

Concentration in Banking Markets: **Regulatory Numerology or Useful Merger Guideline?**

by Charles D. Salley

Americans have long been convinced that competition in the marketplace is a good thing. Competition among numerous firms usually results in wider choice for the consumer, a high degree of innovation, and rewards to efficient operation. Monopoly, on the other hand, tends to restrict the variety of products, result in higher prices, and discourage innovative production techniques. That is why through the years the Congress has enacted much legislation designed to preserve competition.

More specifically, these antitrust laws are intended to encourage competitive markets even though competition might result in the closing of some firms. Since the theory of competition, however, assumes that it is the less efficient firms and those unresponsive to consumer demands that fail, their closing can be a gain to the community as a whole.

To enforce the antitrust laws, Government agencies have often used the number of firms as a convenient indication of the existing degree of market competition. A market is rarely perfectly competitive (an extremely large number of firms) or purely monopolistic, but generally lies somewhere between these extremes. Using the number of firms to characterize a market, then, one presumes that the fewer the firms, the less competitive the market and vice versa.

Concentration as a Measure of Competition

Upon further reflection, the number of firms is really only part of the market picture. There may be many firms; yet, a few large ones could exercise a great influence over the market. Therefore, one needs an index that measures the relationship between the number of firms and their share of the market.

The concentration ratio, or the market share of total assets, income, sales, or some other unit accounted for by one firm or a group of firms is used for this purpose. It attempts to gauge the dominance over the market, or lack of dominance, by a few firms. For example, if the three largest firms account

Monthly Review, Vol. LVII, No. 11. Free subscription and additional copies available upon request to the Research Department, Federal Reserve Bank of Atlanta, Atlanta, Georgia 30303.

for 90 percent of total output, one would presume that the market is less competitive, even though there might be a total of 80 firms, than if the three largest firms account for only 5 percent (see Table 1).

Because the concentration ratio gives a better picture of market structure than the number of firms, it has become a common proxy measure for the degree of competition in a market. Using this ratio in such a manner, one assumes that a handful of large firms, high concentration, and unaggressive competition occur simultaneously.¹ Many court decisions and regulatory agency rulings on mergers thus refer to "concentrated" markets. This is so frequent, in fact, that many observers have come to interpret the concentration ratio itself to be a hard, final criterion of competition.

This is hardly the case, though, because the concentration ratio, while superior to the number of firms as a measure of market structure, has several shortcomings as a measure of competition. The concentration ratio can only suggest that the fewness of large firms makes restrictive pricing and output decisions more possible than if there were many firms of equal size. It does not mean that the large firms are actually engaging in anti-competitive conduct. The existence of a few gigantic firms may simply reflect economies of large-scale operations in production technology, management, or distribution. Therefore, in this light, it would seem best not to regard the concentration ratio as an inflexible rule to regulate mergers but as a signal to a possible problem area warranting further investigation. This holds particularly for bank merger and holding company regulation where the concentration ratio can be especially misleading.

Conflicting Goals of Bank Regulation

The traditional regulatory policy of limiting the number of banks has produced many markets with little or no competition and with correspondingly high concentration ratios. At first blush this appears to be a questionable policy, but it is not when we recall that competition often results in the closing of numerous inefficient firms. Though highly desirable in most industries, perfect competition (as marked by unrestricted entry of new firms and failure of some existing firms) is unacceptable in banking because the local bank is usually more critical to a community than a single business. When a bank fails, the depositors and the businesses served by the bank get hurt as well as the stockholders.

¹The popular presumption is that with fewer firms, a collusive agreement is more easily reached. Economic theory suggests, however, that even without collusion, the fewness of competitors alone may alter their pricing and output decisions from those made under conditions where there are many competitors.

TABLE 1
The concentration ratio is a better measure of market structure than is the number of firms.

Firm	Market A (Share)	Market B (Share)
1	35%	15%
2	20%	15%
3	20%	15%
4	10%	15%
5	5%	15%
6	5%	15%
7	5%	10%
	100%	100%

Both markets have the same number of firms, but larger firms are more significant in Market A than in Market B.

Because the local economic base may not be big enough for all banks to operate profitably, bank failure can result if the number of banks in a community is not limited. Already possessing management experience and a minimum critical operating size, existing banks have additional advantages over new banks for which the risk of failure is, therefore, usually greater.²

On the one hand, then, the goal of banking efficiency seems to require encouragement of competition, while, on the other, the goal of banking stability seems to require restriction of competition. Both goals focus on the control of market entry of new banks via charter regulation and on the control of market exit of competing banks via merger regulation. Both goals hence affect the number of banks in a market and the level of deposit concentration. Thus, we shall see, a high concentration ratio in banking markets is ambiguous unless it is taken in the context of two very different market situations.

Two Market Patterns: Rural and Urban

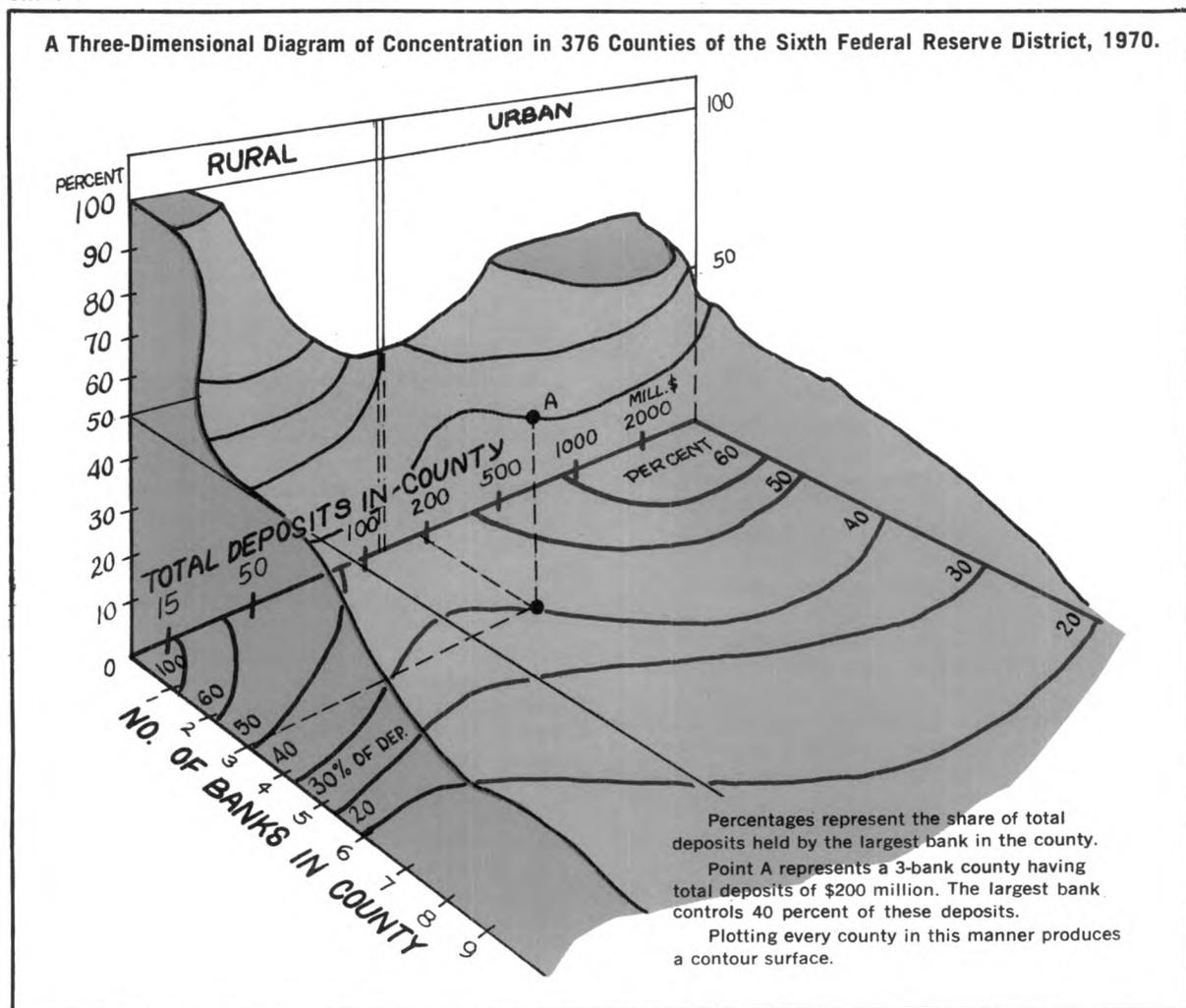
If you closely examine the actual concentration of deposits held by the largest bank in counties within the Sixth District,³ you find that high levels of concentration occur most often in two distinct types of markets. High concentration ratios appear in rural markets with total deposits of \$45 million or less and in urban markets with deposits of \$100 million or more.

Chart I illustrates this finding with the use of 1970 concentration ratios of bank deposits held by

²On the other hand, there is an argument for free entry in banking, arising as a result of deposit insurance, close supervision of operations, and controlled liquidation by the banking agencies. Placing emphasis on supervision, rather than restricting entry, might make it possible to protect the public interest from the consequences of bank failure and also to retain the competitive benefits of easier entry. See D. A. Alhadeff, "A Reconsideration of Restrictions on Bank Entry," *Quarterly Journal of Economics*, May 1962.

³The Sixth Federal Reserve District consists of Alabama, Florida, Georgia, and portions of Louisiana, Mississippi, and Tennessee.

Chart I



Note: Best-fit curve for 1970 is presented rather than actual data.

the largest bank in each of the 376 District counties having banking offices. We have plotted on this three-dimensional diagram the number of banks in the county, the total deposits, and the percent share of these deposits (or concentration) held by the largest bank. Plotting every county in the District in this manner produces an array of such points. And connecting these points into a continuous surface gives us the contour that visualizes the degree of concentration.

In a nutshell, this diagram shows that, in the Sixth Federal Reserve District at least, the highest level of concentration tends to occur in the smallest rural markets and in distinctly urban markets. This finding fits the different regulatory emphasis given to two distinct market situations. In rural markets, including the numerous one-bank communities, the regulatory concern is for stability rather than

competition. It allows a new competing bank to enter only if the community's demand for banking services is great enough for the existing bank(s), as well as for the new bank, to survive. On the other hand, in urban markets, where deposits are concentrated in several large organizations, the regulatory emphasis is on encouraging competition, especially by preventing the disappearance of existing smaller competitors through merger.

Without qualification, the statement that low deposit concentration and unrestricted competition in banking markets are desirable per se is therefore quite meaningless. Measures of concentration clearly have little significance in rural markets where banking stability is paramount. However, concentration may be a useful, though inconclusive, indicator of the competitive situation in urban markets where competition is a regulatory concern.

In other words, 80-percent concentration by the largest bank in a rural market with \$8 million in total deposits should not surprise anyone. But 50 percent concentration by the largest bank in an urban market with \$400 million in deposits should raise the interest of a regulatory authority appraising a proposed merger or holding company acquisition in this market. Thus, the dual purpose of banking regulation tends to confine the usefulness of concentration ratios to the larger banking markets.

Accurate Measure of Concentration in Urban Banking Markets

We can now recognize the usefulness of concentration ratios in meeting only one of banking market regulation's two goals—banking efficiency. Even so, concentration ratios are not foolproof measures of competitive market structure. Even in urban areas, the simple concentration ratio fails to take account of the size discrepancy among the leading banks themselves. For example, all that a concentration ratio of 75 percent for a city's three largest banks tells is that the "big three" together control 75 percent of all bank deposits in the area. Now the 75 percent ratio might represent three banks whose market shares are 60 percent, 10 percent, and 5 percent, respectively; or perhaps each of the three banks holds 25 percent each. The observer would anticipate a stronger market influence from the largest bank in the earlier example; yet, the simple concentration ratio does not call this to his attention.

Therefore, to remedy this particular shortcoming, some persons prefer another measure of concentration known as the Herfindahl Index. This computation does take into account the size distribution among the larger banks.⁴ (The maximum index value for a market controlled entirely by a monopoly bank would be 100 percent x 100 percent or 1.0000.)

The Herfindahl Indices for the two illustrations, each with 75 percent concentration, would be .3725 and .1875, respectively. Thus, whereas the simple concentration ratio indicates that both markets are equally concentrated, the Herfindahl Index conveys more accurately that the second market is much less concentrated than the first (Table 2).

We, therefore, computed a Herfindahl Index of concentration for 1960 and 1970 for each of the

TABLE 2
Markets can have the same concentration ratio but a different size distribution.

Firm	Market A (Share)	75% concentration ratio	Market B (Share)
1	60%	}	25%
2	10%		25%
3	5%		25%
4	5%		5%
5	5%		5%
6	5%		5%
7	5%		5%

.3725 Herfindahl Index for three largest firms .1875

The Herfindahl Index distinguishes between the size distribution of different firms.

Sixth District's county banking markets that had more than one bank. These computations also confirmed what we found from the simple concentration ratios of the largest bank: The concentration of bank deposits is generally highest in the smallest counties with only a few banks and again in the larger metropolitan areas (see Appendix and Chart II on following page).

Changes in Concentration

So far, we have dwelled on the degree of concentration in rural and urban banking markets, but have not said whether this concentration has increased or not. Therefore, to shed light on this question, we have used several methods to compare concentration in 1960 with 1970 in each county. One such comparison, using the Herfindahl Index for 1970, represents a simple comparative static measure. (A higher value for 1970 indicates that larger banks have increased their market shares during the ten-year period.) The other comparison represents a dynamic measure of the change in deposit concentration. That measure compares the 1960 percentile shares of each bank in a given county with the 1970 market shares through regression analysis.⁵ (A coefficient greater than one generally indicates that the large banks have grown at the expense of the other banks and, hence, there has been an increase in concentration. A coefficient less than one indicates that the smaller banks have won larger shares from the large banks, and, hence, concentration has decreased.)

⁴The Index is the sum of the squared market shares rather than a simple sum of the percentile shares (which is the way we arrived at the concentration ratio).

$i = n$

The actual calculation is $HI_x = \sum X_i^2$, where X_i is

$i = 1$

the percentile share of the *i*th firm. See I. M. Grossack, "Towards an Integration of Static and Dynamic Measures of Industry Concentration," *Review of Economics and Statistics*, August 1965.

⁵A simple regression of the individual 1970 shares on the 1960 shares gives a biased picture, since there is a tendency for the growth rates of banks that are largest at the outset to be less than the average rate for the market. (This may be simply a characteristic of the arithmetic of percentages, not necessarily some rule of bank behavior.) Therefore, we calculated the geometric mean of the regression of 1970 on 1960 shares and the reciprocal of the regression of 1960 on 1970 shares. Specifically, the dynamic concentration measure is the geometric mean of $\sum xy / \sum x^2$ and $\sum y^2 / \sum xy$ where *x* is the deviation from the mean share in 1960 and *y* is the deviation from the mean share in 1970. See S. J. Prais, "The Statistical Conditions for a Change in Concentration," *Review of Economics and Statistics*, August 1958.

Even a scanning of the fifth column (concentration coefficient) in the Appendix shows that in the large majority of counties there has been a general decrease in concentration during the period 1960-70. The few instances of increased concentration seem to have taken place primarily in some smaller markets whose total deposits during the period grew from \$7 million to about \$35 million.

Market Share Stability

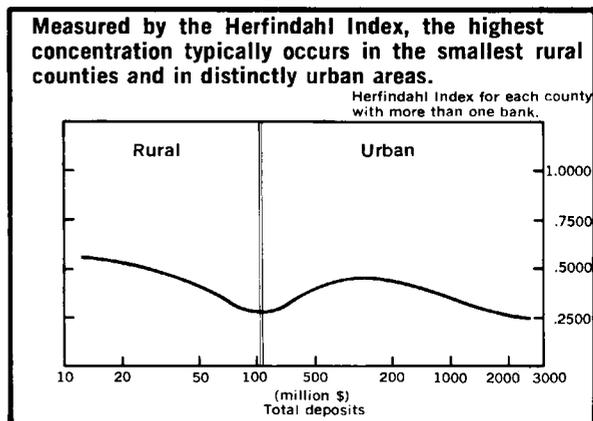
We have seen that the Herfindahl Index and the dynamic coefficient are better measures of concentration than the simple concentration ratio. Recall now that a change in concentration, however measured, is a measure only of market structure; the associated change in competition is *merely presumed*. Thus, while we know that banking markets in the Sixth District have generally become less concentrated, we do not know whether they have become more competitive.

Here is where still another aid—useful in trying to make this judgmental leap from concentration to competition—comes in. Suppose that new or smaller banks have gained a growing share of a particular market. If that has happened, it may be indicative of increased competition, perhaps even aggressive competition. But if the leading banks have maintained their relative positions over many years, it may be indicative of little aggressive competition. Thus, the stability of market shares is an indication of the intensity of competition among banks in a market.

A convenient measure of market share stability is the correlation coefficient of the market shares in two different years, say 1960 and 1970. If the shares of the competitors have not changed—i.e., the largest bank in 1960 is still the largest in 1970, and the smallest bank is still the smallest—the correlation of the shares is perfect and the correlation coefficient is 1.000. Conversely, if the smaller banks have been aggressive and have gained such an increased share that they are now the largest banks, there will be little correlation between the 1960 and 1970 shares and the coefficient will be low, say, .300. The coefficient will be low even when the largest bank has lost its lead position to the second largest. It is also possible, however, that the small banks could have gained such a large share that the concentration level has remained high. In such an event, the concentration measure by itself is not an accurate proxy for the degree of competition. The low correlation of market shares indicates—despite the high concentration—that the level of competition was very great during the ten-year period between 1960 and 1970.

Thus, by using the dynamic measure of concentration and the correlation coefficient of market shares, it is possible to get an improved indication of the degree of competition in a market. The joint

Chart II



measure is still a structural one, but the judgmental leap from competitive structure to competition is on firmer ground.

If the concentration coefficient is *greater than one* and the share correlation coefficient is *high*, the large banks have maintained their leadership and even increased their shares. If the concentration coefficient is *less than one* and the share correlation coefficient is *low*, the smaller banks have aggressively gained shares at the expense of the larger banks or from mergers with other small banks. Judging from the figures in the Appendix, the latter describes what has typically happened in Sixth District banking markets. In other words, *the larger banks have lost some of their dominant positions in the face of new challenges from smaller competitors.*

Conclusion

In their concern to encourage competition in the growing urban banking markets, the regulators of bank mergers and holding company acquisitions are likely to invoke one or more of various measures of market structure. Because these measures are only approximations to the actual degree of competition in individual markets, bankers can be sure that their proposed mergers will not be approved or denied simply on the basis of concentration arithmetic, however sophisticated. Nonetheless, bankers can be equally sure that high levels of concentration in urban markets will incur the scrutiny of the American concern for competitive markets. While measures of concentration by themselves are imperfect as guidelines for mergers, they are extremely useful in signaling a possible problem area warranting a closer look. ■