ranging from 88 to 52 per cent but, in absolute numbers, these three states together represented an increase of only 353,000 head during the 10-year span.

An examination of commercial cattle slaughter and fed-cattle-and-calves-marketed data reveals a similar picture, as would be expected. Commercial cattle slaughter in District states has risen from 4.9 million head in 1958 to 9.6 million head in 1968 — representing a gain in relative share of the total U. S. slaughter from 21 per cent to 27 per cent. A very distinct regional shift in fed-beef production has occurred and indications are that further concentration in the Western and Southern Plains is continuing.

#### FACTORS INFLUENCING CATTLE FEEDING IN THE TENTH DISTRICT

In any attempt to catalog the important factors that have influenced the growth of the fed-cattle industry in the Plains states, certain to be included would be the development of grain sorghum, expansion of irrigation, growth in consumer demand, shifting of population into the Southwest, new technology-induced feeding practices, accompanying economies of size in drylot and confinement feeding, availability of quality feeder cattle, favorable climate for concentration in feedlots, new interstate highways and refrigerated trucking, and community support.

Just compiling a list of important industry determinants is not sufficient for answering the questions posed earlier. Much more must be known. Measures of resource limitations and demand stability must be derived before an evaluation of overcapacity, undercapitalization, or continued growth can be made.

The sequence of events that have, over time, brought about the relocation of the "beef belt" from a Kansas City-Chicago line to an Amarillo-Omaha plane, is less important than projection of likely future developments or changes that will influence the fed-beef industry. Thus, several important resources critical to the fed-cattle industry will be discussed individually.



## Feed Grain Production

Without the development of higher-yielding hybrid grain sorghums and economically feasible well and reservoir irrigation systems, the expansion of cattle feeding in the Plains would have been much slower. Were it not for these factors, it is doubtful that large-scale cattle feeding would even exist in many of the areas where it now dominates the local economy. The production of high-quality feed grain and the development of feeding technology caused a realignment of relative cost considerations. In the 1960's, it became economically feasible to finish cattle for market in the Plains. Ranchers had an alternative to the traditional movement of stockers and feeders into the Corn Belt for finishing. As the demand for grain-fattened cattle (fed beef) grew, the appeal of producing feed grain in the feeder cattle growing areas increased. New technology on confinement feeding and climatic conditions favorable to open-air feedlots (low annual rainfall and cool evenings) further facilitated the development of large-scale cattle feeding.

Water was perhaps the most critical resource in the development of cattle feeding. Dryland farming in most areas of the Western and Southern Plains required judicious adherence to a fallow system and resulted almost exclusively in the production of grass and hard winter wheat which was not considered to be an animal feed grain. But, as can be seen in Chart 1, irrigation has become extensive. This map shows the total pasture and cropland acreage irrigated per county as reported in the 1964 Census. In contrast to the findings of a 1956 study of Census data that revealed a decline of 323,000 irrigated acres in District states from 1949 to 1954, irrigated acreage has increased 2,673,000 acres since 1954, invalidating the conclusions of the 1956 study.<sup>2</sup>

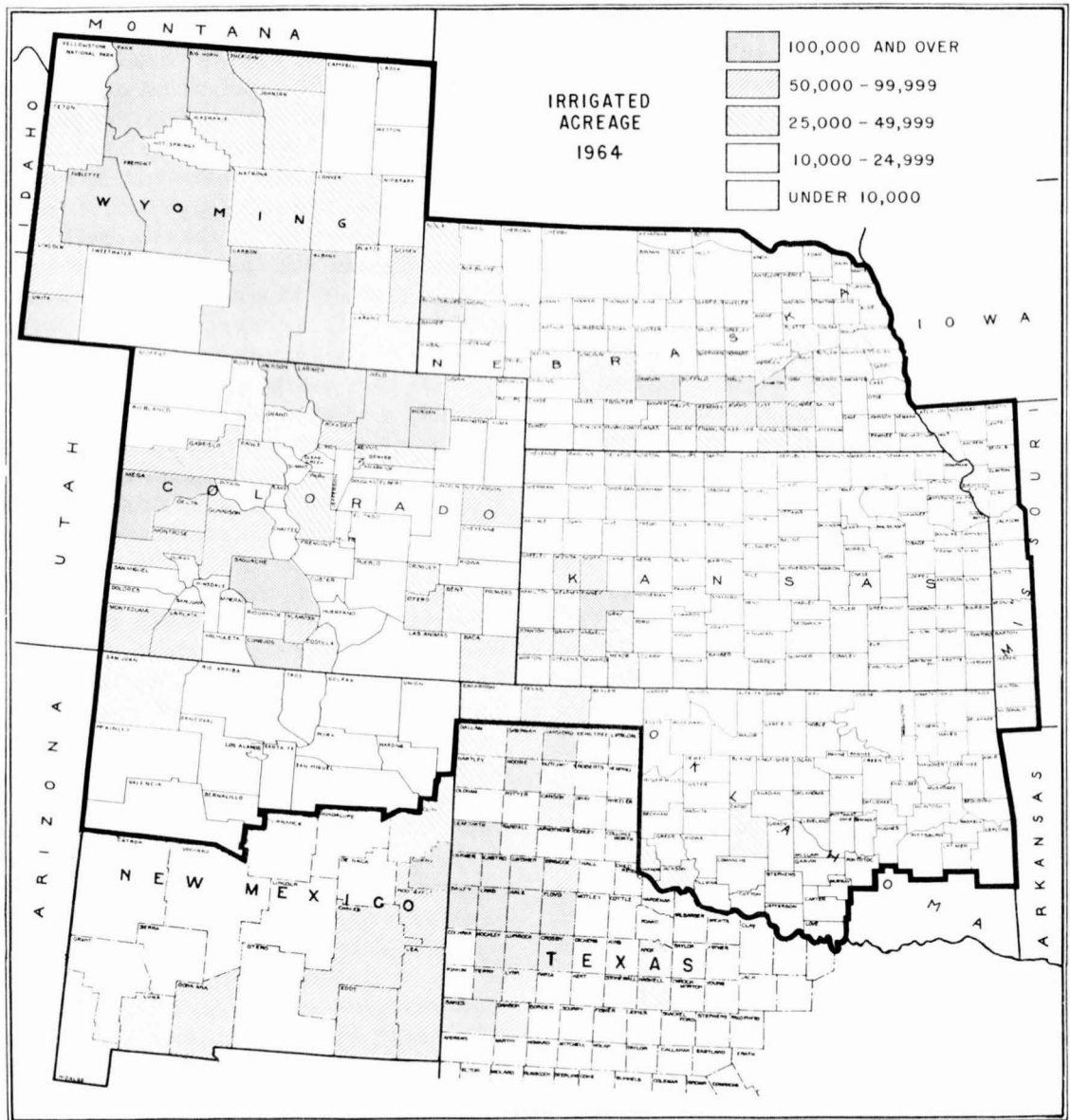
2/ "Development and Financing of Irrigation," *Monthly Review*, Federal Reserve Bank of Kansas City, June 1956, pp. 9-15.

One of the resources critical to the continued growth of large-scale cattle feeding in the Plains states in the 1970's will be water. Already, population growth, industrialization, and existing agricultural needs are putting pressure on available supplies. Some areas are experiencing falling water tables and recharge failures. Water has never been a free good in the thirsty Plains, but agriculture may find the cost rising even faster in future years. Although available data suggest a large reserve of untapped resources, many water specialists are haunted by the fact that irrigated economies throughout history have not exhibited especially good longevity.

The stability of cattle feeding in the Plains in future years will be greatly dependent upon continued production of abundant, high-quality grain sorghum and other feed grains. As one measure of overcapacity, a ratio of fed-cattle to feed-grain production was calculated for all counties in District states. The logic of this measure is that areas of feed grain deficiency are more likely to experience rising costs of production in future years as feed is imported. Chart 2 shows the net surplus or deficit of feed grains in thousands of bushels for a four-state area in 1968 for (1) counties with insufficient local grain production to meet the needs of large feedlots, and (2) for counties contiguous to deficit counties. Shaded counties consumed more feed grain than they produced by the amounts shown. Net surpluses, after allowance for their own feeding needs, are shown for adjacent counties. Numbers were omitted for all counties that had adequate grain production in 1968 to meet the needs of their large lots. This was done to facilitate identification of deficit areas. Other District states were omitted because of incomplete data. As can be seen from this map, most deficit areas could draw an adequate amount from neighboring counties without incurring much additional expense.

Several modifying comments about this analysis are necessary. Computations were made

**Chart 1**  
**IRRIGATED CROP AND PASTURE LANDS**



SOURCE: 1964 U. S. Census of Agriculture, Vol. 1, U. S. Department of Commerce, Bureau of the Census.



iciency-surplus picture. Counties showing a deficit on the basis of large feedlots only would obviously have a greater deficit if the needs of all other livestock were included. Likewise, counties with a surplus actually have less excess grain than shown. Although the omission of other species and cattle fed in small lots is an important consideration, it is not likely to seriously distort the picture of resource needs. The areas where deficits are presently shown will probably first experience the pressure of limited feed-grain supplies. Further expansion in these areas will be dependent upon continued increases in feed-grain production or in sufficient feeding efficiency to justify importing feed grains. The availability of feed grains would appear to already be a constraint on continued feedlot expansion in some sections of western Nebraska, southwestern Kansas, northeastern Colorado, and much of Oklahoma.

### **Feeder Cattle Supply**

Another critical input to the cattle industry is the supply of quality feeder cattle. Production of calves has increased modestly in each of the last two years at about a 1 per cent annual rate. While the production of beef calves has increased from 30,670,000 head in 1967 to a calculated 31,951,000 in 1969, the production of calves from nonbeef cows and heifers 2 years of age and older declined from 13,018,000 in 1967 to an estimated 12,444,000 head in 1969. Also contributing to the total supply of available feedlot replacement stock has been the reduced slaughter of calves and of nonfed steers and heifers which has permitted these animals to move into finishing programs. Future gain from reduced slaughter of nonfinished cattle will be small, however, since this route to market has been diminishing rapidly. Live cattle imports have added marginally to total supply and may increase further if replacement demand remains strong.

Because of the rapid growth in demand for fed beef and the more modest expansion of

feeder cattle supplies, the demand for replacement animals has risen and feeder cattle prices have strengthened. With demand for fed beef anticipated to remain strong,<sup>3</sup> continued pressure for quality feeder cattle is likely in the 1970's. At the same time, the ability of ranchers to expand calf production at the rate of replacement demand is limited.

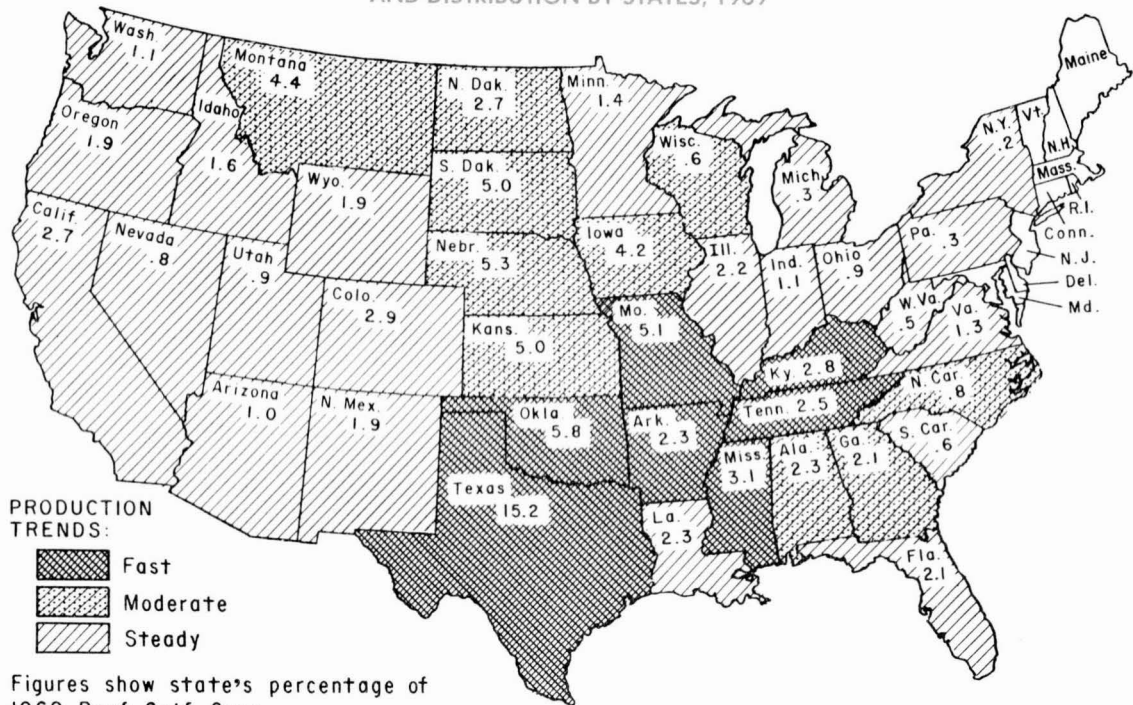
Estimated calving rates have continued to rise and, nationally, it is estimated that the calf crop is equivalent to 89 per cent of all cows and heifers 2 years and older. Continued improvement in the calving rate is anticipated, with each 1 per cent gain based on current cow numbers adding about 444,000 head of cattle to the available feeder supply. In 1969, Iowa led the Nation with a calving rate of 95 per cent. Kansas and Colorado had calving rates of 94 per cent; Nebraska and Oklahoma, 90 per cent; and Texas (the largest source of feeder cattle), 88 per cent. In the absence of significant technological developments in beef-cattle reproduction, additional supply from improved calving alone will be insufficient for expected feedlot needs. Continued expansion of cowherds, live-cattle imports — or a combination of these — will be necessary.

The 1949-69 trend of beef-calf production is depicted in Chart 3. Three degrees of growth have been indicated based upon the individual state's 1949-69 rate of increase weighted by its relative share of total U. S. calf production. States were ranked on the basis of this derived index and divided into the indicated groups. Crosshatched states have exhibited the fastest relative contribution to total numbers and account for 37 per cent of the 1969 beef-calf crop. It is primarily these states that have historically produced "Okie" feeder cattle (crossbreeds consisting of beef, dairy, and Brahman bloodlines). Although in

---

<sup>3/</sup> For a discussion of the demand for beef cattle, the reader is referred to "Economic Growth and the Beef Industry," *Monthly Review*, Federal Reserve Bank of Kansas City, February 1970.

**Chart 3**  
**BEEF-CALF PRODUCTION TREND, 1949-69,**  
**AND DISTRIBUTION BY STATES, 1969**



Figures show state's percentage of 1969 Beef Calf Crop.

SOURCE: Compiled from Western Livestock Marketing Information Project data.

recent years there has been much more discussion about confinement calf production and Corn Belt cowherds, Southcentral and Southwestern states will remain major producers of feeder calves well into the 1970's.

### Livestock Slaughter

With surplus feeder livestock available, the incentive to produce feed grains and market fed beef was strong in the Central and Southern Plains. Once large-scale cattle feeding became established, supply-oriented livestock-slaughter firms were quick to move to the areas of production. The transportation economies due to carcass weight reduction, reduction in procurement costs, and reduced shrink from handling and shipping were significant factors in encouraging relocation of the meatpacking in-

dustry. Other changes such as improved refrigeration, new techniques of automation, slaughter specialization by species, changing consumer markets, and geographical dispersment of livestock production further expedited regional decentralization of the livestock-slaughter and meatpacking industry.

Aggregate figures of number of employees or number of large livestock-slaughter facilities in the Tenth District for the 1958 and 1963 census periods do not accurately reflect the changes occurring within these states. During a period when most states were experiencing substantial reductions in plants and employees, many of the terminal and river market meatpackers in the Plains were moving to new locations still within the Tenth District. Since the 1963 Census, new regulations requiring Federal

inspection have caused many previously non-federally inspected plants to change their status, thus further complicating interpretation of industry data. Other measures such as new construction, value added in meat slaughter or value of beef shipments, annual slaughter in million pounds of liveweight or rated capacity in head per hour clearly show a regional gain in the Tenth District. Although the Tenth District contained only 19 per cent of all federally inspected livestock-slaughtering establishments in 1969, the area accounted for nearly 30 per cent of all commercial cattle slaughtered in the United States.

New beef slaughter, breaking, and fabricating facilities are still being built in the Southwest in response to the regional shift in cattle feeding and rapid expansion of large-scale feedlots. Although the danger of overcapacity should be of concern to the industry, the symbiotic relation of packers and feeders has, to date, been beneficial to both. With continued growth in demand for fed beef anticipated, cattle feeding in the Central and Southern Plains should continue to expand in the 1970's.

#### **Other Factors to Consider**

An important determinant of feedlot location is the climate. The generally warm, dry weather throughout parts of Colorado, Kansas, New Mexico, and Oklahoma facilitates year-around beef production with a minimum of shelter. Lower rainfall produces less runoff and stream pollution from feedlots.

Management is the key factor that ties all the other resources together into a successful business. Programs that include the study of feedlot management such as at Kansas State University and Texas A & M University help provide the Plains area with the necessary personnel. Price changes, types of cattle, diseases, and death losses are some of the many problems facing feedlot management. Scientific developments in market news dissemination, cross breeding, and disease control have eliminated

some problems; and the application of computers to the development of rations and to record-keeping has enhanced the effectiveness of feedlot management, but there are many decisions which still rely on skill, judgment, and experience. The availability of competent and experienced feedlot managers is rapidly becoming a major consideration in new feedlot development.

#### **LOCATION OF LARGE FEEDLOTS**

Large cattle feedlots in Tenth District states have increased from 581 in 1964 to 874 in 1969. This represents a 50 per cent increase in five years, compared with an increase of 35 per cent for the 22 major cattle feeding states during the same period. The increase for major feeding states, after excluding District states, was only 25 per cent; so, clearly, recent expansion has been in the Central and Southern Plains. Nebraska has had an absolute increase of 159 large feedlots in the last five years, compared with 112 for Iowa, 93 for Texas, 70 in Kansas, and 39 in Colorado. Arizona, California, Illinois, Oregon, Pennsylvania, and Washington experienced a decline in the number of large feedlots. Table 1 shows the relative changes for District States and the remaining major feeding states for selected years.

An analysis of distribution by size reveals that much of the increase in recent years has been in the large-lot categories. Lots of from 1,000 to 7,999 head capacity accounted for 77 per cent of the 1962-69 increase in the Tenth District. Twenty-three per cent of the increase in District lots since 1962 was in categories of 8,000 or more head capacity. Of the new feedlots in the 22 major feeding states between 1962 and 1969, Tenth District states account for 59 per cent of those between 1,000 and 7,999 size and 39 per cent of all those over 8,000 capacity.

Just as farms have increased in acreage over time, most large feedlots have grown by incremental additions. Only in recent years have many new feedlots opened with initial capacities



**Table 1**  
**NUMBER OF CATTLE FEEDLOTS BY SIZE GROUPS FOR TENTH DISTRICT STATES**

	Feedlot Capacity (Head in Thousands)																				
	1,000-1,999			2,000-3,999			4,000-7,999			8,000-15,999			16,000-31,999			32,000+			Total		
	1962	1967	1969	1962	1967	1969	1962	1967	1969	1962	1967	1969	1962	1967	1969	1962	1967	1969	1962	1967	1969
Colorado	31	32	33	19	30	28	16	20	29	14	16	17	—	10	13	—	—	—	80	94	120
Kansas	24	32	31	8	28	30	12	23	24	9	17	21	—	8	17	—	—	3	53	100	126
Missouri†	11	20	17	5	15	15	—	—	—	—	—	—	—	—	—	—	—	—	16	33	32
Nebraska	202	252	285	75	113	120	24	57	60	11	15	16	—	5	5	—	3	3	312	416	489
New Mexico†	10	18	8	12	14	14	7	6	6	5	8	8	—	4	4	—	—	—	34	54	40
Oklahoma†	13	21	19	10	17	14	6	4	7	—	6	4	—	3	5	—	—	—	29	50	49
Wyoming	9	12	11*	4	6*	6*	—	—	—	—	—	—	—	—	—	—	—	—	13	19	17
District Total	300	387	404	133	223	227	65	110	126	39	62	66	0	30	44	0	3	6	537	766	873
22State Total	762	916	931	362	497	497	184	300	318	101	170	187	20	77	99	3	19	34	1432	1919	2066
Remainder	462	529	527	229	274	270	119	190	192	62	108	121	20	47	55	3	16	28	895	1153	1193

\* Estimated.

† Numbers are for entire state.

of 10,000 head or more. There was a surge of new large lots opened in the 1968-69 period, but the rate appears to have slowed in 1970.

Analysis of feed lot numbers since 1967 reveals that, of 147 new lots in the 22 major feeding states, 108 are in the Tenth Federal Reserve District. Nebraska showed an increase of 73 and Colorado and Kansas 26 each, while Missouri, New Mexico, Oklahoma, and Wyoming reported a decline in large lots. The gain in District states was uniformly distributed among lot size categories, but still accounted for three-fourths of all new lots over 4,000 head capacity.

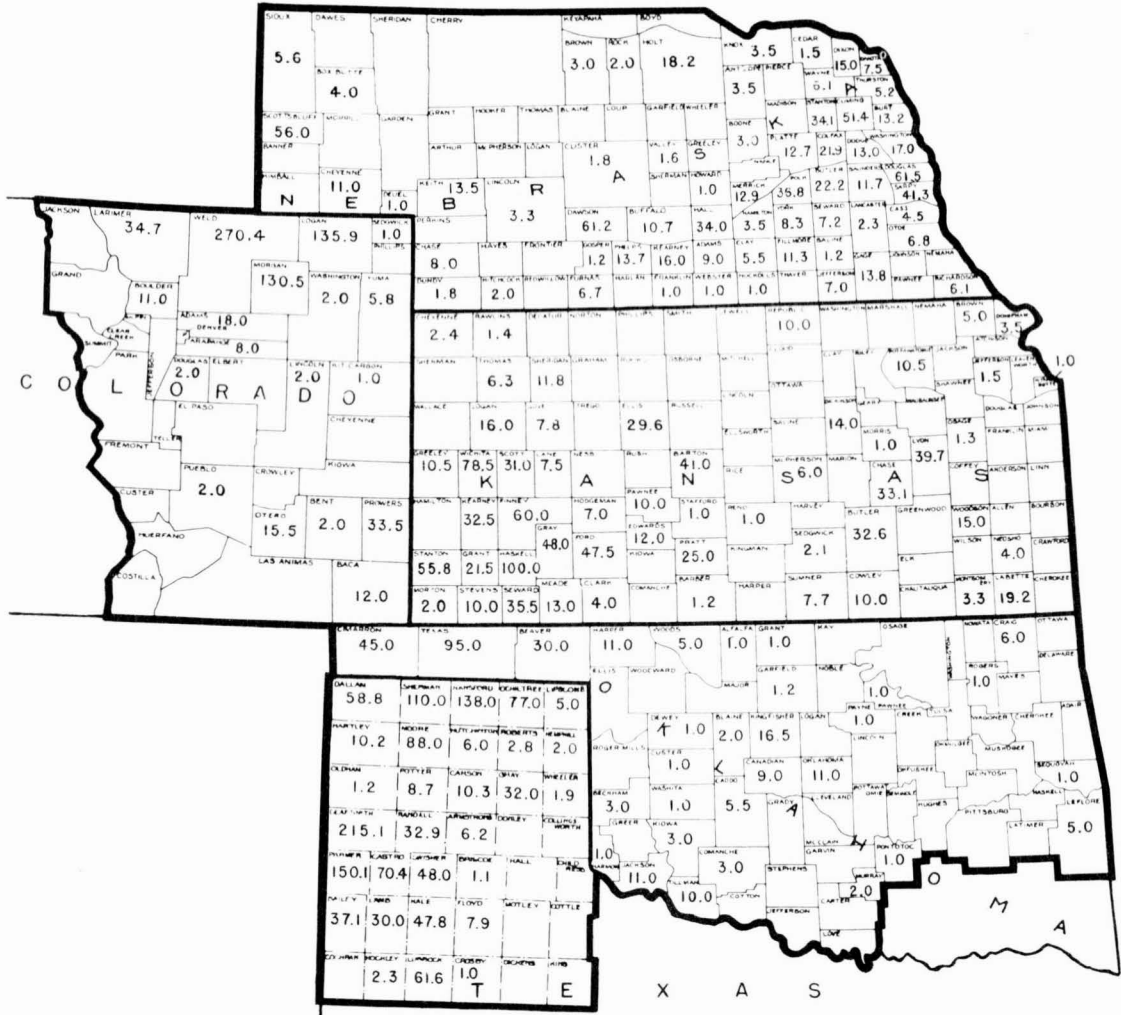
The geographic location of large feedlots is depicted in Chart 4, which includes estimates of maximum one-time capacity for large lots by counties. The influence of irrigation and feed-grain production, as shown in prior figures on feedlot location, can be seen in Chart 4. The heaviest concentrations are in developed irrigation areas where feed grains are relatively abundant. Expansion will likely continue in the developed areas at a faster pace than in areas with limited grain and water resources.

## CONCLUDING COMMENTS

Expansion of cattle feeding in the Central and Southern Plains during the 1960's was both rapid and substantial. The rate of growth intensified as the decade closed. Continued expansion in the 1970's seems probable since those factors that gave rise to a fed-cattle industry are still reasonably prevalent. More pressure on available resources, particularly replacement feeders, feed grains, water, credit, and management are also likely. As these constraints to expansion materialize, production costs will rise — placing marginally efficient feedlots under greater profit stress. If the economy does not cool too much in the early 1970's, fed-beef demand should remain good and moderate industry expansion should continue. Under these conditions, general over-expansion is not likely and an industry "shake-out" would be unlikely. Should the demand for fed beef deteriorate due to slower growth of employment and/or incomes, some large feedlots will likely be hard pressed to maintain break-even capacity levels at lower fed-beef prices.

The fed-cattle industry appears to be mark-

**Chart 4**  
**MAXIMUM ONE-TIME CAPACITY OF LARGE FEEDLOTS IN SELECTED STATES AND COUNTIES**  
**As of End of 1969**  
**(Thousands of Head\*)**



\*The above figures are unofficial estimates gathered from a number of sources and surveys. Errors and omissions may have occurred because of the rapidity of changes in the cattle-feeding industry. Although there are a few large feedlots in Wyoming, New Mexico, and Missouri, they are not shown on this map because of incomplete information.

ing time in the early months of 1970. Fewer new commitments are being made because of the unavailability of credit, the higher cost of replacement cattle, and uncertainty about general economic developments. A pause at this time

should be a healthy experience enabling the fed-beef industry to examine and consolidate the expansion of recent years. A renewal of new construction at the 1967-69 rate does not appear likely this year.