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RESEARCH ON BANKING COMPETITION

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Dale Osborne and Jeanne Wendel

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The Main Fault With Traditional Research on Banking Competition

Dale Osborne* and Jeanne Wendel**

Alice thought she had never seen such a curious croquet-ground in all her life; it was all ridges and furrows; the balls were live hedgehogs, the mallets live flamingos, and the soldiers had to double themselves up and to stand on their hands and feet, to make the arches.

The chief difficulty Alice found at first was in managing her flamingo; she succeeded in getting its body tucked away, comfortably enough, under her arm, with its legs hanging down, but generally, just as she had got its neck nicely straightened out, and was going to give the hedgehog a blow with its head, it would twist itself round and look in her face, with such a puzzled expression that she could not help bursting out laughing; and when she had got its head down, and was going to begin again, it was very provoking to find that the hedgehog had unrolled itself, and was in the act of crawling away; besides all this, there was generally a ridge or furrow in the way wherever she wanted to send the hedgehog to, and, as the doubled-up soldiers were always getting up and walking off to other parts of the ground, Alice soon came to the conclusion that it was a very difficult game indeed.

Lewis Carroll, Alice In Wonderland

All public policy rests on the assumptions, hypotheses, conventions, and selective observations that constitute a conventional wisdom. Public policy toward banking competition rests on the conventional wisdom of the Structure-Conduct-Performance model of competition. This model has two earmarks. First,

*Federal Reserve Bank of Dallas.

**Miami University, Oxford, Ohio.

it takes competition in the sense of behavior as conceptually distinct from--indeed, to be explained by--competition in the sense of conditions. Second, it regards competitive conditions as a matter of concentration in the appropriate geographical market.

Now it is doubtful that competitive conditions can be defined in a way that completely excludes behavior, for the actions of one bank must to some extent affect the conditions of other banks. Nonetheless, the conceptual divorce of competitive conditions from behavior is not peculiar to S-C-P; indeed it seems essential to any model that can support utilitarian public policies in a more-or-less free society. The government of such a society cannot regularly order competitive behavior; it can only foster competitive behavior by creating and preserving competitive conditions. It therefore needs a model that not only distinguishes between conditions and behavior but also describes the former as causing the latter.*

The S-C-P model characterizes competitive conditions in a particular way. It groups the country's banks into local markets and represents the conditions facing each bank by the concentration in its market (or in its markets, which might differ according to the service in question). It thus assumes that banks compete--or more often, collude--with the banks in their market but with no others, and compete the less vigorously the more concentrated the market.

*If public policy were (classically) liberal instead of utilitarian, it would aim at minimizing fraud and coercion instead of increasing social utility. Then, as it would be concerned with punishing the proscribed actions instead of fostering the prescribed ones, it would not require a model which defines competitive conditions to be strictly exogenous to actions.

The courts and regulators do not follow this approach slavishly. But at some point in their deliberations on any proposed charter, acquisition, merger, or innovation they will question its effects on local-market concentration. Indeed, they could hardly do otherwise, for S-C-P is the only model they know; it is what the students of banking competition have given them.

In this paper we will mainly ignore those issues which have already drawn critical discussion, viz., the appropriate delineation of markets, the proper definition of their structure, and the correct measures of performance.* These, for all their importance, are secondary matters if the very concept of a local market is defective. We will argue that, indeed, the S-C-P approach goes wrong at its very first step--the attempt to organize banks into groups constituting local markets whose structure determines bank behavior. After reviewing the evidence that shows how hard such markets are to identify in practice, we trace this difficulty to conceptual ambiguities in the very notion of a market in the required sense. Then we show that if we could resolve these ambiguities and thus find a satisfactory way to identify markets, we would no longer need to do so. The very factors that would put banks into their proper markets would already answer all the questions that S-C-P is intended to answer.

We are aware of the conventional view that S-C-P, for all its faults, has uncovered a statistically significant effect of concentration on performance. But this is a puzzling view. It is true that the majority of published studies appear to show such an effect. A recent non-evaluative

*See Austin (1977) for a good survey.

survey, for example, lists thirty-nine published studies of the relation between concentration and profits or prices, thirty of which report at least one relation that, though quantitatively small, appears to be statistically significant at the ten percent level (Rhoades, 1977). In that survey, the 30/39 "success ratio" is interpreted as evidence of the basic validity and fruitfulness of the S-C-P approach. But in the first place, most of the surveyed studies present several tests of the concentration-performance hypothesis; that is, they employ several different concentration and performance variables and estimate several different forms of the relation between them. For instance, Stolz (1976) regresses ten different price variables on the Herfindahl index in three different ways (linear, cubic, and hyperbolic), thus actually testing the hypothesis thirty times; of these, only four show a statistically significant effect. This study--one of the more careful ones--more truly represents four "successes" in thirty "trials" than one success in one trial as tabulated by Rhoades. In the second place, empirical research is more likely to be published (and if circulated in working papers, noticed and remembered) if it reports a "success" than if not. It thus seems premature to conclude that the percentage of "successes" falls outside the ninety percent confidence interval implied by the null hypothesis.

Even those who overlook this consideration tend to be uncomfortable about the quantitative insignificance of the apparently statistically significant effects of concentration. All, therefore, continue their efforts to perfect the application of the approach by improving the data, clarifying the notions of local markets and concentration, and refining the statistical techniques. These efforts are indeed worthwhile, for the existing work

leaves considerable room for improvement.* But it might be as useful to criticize the conceptual foundations of the approach. The meagre results might not indicate imperfect applications so much as a defective foundation. In order to get a hearing for this criticism, we judge it necessary to dispel another widespread misconception. Following that, we will return to our argument.

The Supposed Support from the Industrial Studies

S-C-P originated in research on nonfinancial industries. Its apparent success in explaining cross-section variations in the profits of such industries is often regarded as ample justification for its continued use in banking research despite its poor performance there.** We must therefore digress for a moment to consider the results of S-C-P's interindustry applications.

Though it is now a conventional wisdom--a set of answers-- S-C-P began as an organizing framework for research, a source of questions: What are the most important dimensions of market structure and how can they be measured? What is the precise meaning of competitive conduct and to what extent is it observable? How are structure and conduct related? These were never thought to be easy questions but they were thought to be fruitful. S-C-P was thought, therefore, to constitute a useful research program. And indeed, the earliest effort in the program

*See the evaluative surveys by Bentson (1973) and Osborne (1977).

**Thus Rhoades speaks for many when he admits to "disbelief and frustration" at the repeated failures to find an appreciable effect of structure on performance, since "so many studies of the industrial sector have found a relatively large effect..." (Rhoades, 1977, p. 16).

disclosed a weak but statistically significant association between concentration and profits in a sample of 42 industries for the period 1936-1940 (Bain, 1951). Probably because it was the first in the field, this study became very influential and its finding came to be accepted as truth. The several studies published soon afterward produced mixed results leading to no firm conclusions and leaving Bain's influence untouched. As late as 1971, Weiss could say that "practically all observers are now convinced that there is something to the traditional hypothesis." (Weiss, 1971, p. 371.)

Recent results, however, undermine the hypothesis in a fundamental way. As the earlier studies supporting the hypothesis are reconsidered with larger samples, longer time periods, and, if appropriate, sounder statistical methods, two kinds of finding emerge. First, most of the positive associations between concentration and profits vanish.* Second, those that remain fail, on closer inspection, to be consistent with the basic idea behind the hypothesis. This idea, it will be recalled, is that firms in concentrated industries can more easily coordinate their actions, by tacit or explicit collusion, to keep prices high and realize greater profits. If so, concentration should permit higher profits among firms of all sizes in the industry. Coordination, even if it were limited to the larger firms, would nevertheless shield the small ones as well. But Demsetz (1973) found that the remaining positive associations between concentration and profits hold only among the large firms, not the smaller ones. This pattern suggests that the above-average profits earned by the leading firms in concentrated industries generally reflect

*See, for example, Brozen (1974, 1975).

superior performance rather than collusion. Indeed, the superior performance might well explain the large firms' growth to dominance and hence the concentration of their industries. If this is so, concentration, far from leading to collusive behavior, actually emerges from competitive behavior. Peltzman (1977), Brozen (1978), and others argue this view quite forcefully.

These findings are raising serious doubts about the conventional wisdom. Phillips (1976), for instance, recently concluded that we know very little about the relation, if any, between market structure and profitability. It is too early to say when the findings will penetrate the minds of legislators, regulators, and judges. But it is already too late to justify S-C-P's application to banking by its interindustry results. That application must stand or fall on its own merits.

Practical Problems With the Local-Market Concept

Since the later and more careful interindustry applications of S-C-P had not yet appeared when serious research into banking competition began in the early 1960's, S-C-P seemed to be a natural organizing framework. In place of separate industries one had separate local markets for banking services but the analogy between them was obvious, and the concepts of structure and conduct seemed as appropriate to local banking markets as to separate industries. Immediately, therefore, distinct geographic markets were assumed to exist for each banking service. Each such market being a self-contained unit, the banks in it compete with each other but with no banks outside it. Since the structure of this unit determines the conduct and performance of the banks within it, the S-C-P theory requires considerable

attention to structure. But no matter how much thought we give to structure, it will be useless if we fail to identify the market boundary.

S-C-P offers no help with the identification of local markets and does not indicate the types, if any, of nonbank financial firms that should be included in the market. These things have been handled in about as many ways in banking as in the industrial sector. But despite the generally poor results, the discussion tends to concern the particularities rather than the approach itself.*

Many investigators have identified banking markets with ready-made political units such as counties, towns, or SMSA's. The dangers of this practice are obvious, and the courts and regulatory authorities have tried to better it by using bank records to identify the geographic area in which a particular bank draws its customers. This approach ignores the potential customers who could be drawn to the bank by a more attractive price-service package. Moreover, it cannot determine how many banks should be considered together in this manner. The resulting market areas are highly sensitive to the way in which this determination is made.**

A better idea is to draw on economic and demographic data to delineate "areas of convenience" within which most local residents work and shop. Stolz (1976), for instance, identified a number of such areas as the relevant markets for a wide range of bank products and services, such as

*Thus Austin's (1977) comprehensive survey of the issues in this field, while quite critical of many particular ways in which the approach has been carried out, never questions the validity of the approach itself.

**See Austin (1969) for a vivid demonstration of this sensitivity.

demand and time deposits, car loans, farm operating loans, and farm machinery loans.

This approach to banking markets can be tested by Analysis of Variance. If each market indeed represents a distinct group of buyers and sellers of a particular banking service, its prices should be fairly homogeneous. While prices might differ between markets owing to intermarket differences in supply and demand, such differences do not exist within markets by definition. Hence the dispersion of prices within markets should be small relative to the dispersion across them. The better the assignment of banks to markets, the higher the F-ratios will be.

Table I presents the results of these analyses for all of the continuous variables studied by Stolz. As the Table shows, for only one variable is the F-ratio significantly large in all three states; for two variables it is significantly large in two of the three states. Of the total of 42 ratios computed for all three states, only nine are significantly large at the 5 percent level. In our judgment, this proportion is too small to rationalize the market assignment.

The convenience-areas are not, of course, without economic significance. The banks within an area tend to exert stronger competitive forces on each other than on banks outside the area. Competitive forces "pile up" in these areas and induce the banks within them to compete more vigorously with each other than with banks outside them. This is why some of the F-ratios are significantly large. To check this reasoning, we performed a similar analysis of variance on arbitrarily defined markets; that is, we randomly grouped the banks of each state into 25 "markets" and computed the F-ratios as above. As expected, none of the ratios were significantly large at the 5-percent level.

Table 1

F RATIOS ASSOCIATED WITH STOLZ'S MARKETS

Variable	Iowa ¹ /	Minne- sota ¹ /	Wiscon- sin ¹ /
Annual percentage rate paid on:			
Passbook savings	1.42	1.23	1.44
90-day deposits .....	.87	1.19	.58
One-year certificates of deposit .....	.84	1.13	1.38
Four-year certificates of deposit	1.34	.90	1.77*
Service charge on a standardized personal checking account	1.30	1.51	5.48**
Typical charge for a returned check	2.08**	2.32**	1.24
Annual percentage rate charged on:			
A 36-month-installment new automobile loan ...	1.16	1.40	1.29
A standardized new farm machine loan maturing in three years .....	.86	1.50	1.23
A one-year farm operating loan secured by crops or livestock	1.18	2.74**	1.82*
Annual charge for smallest-size safety-deposit box .....	.86	1.08	1.54
Total hours bank is open for business:			
During week	1.17	1.28	1.08
On Saturday	2.75**	2.55**	1.81*
Monday-Friday during the core period (9:00 a.m. to 3:00 p.m.)	1.44	1.10	.97
Monday-Friday other than the core period	1.16	1.18	1.06

1. Iowa, 109 banks and 25 markets; Minnesota, 113 banks and 25 markets; Wisconsin, 111 banks and 25 markets.

* Significant at 5-percent level (the critical value is 1.66).

** Significant at 1-percent level (the critical value is 2.05 in Iowa and Wisconsin and 2.04 in Minnesota).

We performed a similar analysis of a market partition determined strictly by counties. Table II reports the results. Here considerably more of the ratios are significantly large. This does not mean that counties approximate the local markets postulated by the conventional approach more closely than Stolz's convenience-areas do. Indeed, Stolz's method would represent an appropriate procedure for obtaining such a local-market partition if the conventional market concept were valid. It is just that competitive forces tend to pile up in each type of "market," forcing some degree of homogeneity on the banks within it. However, the forces extend past both kinds of "market" boundary, and their effect on banks in other "markets" is a matter of more-or-less and not some-or-none.

In any case, the variance within most of the markets is so large relative to the variance between them that the markets cannot be distinguished on the basis of individual price and service variables. Actual banking markets thus remain exceedingly difficult to identify.

Ambiguities in the Concept

Things which remain elusive despite diligent search often turn out to be ill-defined or even nonexistent. That this might be so of distinct local banking markets is suggested by three considerations. First, the concept of a local market implicitly rests on the assumption that locational convenience is of paramount importance to the consumer. It is implausible to assume simultaneously importance of this factor ends at the market boundary. If locational considerations prevent competition between markets, as S-C-P forces us to assume, they must also affect competition within each market. While

Table 2

F RATIOS ASSOCIATED WITH COUNTY MARKETS

Variable	Iowa ¹ /	Minne- sota ¹ /	Wiscon- sin ¹ /
Annual percentage rate paid on:			
Passbook savings	2.29**	.80	.97
90-day deposits	1.31	1.14	.75
One-year certificates of deposit .....	.50	2.72**	1.07
Four-year certificates of deposit	1.33	.88	1.65*
Service charge on a standardized personal checking account	1.78*	1.54	2.60**
Typical charge for a returned check	2.26**	1.24	1.18
Annual percentage rate charged on:			
A 36-month-installment new automobile loan ...	2.17**	1.15	.67
A standardized new farm machine loan maturing in three years .....	.59	1.09	1.49
A one-year farm operating loan secured by crops or livestock .....	.96	1.62*	2.38**
Annual charge for smallest-size safety-deposit box	1.23	1.20	1.48
Total hours bank is open for business:			
During week	1.64*	1.16	1.39
On Saturday	2.84**	2.93**	3.04**
Monday-Friday during the core period (9:00 a.m. to 3:00 p.m.)	1.70*	1.08	1.48
Monday-Friday other than the core period	1.76*	1.23	1.37

1. Iowa, 109 banks and 45 markets; Minnesota, 113 banks and 43 markets; Wisconsin, 111 banks and 40 markets.

* Significant at 5-percent level (the critical value is 1.58).

** Significant at 1-percent level (the critical value is 1.93 in Iowa and 1.91 in Minnesota and Wisconsin).

this is partly a matter of structure (structural measures should depend on time or distance as well as the number and size distribution of banks*), it must make us wonder whether the conventional concept of a market is appropriate.

Second, in areas where population centers are not separated by large sparsely populated regions, the market boundaries must be somewhat arbitrary. Customers who are located near the boundaries could bank conveniently in either market. The competition between both markets' banks for these borderline customers blurs the distinction between the markets.

Third, it is difficult to believe that consumers care only about locational convenience. It is more reasonable to expect them to care about a variety of banking characteristics, of which locational convenience is only one: business hours, prices, lending policies, etc. If consumers are always willing to trade some locational convenience for, say, a better price, one cannot establish a definite boundary around the area in which a group of people will select a bank. That area depends, in part, on the vigor of competition among the banks.

Since competitive behavior partially determines the market and hence the market's structure, it cannot be explained solely by that structure. S-C-P, however, implies a one-way flow of causation from market structure to competition and performance. This is its fundamental conceptual defect.

*We are indebted to Alton Gilbert for this observation.

Many people admit this defect in part; that is, they recognize that conduct feeds back on market structure by affecting market shares. But the defect is worse than this admission suggests. Conduct affects the very market area. Strictly speaking, therefore, S-C-P cannot take its first step--the delineation of market boundaries--without answering the question to which this and the subsequent steps are supposed to lead. This is a weighty objection, if indeed it does not entirely prove the case.

Uselessness of the Concept

To see just how distracting the local-market concept is, let us waive the above objections and assume that the market problem is solvable in principle. What does the problem look like from an abstract point of view?

We begin with a set X of banks--all the banks in the country--and wish to allocate them to subsets that correspond to local markets. Abstractly, then, the problem is to define a family of subsets of X .

We might believe that there are several families of subsets, corresponding to different banking services; the local market for farm loans, for example, might differ from that for time deposits. We might also believe that some of the subsets of a given family intersect, i.e., that a bank can belong to more than one market for a given service. Alternatively, we might believe that the subsets do not intersect, i.e., that they partition X . Whatever we believe to be true of the family, we must in any case assign banks to their appropriate subsets. If this assignment were always obvious, we would have a characteristic function f_M for each subset M : for each bank x ,

$$f_M(x) = \begin{cases} 1 & \text{if } x \in M \\ 0 & \text{otherwise.} \end{cases}$$

In words, if bank x belongs to market M then $f_M(x) = 1$; if not, then $f_M(x) = 0$. We can say, therefore, that if the assignment of banks to markets were never uncertain, each market would have a characteristic function whose range is $\{0,1\}$.

But of course the assignment will in many cases be uncertain. It will not always be obvious whether a particular bank does or does not belong to market M . A local market is therefore a fuzzy set*: in place of a characteristic function that takes values in the two-element set $\{0,1\}$, it has a membership function taking values in the closed interval $[0,1]$. If the membership function for market M is g_M , then $g_M(x)$ shows the degree of membership of bank x in the market. If x unquestionably belongs to M , then $g_M(x) = 1$; if x unquestionably does not belong to M , then $g_M(x) = 0$; if membership is questionable, then $g_M(x)$ is strictly between 0 and 1, being larger the more likely it is that x properly belongs to M . Hence the assignment of banks to markets is equivalent to the assignment of a membership number from $[0,1]$ to each bank with respect to each market. This is the market-delineation problem considered abstractly.**

*See Zadeh (1965).

**If we could solve this problem, we might use the solution in a regression analysis (for example) to multiply the individual-bank data by the value of the membership function. Thus, if $g_M(x) = 1$, $g_N(x) = .5$, $g_R(x) = .2$, and $g_T(x) = 0$ for all other markets T , then instead of using one observation vector for bank x in the regression, we would use three: the given vector with the structure of market M , one-half that vector with the structure of market N , and two-tenths of that vector with the structure of market R .

Without going into the particular factors that we would consider in choosing membership numbers in the uncertain cases, we think the general nature of those factors is clear. Suppose $g_M(x) = 1$; then in choosing a value for $g_M(y)$ we will have to consider the competitive forces between banks x and y . If these forces are strong, we will put $g_M(y)$ equal to 1 or close to it; if they are weak, we will put $g_M(y)$ equal to zero or near it. In other words, we can properly delineate local markets only if we can evaluate the competitive forces between banks. But if we can do this we can deal with competitive conditions directly; we will not have to proxy them by some index of local-market structure. The more accurately we can delineate local markets, the less we need them. This surely proves the case.

A Possible Alternative

Trying to solve a scientific problem (or indeed any problem) is like trying to traverse a maze. Wherever we might be in relation to our goal, we can proceed along any of several paths, each a potential blind alley. We must, therefore, constantly search for signs that we have taken such a path. When the signs have accumulated sufficiently we must abandon our path, however comfortably familiar it might be, and set out on a new one. The abandonment of a blind alley is progress. We therefore feel no compulsion to present, at this time, a fully developed alternative to S-C-P. The following remarks, however, might encourage others to join the search.

The essential idea behind the S-C-P approach is that competitive conditions affect behavior. The approach expresses this idea in a particular form. That this form is unproductive does not mean that the

idea is wrong. What is wrong is the denial of tradeoffs between locational convenience and other aspects of bank services, and thus the denial of all competitive forces between banks in different "markets."

We might as well make a virtue of necessity and not only admit but exploit the fact that, in some appropriate sense, all banks potentially compete with each other. Instead of beginning with the extreme assumption that the population of banks can be divided into subsets constituting local markets, it seems better to begin at the opposite extreme: all banks constitute one market, in which, however, competitive forces are very unequal.

It is no objection that people tend to bank near their homes or businesses. Admittedly, distance and the associated transportation costs give banks an advantage over their distant rivals in attracting local customers, but they do not preclude competition between them. Any bank that tries to exploit its advantage too intensively will lose customers to distant rivals. The desire for profits will therefore lead the banks to protect the part of their business that is cheapest to protect--that of their local customers. Hence consumers tend to deal with the closest bank, not in spite of the competition with distant banks but because of it. That consumers tend to bank locally is therefore, as consistent with the assumption of one market as with the assumption of many.

The one-market assumption acknowledges the importance of locational convenience but avoids the necessity of classifying banks as either convenient to a group of customers or not convenient. Rather, it suggests that any bank offering a sufficiently attractive product will become "convenient" to any consumer. Naturally, it will rarely pay distant banks to do this. Competition for more distant customers is more expensive.

Anything that increases the costs of competing for distant customers will obstruct the competition between distant banks and, therefore, permit competition to be less evenly distributed over the banking system. The branching limitations imposed by many states act precisely in this manner. As mentioned above, only a few performance variables took significantly different values in the different convenience areas defined by Stolz. In Iowa, however, which

permits some branching in either the same county as the home office or a contiguous county, and where only two variables differed significantly between convenience areas, eight differed significantly between counties. In Wisconsin, which has only permitted limited branching since 1968, four variables differed significantly between convenience areas and the same four differed significantly between counties. In Minnesota, a unit banking state, only three variables differed between convenience areas and three also differed between counties. (See Table II.)

In Iowa, competition is distributed more evenly within and less evenly between counties than it is in the other two states because the branching regulations do not so appreciably raise the costs of competing within counties as they do in Wisconsin and even more so in Minnesota.

Again, Jacobs (1971) found that while rates on business loans decline slightly with decreases in concentration, they decline significantly with liberalizations of the branching laws. And when Horvitz (1968) calculated the dispersion in rates paid on time deposits and certificates of deposit in a number of geographical regions, he found it to be smaller the less restrictive the branching laws. Both patterns show that decreasing the costs of competing increases the strength of competition and evens out its distribution.

The one-market assumption directs our attention away from the conventional framework's curious proxies for competitive conditions (concentration ratios, Herfindahl indexes, and the like) to a more direct consideration of competition itself, both in the sense of behavior and in the sense of conditions. Competitive behavior is the attempt to attract and keep customers; competitive conditions determine how strenuous the effort must be and how successful it is. The meaning of competitive behavior thus suggests lines of inquiry into competitive conditions.

The initial attraction of S-C-P was its apparent shortcut past that inquiry. Instead of a research program concerned with the direct measurement of competitive forces, it held out the apparently easier targets of delineating local markets and measuring structure. Experience proves that the apparent shortcut is a dead end. The one-market assumption suggests questions that, though more difficult to answer, go directly to the issues.

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