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# BANKING STRUCTURE AND PERFORMANCE: SOME EVIDENCE FROM OHIO

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Numerous studies have examined the relationship between the structure of banking markets and the performance of banks in those markets. The assumption generally made in these studies is that banks operating in competitively structured markets will produce greater output at lower prices. Nearly all of the investigations employed basically four sets of variables designed to measure (1) bank performance, (2) banking market structure, (3) bank size and efficiency, and (4) economic activity in a banking market. Bank performance was usually measured as an aggregate variable for all banks in a specified market. Such measures as the average loan rate and the average service charge on demand deposits were commonly used. The competitive structure of a banking market was generally approximated in these studies by a concentration ratio, which measures the percentage of deposits held by the largest banks in a market. In most cases, bank size and efficiency were represented by deposits, costs, and loan portfolios; and economic activity of a market, by population and income.

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The results of the studies have been generally mixed because of differences in techniques, markets, and variable specifications. Five studies,<sup>1</sup> found a relationship between market structure and performance, although in some cases the relationship appeared to be relatively small. Kaufman, for example, "found the market structure variable consistently significantly related to various measures of bank performance in directions predicted by economic theory."<sup>2</sup> While the relationship was statistically significant, however, the effect of structure on performance was not strong. Relatively large changes in structure were associated with relatively small changes in performance.

Phillips also found a statistically significant and positive relationship between interest rates and concentration ratios, although the relationship appeared to be "economically small." He concludes that "the weight of the evidence is that—with the effects of loan size, bank size, region, and time removed—concentration is positively associated with interest rates on business loans charged by the banks in these 19 metropolitan areas."<sup>3</sup>

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<sup>1</sup>Franklin R. Edwards, "Concentration in Banking and Its Effects on Business Loan Rates," *The Review of Economics and Statistics*, August 1964; Franklin R. Edwards, "The Banking Competition Controversy," *The National Banking Review*, September 1965; George Kaufman, "Bank Market Structure and Performance: The Evidence from Iowa," *The Southern Economic Journal*, April 1966; Almarin Phillips, "Evidence on Concentration in Banking Markets and Interest Rates," *Federal Reserve Bulletin*, June 1967; Charles T. Taylor, "Average Interest Charges, The Loan Mix, and Measures of Competition: Sixth Federal Reserve District Experience," *The Journal of Finance*, December 1968.

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<sup>2</sup>Kaufman, *op. cit.*, p. 438.

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<sup>3</sup>Phillips, *op. cit.*, p. 925.

One study that found an insignificant relationship between bank structure and performance in metropolitan areas concluded that average bank size was the most important banking structure determinant of local loan rates.<sup>4</sup> Moreover, results indicated that the number of banks in a metropolitan area was an insignificant determinant of the loan rates. In a recent study of bank structure in Texas, the authors also found "that variations in the level of concentration appear to have little impact on six important measures of banking performance."<sup>5</sup> They concluded that the results lend support to the position that small shifts in the structure of banking markets (such as through the merger of two competing institutions) do not have an appreciable impact on performance.

Differences in market areas and banking laws, however, make it difficult to apply the structure-performance results from one state to another. This study, therefore, examined the bank structure-performance relationship in Ohio. To obtain a homogeneous sample, the study was limited to effects of market structure on bank performance in counties that are not included in Standard Metropolitan Statistical Areas (non-SMSA).<sup>6</sup> This type of sampling holds conditions constant across markets and provides for a more sensitive test of the structure-performance relationship than some of the other studies. This means, however, that the study results cannot be generalized to other types of

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<sup>4</sup>Paul A. Meyer, "Price Discrimination, Regional Loan Rates, and the Structure of the Banking Industry," *The Journal of Finance*, March 1967, p. 48.

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<sup>5</sup>Donald R. Fraser and Peter S. Rose, "More on Banking Structure and Performance: The Evidence from Texas," *Journal of Financial and Quantitative Analysis*, January 1971, p. 611.

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<sup>6</sup>Counties in which no city has a population over 50,000.

markets. Results of this study indicate that changes in bank structure have little effect on overall bank performance.

## DEFINING THE MARKET AREA

A major reason for restricting this study to nonSMSA counties relates to the problem of defining a relevant bank market area. Since commercial banks are multi-product firms, it becomes difficult, in some cases, to isolate a single geographic area that includes a large percentage of all the different products that are offered by a bank. For example, the relevant market area for demand deposits may be confined to a much narrower area than the market for commercial loans.

In this study, each of the 57 nonSMSA counties in Ohio was considered a single geographic market for banking services. There are two reasons why these counties should approximate relevant market areas. First, the banks in the nonSMSA counties are, on average, smaller (less than \$30 million in deposits) than banks in metropolitan areas and generally derive from 80 to 90 percent of all types of deposit and loan business from their respective counties. Secondly, under Ohio banking laws, a bank cannot establish branch offices outside of the county in which the main office is located.<sup>7</sup> This aspect of the law has a tendency to restrict the influence of a nonurban bank to the county market.

## PERFORMANCE OF BANKS

Just as the geographic market areas for multi-product firms are often difficult to define, the

<sup>7</sup>An exception to this law is made if a bank is headquartered in a city where the limits overlap into two or more counties. The bank may then branch into each of the counties. This situation only existed in two of the 57 counties in this study.

operating performance concepts for these firms are also difficult to measure. When a firm produces one product, such as automobiles or steel, performance can be measured in terms of similar units produced. Banks, however, produce such diverse services as loans, trust services, and demand deposit accounts. Several performance measures must therefore be used to take account of this variety of products.

In this study, five different performance measures ( $V_i$ ) were used to determine the effect of banking structure on the performance of banks operating in 57 county markets in Ohio.

The first performance measure is the ratio of total service charges on demand deposits to total demand deposits ( $V_1$ ). This ratio measures the average price charged for a dollar of demand deposits. The assumption was made that the more competitive the environment in a particular market, the lower would be the average price for the demand deposits. The second performance variable ( $V_2$ ) is the ratio of yearend average net operating earnings to average total capital for the banks in each market. This ratio is one measure of the average profitability of the banks in a market, and it was assumed that a lower average profit rate would be found in markets with a highly competitive environment.

The third performance measure ( $V_3$ ) is the ratio of the total revenue received on loans for a year to the average gross loans outstanding at the end of the year. This ratio is intended to reflect the average loan price charged by the banks in a market, and it was assumed that the more competitive the market environment, the lower the rate would be. However, many problems are involved with an aggregate performance measure such as this. First, aggregating all types of loans for the banks in a particular market may conceal the

**Bank Performance Variables**

$$V_1 = \frac{\text{total service charges on demand deposits}}{\text{total demand deposits}}$$

$$V_2 = \frac{\text{net operating earnings}}{\text{total capital}}$$

$$V_3 = \frac{\text{total revenue on loans}}{\text{gross loans}}$$

$$V_4 = \frac{\text{total interest paid on time and savings deposits}}{\text{total time and savings deposits}}$$

$$V_5 = \text{average price spread } (V_3 - V_4)$$

**Independent Variables**

$$X_1 = \frac{\text{total deposits of two largest banks in county}}{\text{total deposits of banks in county}}$$

$$X_2 = \text{percent change in county population, 1960-1970}$$

$$X_3 = \text{percent change in county per capita personal income, 1959-1969}$$

$$X_4 = \text{the per capita retail sales in county}$$

$$X_5 = \frac{\text{manufacturing covered employment}}{\text{total covered employment in the county}}$$

$$X_6 = \text{number of savings and loan associations in county}$$

$$X_7 = \frac{\text{total consumer loans}}{\text{gross loans}}$$

$$X_8 = \text{average deposit size of bank}$$

$$X_9 = \frac{\text{total operating expenses}}{\text{total assets}}$$

fact that loans have different prices and some banks specialize in a particular type of loan. Thus, the average price of a loan may not be representative of all banks.<sup>8</sup> Secondly, the effective interest rate charged for similar type loans varies

for the different customers of a bank because of factors, such as compensating balances held by the bank. This makes the real price of a loan quite different from the average loan price that was used in most studies. While sample selection can partially alleviate the first problem, the second problem can only be remedied by a very intensive field survey. In this study, the use of banks in nonSMSA counties provided a sample of a fairly homogeneous group of banks (i.e., banks less than \$30 million in deposits tend to have similar loan portfolios), which minimized the loan aggregation problem. The average loan price should, therefore, be generally representative of the majority of banks in the study.

The fourth performance variable ( $V_4$ ) is the ratio of total interest paid on time and savings deposits to the total amount of time and savings deposits held by the banks. This ratio reflects the average price the banks had to pay in order to attract time and savings deposits. Presumably, if a market is highly competitive, the average price paid for the time and savings deposits would be higher. The fifth performance measure ( $V_5$ ) was derived by taking the difference between variables  $V_3$  (average price charged by the banks for loans they have made to various customers) and  $V_4$  (average price the banks had to pay to attract the raw materials in the form of time and savings deposits to make the loans). This difference represents a measure of the average price spread between the so-called output price (average loan rate) and the average price paid for inputs (time and savings deposits). It was expected that the less competitive the environment in a particular market, the larger would be the difference between  $V_3$  and  $V_4$  (i.e., the higher the price charged on loans and the lower the price paid for the time and savings deposits). Even though  $V_5$  is

<sup>8</sup>This problem may partially account for the fact that the results of some of the past studies were very inconclusive. A discussion of this problem appears in: Almarin Phillips, "Evidence on Concentration in Banking Markets and Interest Rates," *Federal Reserve Bulletin*, June 1967.



dependent upon  $V_3$  and  $V_4$ , it does permit an observation of the structure-performance question in a slightly different manner.

## DETERMINANTS OF BANK PERFORMANCE

The operating performance of banks was assumed to be a function of banking structure as well as other bank and market variables. In most structure-performance studies, the structure of a market was generally proxied by a concentration ratio, which indicates the percentage of deposits held by the largest bank or banks in the market.<sup>9</sup> In this study, the two-bank concentration ratio, or the percentage of deposits held by the two largest banks in the market ( $X_1$ ), was used to proxy banking structure. The two-bank ratio was used because it provided an accurate picture of banking structure in the nonSMSA county markets that were used in the study. The assumption was made that the higher the concentration ratio in any single market, the less competitive would be the environment in that market.

Market variables that could affect the performance of banks can generally be put into the classification of "economic activity" or "demand" variables. It can be expected that the comparative performance of banks in two separate markets would be affected by the differing levels of economic activity, or demand for banking services, even if the banking structure is the same. Four variables were used in this study as proxies for economic activity in the individual markets: (1) the percentage change in county population from

1960-1970 ( $X_2$ ), (2) the percentage change in county per capita personal income from 1959 to 1969 ( $X_3$ ), (3) the per capita retail sales in the county ( $X_4$ ) for 1969 and 1970, and (4) manufacturing employment covered by the State unemployment insurance as a percent of total covered employment in the county ( $X_5$ ). Variables  $X_2$  and  $X_3$  serve as proxies for shifts in demand for banking services in a market, and  $X_4$  is a proxy for the level of demand. Variable  $X_5$  was used to control for differences in the level of industrial activity among the markets. It was assumed that the more highly industrialized markets would have a higher level of economic activity.

A sixth market variable was also included to take account of existing and potential competition provided by other financial institutions in each market. The proxy used for this effect was the number of savings and loan associations operating in each market ( $X_6$ ). Presumably, if a large number of savings and loan associations are operating in a particular market, there would be a significant amount of competition for time deposits and certain types of loans in the markets.<sup>10</sup>

Three bank variables were used to take account of bank operations that could alter bank performance. One of these variables is the percent of total loans held in the consumer loan category by the banks in each market ( $X_7$ ). Even though the banks in the sample are fairly homogeneous, this variable was intended to help control for differences in loan mix that could have an effect upon

<sup>9</sup>The number of banks in a market is sometimes used as a structural proxy. However, both Fraser and Rose and Kaufman found that from a statistical viewpoint the concentration ratio and the number of banks in a market area were equally good proxies for the banking structure.

<sup>10</sup>The same values for variables  $X_2$ ,  $X_3$ ,  $X_5$ , and  $X_6$  were used in both the 1969 and 1970 regression equations. This should not hinder the analysis since these data do not change significantly in one year. The number of savings and loan associations was used in  $X_6$  because data were not available on the deposits of savings and loan associations by nonSMSA counties.

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the performance variables. Another bank variable, average bank size ( $X_8$ ), provided an additional control for differing bank behavior among markets. Larger banks tend to behave differently with respect to loan mix and some prices. The ratio of average total operating expenses to average total assets for the banks in each market ( $X_9$ ) presumably measures, on a market level, how efficiently banks are managed.<sup>11</sup> Some banks may be operated more efficiently than others, which would have an effect on market performance. In order to isolate the effect of market structure upon performance, it is necessary, therefore, to control for the effect that other variables, such as efficiency, may have on performance.

## TECHNIQUES AND RESULTS

The structure-performance relationship among banks headquartered in the 57 nonSMSA counties in Ohio was investigated using multiple regression technique. Cross-sectional regressions were computed for two different years, 1969 and 1970, to observe the structure-performance relationships under different monetary conditions.<sup>12</sup> Data for the banks in the 57 counties were taken from the December 1969 and December 1970 "Reports of Condition" and "Reports of Earnings and Dividends," as compiled by bank regulatory agencies.

It was assumed that the performance variable ( $V$ ), which is the average of the values of this variable for all of the banks in a market, was a function of the concentration ( $X_1$ ) and economic

activity ( $X_2-X_6$ ) in the county as well as the types of banks operating in the market ( $X_7-X_9$ ). Therefore,

$$V_{ij} = F(X_{1j}, \dots, X_{9j}) \text{ where } i = \text{performance measure} \\ \text{and } j = \text{market}$$

There are 57 separate markets or observations in the study. The following sections discuss the study results in detail. The Table summarizes the empirical findings; the actual statistical results are presented in the Appendix.

**Service Charge or Demand Deposits.** Results from this set of equations fail to indicate that bank concentration has an important effect on the average service charge on demand deposits. The relationship between service charges and concentration in the 57 nonSMSA counties is weak, with the degree of association insignificant (at the 5 percent level) in both 1969 and 1970. On the other hand, increases in concentration (as indicated by positive coefficients) may tend to increase the average service charge, but the size of this increase would be relatively small.<sup>13</sup>

Bank cost and bank size are significantly related to service charges on demand deposits. The variable for bank costs is significant (at the 0.1 percent level) in both 1969 and 1970, and the positive sign on the coefficients indicates that banks with relatively high total operating cost/asset ratios tend to charge more for their demand deposits. This result may simply imply that the less efficient banks must, and are able to, charge a

<sup>11</sup> Under certain circumstances the bank cost ratio could be viewed as a bank performance variable. However, in this study the cost ratio is only assumed to be a proxy for the differences in bank efficiency that may have an effect on bank performance.

<sup>12</sup> The year 1969 was a relatively tight money period while 1970 was a period of relative monetary ease.

<sup>13</sup> The estimated change in the average service charge brought about by an increase in the concentration ratio can be computed by taking the concentration coefficient and multiplying it by a representative change in the concentration ratio.



Summary of Results of Structure-Performance Tests  
for NonSMSA Counties in Ohio

Independent Variables

Performance Variables	Concentration Ratio	Percent Change in Population	Percent Change in Income	Retail Sales Per Capita	Industrialization Ratio	Number of Savings and Loan Associations	Consumer Loans/Gross Loans	Average Bank Size	Cost Ratio
1969	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>
V <sub>1</sub> —Average service charge on demand deposits	insignificant	insignificant	insignificant	insignificant	insignificant	insignificant	insignificant	significant positive	significant positive
V <sub>2</sub> —Profit rate	insignificant	insignificant	insignificant	insignificant	insignificant	insignificant	significant positive	insignificant	significant negative
V <sub>3</sub> —Average loan rate	insignificant	insignificant	insignificant	significant negative	insignificant	significant positive	insignificant	insignificant	significant positive
V <sub>4</sub> —Average savings rate	insignificant	significant positive	insignificant	significant positive	insignificant	insignificant	significant positive	insignificant	significant positive
V <sub>5</sub> —Price spread	insignificant	insignificant	insignificant	significant negative	insignificant	insignificant	insignificant	insignificant	insignificant
1970									
V <sub>1</sub> —Average service charge on demand deposits	insignificant	insignificant	insignificant	insignificant	insignificant	insignificant	insignificant	significant positive	significant positive
V <sub>2</sub> —Profit rate	insignificant	significant positive	insignificant	insignificant	significant negative	insignificant	significant positive	significant positive	significant negative
V <sub>3</sub> —Average loan rate	insignificant	insignificant	significant positive	insignificant	insignificant	significant positive	insignificant	significant positive	significant positive
V <sub>4</sub> —Average savings rate	insignificant	insignificant	significant positive	significant positive	insignificant	insignificant	insignificant	significant positive	significant negative
V <sub>5</sub> —Price spread	significant positive	insignificant	insignificant	insignificant	insignificant	significant positive	insignificant	significant positive	insignificant

NOTE: Coefficients are significant at the 5 percent critical level. When significant, the sign is indicated.

Source: Federal Reserve Bank of Cleveland

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higher price for their demand deposits.<sup>14</sup> Bank size and the average service charges on demand deposits are also significantly and positively related for both 1969 and 1970. This means that those banks located in counties with a relatively high average deposit size tended to charge more for their demand deposits than banks in counties with a low average deposit size. This result may imply that relatively large banks in the study are located in less competitive market areas. Therefore, they were able to implement higher service charges on demand deposits.<sup>15</sup>

The coefficients of the savings and loan association variables and the four variables for economic activity show no significant relationship to demand deposit service charges for either 1969 or 1970.

**Net Operating Earnings to Total Capital.** The performance variable in this analysis measures profitability of a bank related to its total invested capital. It was hypothesized that banks would be less profitable in a highly competitive market. This hypothesis was somewhat confirmed by the test results, but the findings are relatively insignificant. For 1969, the concentration variable is significant at the 20 percent level, but is insignificant for 1970. The positive sign on the coefficients, however, suggests that a high rate of profit is positively related to a high concentration ratio.

On the other hand, bank profitability is significantly affected by two of the three bank variables—costs and consumer loan/gross loan—according to equations for both 1969 and 1970.

<sup>14</sup>The simple correlation coefficients between bank costs and concentration are  $-0.18$  and  $-0.14$  for 1969 and 1970, respectively.

<sup>15</sup>This point is substantiated somewhat by positive correlation coefficients between bank size and concentration of  $0.22$  and  $0.19$  for 1969 and 1970, respectively.

The cost ratio is negatively related to the profit rate, indicating that banks in markets with relatively higher average costs generally have lower profits. The consumer loan/gross loan variable has a positive sign, indicating that the banks in the more profitable markets had a larger percentage of consumer loans in their portfolio. This result is consistent with other evidence that indicates consumer loans tend to be more profitable for banks than some other types of loans.

There is no significant impact on bank profitability from the economic activity variables for 1969. For 1970, however, the population variable and the industrialization variable are significantly related to the profit rate.<sup>16</sup> The sign on the population variable is positive, indicating that banks in markets that had large increases in population also had high profit rates. The industrialization variable has a coefficient with a negative sign, which implies that banks operating in the more industrialized markets tended to have lower profit rates. This may reflect the fact that these banks must compete with large city banks for the more profitable commercial and industrial loans that are available in these markets.

Bank profitability in the 57 nonSMSA counties does not appear to have been affected by competition from savings and loan institutions.

**Average Loan Rate.** The conclusion that emerges from the analysis of variables that affect loan rates of the banks under study is that the relationship between bank concentration and the loan rate is weak, while the relationship between costs, income, and the number of savings and loan associations is significant. Specifically, the relationship between concentration and average loan

<sup>16</sup>This result implies that the economic activity variables become more sensitive with respect to profit rates during periods of monetary ease.

rates is weak for both 1969 and 1970, and the impact of an increase in bank concentration appears relatively small; i.e., an increase in the concentration ratio of 20 percentage points would have only increased the average loan rate in 1970 by approximately 0.1 percent.<sup>17</sup>

The bank cost variable is highly significant for both years, and the positive sign on the coefficient indicates that banks with relatively high costs also charged high average rates on their loans. This result is similar to the one on average service charges on demand deposits and suggests that the less efficient banks in these markets are able to charge higher rates for their services.

Per capita retail sales and per capita income were found to be significantly related to higher loan rates, although for different years. For 1969, the retail sales per capita variable implies that counties with high retail sales per capita had relatively lower average loan rates. The level of retail sales per capita was assumed to proxy the intensity of economic activity in a market; and, therefore, the lower average loan rate would be consistent with this assumption. For 1970, the per capita income variable indicates increasing demand for bank services; and, therefore, it would be directly related to the average loan rates.

Finally, the operation of savings and loan associations has a significant and positive relationship with bank loan rates. Results of equations for 1969 and 1970 indicate that banks operating in

markets that contain a relatively large number of savings and loan associations had a higher average loan rate. This may imply that, because savings and loan institutions specialize in real estate loans, banks in markets with several such institutions tend to concentrate on selling other types of loans, possibly because the competition is less intense in these other areas.<sup>18</sup> Since the rates on real estate loans are generally lower than the rates on consumer and some other types of loans, the tendency of holding fewer real estate loans in a portfolio would therefore result in a higher average loan rate for the commercial banks in those markets. Thus, it appears that in markets where there are a relatively large number of saving and loan associations, banks had a higher average loan rate.

**Average Time and Savings Rate.** Bank concentration in nonSMSA county markets in Ohio does not appear to have had an important impact on the average savings rate paid by banks in those markets. In both the 1969 and 1970 equations, the relationship between concentration and the rate paid on deposits is insignificant.

Bank costs, however, are highly significant in both equations, and the sign on the coefficients indicates a direct relationship between the average savings rate and the cost ratio.<sup>19</sup> This relationship implies that those banks operating in high average

<sup>17</sup>The average loan rate may have been more precisely measured for 1970 than for 1969, which was a tight money period with increasing loan rates. Since there are usury ceilings in Ohio, the 1969 average loan rate may not represent the effective loan rate. In 1970, however, monetary policy was less restrictive, and loan rates tended to be lower. Therefore, the 1970 average loan rate and the effective loan rate would probably be approximately at the same level.

<sup>18</sup>This result is supported by the correlation coefficients between the number of savings and loan associations in a market and the percentage of various types of loans held by banks in those markets. There was a negative correlation between the number of savings and loan associations and the percentage of consumer and commercial loans held by banks in these markets.

<sup>19</sup>Part of the significance of this relationship is because of the fact that the total operating costs include the interest paid on time and savings deposits.

cost markets paid a relatively high average savings rate.

The level of retail sales per capita is also significant in both the 1969 and 1970 equations. This result implies that a high level of per capita retail sales was associated with a high average time and savings deposit rate. Since retail sales per capita was viewed as a proxy for the level of economic activity in a market, this result is consistent with a high average time and savings rate.

Finally, there is little relationship between the number of savings and loan associations and the rates paid on time and savings deposits, according to equations for 1969 and 1970. This result is a little surprising because it could be expected that savings and loan associations compete directly with banks for time and savings deposits and would, therefore, drive up the average savings rate. However, the relationship could be distorted by the rate ceilings imposed on both types of institutions, which would limit their competition with each other.<sup>20</sup> This factor could account for the absence of a relationship between the number of savings and loan associations and the banks' average savings rate.

**Average Price Spread.** The relationship between the average price spread and concentration is highly significant in the 1970 equation, but is insignificant in the 1969 equation. Both equations show a positive association, implying that a relatively large price spread is associated with a high level of concentration in the 57 banking

markets. However, the relationship is relatively weak, as evidenced by the fact that a 20 percentage point increase in the two-bank concentration ratio would have only increased the average price spread by approximately .002 percent in 1970.

The wide difference in the relationship between the price spread and concentration for 1969 and 1970 is most likely a result of the type of monetary policy that was being pursued in both years. In 1969, policy was restrictive and loan rates and deposit rates were relatively high. However, usury laws in Ohio kept some loans rates from increasing to their natural level, and Regulation Q prohibited the deposit rates for increasing beyond their stated ceilings, causing the spread between the rates to be distorted. In 1970, as the supply of credit expanded, both loan rates and savings rates fell somewhat from their ceiling levels. The demand and supply forces operating in the market, therefore, were relatively free to produce a price spread that was essentially undistorted. As a result, it can be expected that the relationship between concentration and the average price spread is measured more accurately for 1970 than for 1969.

The number of savings and loan associations in the banking markets under study was found to exert some influence on price spread. The positive sign on the savings and loan variable indicates that a relatively large number of these institutions in a market is associated with a large price spread for the banks in those markets. This is consistent with the earlier findings on the average loan rate and average savings rate equations. It could be hypothesized that savings and loan associations do not offer commercial banks as much direct competition for financial services as might be expected. In fact, the presence of a relatively large number

<sup>20</sup> Savings and loan associations have higher ceiling rates than commercial banks. The Federal Reserve System, however, lifted some of the rate ceilings in 1970 for large denomination time deposits. This change would probably not have a great effect on the present findings since many of the banks in this sample do not offer that type of time deposit.

of savings and loan associations in a market may provide banks with an incentive to concentrate on providing financial services that are not offered by savings and loan associations.

The relationship between price spread and other variables examined—such as per capita retail sales—is generally insignificant. The retail sales per capita variable is significant in the 1969 equation, but insignificant for 1970. The negative relationship between retail sales per capita and the price spread is consistent with earlier results.

## SUMMARY AND CONCLUSIONS

This study generally concludes that the structure of markets (as represented by a two-bank concentration ratio) is not strongly related to the aggregate performance of banks in the nonSMSA markets in Ohio. The study differs somewhat from other such studies in that it was limited specifically to nonSMSA county markets in order to obtain a more homogenous sample for the empirical tests.

The only specific variable that appeared to have had a consistent impact on bank performance is the bank cost ratio. This variable is significant in three of the four equations for both 1969 and 1970, implying that bank efficiency may be an important determinant of the performance of banks in the nonSMSA county markets. There may be at least two reasons why most studies of this type have not consistently shown a strong relationship between market structure and bank

performance. First, banking is a regulated industry. Many of the regulations tend to diminish the significance of the relationship between structure and bank performance since the market is not entirely free to determine prices and output and to reward the efficient or punish the inefficient performer.<sup>21</sup>

Secondly, the results from this study may imply that the approach used to measure bank performance was not sufficiently disaggregated to isolate the structure-performance relationship as it exists for banks in these nonSMSA county markets. While the structure of a market affects some aspects of bank performance, it may be very difficult to detect the extent of the relationship with aggregate performance variables. Additional research using disaggregated variables of bank performance (mortgage loan rates or business loan rates instead of average loan rates) is necessary to measure precisely how great an impact market structure has on bank performance.<sup>22</sup> This type of research must be completed for individual states and for different markets within states before any generalized statements can be made with regard to the banking industry and the structure-performance relationship.

<sup>21</sup>For a discussion of this point see: Almarin Phillips, "Competition, Confusion, and Commercial Banking," *The Journal of Finance*, March 1964.

<sup>22</sup>For example see: Donald Jacobs, *Business Loan Costs and Bank Market Structure* (New York: National Bureau of Economic Research, 1971).

# APPENDIX TABLE

## Statistical Results of Structure-Performance Relationship Tests for NonSMSA Counties in Ohio

Performance Variables	Intercept	Concentration Ratio	Percent Change in Population	Percent Change in Income	Retail Sales Per Capita	Industrialization Ratio	Number of Savings and Loan Associations	Consumer Loans/Gross Loans	Average Bank Size	Cost Ratio	R <sup>2</sup>
1969		X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	
V <sub>1</sub> —Average service charge on demand deposits	-.29112 X 10 <sup>-2</sup>	.94213 X 10 <sup>-3</sup> (.78239)	.26268 X 10 <sup>-4</sup> (.81942)	-.56828 X 10 <sup>-6</sup> (-.70743)	.73054 X 10 <sup>-3</sup> (-1.14822)	.29635 X 10 <sup>-5</sup> (.19977)	.16071 X 10 <sup>-3</sup> (1.18134)	.28650 X 10 <sup>-3</sup> (.13477)	.66004 X 10 <sup>-7*</sup> (2.11502)	.17510† (3.61064)	51.4
V <sub>2</sub> —Profit rate	.13929	.36004 X 10 <sup>-1</sup> (1.49472)	.34542 X 10 <sup>-3</sup> (.53865)	-.33158 X 10 <sup>-5</sup> (-.20634)	.15612 X 10 <sup>-1</sup> (1.22672)	-.60545 X 10 <sup>-4</sup> (-.20590)	.18304 X 10 <sup>-2</sup> (.67260)	.93011 X 10 <sup>-1*</sup> (2.18729)	-.47945 X 10 <sup>-6</sup> (-.76802)	-1.72600* (-1.77914)	26.1
V <sub>3</sub> —Average loan rate	.44813 X 10 <sup>-1</sup>	.66914 X 10 <sup>-3</sup> (.22360)	.11717 X 10 <sup>-3</sup> (1.47080)	.46376 X 10 <sup>-6</sup> (.23230)	-.28203 X 10 <sup>-2*</sup> (-1.78375)	.14805 X 10 <sup>-4</sup> (.40529)	.58994 X 10 <sup>-3*</sup> (1.74493)	-.13849 X 10 <sup>-3</sup> (-.26216 X 10 <sup>-1</sup> )	-.32592 X 10 <sup>-8</sup> (-.42024 X 10 <sup>-1</sup> )	.48180† (3.99762)	43.2
V <sub>4</sub> —Average savings rate	.16587 X 10 <sup>-1</sup>	.22414 X 10 <sup>-3</sup> (.97930 X 10 <sup>-1</sup> )	.12226 X 10 <sup>-3*</sup> (2.00654)	.14487 X 10 <sup>-5</sup> (.94884)	.20935 X 10 <sup>-2*</sup> (1.73115)	-.35645 X 10 <sup>-4</sup> (-1.27582)	-.71634 X 10 <sup>-4</sup> (-.27703)	-.88715 X 10 <sup>-2*</sup> (2.19566)	-.19796 X 10 <sup>-7</sup> (-.33373)	.50038† (5.42831)	60.6
V <sub>5</sub> —Price spread	.28226 X 10 <sup>-1</sup>	.44500 X 10 <sup>-3</sup> (.14438)	-.50878 X 10 <sup>-5</sup> (-.62007 X 10 <sup>-1</sup> )	.98500 X 10 <sup>-6</sup> (-.47906)	-.49138 X 10 <sup>-2†</sup> (-3.01747)	.50450 X 10 <sup>-4</sup> (1.34095)	.66157 X 10 <sup>-3</sup> (1.34095)	.87330 X 10 <sup>-2</sup> (1.60506)	.16536 X 10 <sup>-7</sup> (.20702)	-1.18575 X 10 <sup>-1</sup> (-.14964)	32.8
1970											
V <sub>1</sub> —Average service charge on demand deposits	-.24666 X 10 <sup>-2</sup>	.91616 X 10 <sup>-3</sup> (.70129)	.39042 X 10 <sup>-4</sup> (1.15806)	-.27094 X 10 <sup>-6</sup> (-.30953)	-.69165 X 10 <sup>-3</sup> (-1.37266)	.53850 X 10 <sup>-6</sup> (.33964 X 10 <sup>-1</sup> )	.23438 X 10 <sup>-3</sup> (1.54791)	-.54663 X 10 <sup>-3</sup> (-.21476)	.61106 X 10 <sup>-7*</sup> (2.05432)	.15238† (3.33138)	48.6
V <sub>2</sub> —Profit rate	.27117	.26421 X 10 <sup>-1</sup> (1.16675)	.11794 X 10 <sup>-2*</sup> (2.01821)	.15707 X 10 <sup>-5</sup> (.10351)	-.31025 X 10 <sup>-2</sup> (-.35520)	-.55160 X 10 <sup>-3*</sup> (-2.00705)	.20936 X 10 <sup>-2</sup> (.79767)	.11881† (2.69298)	.28658 X 10 <sup>-6</sup> (.55581)	-3.64484† (-4.59683)	44.7
V <sub>3</sub> —Average loan rate	.42282 X 10 <sup>-1</sup>	.56482 X 10 <sup>-2</sup> (1.48064)	.11218 X 10 <sup>-3</sup> (1.13958)	.45742 X 10 <sup>-5*</sup> (1.78961)	-.19429 X 10 <sup>-3</sup> (-.13205)	-.49444 X 10 <sup>-4</sup> (-1.06799)	.100088 X 10 <sup>-2*</sup> (2.28170)	.56415 X 10 <sup>-2</sup> (.75906)	.56205 X 10 <sup>-8</sup> (.64710 X 10 <sup>-1</sup> )	.43478† (3.25515)	41.8
V <sub>4</sub> —Average savings rate	.24809 X 10 <sup>-1</sup>	-.29472 X 10 <sup>-2</sup> (-1.24553)	.66502 X 10 <sup>-4</sup> (1.08903)	.35315 X 10 <sup>-5*</sup> (2.22741)	.17197 X 10 <sup>-2*</sup> (1.88431)	-.23025 X 10 <sup>-4</sup> (-.80178)	-.20095 X 10 <sup>-3</sup> (-.73270)	-.40452 X 10 <sup>-2</sup> (-.87745)	.34851 X 10 <sup>-7</sup> (.64686)	.33504† (4.04385)	49.2
V <sub>5</sub> —Price spread	.17472 X 10 <sup>-1</sup>	.85955 X 10 <sup>-2*</sup> (2.41178)	.45683 X 10 <sup>-4</sup> (.49670)	.10427 X 10 <sup>-5</sup> (.43664)	-.19140 X 10 <sup>-2</sup> (-1.39242)	-.26418 X 10 <sup>-4</sup> (-.61078)	.12097 X 10 <sup>-2†</sup> (2.92872)	.96868 X 10 <sup>-2</sup> (1.39505)	-.29231 X 10 <sup>-7</sup> (-.36021)	.99741 X 10 <sup>-1</sup> (.79929)	35.8

NOTE: Figures in parentheses are t-values.

\* Significant at the 5 percent level.

† Significant at the 1 percent level.

Source: Federal Reserve Bank of Cleveland



# THE STRUCTURE OF STATE REVENUE

*Warren E. Farb*

## INTRODUCTION

State governments have been faced with both increased operational costs and continually growing demands for public services. As a result, the states have found it necessary to increase tax rates and institute new taxes. They have also turned to the Federal Government for financial aid. In the past, Federal aid has been in the form of grants for specific programs; but in the future, some funds may be distributed through a form of revenue sharing for use largely at the discretion of the recipient government. The proposals for revenue sharing that are currently being considered are based on factors such as population, per capita income, and tax effort of the individual government unit.

This article discusses the variation in state tax structure and tax effort and different aspects of the principal taxes now used by the states, particularly those states in the Fourth District. The possible impacts of a revenue sharing program and state funding of local schools on the state revenue structures are also examined. The discussion and data relate only to taxation at the state level (thus excluding taxes imposed by cities, counties, and school districts) and do not account for differences in services provided at the state

level. (Services provided at the state government level in some states may be provided by counties or municipalities in other states.)<sup>1</sup>

## TAX STRUCTURE

The amount of revenue that a taxing authority is able to raise is necessarily limited by the size of the relevant tax bases. The principal bases are income, sales, and wealth (property tax), although other measurable concepts could be used. A range in possible rates as well as numerous combinations of taxes leads to greatly differing tax structures and, consequently, variations in tax effort among the states. The different tax structures make it virtually impossible to develop a clear-cut measure of effort. For example, one state may be making a strong effort in terms of the wealth base, but its effort may appear weak when compared to the income base.

The measure of tax effort discussed in this article is revenue per \$1,000 of personal income, which tends to remove the effects of differences in income levels among states stemming from either

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<sup>1</sup>For a more complete study, see: "State and Local Revenues and Expenditures," *Economic Review*, Federal Reserve Bank of Cleveland, November 1970.

TABLE I

Rank of States' Revenue Per \$1,000 of Personal Income\*  
Selected Revenue Sources  
1970

Per Capita Personal Income			Total Tax Revenue		General Sales or Gross Receipts		Individual Income Tax	
1	Connecticut	\$4,595	Hawaii	\$111.26	Hawaii	\$53.17	Hawaii	\$34.32
2	Alaska	4,460	New Mexico	94.99	Mississippi	43.55	Wisconsin	31.86
3	Nevada	4,458	Vermont	94.80	Washington	41.72	Delaware	30.88
4	New York	4,442	Mississippi	92.81	West Virginia	38.38	New York	30.80
5	California	4,290	Delaware	88.21	Arizona	30.43	Vermont	30.62
46	South Carolina	2,607	Missouri	51.03	New York	12.44	Louisiana	4.61
47	West Virginia	2,603	Nebraska	49.96	Oklahoma	11.99	New Hampshire	1.39
48	Alabama	2,582	New Jersey	43.95	Vermont	11.97	Tennessee	1.08
49	Arkansas	2,488	Ohio	42.41	New Jersey	11.73	New Jersey	0.58
50	Mississippi	2,218	New Hampshire	38.07	Massachusetts	7.41	Connecticut	0.36

\* Personal income data are U. S. Department of Commerce estimates for calendar year 1969.

Source: U. S. Department of Commerce

different populations or levels of per capita income.<sup>2</sup> Although this measure ignores "wealth" and levels of economic activity, most states recognize income as the major source of tax revenue.

Tax effort—as measured by revenue per \$1,000 of personal income—varies greatly among the states because of variations in income or differences in tax structure (see Table I). The average state tax was \$67 per \$1,000 of personal income in 1970, and ranged from \$38 in New Hampshire to \$111 in Hawaii. Of the five states that ranked highest in per capita personal income in 1970, none was among the top five in tax effort; on the other hand, of the lowest ranked states in per capita income, one state (Mississippi) ranked among the top five in revenues collected. In general, tax effort and per capita income show a

<sup>2</sup>Tax effort measured by tax per \$1,000 of income is a widely used definition, but it does have many shortcomings and is by no means the only measure of tax effort found in economic literature. For a more detailed discussion of measures of tax effort and tax capacity see: Allen D. Manvel, "Differences in Fiscal Capacity and Effort: Their Significance for a Federal Revenue Sharing System," *National Tax Journal*, Vol. XXIV, No. 2 (1971).

weak negative correlation, suggesting that states with relatively high per capita incomes do not necessarily have the lowest tax efforts. Of the five states with the highest revenue per \$1,000 of personal income, all but New Mexico are among the five top states in either income or sales tax efforts. Similarly, those states having the lowest overall tax effort either do not use one of the two major types of state taxation or use them to only a limited extent. Ohio, which did not have a state income tax in 1970, and New Hampshire, which does not have a sales tax, are examples of the former, and New Jersey is an example of the latter.<sup>3</sup> The sources and relative distribution of tax revenue for the five states that rank as the highest in overall tax effort and the five states that rank the lowest are shown in Table II. Tables I and II both illustrate the large disparity in revenues raised per \$1,000 of income between the five top ranked states and the five lowest ranked states. On average, revenues raised by the five leading states

<sup>3</sup>Pennsylvania instituted a state income tax in 1971; and Ohio began levying an income tax in 1972.

TABLE II

Percent Distribution of State Tax Revenue  
1970

National Rank*	Individual Income Tax	General Sales and Gross Receipts Tax	Corporation Income Tax	All Other†
1 Hawaii	30.9%	47.8%	4.3%	17.1%
2 New Mexico	13.1	31.3	3.0	52.7
3 Vermont	32.3	12.6	4.3	50.8
4 Mississippi	9.1	46.9	4.1	39.9
5 Delaware	35.0	—0—	6.9	58.1
MEAN	19.2‡	29.5‡	9.1‡	42.2‡
46 Missouri	15.8	42.0	2.6	39.6
47 Nebraska	17.0	28.7	3.3	51.1
48 New Jersey	1.3	26.7	12.7	59.3
49 Ohio	—0—	38.7	—0—	61.3
50 New Hampshire	3.7	—0—	—0—	96.4

\* Rank of state based on total 1970 tax revenue per \$1,000 of personal income.

† Other includes *selective* sales and gross receipts taxes on alcohol, motor fuel, tobacco, etc., property tax, death and gift taxes, and document and stock transfer taxes.

‡ Adjusted to include only those states imposing the specified tax.

Source: U. S. Department of Commerce

were at least twice as large as revenues raised per \$1,000 of income for the five lowest ranked states.

For all fifty states, the sales tax averaged \$19.12 per \$1,000 of personal income in 1970, or about 30 percent of the average total tax revenue (Table III). Another \$12.40 per \$1,000 of personal income, or 19 percent of the average total tax revenue, was derived from state income taxes.<sup>4</sup> Not only are these two taxes the most important sources of revenue, but they have also been the fastest growing in terms of actual revenue raised. During the post-World War II period, many states instituted these taxes to meet expanding needs for funds. The rapid growth in incomes, upward revisions in tax rates, and continuous growth in retail sales also contributed importantly to the

rapid rise in revenues from state income and sales taxes. Because these taxes have a broad base, it is possible to raise large amounts of tax revenue through relatively small increases in the tax rates. Because the dollar volume of sales and income are highly correlated, the fact that the measure of tax effort used here does not explicitly allow for the sales tax base is not likely to seriously bias the expressed relationships.

**Sales Tax.** The retail sales tax was used by 45 states in 1970.<sup>5</sup> Among these states, however, there are many differences in the application of the tax. Actual sales tax rates range from 2 percent in Indiana and Oklahoma to 6 percent in Pennsylvania, and the items that are subject to the tax vary considerably. The most commonly exempted item is barber and beauty parlor services, which is

<sup>4</sup>The sales and income taxes average \$22.63 and \$14.69, respectively, per \$1,000 if only those states levying these taxes are considered.

<sup>5</sup>States that did not have a retail sales tax in 1970 are: Alaska, Delaware, Montana, New Hampshire, and Oregon.

TABLE III

## Sources and Distribution of Revenue Per \$1,000 of Personal Income\*

Average, All States

1970

Source	Per \$1,000 of Income	Percent of Total Revenue	Percent of Total Tax Revenue
Total general revenue	\$104.95	100.0%	
Intergovernmental revenue from Federal government	25.99	24.8	
Total tax revenue	64.73	61.7	100.0%
General sales tax	19.12		29.5
Individual income tax	12.40		19.2
Other taxes†	33.21		51.3
Other revenue‡	14.23	13.5	

\* Personal income data are U. S. Department of Commerce estimates for calendar year 1969.

† Other taxes include "other" as defined in Table II plus comparable income taxes and property taxes.

‡ Consists of revenue received from local governments in the form of shared revenues and grants-in-aid, as reimbursed for services, or in lieu of taxes.

Source: U. S. Department of Commerce

taxed by only seven states. Utilities, especially local transportation, are also exempted from the retail sales tax by many states. Other exemptions range from food and clothing to repair services.<sup>6</sup>

In addition to exempting entire classes of goods from general sales taxation, some states allow special taxes and tax rates on specific items. For example, Connecticut and some other states exempt admission charges from the general sales tax, but impose a separate admission tax. Twenty-five states allow county and municipal governments to impose a sales tax levy in addition to the state sales tax. In most states, the additional tax rate is limited to either 0.5 or 1 percent; however, Alaska allows municipalities to tax at a rate up to 5 percent, and Colorado and New York allow up to 3 percent.

Regardless of its form, however, the sales tax is relatively simple to understand and administer. It can also be used to obtain large amounts of revenues, is relatively easy to increase if the need

arises, and is adaptable to sharing with other government units.<sup>7</sup>

**Income Tax.** A state personal income tax is more complicated to administer than the sales tax, but most states that use the income tax try to keep it as simple as possible. In comparison with the Federal income tax, these efforts have been successful.

Of the 44 states that used a personal income tax in 1970, Vermont and Alaska opted for the simplest of all methods—a fixed percentage tax levy on individual Federal income tax liability. For the other states, complications are introduced at two levels: (1) in calculating the tax base and (2) in determining the applicable tax rate.

In some states, the definition of income for tax purposes is related to one of the several income concepts used in the Federal income tax return, while in other states the tax base is independent of the Federal income tax. States may or may not allow standard or itemized deductions or

<sup>6</sup>For a complete list of exemptions by state see, *State and Local Sales Taxes*, (New York: Tax Foundation, Inc., 1970).

<sup>7</sup>Of the 25 states that permit a local sales tax levy in addition to the state sales tax, 19 administer the entire tax at the state level.

deductions for Federal taxes. All states provide for some type of personal exemption, but both the size and the rules governing the exemption vary widely. For example, Maryland allows \$800 per person; Mississippi allows \$4,000 for a single individual and \$6,000 for a family; and Wisconsin allows a tax credit of \$10 per person to be applied to the actual tax bill.

The rate structures of the state personal income taxes can be classified into two general categories: graduated and flat. By far the most popular method is the graduated rate structure, and it is used by over two-thirds of the income taxing states. The New York income tax structure begins with a 2 percent rate on the first \$1,000 of income and increases to 14 percent on income over \$23,000. The flat rate tax generally tends to be a relatively low rate, such as the 2 percent used in Indiana. Another form of the flat rate tax is a fixed percentage of Federal income tax liability, which is used by Alaska and Vermont. This method, although a flat rate, tends to tax high incomes more heavily than low incomes because of the graduated rates built into the Federal tax structure.

When the flat rate income tax is used, revenue can be increased in a manner similar to retail sales tax; all that is required is the enactment of appropriate legislation. With a graduated tax, however, new schedules must be constructed. Depending on the priorities of the state, the increase can be evenly spread out over all incomes or concentrated on one or more income levels. With an income tax, it is also possible to change the amount of total revenue raised by the tax without changing the tax rate structures. This can be accomplished by changing the rules concerning exemptions, deductions, and credits or by altering the definition of taxable income.

The graduated income tax is generally regarded to be the most progressive of the major sources of state tax revenue with respect to income.<sup>8</sup> An income tax based on a flat rate generally is considered to be proportional; and a sales tax, regressive. However, the various adjustments and alternatives to the tax base that are permitted under the state laws have drastically altered these general relationships. The flat rate personal exemption, for instance, which is used in many graduated income taxes, tends to lessen the degree of progressiveness because an individual in a high tax bracket will benefit more from the exemption than an individual in a lower tax bracket. With respect to the retail sales tax, exemptions can make the tax less regressive. Therefore, the low income individual would receive the greatest benefit from the exemption of a necessity such as food from the sales tax base, causing a lower degree of regressiveness.

**Intergovernmental Transfers.** Another major source of revenue for state governments, which has been increasing rapidly in recent years, is intergovernmental transfers from the Federal Government. Most of the funds are currently earmarked for specific uses, such as highway construction, education, and welfare. However, there has been considerable debate concerning the desirability of allowing the recipient, both governments and individuals, full discretion in spending transferred funds. Under most "revenue sharing" plans, the

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<sup>8</sup>No other single source of tax revenue contributes as much as 10 percent of total revenue, and only the corporate income tax contributes as much as 5 percent (see Table II). In this article, a tax is considered to be progressive if the amount of tax paid as a percentage of income increases as income increases. If the percentage of income paid as tax is equal for all income levels, the tax is considered to be proportional; and if the percentage decreases, the tax is considered regressive.



## ECONOMIC REVIEW

recipient government unit would be granted a specified share of designated funds instead of receiving fixed amounts of money for a specific project. One of the prime objectives of such plans is to transfer Federal tax revenue from those areas of the country with the least pressing need to areas with the greatest relative need. The revenue sharing plans under consideration in Congress would make the size of the grant dependent upon a complicated formula based on the population, income level, and possibly the tax effort of the recipient government. In the version recently approved by the House Ways and Means Committee, an additional allowance is made for the degree of urbanization, with large urban areas eligible to receive the greatest benefits.<sup>9</sup>

In 1970, Federal transfers provided nearly 25 percent of total state revenue and 40 percent of total tax revenue. Nationally, these transfers represented an average of \$25.99 per \$1,000 of personal income. The range of Federal transfers, however, was from \$82.24 in Alaska to \$15.13 in New Jersey. In Alaska, only 8.7 percent of the *general* revenue came from the Federal Government, even though the transfers were 120 percent of *total tax* revenue.<sup>10</sup> In New Jersey, even though the transfers per \$1,000 of income appear to be small, the Federal payments provided 21.7 percent of the State's *general* revenue from all sources and 34 percent of its *tax* revenue.

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<sup>9</sup>The \$5.3 billion revenue sharing plan agreed to by the House Ways and Means Committee contains both general and special revenue features. The proposal contains no restrictions on the \$1.8 billion allocated to state governments, while \$3.5 billion allocated to local government units would be restricted to certain types of spending, including capital outlays, maintenance, and operations.

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<sup>10</sup>This is caused by the large amount of general revenue derived through state oil and gas holdings and leases.

In view of the current debate involving the relationship of Federal revenue sharing to state tax efforts, tax effort and Federal transfers to states were statistically related by simple regression analysis. Results indicate that 21 percent of the Federal transfer payments per \$1,000 of personal income in 1970 were distributed as if they depended on the tax efforts of the states (measured by the tax paid per \$1,000 of personal income). If the population of the state were added to the regression, an additional 10 percent of the Federal transfer can be explained. Per capita transfer payments to states were not as strongly related to tax effort and population as were transfers per \$1,000 of personal income, although tax effort did account for 12 percent of the Federal transfers per capita and population an additional 4 percent. In general, then, without revenue sharing and a specific formula for the distribution of Federal funds, a state's own tax effort and population were in fact related to the state's revenue per \$1,000 of personal income from the Federal Government in 1970. To date, revenue sharing proposals have contained formulas that would take into consideration a state's population, some aspects of its tax effort, and its level of personal income in determining the allocation of funds.<sup>11</sup> It should be noted, however, that revenue sharing would not replace all of the current Federal revenue transfers to states.

**Property Tax.** In 1970, property tax accounted for only 2.3 percent of state tax revenue, but 84.9 percent of local tax revenue. This tax is relatively unimportant at the state level, but it does provide

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<sup>11</sup>It is likely that, if only those funds that are transferred to states at the discretion of the Federal Government—not depending on matching funds or other fixed programs—are studied, the importance of the level of income in the state would increase.



the major portion of local educational funds. Recent rulings by the California Supreme Court and other state supreme courts, however, have raised the question of whether or not the property tax can be considered an equitable source of funds for community schools.<sup>12</sup> If the "California decision" is upheld, the financing of public education could become a state function. If this should occur, the states would be required to increase their tax revenue, on average, as much as 80 percent, *ceteris paribus*. An increase of such large proportion in state tax revenue could be financed through a broad-based tax such as the income or sales tax. Although the additional state taxation could be offset by lower local property taxes, it is unlikely that individuals would find the changes offsetting. Many would find their total state and local tax burden increased, while others would find their burden decreased.<sup>13</sup> Alternatively, a state may decide to maintain the current property tax structure and to make the state the recipient rather than the local school district. Either method would require a greatly expanded revenue effort by the state, but would permit equal distribution of funds among all schools in the state, thus eliminating the objections raised by the California court.

### TAX STRUCTURE AND FEDERAL TRANSFERS IN THE FOURTH FEDERAL RESERVE DISTRICT

Of the four states included wholly or partly within the Fourth Federal Reserve District—Ohio,

<sup>12</sup>Several other state courts, including those in Texas, Minnesota, and New Jersey, have also ruled that the property tax can no longer be used as the primary source of school financing.

<sup>13</sup>Alternatively, the Federal Government may provide the needed financing required for education either through general revenue sharing or earmarked grants.

Pennsylvania, Kentucky, and West Virginia—only Kentucky and West Virginia had both a personal income tax and a retail sales tax in 1970.<sup>14</sup> Ohio and Pennsylvania rely primarily on a sales tax, although Pennsylvania does receive substantial income from its corporate income tax (see Table IV). It is, therefore, not surprising that Ohio and Pennsylvania receive considerably lower tax revenue per \$1,000 of personal income than Kentucky and West Virginia. As might be expected from the previous discussion, Kentucky and West Virginia, which ranked 43rd and 47th, respectively, in per capita personal income among the 50 states—received more intergovernmental transfers per \$1,000 of personal income (and per capita) from the Federal Government than Ohio and Pennsylvania, which ranked 15th and 16th, respectively, in per capita personal income. This distribution pattern of Federal transfer payments possibly reflects the greater need in the relatively low income states. This is especially true of West Virginia, which received more than double the national average transfer per \$1,000 of personal income.

The 1970 distribution of Federal transfers to Fourth District states can be compared with the distribution that would result from any of the proposed revenue sharing plans by calculating the share of all intergovernmental transfers from the Federal Government that is allocated to each of the Fourth District states. The most notable difference between the 1970 distribution pattern and the revenue sharing plan proposed by the Administration in 1971 is that the two most populated states in the District (Pennsylvania and Ohio) would receive a greater proportion of total

<sup>14</sup>Exactly how the tax burden will shift among individuals depends on what taxes are used, what tax schedules are used, and on how the property tax is administered.

TABLE IV

Sources and Distribution of Tax Revenue in the Fourth District States  
Per \$1,000 of Personal Income\*  
1970

	Ohio			Pennsylvania			Kentucky			West Virginia		
	Tax per \$1,000	Percent of Total Tax Revenue	National Rank	Tax per \$1,000	Percent of Total Tax Revenue	National Rank	Tax per \$1,000	Percent of Total Tax Revenue	National Rank	Tax per \$1,000	Percent of Total Tax Revenue	National Rank
Total tax revenue	\$42.41	100.0%	49	\$64.32	100.0%	30	\$76.40	100.0%	15	\$81.31	100.0%	8
Sales tax	16.41	38.7	34	21.96	34.1	21	29.09	38.1	8	38.38	47.2	4
Individual income tax	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	13.20	17.3	19	8.46	10.4	31
Corporation income tax	n.a.	n.a.	n.a.	12.27	19.1	n.a.	4.29	5.6	n.a.	0.82	1.0	n.a.
Revenue from Federal Other taxes†	26.00	61.3	n.a.	30.09	46.8	n.a.	29.82	39.0	n.a.	33.65	41.4	n.a.
Revenue from Federal Government	16.38	23.5‡	48	20.45	21.8‡	42	36.66	28.8‡	17	53.71	35.8‡	4
Per capita personal income	\$3,738		15	\$3,659		16	\$2,847		43	\$2,603		47

n.a. Not applicable.

\* Personal income data are U. S. Department of Commerce estimates for calendar year 1969.

† As defined in Table II.

‡ As percent of total general revenue.

Source: U. S. Department of Commerce

Federal funds, while the other two states (West Virginia and Kentucky) would receive a smaller proportion of funds (see Table IV). It is likely, however, that the programs that are most sensitive to need and low levels of income would continue independently of any revenue sharing plan, although the House Ways and Means Committee proposal favors those areas with the greatest need, particularly cities and areas with low average incomes.

In the Fourth District, as would be expected, the two states with the largest income bases—Ohio and Pennsylvania—are also the most capable of increasing their tax revenue. Neither of these states had a personal income tax in 1970, although Pennsylvania did receive 19 percent of its tax revenue from a corporate income tax. The revenue per \$1,000 of personal income received from sales taxes in these states is also relatively low; this is probably because of the exemption of food and numerous other items. West Virginia and Kentucky, however, already rank among the top 15 states in terms of tax effort and use both a sales and income tax, as well as a corporate income tax. In spite of a relatively low retail sales tax rate of 3 percent, West Virginia ranks fourth among all states in revenue per \$1,000 of personal income from a sales tax because of its low level of per capita income. The regressions discussed in the previous section, however, indicate that for all 50 states the relation between per capita income and tax effort is weak.

## SUMMARY AND CONCLUSIONS

Nearly one-half of all the 1970 tax revenue at

the state level of Government was raised through two broad-based taxes—the personal income tax and the retail sales tax. The implementation of these taxes and the resultant tax effort vary greatly among the states. Many of the state income taxes have graduated rate structures allowing progressiveness, but often the degree of progressiveness is lessened by income exemptions, deductions, and credits.

Being broad-based, the sales and income taxes are capable of raising large amounts of revenue. Small increases in the tax rates result in large increases in tax revenue. Although the property tax is also broad-based, other things being equal, its base can be increased only through property revaluation, and actual rate increases usually require voter approval. If recent state court decisions are upheld in higher courts, it is possible that the financing of education—which is currently financed primarily through property taxation—may become a state function requiring an increase, on average, of as much as 80 percent in state tax revenue.

Another major source of state revenue that has been growing in importance is transfers and grants from the Federal Government. In coming years, intergovernmental transfers are likely to increase, although the method of distribution may become more formalized with the advent of a revenue sharing or similar program. Congressional proposals currently under consideration for distributing Federal funds to the states include provisions that take into consideration not only a state's population, but also its income level and possibly its tax effort.