

Utilization of Federal Reserve Bank Services by Member Banks: Implications for the Costs and Benefits of Membership

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THE proportion of commercial banks belonging to the Federal Reserve System has been declining for more than three decades. The percentage of banks in the Federal Reserve System decreased from 49.1 percent of all commercial banks in 1945 to 39.3 percent at the end of 1976 (see Chart I). The percentage of total bank deposits held at Federal Reserve member banks declined from 86.3 percent to 73.8 percent over the same period.

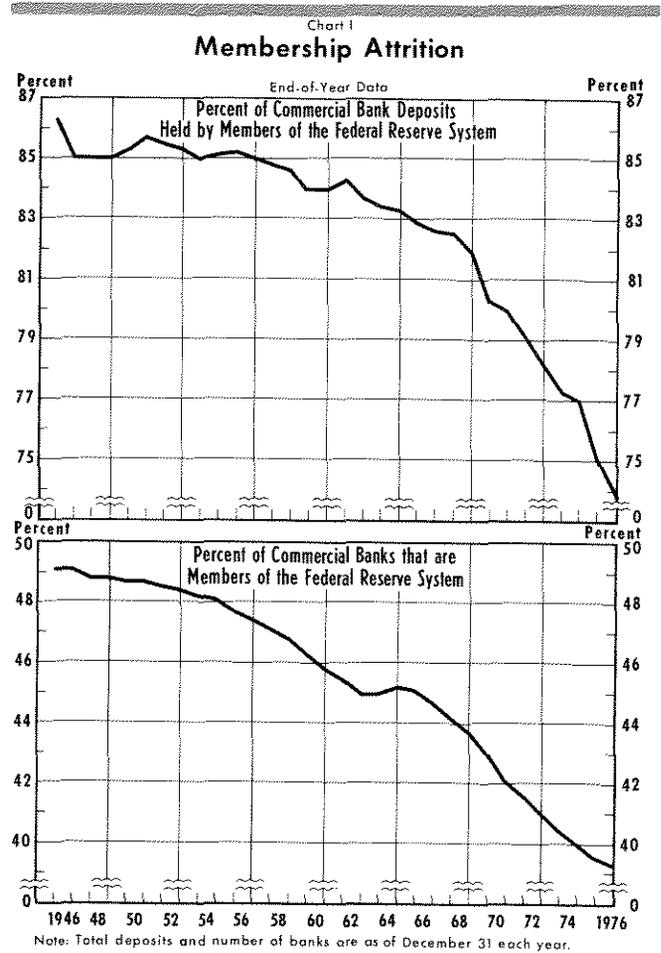
The reason banks mention most frequently for withdrawing from Federal Reserve membership is the cost of reserve requirements imposed on members relative to reserve requirements of the various states for nonmember banks.¹ However, the utilization of Federal Reserve Bank services by member banks must also be considered in an analysis of the costs and benefits of membership. The implications for the costs and benefits of Federal Reserve membership are analyzed on the basis of a survey of services used by member banks that are served by the head office of this Reserve Bank.

RESERVE REQUIREMENTS AS A CAUSE OF MEMBERSHIP ATTRITION

In general, state reserve requirements for nonmembers are not lower than those for member banks.² This observation is especially applicable to smaller banks, since in about half of the states reserve requirements are flat percentages of various classes of

¹Peter Rose, "Exodus: Why Banks are Leaving the Fed," *The Bankers Magazine* (Winter 1976), pp. 43-49.

²Required subscriptions to Federal Reserve Bank stock by member banks can be considered a type of interest bearing reserve requirement. Member banks must subscribe to stock of their Federal Reserve Banks in amounts proportional to their capital and surplus. The annual yield on that stock is six percent. That rate of return was a significant inducement to membership in the 1930s and 1940s when market interest rates were very low, but given the market interest rates of recent years, the yield on Federal Reserve stock is now probably a neutral factor in the costs and benefits of membership. Therefore, Federal Reserve Bank stock is not included in the following discussion of the reserve burden of member banks or the costs of membership.



deposit liabilities, whereas reserve requirements for member banks are graduated so that requirements are lower for smaller banks. The significant difference between the reserve requirements of member and nonmember banks concerns the *types of assets* they can use to meet their legal reserve requirements.

In most states nonmember banks can meet their reserve requirements with vault cash, cash items in the process of collection (CIPC), and demand balances due from other commercial banks. Member banks can meet their reserve requirements only with

vault cash and *collected* reserve balances at the Federal Reserve Banks.

The reserve burdens of most nonmember banks are reduced substantially because they are permitted to use CIPC to meet state requirements. Their CIPC represent primarily the value of checks they have deposited with correspondent banks for which the correspondents have not yet received payment.³ On the other hand, when member banks deposit checks with Reserve Banks, they receive credit to their reserve accounts according to a schedule which depends upon the location of the banks on which the checks are drawn. Member banks receive immediate credit for some checks, but for others credit is delayed one or two days. The deferred credit schedule approximates the time required for the Federal Reserve System to receive payment for outstanding checks.

To demonstrate the significance of CIPC for the relative reserve burdens of member and nonmember banks, the ratios of CIPC to reserve balances were calculated for a group of 49 member banks that are served by the St. Louis office of the Eighth Federal Reserve District and which regularly clear both local and out-of-region checks through this Reserve Bank. The four largest correspondent banks in the area were excluded from these calculations since their CIPC are exceptionally large in relation to their reserve balances. Average daily reserve balances of those member banks would have been 82.6 percent greater if they could have counted CIPC as part of their reserves.⁴ Another indication of the significance of CIPC is Knight's estimate that, on average, only 56 percent of demand balances that banks hold at correspondent banks are collected balances.⁵

Another significant difference between reserve requirements of states and those of the Federal Reserve is that nonmember banks can meet state reserve requirements with deposits at correspondents. As indicated below, correspondents offer respondent banks higher implicit rates of return on demand balances in the form of services than the implicit returns member

banks receive on their reserve balances at Reserve Banks. In addition, in about half of the states, nonmember banks can meet various proportions of their reserve requirements by holding interest earning government securities, and the Federal Reserve enforces its reserve requirements more rigorously than do most states.⁶

REASONS FOR ANALYZING THE UTILIZATION OF RESERVE BANK SERVICES BY MEMBER BANKS

Empirical studies support the view that member banks have greater reserve burdens than nonmembers by showing that member banks have higher cash/asset ratios than nonmember banks of the same size, especially among smaller banks.⁷ However, these studies do *not* show in general that the reserves of member banks at Reserve Banks are larger than the demand balances that nonmember banks hold at correspondents. The cash/asset ratios of member banks are higher than those of nonmembers because many member banks hold their required reserves at the Federal Reserve *and* hold substantial demand balances at correspondent banks.

Therefore, analysis of the cost of Federal Reserve membership involves more than just comparison of reserve requirements of the Federal Reserve with those of the states. It also involves examination of reasons why member banks hold large balances with correspondents. One of the major reasons banks hold demand balances at correspondent banks is to compensate correspondents for their use of services. Thus it is relevant to examine the services that mem-

⁶In 30 states there are no specified dollar penalties for reserve deficiencies for nonmember banks.

⁷Cash assets of banks are generally measured as their vault cash, demand balances due from correspondents, cash items in the process of collection, and reserve balances at Reserve Banks. See Gary G. Gilbert and Manfred O. Peterson, "Reserve Requirements, Federal Reserve Membership and Bank Performance," FDIC Working Paper No. 74-8, and "The Impact of Changes in Federal Reserve Membership on Commercial Bank Performance," *Journal of Finance* (June 1975), pp. 713-19; Robert E. Knight, "Reserve Requirements, Part I: Comparative Reserve Requirements of Member and Nonmember Banks," *Monthly Review*, Federal Reserve Bank of Kansas City (April 1974), pp. 3-20; Robert J. Lawrence and Duane Lougee, "Determinants of Correspondent Banking Relationships," *Journal of Money, Credit and Banking* (August 1970), pp. 358-69; Lucille Mayne, *The Effect of Federal Reserve System Membership on the Profitability of Illinois Banks, 1961-63* (Center for Research of the College of Business Administration, Pennsylvania State University, 1967); Walter A. Varvel, "The Cost of Membership in the Federal Reserve System," Federal Reserve Bank of Richmond, Working Paper 77-1, March 1977.

³Nonmember banks are officially allowed to count their CIPC as reserves in less than half of the states. However, in the other states nonmembers can count CIPC as reserves by recording all deposits of checks with their correspondents as demand balances due from correspondents, whether the funds are available for their use immediately or with some delay due to the time required for collection.

⁴Average daily reserve balances and CIPC were calculated for the period September 9, 1976, through January 12, 1977.

⁵Robert E. Knight, "Comparative Burdens of Federal Reserve Member and Nonmember Banks," *Monthly Review*, Federal Reserve Bank of Kansas City (March 1977), pp. 24-25.

Table I

PERCENT OF INSURED COMMERCIAL BANKS
IN EACH SIZE GROUP THAT ARE MEMBERS
OF THE FEDERAL RESERVE SYSTEM
AS OF DECEMBER 31, 1976

Asset Size (in millions)	Percent
\$ 5 or less	18.7%
5 - 9.9	25.5
10 - 24.9	38.0
25 - 49.9	48.9
50 - 99.9	58.5
100 - 299.9	66.3
300 - 499.9	78.6
500 or more	86.7

Source: Federal Deposit Insurance Corporation

ber banks obtain from Reserve Banks and services that they receive from correspondents.

Another reason for examining the use of Reserve Bank services by member banks concerns the size distribution of member banks. In most states reserve requirements for nonmember banks are either flat percentages of various types of deposit liabilities or less graduated than requirements of the Federal Reserve. Also, the ratio of CIPC to total deposits tends to be positively related to bank size. If relative re-

serve requirements were the only basis on which banks decided whether to be members of the Federal Reserve, these two reasons would cause the largest banks to have the greatest incentives to drop membership. Yet this is not the case.

Table I indicates that the percentage of banks that are Federal Reserve members increases with the size of banks. Table II shows that the size distribution of banks withdrawing from membership during 1971 through early 1977 corresponds closely to the size distribution of all members at the end of last year, but that no banks with total deposits over \$1 billion withdrew from membership during that period. So there must be additional factors which influence the decisions of banks concerning Federal Reserve membership. One such factor is the utilization of Reserve Bank services by member banks.

NATURE AND UTILIZATION OF FEDERAL RESERVE BANK SERVICES

Services that Reserve Banks provide to member banks are discussed in approximately the order of cost to the Federal Reserve System of providing them, as indicated in Table III. Information on the utilization of services by member banks of differing size is derived from a survey which includes 233 member

Table II

SIZE DISTRIBUTIONS OF INSURED BANKS IN THE U.S. THAT WITHDREW FROM FEDERAL RESERVE MEMBERSHIP,
JANUARY 1971 - MARCH 1977, AND ALL MEMBER BANKS, DECEMBER 31, 1976

Range of Total Deposits ¹ (millions of dollars)	Banks that Withdrew from Membership			All Member Banks	
	Number	Percentage	Cumulative Percentage	Percentage	Cumulative Percentage
up to 5	15	5.0%	5.0%	6.6%	6.6%
5 to 10	42	14.1	19.1	14.1	20.7
10 to 20	77	25.8	44.9	24.8	45.5
20 to 30	46	15.4	60.3	15.9	61.4
30 to 40	30	10.1	70.4	8.9	70.3
40 to 50	17	5.7	76.1	5.6	76.9
50 to 60	14	4.7	80.8	3.6	79.5
60 to 75	7	2.4	83.2	4.5	84.0
75 to 100	12	4.0	87.2	3.6	87.6
100 to 150	16	5.4	92.6	4.0	91.6
150 to 250	7	2.4	95.0	2.8	94.4
250 to 500	12	4.0	99.0	2.7	97.1
500 to 1,000	3	1.0	100.0	1.4	98.5
1,000 and over	0	0.0	100.0	1.5	100.0
Total	298	100.0%		100.0%	

¹Measured as of December 31, 1976, except in 8 cases in which recent data were not available. In those cases total deposits were measured around the time banks withdrew from membership.

Table III

COSTS OF PROVIDING SELECTED SERVICES TO MEMBER BANKS IN 1976

Service	Total Federal Reserve System		Federal Reserve Bank of St. Louis ¹	
	Cost of Providing Services	Percent of Total Cost of These Services	Cost of Providing Services	Percent of Total Cost of These Services
Check Collection	\$124,566,969	65.6%	\$3,714,454	73.1%
Coin and Currency Pickup and Delivery	50,220,644	26.4	946,111	18.6
Wire Transfers	5,672,666	3.0	124,695	2.5
Safekeeping of Securities	7,224,907 ²	3.8	199,439 ¹	3.9
Discounts and Credits	2,303,490	1.2	99,908	2.0
Total	\$189,988,676	100.0%	\$5,084,607	100.0%

¹Cost data pertain only to head office operations.

²These figures include the cost of providing some safekeeping services for nonmember banks.

Source: Federal Reserve System Board of Governors, *Functional Expense Report, 1976 Annual Report, Section I, pp. 41-69.*

banks served by the head office of this Bank. Banks are ranked by total assets and divided into groups of 20 each, except for group 12, which includes the 13 largest banks in the survey. Results, summarized for each group, are presented in Table IV.

Check Collection

The service to member banks that is the most expensive for Reserve Banks to provide to members is collection of checks. The Federal Reserve System provides the only national system of check collection, through which 13.2 billion checks were cleared in 1976. This represents about 45 percent of all checks written in the nation last year.

Member banks may deposit for credit to their reserve accounts checks drawn on any other domestic bank that remits at par.⁸ There is no direct charge to member banks for this service. Since the early 1970s, nonmember banks located in zones served by Regional Check Processing Centers have been permitted to deposit at Reserve Banks checks drawn upon other banks in their regions. Deposits of such checks are credited to the reserve accounts of member banks that serve as correspondents. There is no charge to nonmember banks for this service. Nonmember banks collect out-of-region checks through their correspondents. All checks deposited with Reserve Banks must be encoded with bank routing numbers and dollar amounts. Banks depositing more than a certain minimum number of checks must sort checks by location of the banks on which the checks are drawn.

⁸A non-par bank charges a fee when checks drawn upon accounts of its depositors are presented for collection by any means other than at the bank's own teller window. Reserve Banks will not accept checks drawn upon such banks for deposit to a member bank reserve account. As of December 31, 1975, there were only 73 non-par banks in the nation.

A survey of checks deposited with this Bank was conducted in January of this year. Column (4) of Table IV reports the percentages of banks within each size group that deposited more than five checks during that month.⁹ A large majority of banks with total assets under \$100 million clear checks through correspondents.

For each bank that deposited more than five checks with the Reserve Bank, the number of checks deposited in January was multiplied by 12 to get an annual rate, and averages within each size group are reported in column (5).¹⁰ A few large banks deposited most of the checks. For instance, the 12 largest banks deposited 79 percent of all checks, and the five largest deposited 74 percent. These figures actually understate the share of checks directly deposited by the largest banks since several of these large banks send checks drawn on banks in other Federal Reserve districts directly to the other Federal Reserve Banks. The survey does not include information on the number of such checks.

Another function involved in check clearing is that of banks *paying* their Reserve Bank for checks drawn upon them (remitting for the Fed's cash letters). The percentages of banks in each group that remit by having their reserve accounts debited are indicated in

⁹There were 15 member banks that deposited from one to five checks in January. To include those banks in the percentages in column (4) would exaggerate the number of banks using the Reserve Bank's check clearing facilities.

¹⁰The volume of checks deposited with Reserve Banks in the first quarter of each year tends to be about three percent below the volume for the previous fourth quarter. Therefore, these figures probably understate the annual rate at which banks deposit checks. Since the Board of Governors of the Federal Reserve System reports volume of checks data only on a quarterly basis, there is no accurate means of adjusting one month's data for seasonal influences.

column (6). Those member banks not using this method arrange for the reserve accounts of their correspondents to be debited, the same method of settlement that is used by nonmember banks.

This settlement function is analyzed as a separate service since the method that member banks use for settlement involves costs and benefits which are different from the costs and benefits involved in the method used for clearing checks. If member banks choose to settle through their reserve accounts, they incur transactions costs involved in meeting their weekly required reserves. If they settle through correspondents, they must compensate correspondents for record keeping and for the transactions costs which they create for their correspondents.

In most size groups in Table IV, the number of banks that have their reserve accounts debited for checks drawn upon them is greater than the number that deposit checks directly with the Reserve Bank. This is probably because depositing checks directly with the Reserve Bank involves more processing by member banks (encoding and sorting) than correspondents require. Remitting for the Fed's cash letters through the reserve account involves only somewhat more frequent adjustments to a member bank's reserve account than remitting through a correspondent's account. However, most of the smaller member banks use a correspondent's account to settle for checks drawn upon themselves. For instance, of the 100 smallest members in the survey, only 16 settle through their reserve accounts, and of the next 100 largest, 38 settle through their reserve accounts.

Coin and Currency Service

One of the important operational functions of Reserve Banks is removing defective currency from circulation and issuing new currency. Reserve Banks provide both member and nonmember banks with coin and currency. Armored car service for pick up and delivery of coin and currency is made available daily at offices of member and nonmember banks in metropolitan areas surrounding offices of Reserve Banks and weekly in other areas. Banks not located on armored car routes receive coin and currency from Reserve Banks through the mail. This service is provided to member banks without charge, whereas nonmember banks are charged fees to cover costs. Reserve Banks charge both members and nonmembers a fee for *wrapped* coin to cover the cost of that operation.

Information on the coin and currency service used by member banks is presented in columns (7) - (10) of Table IV. Column (7) indicates that most member banks receive armored car service. Almost all of the others receive Federal Reserve coin and currency service through the mail (see column 8). The remaining member banks receive money service from correspondents.

When member banks receive money shipments or deposit coin and currency at the Reserve Bank, they can have the Reserve Bank debit or credit their reserve accounts or those of their correspondent banks. Such practices vary among member banks, as indicated in column (9). The method of debiting and crediting for a bank's money service, either through its reserve account or a correspondent account, can be considered a separate aspect of this service, as in the discussion above about settlement for checks drawn upon a member bank.

The degree to which member banks of various sizes use the Federal Reserve's coin and currency service is quantified in column (10) in terms of fees that member banks using this service would be charged as nonmembers. The annual value of coin and currency service to each member bank was calculated at fees charged nonmember banks based upon utilization of that service in September, October, and November of last year. For banks in each size group that receive money service from the Reserve Bank, the average annual value of their money service is presented in column (10).¹¹

Wire Transfers

A Reserve Bank service that is offered exclusively to member banks at no charge is wire transfers—transferring funds electronically from the reserve account of one member bank to the reserve account of any other member bank in the country.¹² This system is used heavily for conducting transactions in the Federal funds market and for making payments for large business customers. Many of the large member banks use the wire transfer service through on-line equipment, initiating and receiving notice of transac-

¹¹There were not sufficient data to calculate the fees member banks receiving coin and currency service through the mail would have been charged for such mail service as nonmembers. The value of the "mailed-money" service for members was calculated based upon what they would have paid as a nonmember for the same value of coin and currency shipments provided through armored car service.

¹²There is a charge for transfers of less than \$1,000.

Table IV

UTILIZATION OF FEDERAL RESERVE BANK SERVICES BY MEMBER BANKS OF VARIOUS SIZE, 1976-77 SURVEY¹

Group Number	Total Assets of Banks in Each Group as of 6/30/76 (thousands of dollars)			(4) Percent of Banks that Clear Checks Through the Reserve Bank ²	(5) Average Annual Number of Checks Cleared by Banks that Clear Checks Through the Reserve Bank	(6) Percent of Banks Remitting for the Fed's Cash Letters Through Debits to Their Reserve Accounts	(7) Percent of Banks Receiving Armored Car Service	(8) Percent of Banks Receiving Money Service Through the Mail	(9) Of Banks Receiving Money Service Through Armored Car or Mail, Percent Having Reserve Account Debited and Credited
	(1) Average	(2) Maximum	(3) Minimum						
	(10) Average Annual Implicit Subsidy to Member Banks from Money Service	(11) Percent of Banks Initiating Wire Transfers Frequently ³	(12) Of Banks Initiating Wire Transfers Frequently, Average Annual Number						
1	\$ 3,891.6	\$ 6,312	—	5%	21,816	15%	75%	20%	53%
2	7,179.8	8,268	\$ 6,384	0	0	45	45	50	58
3	9,592.3	10,351	8,270	15	215,740	20	55	40	74
4	11,706.4	12,998	10,533	25	837,271	25	65	30	58
5	15,051.6	16,395	13,009	10	232,416	20	75	20	47
6	17,723.6	19,995	16,422	30	383,042	35	75	25	60
7	21,790.2	23,766	20,394	10	365,472	20	85	15	60
8	25,991.2	27,536	24,158	40	360,959	50	90	10	75
9	30,952.0	34,037	27,580	40	1,172,649	50	95	5	65
10	40,961.1	46,755	34,527	35	950,337	35	100	—	70
11	69,106.8	107,641	46,836	70	1,778,203	75	100	—	70
12	425,173.8	1,743,592	107,932	92	16,355,889	92	100	—	92
Group Number	(13) Percent of Bank Holding U.S. Government Securities in Book Entry at the Reserve Bank	(14) Of Banks Holding Securities in Book Entry, Average Amount ⁴ (thousands of dollars)	(15) Percent of Banks Holding Definitive Securities at the Reserve Bank for Their Investment Account	(16) Of Banks Holding Definitive Securities at the Reserve Bank, Average Amount ⁵ (thousands of dollars)	(17) Percent of Banks that were Regular Borrowers at Discount Window 1975-1976 ⁵	(18) Annual Cost of Services Used by Member Banks as Percent of Their Average Daily Reserve Balances ⁶			
1	30%	\$ 427.0	25%	\$ 49.4	5%	0.594%			
2	70	985.3	35	403.0	0	0.294			
3	50	1,082.5	35	623.3	5	0.449			
4	40	1,631.6	30	1,669.5	15	0.344 ⁷			
5	55	1,216.7	45	859.8	10	0.275			
6	70	1,051.4	50	1,427.1	10	0.752			
7	55	1,475.1	35	1,915.7	0	0.313			
8	80	2,038.8	70	1,713.4	20	0.481			
9	75	2,466.1	65	2,896.3	10	0.880			
10	75	1,254.0	80	2,762.6	0	0.589			
11	70	5,945.0	65	5,025.2	15	1.015			
12	100	123,808.8	69	13,196.0	23	1.693			

¹The 233 banks in the survey are Eighth District banks in Illinois and Missouri that were members during the period September 1976 through January 1977.

²These banks deposited six or more checks with the Reserve Bank during January 1977.

³These banks initiated six or more wire transfers during the months of November and December 1976.

⁴These are par values of securities held in safekeeping as of November 30, 1976.

⁵These banks borrowed in two different months or for 15 days or more in either 1975 or 1976.

⁶For banks in each size group the cost of services utilized was summed and divided by the sum of their average daily reserve balances in the period September 9, 1976, through January 12, 1977. The cost of clearing a check is estimated at \$0.015. This is above the unit cost reported in the Federal Reserve's *Functional Expense Report*; this cost figure is used as an estimate of unit costs with the relevant capital costs added. The basis for assigning costs to the money service is the schedule of fees for that service charged nonmembers. For banks initiating wire transfers with on-line equipment, the cost of each wire transfer initiated is estimated at \$0.30, based upon data from the *Functional Expense Report*. For banks not on-line for wire transfers, the cost of each wire transfer initiated is estimated as \$2, which is approximately the cost assigned to this service in the account analysis studies of correspondent banks made by the Federal Reserve Bank of Kansas City.

⁷One bank was deleted from group 4 because its utilization of Fed services was so much greater than that of other banks of similar asset size that the percentage that cost of services is of reserve balances with this bank included was unrepresentative for other banks of that asset size.

tions through their own terminals. Other member banks initiate wire transfers by telephone, giving employees at Reserve Banks details of transactions. Non-member banks may use this funds transfer system only indirectly through member banks. During 1976, member banks initiated 21 million wire transfers with a total dollar value of \$35,617.8 billion.

Based upon a survey in November and December of last year, many of the banks either initiated no wire transfers or made minimal use of the service.¹³ Frequent users of the wire transfer service are defined as those initiating more than five wire transfers during the two month period; column (11) presents the percentage of banks in each size group that initiated wire transfers frequently.

The number of wire transfers originated by frequent users was multiplied by six to get annual rates; averages of those annual rates for frequent users of the service are presented in column (12). These calculations indicate that banks in the largest size group initiated most of the wire transfers. As additional evidence, the four banks that initiated the most wire transfers accounted for 86.8 percent of wire transfers that were sent by all banks in the survey, including those of the infrequent users.

Safekeeping of Securities

Reserve Banks hold securities in safekeeping for member banks at no cost to members. Securities are held in two forms:

(1) Certain Federal Government obligations are held at Reserve Banks in book-entry form. No physical debt certificates are issued by the Treasury, but ownership records are kept on the books of the Reserve Banks. Customers of member banks may also hold Federal debt obligations in this form, with the member banks acting as their agents for this service. Ownership of these securities may be changed through wire transfers.

(2) The other form in which securities are held in safekeeping at Reserve Banks is that of definitive securities — actual paper evidence of debt obligations (not limited to Federal Government debt). Reserve Banks collect bond coupons for member banks at no charge, and collect matured bonds at no charge other than shipping charges for collection outside Federal Reserve Bank cities. Collected funds are credited to the reserve accounts of member banks.

¹³Of the 233 banks in the survey, 78 initiated no wire transfers during that period. All but three of the banks not using that service had total assets less than \$35 million. The banks initiating from one to five wire transfers (57 in total) are also relatively small; all but nine had total assets less than \$35 million.

Reserve Banks hold, for nonmembers, Federal Government securities that are required as collateral for U.S. Government deposits at those banks. Reserve Banks also accept, from nonmembers, custody of securities that are pledged as collateral to deposits of bankrupt estates. Other than in these two cases, nonmembers are not allowed to keep securities for their own investment account or for the accounts of their customers in safekeeping with Reserve Banks.

Columns (13) - (16) of Table IV present information on securities that member banks hold in safekeeping with the Reserve Bank. Some member banks do not use this service, preferring to hold securities with their correspondents or in their own vaults. Use of the safekeeping service of the Reserve Bank is somewhat related to bank size, with a greater percentage of the larger banks using this service. However, more of the smaller banks use this service than they do the Reserve Bank's check clearing or wire transfer services.

Borrowing through the Discount Window

Reserve Banks make loans to member banks for various purposes and durations. In the most common situation, a member bank borrows for only a few days at a time, presumably to adjust its reserve position to unanticipated deposit withdrawals or loan demands. This type of lending is called *adjustment credit*. Certain member banks with distinct seasonal patterns in loan demand and deposit flows qualify for *seasonal borrowing privileges*, under which they may borrow fixed amounts from Reserve Banks for several consecutive months. A third category of Federal Reserve lending is *emergency credit*, involving loans for extended periods of time to member banks experiencing financial difficulties that make other sources of funds unavailable to them at prevailing market interest rates. Emergency credit is made available at a higher discount rate than the rates for adjustment credit or seasonal lending. In some circumstances emergency credit can be made available to nonmember banks, but at a higher interest rate than emergency credit for member banks.

The discount rate was above the Federal funds rate during most of 1975 and 1976. Therefore, banks that borrowed at the discount window during those years were generally borrowing to make short-term adjustments to their reserve positions rather than borrowing to profit from a relatively low discount rate, as many banks did in 1974. Banks that are "regular" borrowers at the discount window are identified in this paper as

those that borrowed in either two different months or for a total of 15 days or more in either of the past two years. These "regular" borrowers are assumed to be relying upon the discount window as an important source of short-term credit.

Only 21 banks are identified as "regular" borrowers (see column (17), Table IV).¹⁴ Note that 15 of them had total assets of less than \$35 million. Thus, although most member banks do not borrow when the discount rate is above money market rates, the discount window is an important source of short-term credit for several of the smaller member banks.

Aggregating the Benefits of Membership

The benefits of Federal Reserve membership are measured by summing the costs to the Federal Reserve of providing services to member banks and dividing by their respective average reserve balances at the Reserve Bank. This percentage is called an *implicit rate of return on reserve balances*. Average implicit returns are presented in column (18) of Table IV. The numerator of this ratio is an estimate of the cost to the Reserve Bank of providing check clearing, money service, and wire transfers. This approach overstates the benefits of membership from these services to the extent that member banks use more of these services at zero explicit prices than they would as nonmembers, paying for services by explicit fees or correspondent balances.

Means of allocating the costs of services to individual member banks are discussed in Table IV. No suitable basis was devised for allocating the costs of safekeeping of securities and credit discount services to individual member banks, but, as indicated in Table III, the three services included in calculations in column (18) — check clearing, coin and currency service, and wire transfers — account for about 95 percent of the costs of services provided. Therefore, allocating just the costs of these three services to member banks provides suitable estimates of the benefits of membership measured in terms of costs of services used.

In all size groups the implicit rates of return on reserve balances are quite low.¹⁵ The highest per-

centages are for the largest group of banks in the survey, averaging 1.69 percent. The calculated implicit returns for the largest banks are understated since they do not include the costs to the Federal Reserve System of clearing checks that several of those banks sent directly to other Reserve Banks. For the smaller member banks (the 200 smallest in the survey), the implicit returns average about one-half of one percent.

IMPLICATIONS FOR MEMBERSHIP

Data on implicit returns to the smaller member banks relative to their reserve balances indicate why smaller banks have incentives to withdraw from membership. The survey has too few observations on the utilization of Reserve Bank services by large banks to offer an explanation for why most large banks have remained in the Federal Reserve System.

Smaller Banks

Division of banks into categories of large and small is somewhat arbitrary. For purposes of this discussion small banks are identified as those with total assets less than \$50 million (or roughly those in groups 1-10 in Table IV).

Table IV indicates that most of these banks use few Reserve Bank services. The implicit rate of return on reserves averaged about one-half of one percent for those banks. These results indicate that for most of the smaller member banks, Federal Reserve services are more expensive than the services of correspondent banks, which are close substitutes for the services offered by Reserve Banks.

Implicit returns on demand balances at correspondent banks, similar to the implicit returns on reserve balances discussed above, can be derived from studies of account analysis at correspondent banks. The correspondent banks that perform account analysis keep records of services used by respondent banks and assign dollar values to the utilization of services based upon the costs to the correspondent banks of providing those services. Correspondent banks multiply the average collected demand balances of respondent banks by implicit interest rates, called earnings allowances, to determine periodically whether respondent banks have been holding large enough demand balances to compensate for the services they use.

¹⁴Only 24 member banks out of 233 in the survey borrowed at any time during 1975-76. Therefore, most of the banks that borrowed are identified as regular borrowers.

¹⁵These rates of return would be even lower if the costs of services provided to members were strictly limited to those offered exclusively to member banks. A large share of the costs of services provided to members in these calculations

is the cost of clearing checks drawn upon banks located within the region served by their own Regional Check Processing Center. Nonmember banks may also present such checks to Reserve Banks for collection.

In a survey of 130 correspondent banks conducted by Knight in July 1976, the earnings allowances on collected demand balances, *unadjusted* for the required reserves of correspondent banks against those deposits, ranged from 3.34 to 6.19 percent with an average of 4.5 percent.¹⁶ These percentages indicate the implicit returns respondent banks may receive on their collected demand balances at correspondents if they fully utilize the services made available to them. Thus, correspondent banks make available significantly more services per dollar of collected demand balances than do Reserve Banks, assuming that Reserve Banks are not substantially more efficient than correspondent banks.¹⁷

This conclusion could be challenged on the basis that the smaller member banks could increase their implicit returns on reserve balances substantially if they just made fuller use of Reserve Bank services. This issue is investigated by calculating the implicit returns on reserve balances for a group of banks

with total assets less than \$50 million which make relatively full use of Reserve Bank services. Each of the banks included in this analysis regularly clears local and out-of-district checks directly through the Reserve Bank. There are 34 such banks served by the head office of this Bank. Their total assets as of June 1976 ranged from \$8.8 to \$49.9 million, with average assets of \$27.6 million.¹⁸ All of these banks receive coin and currency service from the Reserve Bank, and all but three of them initiated wire transfers.

The average implicit return to these banks on their reserve balances is 1.32 percent. Thus, although member banks which utilize Reserve Bank services more fully than average can increase their implicit returns on reserve balances substantially, their implicit returns still will be low relative to the implicit interest rates on collected demand balances at correspondents.

Significance of the Costs of Membership — Given the relatively low implicit returns to member banks on their reserve balances, a remaining question is the size of the costs of Federal Reserve membership in relation to bank profits and capital. If the costs of membership are positive but insignificant, current members would not have strong incentives to withdraw from membership. The costs of membership are estimated for a group of member banks which make minimal use of Reserve Bank services. The characteristics of those banks and the procedure for calculating their costs of Federal Reserve membership are presented in the Appendix. Membership costs of banks making minimal use of Reserve Bank services are analyzed because measuring the costs to those banks of obtaining services as nonmembers requires few assumptions.

For the 54 banks included in the analysis, the costs of Federal Reserve membership averaged 1.8 percent of their equity capital in 1976. The cost of membership as a percent of 1976 profits before income taxes and securities gains and losses averaged 11.2 percent among 49 banks with positive profits last year. These calculations indicate that for the smaller member banks making little use of Reserve Bank services, there is a substantial cost associated with Federal Reserve membership.

Why Do So Many of the Small Member Banks Make Minimal Use of Reserve Bank Services? — This

¹⁶For a description of the methodology used in that study of account analysis, see Robert E. Knight, "Account Analysis in Correspondent Banking," *Monthly Review*, Federal Reserve Bank of Kansas City (March 1976), pp. 11-20. The earnings allowances reported in the survey of July 1976 were for collected demand balances of respondent banks net of required reserves that correspondent banks must hold against those deposits. In the discussion above, those earnings allowances were converted to a basis of collected balances unadjusted for required reserves by multiplying by one minus the marginal reserve requirement on demand deposits for correspondent banks, which is assumed to be 16.5 percent, the marginal reserve requirement for member banks with demand deposits greater than \$400 million. This adjustment is made to the earnings allowances by correspondent banks to make them more comparable to the implicit returns on reserve balances of member banks calculated above.

¹⁷Comparisons of implicit returns that member banks receive on their reserve balances to the earning allowances at correspondent banks understate to some extent the differences in implicit yields on reserve balances and collected demand balances at correspondent banks. This bias results from the fact that correspondents are not charged fees for the Reserve Bank services they use as part of their service to respondent banks, and therefore, do not have to include the costs to the Reserve Banks in offering those services in their implicit charges to respondent banks in order to price their services profitably. An objection might be raised to this conclusion on the basis that correspondent banks must set their implicit charges on services they offer to respondent banks high enough to cover their costs of Federal Reserve membership in terms of foregone earnings on the large reserve balances they must hold. If this objection is valid, it would mean that comparison of implicit returns on reserve balances to earnings allowances at correspondent banks would overstate the differences in yield on reserve balances in terms of services relative to the implicit yields on demand balances at correspondents. However, this objection is not valid since the earnings allowances reported above equal the earnings allowances from the recent study of accounts analysis at correspondent banks multiplied by one minus the marginal reserve requirement on demand deposits, thus removing this second source of potential bias.

¹⁸Two other banks had these characteristics but were excluded from this analysis because their utilization of services was unusually great. Apparently those banks serve as check processing centers for other banks in their holding companies.

analysis has not explained *why* most of the smaller member banks make little use of Reserve Bank services. Explanations could be offered for each service separately. For instance, one explanation for why most of the small member banks clear checks through correspondents is the Fed's encoding and sorting requirements. However, a more general explanation, which is supported by the evidence in the sections above, is that most of the smaller member banks find the transactions costs of managing their reserve accounts, while using Reserve Bank services, greater than the benefits derived from using those services.

Use of Reserve Bank check clearing services involves frequent debits and credits to a member bank's reserve account. Having a reserve account debited and credited for money shipments also creates some problems for a member bank in managing its reserve position. When a member bank orders a currency shipment, its reserve account is debited, but the funds transferred to the bank as vault cash are not counted as part of reserve assets for two weeks. For the current reserve settlement week, the funds withdrawn from the bank's reserve account must in general be replaced with funds from another source in order to meet reserve requirements. Use of other Reserve Bank services — wire transfers, safekeeping of securities, and borrowing through the discount window — involves similar adjustments to the reserve positions of member banks.

Member banks know the average reserve balances they are required to hold during each reserve settlement week at the beginning of the week, and most member banks receive statements daily on the balances in their reserve accounts. Even though the Reserve Banks provide members with this information, member banks incur transactions costs in managing their reserve positions if they are using Reserve Bank services which involve frequent debits and credits to their reserve accounts. Banks using such services must monitor their reserve positions closely, project debits and credits to their reserve accounts, sell assets or borrow funds to avoid reserve deficiencies when there are unanticipated debits, and buy assets or lend funds to avoid large excess reserves when they have unanticipated credits.

Large banks cope with such reserve management problems by employing specialists in that function. According to the explanation for the behavior of the smaller member banks developed in this section, a large proportion of them prefer not to incur the transactions costs that result from using Reserve Bank

services directly. Instead they prefer to hold relatively idle balances at the Reserve Bank to meet reserve requirements, obtaining services through correspondents and using their demand balances at correspondents as their working balances. As explained above in the discussion of account analysis at correspondent banks, correspondents require respondent banks to hold average demand balances in some proportion to the costs of services they use. However, correspondent banks require this balancing out less frequently than once a week, thus allowing their respondent banks more flexibility in the use of their demand balances than Reserve Banks allow members in the use of their reserve balances.

Data from the survey discussed above include several observations which tend to support the hypothesis that many of the smaller member banks avoid using Reserve Bank services because of the reserve management problems that would result. Note in columns (6) and (9) of Table IV that in most size groups more banks have their reserve accounts debited and credited for money shipments than have their reserve accounts debited for checks drawn upon them. A member bank orders money shipments in advance and therefore can plan its reserve management over a reserve settlement week, taking such entries into consideration. In contrast, debits to a member bank's reserve account in remitting for the Fed's cash letters come in amounts and with timing that cannot be foreseen accurately. Therefore, one explanation for why more member banks order money shipments through their reserve accounts than settle for checks drawn upon them through their reserve accounts is that debits and credits due to money shipments create smaller transactions costs in managing their reserve positions.

Another observation that supports this view is that the smaller banks which do use services involving frequent debits or credits to their reserve accounts tend to use other such services. Use of one such service forces a bank to deal with the problem of managing its reserve account subject to frequent debits or credits. Thus, using other such Reserve Bank services imposes a smaller marginal burden.

There are 58 banks among the 200 smallest in the recent survey that either deposit checks directly with the Reserve Bank or pay for checks drawn upon them through their reserve accounts. Use of these services involves the most frequent and unpredictable debits and credits to reserve accounts. Of these banks, 52, or 89.7 percent, have their reserve accounts debited and credited for money shipments; of the other 142 mem-

ber banks among the 200 smallest in the survey, only 69, or 48.6 percent, have their reserve accounts debited and credited for money shipments.

A similar difference in behavior exists among these banks with respect to use of the wire transfer service. Of the same 58 banks, 39, or 67.2 percent, initiated more than five wire transfers during a two-month period, whereas among the remaining 142 banks, only 33 banks, or 23.2 percent, initiated wire transfers that frequently. Many of the member banks that did not initiate wire transfers through the Reserve Bank probably did so through correspondents.

The discussion above indicates a preference among the smaller member banks for holding relatively idle balances at Reserve Banks to meet their reserve requirements and holding more active demand balances at correspondents which serve as their working balances. Results in Table V, using observations for all Eighth District member banks, reflect such a pattern of behavior.

One measure of activity in reserve balances and demand balances at correspondents is the standard deviation of daily balances divided by the mean of daily balances. For banks in each size group excluding the 25 largest banks, their demand balances at correspondents are, on average, more variable than their reserve balances, indicating that the smaller member banks tend to hold relatively idle balances with the Reserve Bank and use their demand balances at correspondents as their working balances.

Another measure of variability in daily balances presented in Table V is the average number of days that balances in an account did not change from the previous day. To indicate the limits on these numbers, the data used cover 126 days, and the minimum number of days a bank's reserve balance could remain unchanged is 36, due to weekends and holidays. Many of the smaller member banks leave their reserve balances unchanged for several days in a row. The number of days reserve balances remained unchanged averaged 76.5 among the 60 smallest banks and tended to decline as bank size increased. The number of days demand balances at correspondents remained unchanged were approximately the minimum for banks in all size groups.

Member banks that use the services of correspondents, instead of the services provided by their Reserve Banks, must hold substantial demand balances at correspondents to compensate for the services they use. Thus, many member banks bear double reserve

burdens, meeting the reserve requirements of the Federal Reserve *and* holding demand balances at correspondents that are large enough to exceed the reserve balances that would be required of them as nonmember banks.

In most states nonmember banks can meet their reserve requirements with demand balances at correspondents and CIPC. The last column of Table V indicates that in all size groups Eighth District member banks hold average daily demand balances at correspondents plus CIPC that are larger than their average daily reserve balances at the Reserve Bank. The ratio of demand balances at correspondents plus CIPC to reserve balances is especially high among the smallest member banks and the largest member banks in Table V, the large correspondent banks having especially large CIPC.¹⁹

These observations do not necessarily imply that most member banks would hold the same level of demand balances at correspondents if they became nonmembers. Several studies show that nonmember banks hold larger demand balances at correspondents than member banks of the same deposit size.²⁰ The observations in the last column of Table V do indicate that most member banks hold assets that would count as reserves if they were nonmember banks which are larger than their current reserve balances at the Reserve Bank.

Why Do So Many of the Small Banks Retain Federal Reserve Membership? — The analysis above indicates that there are substantial costs associated with Federal Reserve membership, and yet, as indicated in Table I, many of the banks in the smaller size groups are members of the Federal Reserve. Access to the Federal Reserve services discussed above does not provide sufficient benefits to offset the opportunity costs of required reserves. Therefore, the remaining

¹⁹The numerator of this ratio is demand balances at correspondents plus CIPC for the following reasons. One reason concerns the differences among member banks in the way they record deposits at correspondents. Some banks record the value of deposits to accounts at correspondents as CIPC until the funds are collected; others record deposits at correspondents as demand balances when they make deposits, whether the funds will be available for their use immediately or in a few days. Therefore, adding CIPC to demand balances at correspondents is necessary for getting comparable observations among banks. Member banks that clear checks through their Reserve Banks are required to record uncollected funds as CIPC. If these banks were nonmembers, those CIPC would count as reserve assets. Therefore, these funds are included in the numerator of the ratio in Table V, which shows the extent to which member banks hold double reserve assets.

²⁰See references in footnote 7.

Table V
MANAGEMENT OF CASH ASSETS BY EIGHTH DISTRICT MEMBER BANKS¹

Groups of 20 Banks Ranked from Largest to Smallest (First Group has 5 Banks)	Reserve Balances at the Federal Reserve				Demand Balances Due from Correspondent Banks			
	Average Daily Reserve Balances (thousands of dollars)		Standard Deviation of Reserve Balances Divided by Mean Balance: Average of These Ratios for Each Group of Banks	Average Number of Days Reserve Balances Were the Same as on the Previous Day	Standard Deviation of Balances Due from Mean Balance: Average of These Ratios for Each Group of Banks	Average Number of Days Due From Balances Were the Same as on the Previous Day	Average Ratio of Due from Balances Plus CPC to Reserve Balances	
	Largest in Group of Banks	Smallest in Group of Banks						Average for Group of Banks
1	\$57290.2	\$37248.4	0.4791	36.40	0.6374	40.40	3.12	
2	33156.5	5216.0	0.3454	39.15	0.2735	39.20	2.55	
3	4846.5	2904.0	0.2069	40.55	0.2617	39.35	1.43	
4	2873.8	2205.8	0.1909	40.60	0.2455	39.20	1.50	
5	2176.7	1659.2	0.1440	43.50	0.3429	35.80	1.30	
6	1630.1	1411.4	0.1565	45.55	0.2826	37.70	1.55	
7	1399.9	1254.2	0.2071	42.00	0.3148	37.05	1.45	
8	1245.8	1096.5	0.1503	49.30	0.3034	35.20	1.06	
9	1087.0	971.1	0.2033	45.05	0.3438	38.75	1.31	
10	969.9	843.5	0.2274	46.80	0.3323	34.10	1.50	
11	840.9	762.6	0.1454	53.00	0.3648	37.85	1.35	
12	762.0	706.9	0.1185	57.30	0.3202	36.75	1.69	
13	705.0	633.8	0.1566	57.25	0.3002	34.50	1.66	
14	632.5	585.5	0.1579	55.35	0.3160	36.45	1.97	
15	584.9	479.8	0.2069	52.95	0.2786	33.40	1.57	
16	478.1	408.2	0.1874	64.20	0.3025	45.35	1.56	
17	407.7	344.2	0.1988	64.90	0.3862	36.30	1.78	
18	339.9	289.9	0.2433	59.25	0.3301	36.05	2.11	
19	289.9	256.2	0.2132	60.15	0.3160	31.50	2.45	
20	255.3	212.2	0.1633	82.65	0.3704	32.20	2.24	
21	198.8	136.5	0.2183	70.15	0.2907	33.75	3.49	
22	134.8	7.4	0.3018	76.55	0.4035	35.75	3.27	

¹The 425 banks included in these calculations are all Eighth District banks that were members over the period September 9, 1976 through January 12, 1977. All observations apply to that period.

privilege of Federal Reserve membership which appears to account for retention of membership by the smaller banks is access to a *lender of last resort* through their Reserve Bank's discount window. That privilege is a type of insurance policy on availability to credit during periods of financial difficulty, whether that difficulty occurs within the individual bank or in the whole economy. The cost of membership to a bank can be considered its premium paid for this form of insurance. Since the Federal Reserve has a monopoly on offering the service of lender of last resort, it can charge high premiums for that service, as indicated by the costs of membership calculated above.

Larger Banks

There remains the question of why most of the larger banks remain in the Federal Reserve. One possible explanation is that the large member banks use enough Reserve Bank services to more than compensate them for the opportunity costs of the reserve balances they hold. Table IV provides information on this explanation. Dividing the cost to the Reserve Bank of providing services to banks in the largest group by their average reserve balances yields an implicit rate of return of only 1.69 percent. For the three largest banks in the survey, that implicit rate of return is 1.83 percent. As noted above, these figures are understated somewhat because the checks sent by some of these banks directly to other Reserve Banks are not accounted for. But even allowing for that factor, the large member banks receive a low rate of return on their reserve balances in terms of the costs of the services they use. However, membership may still be profitable for the large banks if access to Federal Reserve services allows them to earn large profits as correspondent banks.

These results do not support the view that the larger banks retain their membership in the Federal Reserve because of high implicit returns on their reserve balances. There are too few large banks included in the survey of the utilization of services by member banks to draw strong conclusions about the generality of these results or the reasons why the larger banks retain their membership in the Fed. However, it is unlikely that many of the large member

banks receive very high implicit rates of return on their reserves in the form of services, since for the Federal Reserve System as a whole the cost of providing services to member banks is approximately one percent of total reserve balances held by members at Reserve Banks. Therefore, the Federal Reserve is effectively imposing a tax on the banking industry, even with Federal Reserve membership being voluntary. The tax takes the form of interest foregone by member banks on their reserve balances less the costs to Reserve Banks of providing services to member banks. At an interest rate of five percent, that tax in 1976 was about \$1 billion.²¹

CONCLUSIONS

An analysis of the costs and benefits of Federal Reserve membership is incomplete without information on the degree to which member banks use the services provided by their Reserve Banks. Member banks with total assets of less than about \$50 million make relatively little use of Reserve Bank services, using the services of correspondents instead. There is evidence that the costs of this arrangement to many of the smaller member banks are lower than the costs of managing their reserve accounts if they made fuller use of Reserve Bank services. Member banks making minimal use of Reserve Bank services bear substantial Federal Reserve membership costs, averaging 11.2 percent of profits and 1.8 percent of equity capital for one group of banks.

Most of the major correspondent banks have remained members of the Federal Reserve. The large banks are heavy users of Reserve Bank services, but their implicit returns on reserve balances in the form of services are substantially higher than the implicit returns to the smaller member banks, but are still rather low.

²¹Member bank reserves held at Reserve Banks averaged \$26.2 billion in 1976. Suppose the opportunity cost to member banks from holding those reserves is 5 percent, the average yield on U.S. Government Treasury bills last year. The total opportunity cost of holding reserves would be \$1.3 billion. With the total costs to Reserve Banks of offering services to member banks between \$200 million and \$300 million, the total implicit tax on banking was about \$1 billion.

APPENDIX

Calculation of the Costs of Federal Reserve Membership

The purpose of the following calculations is to estimate the income that selected banks forego by being members of the Federal Reserve System. Member banks included in this analysis have the following characteristics:

- (a) they clear checks and remit for the Fed's cash letters through correspondents,
- (b) they hold no securities in safekeeping, and
- (c) none of them are regular borrowers through the discount window, as identified above.

Banks with these characteristics are chosen since becoming a nonmember would have less effect on their operations than on other banks in the survey and because specific dollar amounts can be assigned less arbitrarily to the Reserve Bank services they use than for other banks that make use of additional Reserve Bank services. In total, 54 banks meet these conditions; their total assets range from \$3.4 million to \$44.5 million. Only seven of these 54 banks have any demand deposit liabilities due to other commercial banks, averaging \$33 thousand during the two weeks ending January 12, 1977. These banks do not appear to be functioning as correspondents to any significant degree; therefore, no adjustment is necessary for loss of correspondent banking profits due to these banks becoming nonmembers.

The first step involves estimating how much a bank could increase its earning assets if it became a nonmember (assuming its total assets remain unchanged). Since Illinois has no reserve requirements, member banks in Illinois are assumed to increase their earning assets by the amount of their average reserve balances at the Reserve Bank. Of the 54 banks in this analysis 35 are located in Illinois.

The calculations are more complex for Missouri banks. Reserve requirements for nonmember banks in Missouri are approximately equal to those of Federal Reserve members. Nonmember banks in Missouri may hold their reserve assets only as vault cash, demand balances at correspondents, or cash items in the process of collection (CIPC). Banks are assumed to have the same average level of vault cash and CIPC whether they are member or nonmember banks. The reserves necessary to satisfy a bank's state reserve requirements are calculated as its average reserve balance at the Reserve Bank plus its average demand balance at correspondents and CIPC multiplied by the bank's marginal reserve requirements

on demand deposits. Under Fed reserve requirements, demand balances at correspondents and CIPC are subtracted in calculating demand deposits subject to reserve requirements, whereas that deduction is not made for nonmember banks in Missouri. If a bank's demand balances at correspondents are larger than what would be required to meet state reserve requirements as a nonmember bank, the bank is assumed to increase its earning assets by the amount of its current reserve balances at the Fed if it becomes a nonmember. If a bank's demand balances at correspondents are smaller than what would be required to meet state reserve requirements, the amount by which that bank could increase its earning assets is calculated by adding its average reserve balance at the Reserve Bank to its average demand balance at correspondents and subtracting its required reserve balance at correspondents as a nonmember bank. Average daily reserve balances, demand balances at correspondents, and CIPC are measured over the period September 9, 1976, through January 12, 1977.

The income foregone as a member bank is calculated as follows:

- (1) the dollar amounts by which a bank could increase its earning assets as a nonmember is multiplied by five percent.
- (2) the following amounts are deducted from that calculated in (1) above:
 - (a) the annual cost to the bank of obtaining its coin and currency service as a nonmember bank;
 - (b) the number of wire transfers the bank makes at an annual rate multiplied by \$2, the approximate cost of initiating a wire transfer as a nonmember bank;
 - (c) for banks having their reserve accounts debited and credited for money shipments, the number of such ledger entries in a year charged at ten cents per entry. This amount is approximately the implicit charge by correspondent banks per ledger entry in their account analysis.

Among the 54 banks, the resulting measure of income foregone for each bank averages 1.8 percent of 1976 equity capital. For the 49 banks with positive profits in 1976, income foregone as a member of the Federal Reserve averaged 11.2 percent of their 1976 profits.

