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FEDERAL RESERVE BANK OF KANSAS CITY



**UNEMPLOYMENT INSURANCE:
PROGRAMS, PROCEDURES, AND PROBLEMS**

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Farm Real Estate Values— Some Important Determinants

By Marvin Duncan

The value of all farm assets has grown markedly since 1940, increasing from \$53 billion to a total of \$585 billion on January 1, 1976. Though all asset categories have increased sharply, none has grown faster than real estate. The value of real estate in the farm sector balance sheet has grown from \$34 billion in 1940 to \$422 billion in 1976—over 12.5 times its 1940 value. By comparison, total assets less land have increased from \$19 billion in 1940 to \$163 billion in 1976—just under 8.5 times its 1940 value. By another standard of comparison, real estate represented 64 per cent of the total assets of the farming sector in 1940. By 1976, the proportion had risen to 72 per cent. Total liabilities have also grown, from \$10 billion to \$91 billion, during that period. However, the proportion of total liabilities accounted for by real estate debt has decreased over that period from 66 per cent to 56 per cent.

Over the past 36 years, farm real estate has accounted for an increasing proportion of proprietors' equities (net worth) in the farming sector (Chart 1). For example, while proprietors' equities increased 13 per cent during 1975, farm real estate values increased 14 per cent. It is not surprising that farmers and ranchers have become increasingly interested in the land as an asset and in the factors affecting land values. Farmers, ranchers, nonfarm investors, and lenders are asking if the mix of factors affecting

land values has changed—and if present rates of increase in property values are sustainable in the future.

VARIABLES AFFECTING LAND VALUES

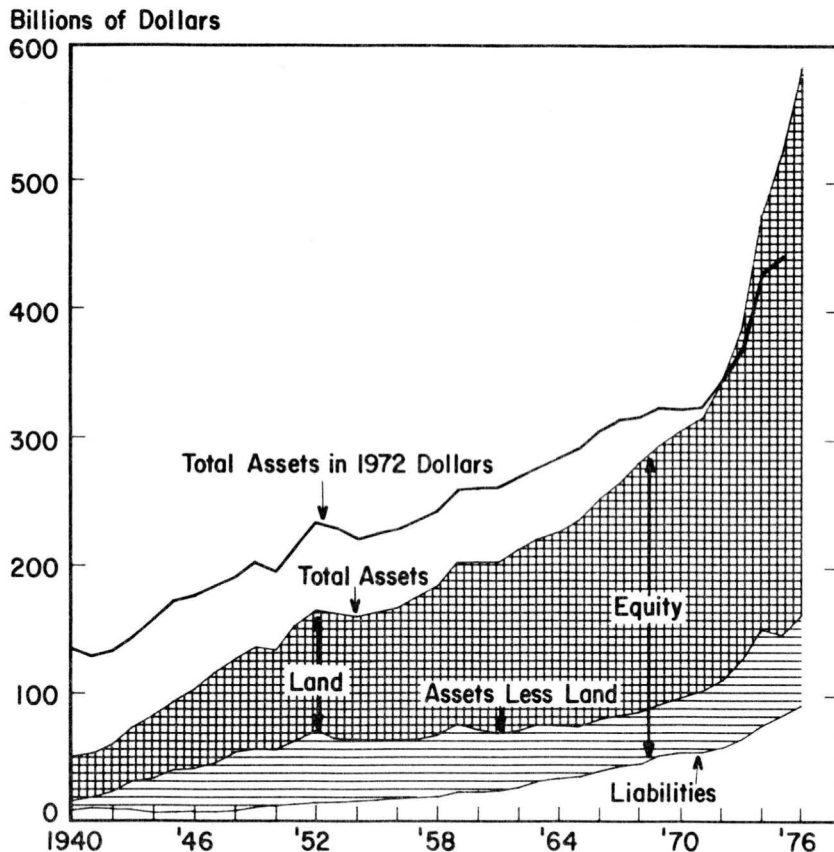
Many variables may affect farm real estate values. For practical purposes, however, it is necessary to reduce the number of factors to be considered in any analysis. Furthermore, variables considered must be consistent with economic theory and adequate data must be available to test the impact of the variables selected on farm real estate values. Another constraint concerns the statistical relationships among the variables considered. For example, if explanatory variables are too closely related (correlated), it may be necessary to let one serve as a proxy variable explaining its own effect, as well as the effect of the others, in the statistical analysis. Finally, using only a few variables believed to have major impact on farm real estate values simplifies the analysis and interpretation of the results.

The following variables are often considered to be major determinants of farm real estate values.

Inflation

Chart 2—in which the indexes charted have 1940 base values of 100—indicates the movements of indexes of farm real estate values

Chart 1
BALANCE SHEET OF FARMING SECTOR



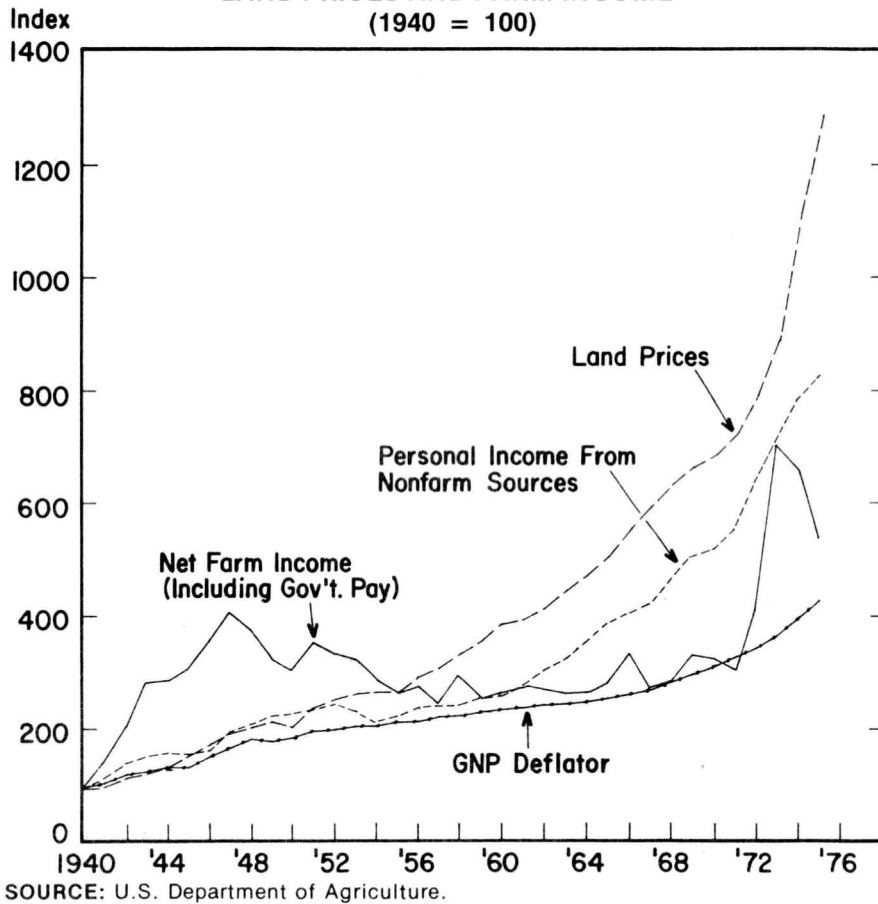
SOURCE: U.S. Department of Agriculture (USDA).

and the implicit price deflator for GNP during the 1940-76 period.¹ With the exception of 1940 through 1944, the farm real estate price index has been above the GNP deflator index and since 1955 has risen at an increasingly faster rate. Those who contend that land is a good hedge against inflation appear to be correct. Except for a few relatively short periods of time, farm real estate price changes have generally

moved in the same direction as the GNP deflator since 1925. Percentage land price changes have often been greater, however, both on the up and down sides, than percentage changes in the GNP deflator. Correlation analysis of the two indexes indicates a correlation coefficient—adjusted for autocorrelation—of .37 (on a scale of 0 to 1.0) and one that differs significantly from zero. While this does not mean that 37 per cent of farmland price increases are due to inflation—correlation does not imply causation—it does mean that the indexes have exhibited approximate harmony over the past half century.

¹ The implicit price deflator for gross national product (GNP), which adjusts nominal gross national product data for inflation, is the broadest measure of change in the general price level.

Chart 2
LAND PRICES AND FARM INCOME
 (1940 = 100)



SOURCE: U.S. Department of Agriculture.

Farm Income

The value of land is ultimately determined by the value of products produced on the land or uses to which the land can be put (coal mining, urban development, recreation, etc.).² Farm real estate values maintained a fairly stable relationship to farm income trends from the mid-1920's to the mid-1950's. Since then, however, farmland values have increased at an

increasingly rapid rate that has outstripped increases in net farm income—except during the 1971-73 period when rapid increases in farm income were accompanied by rapid increases in land values.

A partial explanation for this apparent paradox may be found in the trend of personal income of the farm population from nonfarm sources (Chart 2). This index has increased at a rate almost comparable to the rate of increase in land prices from 1961 to 1975—land prices increased 225 per cent and personal income from nonfarm sources increased 199 per cent. By 1975, personal income of the farm

² Marvin Duncan, "Farm Real Estate Values," Federal Reserve Bank of Kansas City *Monthly Review* (January 1977), pp. 13-20.

population from nonfarm sources totaled \$22.7 billion and was equal to the realized net income from farming. When inventory adjustments were included, however, net income from farming totaled \$25.6 billion. Income from nonfarm sources has enabled many farm families—particularly new entrants—to meet the cash flow requirements of farm real estate purchases.

Government Payments

Government payments to farmers have been a factor in farm income since the mid-1930's. In 1935, these payments accounted for almost 7.5 per cent of cash receipts to farmers. However, such payments declined in importance until 1955, when they accounted for less than 1 per cent of cash receipts. Beginning in 1956, that proportion rose again, reaching a range of 6 per cent to 7.3 per cent of cash receipts in the late 1960's and early 1970's, before declining to very low levels after 1973.

Farm real estate values have increased because of the lowered risk level in farming resulting from the income maintenance aspects of government farm programs. It has been suggested that capitalization of farm program benefits into land values quite directly leads to the need for more benefits—resulting in higher land values and again the need for more benefits.³ Others note that the proportion of the payments actually capitalized into land values is moderated because of uncertainty over the duration of such payments.⁴ Thus, future buyers of farm real estate need not lose all the additional income flowing from government payments if an appropriate discount rate is used in determining the property value.

³ Walter E. Chryst and John F. Timmons, "The Economic Role of Land Resource Institutions in Agricultural Adjustment," *Dynamics of Land Use: Needed Adjustment* (Ames: Iowa State University Press, 1961), pp. 252-77.

⁴ Robert D. Reinsel and Ronald D. Krenz, *Capitalization of Farm Program Benefits into Land Values* (Economic Research Service, U.S. Department of Agriculture, October 1972).

Capital Gains

With the exception of only 3 years since 1950, holders of farm real estate in the aggregate have enjoyed capital appreciation of that asset (Chart 3). The annual rate of capital appreciation has been as high as 25.2 per cent. In fact, when the rates of income earnings of land⁵ are compared to the capital appreciation rates, the latter could be expected to have had a more profound impact on farm real estate value changes than the former. Thus, expectation of capital appreciation can result in increased farm real estate values.

Alternative Investment Opportunities

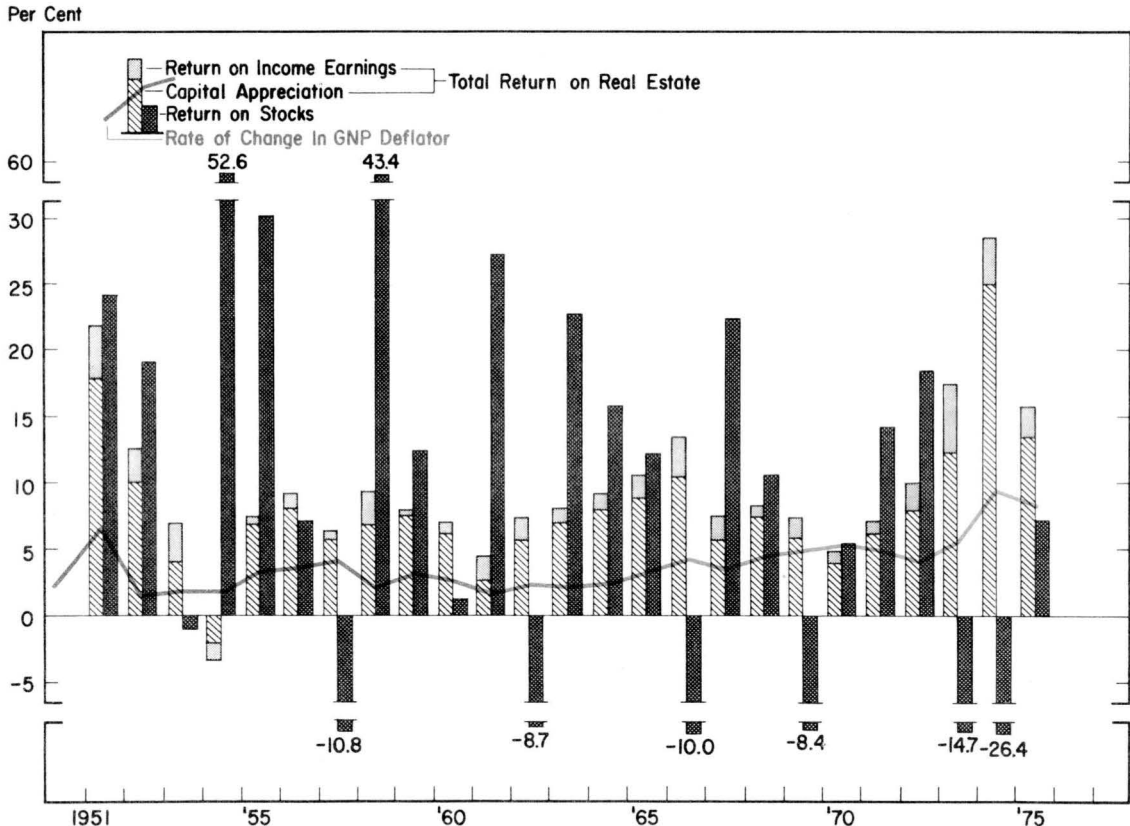
Rational investors make investments that are expected to maximize their total net return over time. Both annual rates of return and rates of capital appreciation must be considered. When returns are higher in agricultural investments than elsewhere, it is reasonable to expect asset prices in the farm sector to be bid up relative to prices of nonfarm assets. Conversely, higher rates of return outside of agriculture would cause investors to shift out of agricultural investments. Between 1940 and 1975, rates of return on common stocks, for example, were below the total rates of return on farm real estate about half the time (Chart 3). On balance, increased profitability of alternative investment opportunities should have a depressing effect on farm real estate values as funds that formerly bid for real estate are invested elsewhere.

Transfers of Farmland

The total number of voluntary farmland transfers is generally taken to represent the supply of farmland on the market during a given time. Farm enlargement demand and the demand for nonfarm uses imply increasing

⁵ Income earnings of land is realized gross farm income including government payments less production costs, family labor costs, and a management charge of 10 per cent of cash receipts.

Chart 3
RATES OF RETURN ON FARM REAL ESTATE AND COMMON STOCKS



SOURCES: U.S. Department of Agriculture.

The common stock return is based on the Standard and Poor's Composite Index and is from Roger G. Ibbotson and Rex A. Sinquefeld, "Stocks, Bonds, Bills, and Inflation: Year-by-Year Returns (1926-1974)," **The Journal of Business** (January 1976), pp. 11-47. Gross farm income less production costs, costs of family labor, and a management charge (10 per cent of cash receipts) divided by the total value of farm real estate yields the rate of return on income earnings.

competition for the available farmland. Thus, a decrease in voluntary transfers (supply) should increase the sale price of farmland.

Farm Enlargement

Land purchases by farmers and ranchers to increase the size of their operations have been a persistent and important factor affecting farm real estate values. A remarkably constant stream of new technology has enabled farmers

and ranchers to handle ever increasing acreage with less manpower. While this technology has generally reduced the per unit cost of production it has frequently been available only in large, discrete units such as four-wheel drive tractors. Thus, to achieve the potential efficiencies resulting from technology, it has often been necessary to expand the scale of farm and ranch enterprises. Average farm size in the United States increased from 145 acres in 1925 to 206

acres in 1950. By 1975, the average farm size had increased to 387 acres. Since 1940, farm size and farm real estate values have both increased—almost without hesitation.

From the individual operator's point of view, technology which reduces costs and increases output enables him to pay higher prices for land needed to expand his operation. However, when many farmers and ranchers follow this strategy they frequently find aggregate output has increased as a result of widespread adoption of the new technology. Because demand is inelastic for most agricultural products,⁶ product prices may decline enough to cause lower gross revenues per acre than prevailed before the adoption of new technology. Thus, technology alone should then result in decreasing land prices. However, as population and per capita income increase, demand for farm products increases. Furthermore, government farm programs support farm income levels and reduce uncertainty associated with agricultural production. Thus, increasing demand, along with the interaction of technology and government farm programs, makes farm enlargement profitable—adding upward thrust to farm real estate values.

MODELS OF FARM REAL ESTATE VALUES

Researchers have used a variety of approaches in formulating econometric models of farm real estate values ranging from very simple single equation models with few explanatory variables to complex multiequation models employing sophisticated statistical techniques for their solutions. A brief discussion of three different models for predicting land prices offers insight into the approaches used.⁷

Tweeten and Nelson explained 95 per cent of the variation in land prices during the 1923-63

⁶ For a given level of demand, a production increase of a given percentage results in a product price decline such that gross revenue is lower than before the production increase.

period, using a five equation model that posited land price as a function of land in farms, farm transfers, the number of farms, last year's net farm income, rate of return on nonfarm investment, and last year's land price.⁸ They concluded that farm enlargement pressure was the most important cause of increase in farmland values during the 1950-63 period. This model has good predictive qualities: A simplified one equation version of the model—using 1925-75 data—explained 98.8 per cent of the variation in land prices during that time period.

Herd and Cochrane developed a simultaneous equation model of the farm real estate market in an effort to explain rising farmland prices in the face of constant income per acre.⁹ They hypothesized that technological advance played an important role in the price increases. Study results indicated that technology (the USDA productivity index), the ratio of prices paid to prices received, and the general price level were primary determinants of farmland prices.

Robert Reinsel, using a different approach, predicted land price as a function of U.S. population and the money supply (including time deposits).¹⁰ The model explained 99.8 per cent of the variation in land prices from 1947-70. Reinsel concluded that inflationary pressures in the economy and increased population pressures were the dominant factors

⁷ Apparently, neither Tweeten and Nelson nor Herd and Cochrane corrected for possible serial correlation in their model solutions. Reinsel used a generalized least squares approach to correct for serial correlation in his model solution.

⁸ Luther G. Tweeten and Ted R. Nelson, *Sources and Repercussions of Changing U.S. Farm Real Estate Values* (Technical Bulletin T-120, Oklahoma State University, April 1966).

⁹ Robert W. Herd and Willard W. Cochrane, "Farm Land Prices and Farm Technological Advance," *Journal of Farm Economics* (May 1966), pp. 243-63.

¹⁰ Robert D. Reinsel, "The Aggregate Real Estate Market" (Unpublished Ph.D. Thesis, Michigan State University, 1973), pp. 107-36.

affecting farm real estate values. Although the model accurately predicts land price, it cannot explain the impact of other important determinants of land values.

A SIMPLE MODEL OF THE FARM REAL ESTATE MARKET

A single equation econometric model of the farm real estate market at a national level has been constructed. Although the model is primarily a predictive one, it also has some capability to explain the impact of certain explanatory variables generally agreed to be important determinants of value. Additionally, some insight into the more important questions currently being raised about farm real estate can be gained by analyzing the model results.

It is reasonable to expect that farmers and ranchers, as well as nonfarm investors, determine what they will bid for farm real estate based on an expected level of realized net income, capital gains, or returns on alternative investments. For this model, the expected values are based on a weighted average of the actual values for the past 3 years.¹¹ Table 1 indicates the variables used in the model. All variables, except voluntary transfers (T) and average farm size (F), are adjusted for inflation using the GNP price deflator. Thus, the real impact (inflation adjusted) of the explanatory variables on farm real estate values can be determined.¹²

Model Results¹³

The empirical results of the land price model are summarized in Table 2. Equation 1 is solved using 1929-75 data. Equation 2 is solved using 1937-75 data in order to include the impact on

¹¹ Expected value = $\frac{3V_{t-1} + 2V_{t-2} + V_{t-3}}{6}$.

¹² The model is of the form:
 $P = \beta_0 + ENFI/A + EPINF/A + GPL/A + Cge + Se + T + F.$

¹³ The reader who is not interested in the detailed econometric findings may wish to go directly to the Summary and Conclusion section, p. 11 of this article.

Table 1
 IDENTIFICATION OF VARIABLES
 USED IN MODEL*

<u>Designation</u>	<u>Description</u>
P	Value of land per acre
ENFI/A	Expected farm operators' realized net farm income/acre
EPINF/A	Expected personal income of the farm population from nonfarm sources/acre
GPL/A	Government payments/acre
Cge	Expected return—earnings plus capital gains—on farm real estate
T	Voluntary transfers of farmland per 1,000 farms
Se	Expected returns on common stock
F	Average farm size (acres)†

*All monetary variables and common stock returns are deflated by the GNP price deflator. Expected values, where used, are calculated from deflated values.

†This variable represents farm enlargement pressures.

land prices of nonfarm income sources of the farm population. All regression coefficients for the explanatory variables have the expected signs, with the possible exception of government payments (GPL/A).

Government payments (GPL/A) has a statistically significant coefficient in equations 1 and 2. However, the coefficient sign is negative, meaning an increase in the size of government payments is associated with a decrease in the price of land. Since government payments is usually considered to be an income component, a positive coefficient sign is normally expected. The negative relationship can be partially

Table 2
ESTIMATED FARM REAL ESTATE VALUE EQUATIONS

Eqtn. No.	Data Period	\bar{R}^2	S.E.	D.W.	Rho ^a	β_0	Variables								
							ENFI/A	EPINF/A	GPL/A	Cge	Cge60-75	Se	T	T42-49	F
1	1929-75 level of significance ^b	.989	4.211	1.912	.930	-95.813	1.381 †		-8.131 ‡	.078	.706 †	-.047	-.084	.062	.669 *
2	1939-75 level of significance	.991	4.025	1.826	.808	-75.163	1.239 ‡	3.066 §	-7.857 §	-.312	.963 †	-.001	-.127	.089	.522 *

^a A generalized least squares (Cochrane-Orcutt) procedure was used to correct for the first order serial correlation. Rho (ρ) is the correcting factor in the general regression equation of the form $Y = X\beta + \Sigma_t + \rho\Sigma_{t-1}$.

^b *significant at 1% level
†significant at 5% level
‡significant at 10% level
§significant at 20% level.

explained by looking at the (GPL/A) and land value data series, adjusted for inflation. Apparently, the variability in government payments during the periods for which equations 1 and 2 are solved—compared to the continued increase in land values—results in a negative relationship. This is particularly evident in the latter part of the data period, when government payments fell to low levels as land values were increasing rapidly.

The most important determinants (statistically significant) of farm real estate values are found to be farm enlargement pressures (F) and expected realized net farm income (ENFI/A). Capital gains expectations were significantly greater during the 1960-75 period (Cge60-75) than previously. Expected personal income by farmers from nonfarm sources (EPINF/A) is a significant determinant in equation 2—but at a lower level of significance. The highly significant positive coefficient for farm enlargement (F) in both equations indicates that variable continues to be a very important factor in explaining increased land values.

The model solutions (Table 2) indicated that expected returns on common stock (Se) and voluntary transfers of farmland (T), though statistically insignificant, are of the expected negative sign. Improved returns from stocks will

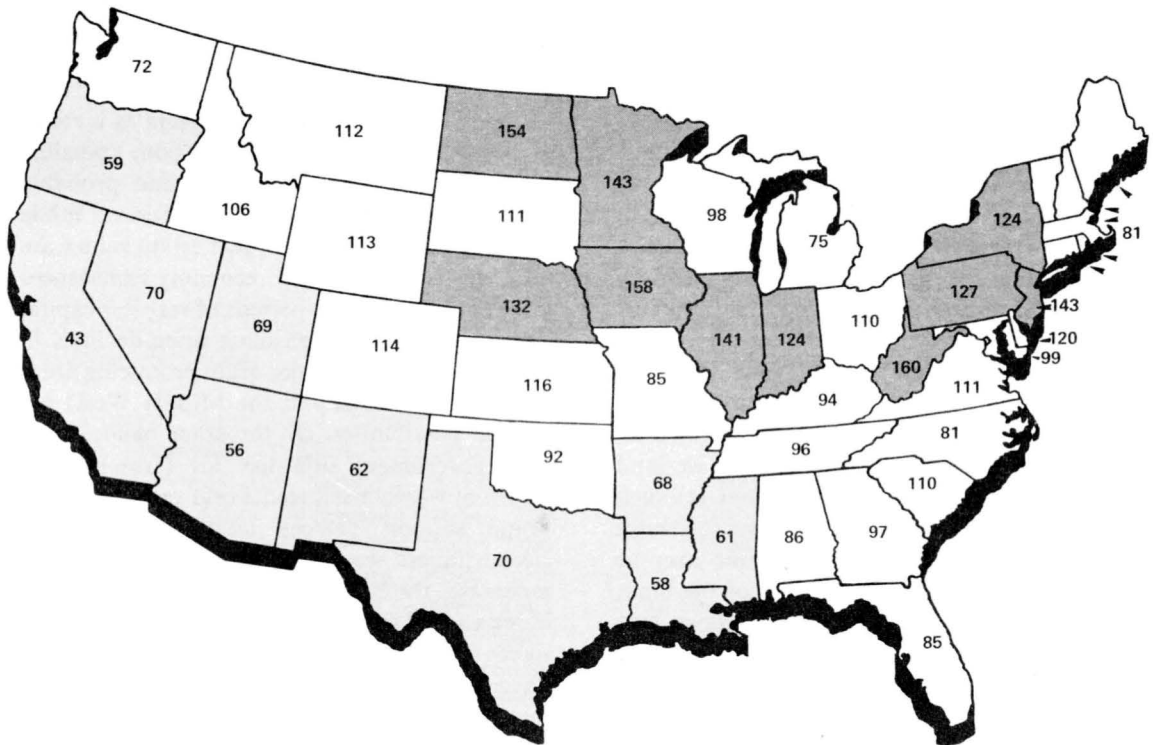
bid investment funds away from land. Increased supply of farmland for sale, indicated by more transfers, can be expected to result in a lower equilibrium price for farmland. The (T42-49) variable accounts separately for a period of unusually large voluntary farm transfers and rising land values and had been expected to have a positive sign. Despite the positive sign, the net impact of farm transfers between 1942 and 1949 (adding the coefficients for T and T42-49) is still negative.

The elasticities¹⁴ for the variables in equation 2 were calculated using 1975 data. A 1 per cent increase in the value of each variable in the equation would be expected to change land price by the following percentage value:

ENFI/A	=	+0.23
EPINF/A	=	+0.23
GPL/A	=	-0.01
Cge	=	-0.04
Cge60-75	=	+0.13
Se	=	0.00
T	=	-0.02
F	=	+0.90

¹⁴ $e = \beta \frac{x}{y}$ where β is the regression coefficient, x is the independent variable, and y is the dependent variable.

PER CENT CHANGE IN AVERAGE VALUE PER ACRE
OF FARM REAL ESTATE, MARCH 1971-FEBRUARY 1976



△ BASED ON INDEX NUMBERS OF AVERAGE VALUE PER ACRE.

SOURCE: U.S. Department of Agriculture.

Generally, most of the same variables important in determining national land values are assumed to be important at a state level, also. However, increases in state land values (Chart 4) will reflect the profitability of agriculture within each state, as well as the impact of such variables as government payments, expected capital gains, and farm enlargement pressures.

SUMMARY AND CONCLUSION

Population and income growth in the United States have increased demand for agricultural products and nonfarm uses of land, providing support for higher farm real estate values.

Increases in land value have also more than kept pace with changes in the general price level (as measured by the GNP deflator). In general, the view that farm real estate is a good hedge against inflation is not unreasonable.

Analysis of real changes—i.e., with the impact of inflation removed—in farm real estate values indicates farm enlargement pressure, farm income, and capital gains expectations continue to be the most important determinants of land prices. Farm enlargement pressure has been a major determinant for at least 35 years. As long as present trends in agricultural technology continue, farm enlargement pressure

will provide an upward thrust to farm real estate values.

Increases in farm real estate values continue to outpace increases in realized net farm income. This situation presents a particularly difficult barrier to new entrants into farming who must amortize large land indebtedness out of current earnings. However, income to farm families from nonfarm sources has been steadily increasing and now is approximately equal to realized net farm income. Consequently, nonfarm income provides an increasingly important cash flow source to service farm real estate debt.

The increased importance, since 1960, of capital gains expectations in determining farm real estate values is not surprising. However, those who expect capital gains to validate land purchase decisions should realize that (1) such expectations do not provide cash flow to service the real estate debt, (2) capital gains may be realized only by sale or refinancing of the land, and (3) present capital gains expectations may be based on short-term farm income and price inflation experience that may not be supported in the future.

On balance, farmland and ranchland will continue to be good long-term investments when realistically priced and when a purchaser can

realistically expect to generate a cash flow sufficient to service the real estate debt—as well as other production costs, debt service, and living expenses. It is quite likely, however, that the rate of increase in farm real estate values (both nominal and real) will decrease substantially over the next few years as a result of lower rates of price inflation, possible reductions in net farm income, and probable reductions in capital gains expectations. While long-term declines in farm real estate values are unlikely—unless the U.S. economy experiences price deflation—short periods of very low capital appreciation or even absolute price declines in some areas (such as major grain producing areas of the Great Plains and the Middle West) are distinct possibilities. On the other hand, large-scale government subsidies for farmers or a return of weather-induced world crop shortfalls would support present land values. Those circumstances would also prevent, or at least moderate, the substantial slowdown in the rate of increase of farm real estate values that market forces appear to dictate. As a result of the uncertain future, farm real estate lenders may increasingly rely on the income earning capacity of land as a measure of collateral value, rather than the previously popular comparable sales approach to determining value.

Comparative Burdens of Federal Reserve Member and Nonmember Banks

By Robert E. Knight

In a recent report the Conference of State Bank Supervisors (CSBS) investigated the relative burdens and benefits of Federal Reserve member and nonmember banks.¹ The study argues that while member banks hold greater amounts of "nonearning" assets, their direct access to Federal Reserve services allows them to serve as correspondents. Consequently, the member bank burden of "nonearning" assets should be adjusted for the benefits derived from performing correspondent activities. When such calculations are performed, the study finds the net burden ratios for the two groups of banks are quite similar, with member banks actually having a lower overall burden than nonmembers. Based on these results the study draws several policy conclusions:

- (1) Subjecting all banks to the Federal Reserve's reserve requirements is not necessary to achieve equitable treatment of member and nonmember banks;
- (2) To the extent any inequities exist, they are as great among member banks as between member and nonmember banks; and

- (3) Any inequities between members and nonmembers are so minor that they could be corrected by altering the reserve requirements of member banks.

In the first portion of this article, the CSBS report is reviewed and evaluated. Subsequently, an alternative approach for measuring the net burdens or benefits of membership to banks is suggested. The alternative method yields estimates of the net "burden/benefit" ratios that vary sharply from those in the CSBS report. In particular, they imply that member banks in all but the largest deposit size category experience a net burden associated with membership.

A REVIEW AND EVALUATION OF THE CSBS STUDY

A summary of the figures analyzed by the CSBS to derive the "burden/benefit" ratios for member and nonmember banks is presented in Table 1. The data are from the December 1973 call report, and all figures are presented as

¹ Lawrence E. Kreider, "Optional Affiliation with the Federal Reserve System for Reserve Purposes Is Consistent with Equitable Treatment Between Banks" (Washington, D.C.: Conference of State Bank Supervisors, 1976).

Table 1

OUTLINE OF CSBS APPROACH FOR DERIVING NET BURDEN RATIOS
OF INSURED MEMBER AND NONMEMBER BANKS

**(All figures are for December 31, 1973, and are expressed as a
percentage of total deposits less cash items in process of collection)**

	MEMBER BANKS	NONMEMBER BANKS
Cash Assets		
1. Reserves with Federal Reserve Banks	0.0572	—
2. Demand Balances Due from Commercial Banks	0.0383	0.0760
3. Vault Cash	0.0168	0.0172
4. Total Cash Assets (= lines 1+2+3)	0.1124	0.0932
Correspondent-Type Liabilities		
5. Collected Demand Balances Due to Commercial Banks (= 57.5% of gross balances)	0.0340*	0.0042
6. Collected Demand Balances Due to Mutual Savings Banks (= 87.6% of gross balances)	0.0019	0.0005
7. Collected Demand Balances Due to U.S. Govern- ment (= 87.6% of gross balances)	0.0149	0.0092
8. Collected Demand Balances Due to States and Political Subdivisions (= 87.6% of gross balances)	0.0239	0.0315
9. Total Collected Correspondent-Type Liabilities (= lines 5+6+7+8)	0.0748	0.0456
Net Correspondent-Type Balances Available to Yield Profits		
10. Net Balances for Profits (= 30% of line 9)	0.0224	0.0137
Nonearning Reserve Assets		
11. Nonearning Reserves at Federal Reserve Banks	0.0390	—
Member Banks: 68.2% of line 1		
Nonmember Banks: None		
12. Nonearning Demand Balances Due from Correspondents	0.0057	0.0396
Member Banks: 14.9% of line 2		
Nonmember Banks: 52.2% of line 2		
13. Nonearning Vault Cash	0.0033	0.0041
Member Banks: 20.2% of line 3		
Nonmember Banks: 24.3% of line 3		
14. Total Nonearning Assets (= lines 11+12+13)	0.0481	0.0438
15. Net Burden Ratios (line 14-10)	0.0257	0.0301

*In Table 7 of the CSBS study, this figure was incorrectly listed as .0366. The totals reported in the study were, however, correct.

ratios to total deposits adjusted (total deposits less cash items in process of collection). Although the balance sheet items excluded from cash assets or included with correspondent-type liabilities could be questioned, the conclusions of the study hinge primarily on the proportions of alternative types of assets and liabilities assumed to represent a net burden or benefit to banks. For example, the CSBS assumes that 30 per cent of the collected correspondent-type balances are available to correspondents to yield net benefits or profits (line 10). On the cost or burden side, the report stipulates that for member banks 14.9 per cent of the gross demand balances due from correspondents are in excess of those required to compensate correspondents, while the comparable percentage for nonmembers is 52.2 per cent (line 12). In the case of vault cash (line 13), the nonearning or nonproductive portion for members is judged to be 20.2 per cent, and for nonmembers, 24.3 per cent. Similarly, 68.2 per cent of the reserves member banks maintain at the Federal Reserve are assumed to be nonearning (line 11). The ratio of total nonearning or nonproductive assets is then computed (line 14) and reduced by the ratio of benefits banks are presumed to derive from their correspondent business (line 10). On balance, the figures suggest that members and nonmembers, respectively, have net burdens equal to 2.57 per cent and 3.01 per cent of total deposits adjusted (line 15).

Despite these summary ratios, the analysis in the report is conducted mainly by comparing the behavior of member and nonmember banks in different deposit size categories. On this level, the study indicates that nonmember banks with total deposits under \$25 million or over \$200 million experience greater burdens than member banks. To the extent these figures are valid, they imply that the 7,040 nonmember banks in these size categories should have an incentive to join the Federal Reserve to lower their net burden. These

conclusions, however, are suspect. The burden ratios estimated in the study are frequently at variance with the common belief that Federal Reserve membership entails a net burden for banks, particularly smaller ones.

Although the CSBS report is presented as an objective research effort, the approach appears arbitrary. In several instances the percentages used to calculate the net "burden/benefit" ratios do not appear to be based on independent analysis or study. The fact that no sources and little justification are given for the more controversial estimates makes their confirmation extremely difficult. Moreover, some of the figures are even inconsistent within the report.

Before turning to the inconsistencies, however, several broader issues raised by the report need to be considered. First, the CSBS study implicitly assumes that the costs of membership are largely offset by the ability of member banks to function as correspondents. The validity of this assumption, though, is uncertain. On the one hand, some observers feel that member banks experience a competitive advantage in the offering of correspondent services because they have direct access to the free services provided by the Federal Reserve, such as check collections. This advantage, moreover, is felt to give them a lead in competing for all correspondent business, even when the services are in no way related to membership status. The fact that member banks hold by far the largest share of balances due to other banks is often cited as proof of this view.

Critics, on the other hand, tend to argue that only large banks are able to offer a full range of correspondent services. In their opinion the fact that larger banks are generally members of the Federal Reserve is irrelevant. To support this hypothesis, the critics maintain that nonmembers are frequently able to obtain access to Federal Reserve services of an operational nature on nearly the same terms as

members.² In addition, they feel that the large number of nonmember banks with "due to" balances is important evidence that the nonmembers are a significant competitive force in the market for correspondent banking.³ Under these circumstances, the critics argue that it makes little sense to consider correspondent business a benefit of a System

² Member bank correspondents, for example, may experience an advantage in soliciting correspondent business because the Federal Reserve accepts cash letters from member banks and collects them without charge. Providing assistance with check collections is one of the most important correspondent services, but correspondents need not be members to gain access to the Federal Reserve's check collection facilities. In the case of regional check processing centers operated by the Federal Reserve, nonmember banks may deposit items drawn on other participating banks. In addition, some nonmember correspondents have developed arrangements whereby they are able to deposit any item for collection directly at a Federal Reserve Bank. A nonmember bank engaging in such practices normally uses a split endorsement, which contains both its name and the name of a member bank. Technically, items are deposited in the name of a member bank which in turn makes funds available to the nonmember as they become collected.

The extent of such practices is presently unknown, but the result is clearly to reduce the need of a correspondent bank to be a member of the Federal Reserve. Moreover, many fundamental correspondent services, such as providing data processing, assisting with loan participations and international transactions, arranging purchases and sales of Federal funds, offering advice and consulting expertise, etc., have little or no relationship to Federal Reserve membership.

Another advantage to member banks offering correspondent services may occur from the restrictions placed on interbank deposits of member banks. Section 19(e) of the Federal Reserve Act limits a member bank's deposit with any nonmember bank to 10 per cent of the member bank's paid up capital and surplus. If this provision were rigidly enforced, member banks would frequently be unable to use nonmember banks as their principal correspondents. In the past, however, this limitation has at times been evaded by obtaining the participation of a third bank. If the member bank's account at the nonmember were to exceed the limit, the nonmember would credit the excess to the account of a third bank. The third bank in turn would simultaneously credit the account of the member bank and debit the account of the nonmember. Thus the nonmember in effect would retain total use of the member bank's funds. In late 1976 the Federal Reserve proposed a regulation to close this loophole.

membership. While this article does not attempt to resolve this debate, one point does require mention. Even if the CSBS argument is accepted, in June 1975 there were 3,272 member banks with no demand balances due to other commercial banks. These banks clearly received no offset to the gross cost of System membership. Computing ratios of the average "burden/benefit" for all member banks in a given deposit size category could seriously distort the situation for individual banks.

A second difficulty with the report involves the use of the call report statistics for estimating the net "burden/benefit" ratios. The correspondent balance figures reported on call report dates are often subject to substantial "window dressing," and can yield unrepresentative results. In fact, if the June 1974 call report figures had been used rather than those for December 1973, the study would have concluded that member banks on average experienced a greater burden than nonmembers, just the opposite of what the December 1973 figures suggested. Furthermore, some of the inferences drawn in the report are clearly the result of overinterpreting the 1-day call report figures. For example, the inequity between the treatment of state chartered member banks and national banks is stressed by showing that state chartered member banks with deposits over \$5 billion had a ratio of reserves on deposit at Reserve Banks that was 72 per cent above the ratio for national banks of the same size.⁴ The charge, however, is invalid. Abstracting from differences in holdings of vault cash or in reservable liabilities, the ratios for both groups would tend to be identical over a statement week since both are subject to the same reserve

³ For example, the June 1975 call report statistics indicate that there were 2,522 member banks and 2,235 nonmember banks with demand balances due to domestic commercial banks. In fact, all commercial banks, both member and nonmember, with total deposits over \$500 million showed demand balances due to other commercial banks.

⁴ Kreider, pp. 10-13.

requirements. The 72 per cent difference merely demonstrates the magnitude of the distortion that can arise when call report figures are used to compare the relative burdens of reserve requirements.⁵

A third problem with the study is that it contains several methodological inconsistencies which influence the conclusions. For instance, in calculating the benefits correspondents derive from the sale of services, the gross "due to" balances are adjusted for uncollected funds or float. However, in measuring the cost to respondent banks of purchasing correspondent services, the total of "due from" balances is assumed to be collected. Certainly "due to" balances which are uncollected are also uncollected on the "due from" side. In recent years correspondent banks have devoted considerable effort to obtaining accurate measures of collected balances, mainly in an attempt to prevent respondents from seeking to sell uncollected correspondent balances in the Federal funds market. Since nonmember banks tend to maintain larger "due from" accounts than members, this inconsistency results in overstating the relative reserve burden of the nonmembers.⁶

Another inconsistency concerns the profitability of providing correspondent services. In particular, the report assumes that the cost of

providing correspondent services is equal to 70 per cent of the income produced by "due to" balances and that the remaining 30 per cent is net profit.⁷ On the other hand, 52.2 per cent and 14.9 per cent of the "due from" balances held by nonmember and member banks, respectively, are stipulated to be in excess of that required to compensate correspondents for services. However, the balances which are assumed to generate profits to correspondents are significantly different under the two estimates. On the respondent side, profits to correspondents would be equal to the interest on \$8.8 billion of "due from" balances; on the correspondent side, profit would be equal to the interest on \$5.2 billion of "due to" balances, a difference of 70 per cent.⁸ This discrepancy is mainly attributable to the nonuniform treatment of collected balances. However, it results either in understating the profitability of correspondents or overstating the net burden to respondents of holding nonproductive "due from" balances. Since nonmembers are assumed to be the major holders of such nonearning balances, the tendency in the latter case would be to overstate the burden of state reserve requirements.

Although the CSBS report rarely discusses the comparative implications of the nonproductive or nonearning compensating balances assumed in the study, the figures raise a number of interesting questions. For instance,

⁵ One way to minimize, although not eliminate, such problems is to analyze only deposit size groups containing sizable numbers of banks. If the figures for any individual bank or small group of banks are not permitted to dominate the averages for a deposit size category, the likelihood of obtaining representative estimates is greatly improved.

⁶ Using data derived from the annual account analysis surveys of the Federal Reserve Bank of Kansas City, the report assumes that 42.5 per cent of correspondent balances due to banks are uncollected. While this figure is probably valid for larger correspondents, smaller correspondents have never been included in the survey. The applicability of this figure to smaller correspondents, consequently, is uncertain. In any event, the adjustment made for float is sizable, and the fact that "due from" balances are not corrected for float leads to a significant distortion.

⁷ Kreider, p. 22.

⁸ The average member and nonmember bank percentages of "due from" balances that are assumed to be in excess of the amount required to compensate correspondents for services are calculated in Table 14 of the CSBS study. The table shows that \$8.776 billion of such balances are available to correspondents to yield profits. In contrast, Table 7 shows the collected demand balances due to commercial banks. Using the 30 per cent profitability ratio stipulated in the study, the figures in Table 7 imply that interest received on \$5.151 billion of collected "due to" balances is available to correspondents as profit. Thus, the report implies respondent banks have provided about 70 per cent more in nonearning funds at correspondents than correspondents are assumed to have received.

why should the nonproductive fraction of a member bank's vault cash ever be less than for a nonmember bank? Why should any bank hold more than the maximum amount of vault cash expected to be required for normal operating needs? Nonmember bank reserve requirements may explain a tendency for nonmember banks to hold large amounts of excess or nonearning balances at correspondents, but why should member banks have such balances? On the other hand, why should the average **total** demand of member banks for correspondent-type services exceed that of nonmembers by about 40 per cent?⁹ Do the extra services that member banks receive from the Federal Reserve require the members to

⁹ The assumed compensating balances required for correspondent-type services can be derived from Tables 1, 2, 13, and 14 of the CSBS study. Specifically, Table 1 indicates that member banks have 5.72 per cent of total deposits adjusted in reserves at the Federal Reserve. Table 13 states that 3.90 per cent of total deposits adjusted or about 68 per cent of these balances are nonearning or nonproductive. Therefore, about 32 per cent of the funds member banks have on deposit at Reserve Banks, equalling 1.82 per cent of total deposits adjusted, are earning assets.

Similarly, Table 2 indicates that member banks hold 3.83 per cent of total deposits as demand balances due from correspondents, but the figures in Table 14 show that 14.9 per cent of these funds are nonproductive, making the remainder, or 3.26 per cent of total deposits adjusted, the earning or productive compensating balances at correspondents. Total earning balances at both correspondents and the Federal Reserve, therefore, are equal to 5.08 per cent of total deposits adjusted.

By comparison, nonmember banks are assumed to obtain correspondent-type services only from correspondent banks. Similar calculations indicate that the report implies that nonmembers on average maintain 3.63 per cent of total deposits adjusted in compensating earning balances at correspondents. Thus, per dollar of deposits, member banks are assumed to keep nearly 40 per cent more earning compensating balances at correspondents than are kept by nonmembers.

Comparison of the additional percentages of correspondent services utilized by member banks in different deposit size categories reveals that the small and the largest member banks are presumed in the CSBS study to require the greatest "extra" correspondent assistance. For instance, member banks with deposits under \$1 million and with deposits between \$1 and \$3 billion are assumed to require 79 per cent and 98 per cent, respectively, more

hold this much more in compensating balances? Member banks, of course, have access to the discount window, but compensating balances are not required for borrowings and direct interest payments are required on any amount borrowed. Access to the discount window, therefore, cannot serve as a justification for the comparatively greater demand for correspondent-type services of member banks. Moreover, since both member and nonmember banks function as correspondents, further study would be required to relate the 40 per cent difference to any derived demand for correspondent-type services which may exist as a result of the provision of these services.

Although evidence is sketchy, the relatively greater demand by member banks for correspondent-type services does not appear to be supported by previous studies. Several years ago the Federal Reserve Bank of Kansas City conducted a small study regarding the demand for transit-type services from correspondents. While large variances were evident among similarly sized banks and while urban banks experienced comparatively greater demands, the analysis was unable to find any regular difference between member and nonmember banks.¹⁰ The study, however, was limited to a comparison of banks with under \$30 million in total deposits. Clearly the difference in the relative demand for correspondent-type services assumed in the CSBS report requires an explanation, but none is provided. The results

correspondent assistance than comparably sized nonmember banks. Although the implied demand by member banks for correspondent-type services in the medium sized deposit categories tends to be closer to that of nonmembers, the figures for the "extra" services required present an irregular pattern.

¹⁰ Robert E. Knight, "The Impact of Changing Check Clearing Arrangements on the Correspondent Banking System," *Monthly Review*, Federal Reserve Bank of Kansas City, December 1972, pp. 14-24.

of the assumptions in the CSBS study, though, are to lower the estimated cost of Federal Reserve membership and to raise the estimated burden experienced by nonmember banks.

The overall approach and the questionable ratios of earning and nonearning assets are the most important issues in an evaluation of the CSBS report, but a variety of less significant questions also exist. Why does the study consider that balances due to the Federal government, states, and political subdivisions are the functional equivalent of correspondent balances? Governmental units certainly require the use of banking services, but the magnitude of government deposits has rarely been determined by the amount necessary to compensate banks for services. Why is no allowance made in the report for the services the Federal Reserve provides to nonmember banks without charge, such as access to regional check processing centers and automated clearinghouses and some security safekeeping? Are member banks in these instances expected to pay the cost for both groups? Why does the report treat cash items in process of collection as a deduction from deposits, as would be the case for member banks, but ignore the fact that in most states nonmembers may count cash items toward meeting reserve requirements? Why are differences in the composition of deposits between member and nonmember banks ignored in the report? In recent years nondeposit liabilities have become a major source of loanable funds to banks. Would the conclusions in any way be changed if the estimated burdens were related to total assets rather than a measure of adjusted deposits?

Such questions warrant further inquiry, but they ignore the fundamental issue that the ratios of nonearning or nonproductive assets stipulated in the report are quite arbitrary. The following sections of this article reestimate the comparative burden of member and nonmember banks using a slightly different

approach. Under the assumption that similarly sized banks have the same total demand for correspondent-type services, the data indicate a cost of Federal Reserve membership for banks in most size categories.

AN ALTERNATIVE APPROACH FOR MEASURING THE COSTS AND BENEFITS OF FEDERAL RESERVE MEMBERSHIP

An Overview of the Model

The approach used in this article to measure the comparative burdens of member and nonmember banks is similar in spirit to that in the CSBS study. Holdings of net earning and nonearning assets and liabilities are estimated as a percentage of deposits for both member and nonmember banks. The first step is to determine the nonearning portion of nonmember bank balances due from correspondents. Since Illinois nonmembers are not subject to any formal reserve requirements and since the "due from" balances maintained by nonmembers nationally are essentially equal to that of the Illinois nonmembers, it is concluded¹ that state reserve requirements on average impose no burden on nonmember banks. The "due from" balances maintained by nonmembers can be considered to be the amount required to compensate correspondents for services.

The second step in the calculation of the burden ratios involves the derivation for member banks of the excess correspondent-type balances due from other banks. In contrast to nonmember banks which generally obtain correspondent services only from correspondents, member banks receive such services from both the Federal Reserve and correspondents. Moreover, the sum of balances member banks keep at correspondents and the Federal Reserve substantially exceeds the balances nonmembers have at correspondents.

The article assumes that similarly sized member and nonmember banks have the same **total** demand for correspondent-type services and that member banks strive to hold no more at correspondents than is required to compensate them fully for services. Therefore, the excess of the sum of balances held by member banks at correspondents and the Federal Reserve over the balances held by nonmembers at correspondents can be taken as indicative of the cost to member banks of System reserve requirements. This excess is considered to be nonearning balances of member banks at the Federal Reserve.

The third step is determining the nonearning portion of vault cash for both member and nonmember banks. Although it is not clear why any bank would choose to hold more vault cash than required for operating purposes, the nonearning portions stipulated in the CSBS study are sufficiently small that they have relatively little effect on the estimated burden ratios. As a result, the CSBS estimates are used without modification. Thus, the major factors creating burdens for banks are the nonearning portions of vault cash and balances held at the Federal Reserve. This sum is then reduced by the proportion of balances due to respondent banks that are in excess of that required to compensate correspondents for performing services. In other words, the benefit ratio is equal to the proportion of "due to" balances that is assumed to yield profits to correspondents.

The next section of the article describes the data used to generate the estimates of the "burden/benefit" ratios. In the succeeding section, the "burden/benefit" ratios are derived.

The Data

In the model developed here the data analyzed are from the June 1975 call report, rather than the December 1973 call used by the CSBS. The alternate date has been selected

because the figures are more recent and because correspondent balance totals are often subject to less window dressing on the June call. The shift of dates, however, does not significantly affect the results. Had the CSBS used the same ratios to analyze the June 1975 data as were used for December 1973, the report would have found that both member and nonmember banks experienced slightly lighter burdens of nonearning assets than were suggested by the 1973 figures. The relative burden of nonmember banks, though, would have appeared greater in 1975 than in 1973. Specifically, for 1973 the CSBS found that the proportion of total deposits adjusted that was nonearning was 2.57 per cent for member banks and 3.01 per cent for nonmembers, a difference of .44 per cent. By comparison, the 1975 data suggest figures of 2.45 per cent for members and 3.00 per cent for nonmembers, thus implying an even greater disparity.

Several other slight modifications are also made in the analysis of the data. In this article, the net "burden/benefit" ratios are expressed as a fraction of total deposits, rather than of total deposits minus cash items in process of collection. This alteration does not modify any of the basic conclusions, although since member banks have a higher ratio of cash items in process of collection the change tends to lower the "burden/benefit" ratio relatively for member banks. A second modification involves the exclusion of demand balances due to government units from correspondent totals. The reason the CSBS considers these deposits to be in the same category as correspondent balances is not clear. These funds are often allocated among banks in proportion to their deposit sizes and Federal Reserve membership is rarely of any direct significance in the allocation. Moreover, few governmental units make frequent use of many correspondent services other than check collections. Regardless, since nonmember banks had slightly greater ratios of these deposits on both

call dates, their exclusion from the present analysis has the relative effect of understating the profits nonmember banks derive from these deposits. The overall effect of these modifications, therefore, is to raise the "net burden" ratio for nonmember banks relative to that of member banks. Consequently, to the extent any biases have been introduced in these modifications, they are all in the direction of confirming the hypotheses in the CSBS report.

A comparison of member and nonmember bank holdings of cash assets—vault cash, correspondent balances, cash items in process of collection, and deposits at the Federal Reserve—is shown in Table 2. Since both member and nonmember banks utilize many services of the correspondent banking system, both groups hold large balances with correspondents as compensation. When deflated by deposits, however, the table shows that smaller banks place between 5 and 9 per cent of total deposits in correspondent balances. The percentage generally declines as bank size increases, although banks in the largest deposit size category evidence some increase. Member banks, moreover, regularly hold smaller balances with correspondents than do nonmembers. The lower average of member bank "due from" balances undoubtedly reflects the facts that member bank reserves partly satisfy a need for liquidity and that the Federal Reserve performs some services for members which might otherwise be handled by correspondents. The additional fraction of deposits maintained in correspondent balances by nonmember banks averages between 1.2 and 8.4 per cent of total deposits, with the largest differential by far occurring for banks with total deposits over \$1 billion.

Cash items in process of collection rise rapidly with bank size for both member and nonmember banks. The relatively low fraction of deposits represented by cash items at smaller banks is probably not very meaningful since most small banks tend to classify cash items as

"due from banks" immediately upon dispatch of a cash letter. As a result, a tendency exists to understate cash items and to overstate "due from" balances. Normally this misclassification is of no significance. Member banks are permitted to deduct the total of cash items and "due from" balances in computing deposits subject to reserve requirements, while nonmember banks are generally allowed to meet state reserve requirements with holdings of either of these assets. By comparison, the table also shows that member banks in each deposit size category regularly hold a slightly larger fraction of deposits in vault cash.

If bank reserves at the Federal Reserve are included with other cash assets, member banks in all deposit size categories hold a higher percentage of deposits in cash assets. Member banks with deposits under \$100 million tend to have between 2.2 and 3.8 per cent of deposits more in cash assets than do comparably sized nonmember banks. For larger member banks the additional fraction of deposits held as cash assets rises sharply, varying between 5.4 and 7.6 per cent of total deposits. In part, this tendency is attributable to the progressive nature of System reserve requirements. In contrast, if cash items in process of collection are excluded from cash assets, the figures in the table could still be used to show that member banks in all but the largest deposit size category hold higher amounts of cash assets, although the differences are not so pronounced.

Demand balances due to mutual savings banks and domestic commercial banks are also shown in Table 2. In all size groupings, member banks have a higher proportion of total deposits in "due to" balances than do nonmembers. As would be expected, the relative importance of these types of deposits tends to rise with the size of the reporting bank. However, even if "due to" balances are netted against total cash assets, member banks in all but the largest deposit size category still hold greater fractions of deposits in cash assets.

Table 2
CASH ASSETS PER \$1,000 OF TOTAL DEPOSITS
June 30, 1975

ALL INSURED COMMERCIAL BANKS IN THE UNITED STATES	TOTAL DEPOSIT SIZE IN MILLIONS OF DOLLARS							
	LESS THAN \$5	\$5 TO \$10	\$10 TO \$25	\$25 TO \$50	\$50 TO \$100	\$100 TO \$500	\$500 TO \$1,000	\$1,000 AND MORE
All Member Banks								
Vault Cash	22.54	17.80	17.00	17.04	17.39	17.85	16.10	9.26
Reserve with Federal Reserve	33.67	34.64	34.96	38.84	42.33	42.75	37.48	53.61
Total Reserves	56.21	52.44	51.96	55.88	59.73	60.60	53.57	62.87
Demand Balances Due from Correspondents	75.34	60.62	50.19	45.20	36.91	31.13	21.66	33.65
Cash Items in Process of Collection	9.66	8.35	12.00	16.89	30.23	60.79	90.51	115.38
Total Cash Assets	141.21	121.41	114.15	117.97	126.87	152.52	165.75	211.90
Demand Balances Due to Domestic Commercial Banks	5.99	3.33	2.87	5.48	12.84	38.19	46.49	86.72
Demand Balances Due to Mutual Savings Banks	1.65	1.18	1.30	0.64	1.16	1.36	1.41	2.43
Total Due to Demand Balances	7.65	4.52	4.17	6.12	14.00	39.55	47.89	89.15
All Nonmember Banks								
Vault Cash	16.75	14.70	15.40	14.99	13.67	14.19	14.83	8.99*
Demand Balances Due from Correspondents	86.84	76.41	71.33	68.35	65.40	67.92	52.13	118.12*
Cash Items in Process of Collection	2.51	3.64	5.40	7.23	9.89	16.03	22.61	30.35*
Total Cash Assets	106.10	94.75	92.13	90.57	88.96	98.14	89.57	157.46*
Demand Balances Due to Domestic Commercial Banks	2.54	1.48	1.66	3.14	11.02	16.87	7.40	13.74*
Demand Balances Due to Mutual Savings Banks	0.09	0.25	0.31	0.33	0.40	0.94	1.97	—
Total Due to Demand Balances	2.63	1.74	1.97	3.47	11.42	17.81	9.37	13.74*
MEMO:								
Demand Deposits Per \$1,000 of Total Deposits								
Member Banks	443.86	394.67	360.13	361.29	364.03	403.93	437.39	452.61*
Nonmember Banks	406.23	362.07	358.63	358.36	359.68	374.71	360.71	409.45*
Number of Banks								
Member Banks	526	931	1,985	1,110	621	462	84	75
Nonmember Banks	2,063	2,239	2,694	970	351	191	15	3

NOTE: Details may not add to totals due to rounding.
 *Sample contains three or fewer banks.

Table 3
CASH ASSETS PER \$1,000 TOTAL DEPOSITS FOR
INSURED NONMEMBER BANKS IN ILLINOIS
June 30, 1975

	TOTAL DEPOSIT SIZE IN MILLIONS OF DOLLARS							
	LESS THAN \$5	\$5 TO \$10	\$10 TO \$25	\$25 TO \$50	\$50 TO \$100	\$100 TO \$500	\$500 TO \$1,000	\$1,000 AND MORE
Vault Cash	16.52	12.16	13.23	12.26	9.50	7.09	—	—
Demand Balances Due from Correspondents	86.76	73.38	61.24	55.62	57.70	57.30	—	—
Cash Items in Process of Collection	2.36	3.25	3.39	5.78	4.96	5.22	—	—
Total Cash Assets	105.63	88.79	77.87	73.65	72.16	69.61	—	—
Demand Balances Due to Domestic Commercial Banks	0.48	0.75	0.45	1.76	4.63	9.40	—	—
Demand Balances Due to Mutual Savings Banks	—	—	—	—	—	—	—	—
Total Due to Demand Balances	0.48	0.75	0.45	1.76	4.63	9.40	—	—
MEMO:								
Demand Deposits Per \$1,000 of Total Deposits	399.67	345.35	329.14	319.78	306.25	265.95	—	—
Number of Banks	149	198	207	102	41	11	—	—

NOTE: Details may not add to totals due to rounding.

ESTIMATED BURDENS OF MEMBER AND NONMEMBER BANKS

Nonearning Member Bank Balances at Reserve Banks

Previous studies of the comparative burden of state nonmember reserve requirements have generally focused on nonmember banks in Illinois. Although Illinois nonmembers are expected to maintain prudent levels of liquidity, they are not subject to any statutory reserve requirement. The "due from" balances maintained by these banks, consequently, are often assumed to be equal to the amount nonmembers must hold to compensate correspondents for services. Cash asset holdings of these Illinois banks on June 30, 1975, are shown in Table 3. A comparison of these figures with those for all nonmember banks in

Table 2 reveals that Illinois nonmembers in the smallest deposit size category had virtually the same relative amount of "due from" balances as all nonmember banks, but in larger deposit size categories held slightly smaller amounts of these balances. The tendency for larger Illinois nonmembers to maintain relatively smaller "due from" accounts could be attributed to the absence of reserve requirements or the fact that demand deposits at these banks comprise a smaller share of deposits than at nonmembers generally. This conclusion, however, may not be warranted. An identical comparison based on the June 30, 1973, call report figures produced nearly the opposite picture.¹¹ At that

¹¹ Robert E. Knight, "Reserve Requirements: Comparative Reserve Requirements at Member and Nonmember Banks," *Monthly Review*, Federal Reserve Bank of Kansas City, April 1974, p. 11.

time Illinois nonmembers with total deposits under \$10 million held slightly smaller amounts of “due from” balances than did all nonmember banks, while larger Illinois nonmembers had somewhat larger amounts of “due from” balances.

While these comparisons demonstrate the magnitude of fluctuations that can occur in “due from” balances on call report dates, the tendency for the Illinois nonmember “due from” ratio to fluctuate closely about the ratio for all nonmember banks suggests two conclusions. The first is that state reserve requirements have a relatively insignificant effect on the “due from” balances maintained by nonmember banks on average. The second conclusion follows from the first and is that the “due from” balances of nonmembers are roughly equal to the amount required to compensate correspondents for services.¹²

Ascertaining the demand of member banks for services from correspondents and the Federal Reserve is more difficult. However, it seems reasonable to presume as a first approximation that banks of similar sizes should on average have the same needs for correspondent-type services. Moreover, since there is no requirement that member banks maintain any correspondent accounts, the balances these banks maintain should be a relatively accurate reflection of the amount member banks must hold to compensate correspondents. The figures in Table 2 indicate that member banks tend to have smaller ratios

¹² The second conclusion must be viewed from the standpoint of a respondent bank. Correspondent banks, of course, earn profit from the provision of services and frequently find in an account analysis that excess balances have been maintained. However, the account analysis rarely includes all correspondent services rendered, and thus may understate the total cost of providing services. Moreover, a respondent bank would normally strive to maintain sufficient excess balances at a correspondent to serve as a justification for a future call on services. In this sense, therefore, “due from” balances can be considered as the amount respondent banks feel must be provided to ensure adequate compensation to correspondents for services.

of “due from” balances at correspondents than do nonmember banks. Given these facts and assumptions, the compensating balances member banks would be required to maintain with the Federal Reserve, if the Federal Reserve priced its services like correspondents, can be calculated. Required compensating balances for services provided member banks by the Federal Reserve would be equal to the difference between member and nonmember bank collected balances at correspondents. In other words, the excess of the sum of balances held by member banks at correspondents and the Federal Reserve over balances held by nonmembers at correspondents can be taken as indicative of the cost to member banks of System reserve requirements. This excess is considered to be nonearning balances of member banks at the Federal Reserve.

In contrast with the approach of the CSBS study, this analysis implies that the holding of demand balances at correspondents entails no real loss to either members or nonmembers. Member banks, however, experience a burden to the extent that the total of their collected “due from” demand balances at correspondents and their balances at Reserve Banks exceeds the collected “due from” demand balances maintained by nonmembers. If the “due from” figures in Table 2 are adjusted for uncollected funds¹³ and the computations described are performed, the burden ratios shown in line 2 of Table 4 are obtained.¹⁴ The results suggest that the reserve requirement burden is higher for smaller banks and ultimately declines as deposit size expands. On average, member banks with total deposits under \$1 billion appear to experience a burden from balances at Reserve Banks of 2.7 to 2.0 per cent of total deposits. In contrast, at 0.6 per cent the ratio is substantially lower for member banks with deposits over \$1 billion. Although this pattern is nearly the reverse of that obtained in the CSBS study, it appears reasonable. Many small banks make almost no

Table 4

COMPARATIVE BURDENS OF NET NONEARNING ASSETS FOR MEMBER AND NONMEMBER BANKS

(All figures are shown per \$1,000 of total deposits)
June 30, 1975

INSURED COMMERCIAL BANKS IN THE UNITED STATES	TOTAL DEPOSIT SIZE IN MILLIONS OF DOLLARS							
	LESS THAN \$5	\$5 TO \$10	\$10 TO \$25	\$25 TO \$50	\$50 TO \$100	\$100 TO \$500	\$500 TO \$1,000	\$1,000 AND MORE
Insured Member Banks								
1. Nonearning Vault Cash . . .	5.634	4.449	4.251	4.260	4.261	3.838	2.978	1.482
2. Nonearning Balances at Federal Reserve Banks . . .	27.242	25.813	23.143	25.899	26.404	22.184	20.447	6.391
3. (less) "Due to" Balances Available for Profit	0.989	0.582	0.530	0.773	1.746	4.885	5.859	10.563
4. Net Burden(+)/Benefit(-) . .	31.887	29.680	26.864	29.386	28.919	21.137	17.566	-2.690
Insured Nonmember Banks								
5. Nonearning Vault Cash . . .	4.187	3.675	3.850	3.748	3.383	3.299	3.225	1.888
6. (less) "Due to" Balances Available for Profit	0.368	0.243	0.275	0.485	1.596	2.489	1.309	1.920
7. Net Burden(+)/Benefit(-) . .	3.819	3.432	3.575	3.263	1.787	0.810	1.916	-0.032

¹³ To obtain an estimate of collected balances at correspondents, the interbank deposit totals shown in Table 2 have been reduced by 44.1 per cent. This figure was obtained from the 1975 account analysis survey of major correspondents and appears to be relatively robust. However, the applicability of this percentage to the "due from" deposits or to smaller correspondents which are less active in offering check collection services is unknown. Following the CSBS approach, the percentage is assumed to be invariant throughout the analysis.

For a description of the 1975 account analysis survey results see Robert E. Knight, "Account Analysis in Correspondent Banking," *Monthly Review*, Federal Reserve Bank of Kansas City, March 1976.

Interestingly, use of the 44.1 per cent figure for the uncollected portion of demand balances is consistent with the assumption that member and nonmember banks with under \$50 million in deposits have the same ratios of total uncollected funds (uncollected "due from" balances plus cash items in process of collection). For larger banks the percentage results in a higher total of uncollected funds for member banks, which could be attributable to the fact that these banks perform clearing services for smaller members and nonmembers.

¹⁴ A numerical example may help to clarify the procedure

used to derive the figures in Table 4 which show nonearning balances of member banks at Reserve Banks. Table 2 indicates that member banks in the smallest deposit size category have balances due from the Federal Reserve and correspondents, respectively, of 33.67 and 75.34, where both figures are expressed per \$1,000 of total deposits. Balances at Reserve Banks represent collected funds, but balances at correspondents include both collected and uncollected funds. Since uncollected funds cannot be used to compensate correspondents for performing services, collected balances must be estimated. Thus, collected balances of members at correspondents are equal to 75.34 times 55.9%, or 42.115. Therefore, total collected balances of members at correspondents and the Federal Reserve are equal to 42.115 plus 33.67, or 75.785.

Similarly, collected funds of nonmembers at correspondents are equal to the "due from" deposits of 86.84 times 55.9%, or 48.543. If both groups of banks have the same demand for correspondent-type services, the compensating balances of each would be identical. However, since member banks are holding 27.242 (= 75.785 minus 48.543) more in correspondent-type balances than nonmembers, this figure is used in Table 4 as a measure of the nonearning balances at the Federal Reserve of member banks in the smallest deposit size category.

use of Federal Reserve services, while large banks are usually the major depositors of cash letters, initiate by far the majority of wire transfers, often make the most frequent demands upon the Fed to supply currency and coin both for their own use and for respondents, etc.

In any event, these burden ratios should be viewed in a relative sense rather than as a precise measure of the actual burden. Implicitly the figures assume that about 31 per cent of the total balances member banks keep at Reserve Banks are nonearning assets. Earning balances, therefore, are equal to about 69 per cent of the total. By comparison, if the yield on the total of member bank balances at the Federal Reserve were equal to the average Treasury bill rate in 1975, only about 35 per cent of the income generated would be required to pay the total cost the Federal Reserve actually experienced in providing services to member banks. However, correspondents are not able to earn interest on the total of deposit funds they receive and would normally include an allowance for profit in the cost of services. If the Federal Reserve's compensating balance requirements were established in the same fashion as a correspondent, between 50 and 55 per cent of the member bank reserves at the Federal Reserve would be required to cover the System's costs of providing services to banks. Window-dressing tendencies or unanticipated movements in interbank balances could easily account for the remaining difference in these two estimates.

A word of caution is in order. The relative burden ratios could be significantly distorted by window dressing. The tendency for window dressing to occur on call report dates suggests that the estimated burden experienced by member banks may be understated. If all banks were to increase their "due from" totals by an equal percentage on call report dates, the fact that nonmember banks have larger "due

from" balances would lead in this model to an overstatement of earning or productive reserves of member banks at Reserve Banks. These considerations suggest that the relative burden ratios are probably representative, but that the actual figures may be biased downward.

Nonearning Vault Cash

The CSBS study assumes that certain portions of vault cash for both member and nonmember banks are nonearning. In the case of members, the nonearning fraction is assumed to fall from 25 per cent for banks with deposits under \$75 million to 15 per cent for banks with deposits over \$5 billion. For nonmember banks the ratio falls from 25 per cent for the smallest to 20 per cent for the largest. Although it is not clear why any bank would hold vault cash that exceeded its maximum likely operating needs, vault cash comprises a relatively small percentage of cash assets. The nonearning component, therefore, has relatively little impact on the burden ratios which are expressed as a fraction of total deposits. Under these circumstances, the nonearning percentages suggested by the CSBS report have been used to estimate the nonearning vault cash ratios for member and nonmember banks. The estimated burden figures for vault cash are shown in lines 1 and 5 of Table 4.

Earning "Due to" Balances

The CSBS study, as mentioned previously, calculates the earning portion of demand balances due to banks and government units by adjusting ledger balances for float and then assuming that 30 per cent of the interest earned on the remaining collected balances represents profit. This approach tends to be overly simplistic. Account analysis surveys have generally found that correspondent banks incorporate a substantial profit margin into their analysis. In 1975, the most common

pretax allowance was 25 per cent.¹⁵ Correspondents, though, rarely realize profits of this magnitude. The primary reason is that the account analysis usually lists only those services that are easily quantifiable—number of items deposited, ledger entry credits or debits, wire transfers, etc.—but rarely covers intangible services such as consulting advice, customer referrals, and loan participation assistance. By seeking a relatively high profit on listed services, correspondents hope to cover the costs and earn a reasonable profit on all services. Either a 25 or 30 per cent figure would tend to overstate actual profits, but for the sake of comparability the 25 per cent figure has been used in the calculations of net benefits.

The treatment of required reserves also demands special mention. Since member banks must hold reserves against demand deposits either in vault cash or in a noninterest earning deposit at the Federal Reserve, the total of collected "due to" balances is not available to generate an interest return. For member banks the investable funds represented by correspondent balances are computed in this study by reducing gross "due to" balances by float and by an allowance for the reserves banks must maintain. Of the remaining balances, 25 per cent is assumed to be available to yield profits to correspondents. In the case of nonmember banks a slightly different approach is utilized. Nonmember banks are also expected to hold reserves against deposits, but these are generally held in correspondent balances which are a form of earning asset. As a result, no deduction was made for the reserves of nonmember correspondents. Ignoring any reserves nonmember banks maintain for "due to" balances may result in overstating the net benefit nonmember banks experience from providing correspondent services, but the magnitude of this bias would be small.

¹⁵ Robert E. Knight, "Account Analysis in Correspondent Banking," *Monthly Review*, Federal Reserve Bank of Kansas City, March 1976.

The estimated benefits member and nonmember banks derive from serving as correspondents are shown in lines 3 and 6 of Table 4. As can be seen, member banks in all deposit size categories have higher benefit ratios, but the magnitude of the ratios is quite small for member banks with deposits under \$100 million. This pattern, of course, reflects the fact that the major correspondent banks are often large member banks.

CONCLUSION

The alternative approach used in this article for measuring the net burden to banks of reserve requirements and the partially offsetting benefits of serving as correspondents implies on balance that member banks experience a burden not borne by nonmembers. The net "burden/benefit" figures in lines 4 and 7 of Table 4 indicate that only in the largest deposit size category does the profit experienced by member banks as correspondents offset the nonearning portion of cash assets. Member banks with total deposits under \$100 million experience a net burden equal to foregone interest on about 3 per cent of total deposits, while the burden for those with deposits between \$100 million and \$1 billion is somewhat less. In contrast, banks with total deposits over \$1 billion appear to experience a net benefit from System membership. Despite the fact that System reserve requirements are quite progressive, these estimates suggest that smaller member banks may operate at a competitive disadvantage relative to the larger ones. The figures further imply that if the Federal Reserve wished to eliminate a cost to membership, it would be necessary to reduce average reserve requirements on total deposits by about 3 percentage points for banks with deposits under \$100 million and by about 2 percentage points for banks with deposits between \$100 million and \$1 billion.

By comparison, the lowest burdens among

nonmembers are also experienced by the largest banks. The most outstanding feature of the figures, however, is the relatively low burden ratios for nonmembers in all deposit size categories. In all but the largest deposit group, the estimated burden for nonmembers is 13 per cent or less of the burden experienced by similarly sized member banks.

These conclusions are nearly the opposite of those of the CSBS report which indicated that on average nonmember banks experienced a heavier burden than members. However, unlike the CSBS report, the figures in this study are consistent with the Federal Reserve's experiences in which the smaller member banks have shown the greatest desire to withdraw from System membership. Nevertheless, a word of caution is in order. While the figures appear to be indicative of relative burdens, they should not be interpreted literally. In the first place, no consideration has been given in the analysis to differences in the deposit composition of member and nonmember banks. The fact that demand deposits comprise a smaller share of total deposits at nonmembers could imply that member banks should normally experience greater comparative burdens. Differences of these magnitudes in relative burdens, however, could not be completely explained by this factor. In addition, no allowance has been made for differences among similarly sized banks in the demand for correspondent services. Factors such as a bank's location, the nature of its business, its liquidity, and the aggressiveness of its management could affect the need for such services. Membership status could also have an impact. Further research would be necessary to determine whether the omission of these factors had introduced any

systematic bias in the calculations. Regardless, the estimated burden figures are at best applicable only to broad classes of banks and may not be representative of the situation at any individual bank. The qualification is significantly reinforced by the fact that all banks have balances due from other banks, but less than half have balances due to other banks.

Secondly, the computations are based on 1-day figures rather than daily averages. The extent to which this may bias the results is unknown, but evidence considered earlier suggested that window dressing at the time of the call was significant. Thirdly, the model requires fewer assumptions about the earning or nonearning components of balance sheet items than did the CSBS analysis, but to the extent the assumed proportions are wrong, the net burden ratios would be biased. Finally, the issue has not been resolved as to whether the ability to serve as a correspondent bank should be considered a benefit of Federal Reserve membership. If any large bank, member or nonmember, can function effectively as a correspondent, the overall model may be invalid. A number of alternative approaches for measuring the burden of Federal Reserve membership could be used, but these generally tend to arrive at the same conclusion as this article.

In conclusion, the model in this article suggests that even under the type of assumptions introduced by the CSBS study, the burden of nonmember banks is not heavier than that of members. Nonmember banks appear to have a significant competitive advantage over member banks, particularly in the smaller size groupings.