



American Finance Association

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Source: *The Journal of Finance*, Vol. 36, No. 1 (Mar., 1981), pp. 181-186

Published by: Blackwell Publishing for the American Finance Association

Stable URL: <http://www.jstor.org/stable/2327471>

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A Note on Concentration and Checking Account Prices

D. K. OSBORNE and JEANNE WENDEL

ABSTRACT

A recent survey (Rhoades, 1977b) of Structure-Conduct-Performance studies in banking lists twelve studies of the effect of concentration on checking-account prices. All twelve rely on proxies for price instead of actual price. Here we evaluate this practice by comparing the three most widely used proxies with the prices actually charged by a sample of 154 Texas banks.

A RECENT SURVEY (RHOADES, 1977b) of Structure-Conduct-Performance studies in banking lists twelve studies of the effect of concentration on checking-account prices.¹ All twelve rely on proxies for price instead of actual price. Here we evaluate this practice by comparing the three most widely used proxies with the prices actually charged by a sample of 154 Texas banks. (A fourth proxy, used only once, has been discussed elsewhere by Osborne [1977]). We begin by describing the computation of actual price and then ascertain the relations between the price and each of the proxies. Finally we demonstrate the effects of the substitution of proxies for price in regression analysis and point out two properties of the sample prices that appear to be at odds with the *S-C-P* paradigm.

I. Price

Banks generally offer the consumer an array of services and pricing options. We focus on the service of processing n checks per month together with the associated bookkeeping and reporting. The price of this service is the minimum cost that the depositor must pay for writing n checks; at most banks it has an explicit and an implicit part. The explicit part consists of the purchase cost of blank checks, a per-item processing fee, and a monthly service charge. The third of these explicit costs (and at some banks, the second as well) depends on the balance, B , in the account. The monthly explicit cost is therefore a function of the number of checks and the balance, say $C(n, B)$. At all but a few of the sample banks, B is the minimum, or unused, balance.

The implicit part of the price is the opportunity cost of maintaining the unused balance; it reflects the post-tax yield obtainable from an investment of comparable risk and liquidity, here taken to be 4% per year or .33% per month. (The sample was taken in the summer of 1977). The monthly implicit cost is therefore .0033 B . For a given value of n , the sum $C(n, B) + .0033B$ is minimized by a balance of

¹ Bell and Murphy [1969], Fraser and Rose [1971, 1972, 1976a, 1976b], Klein and Murphy [1971], Fraser, Phillips, and Rose [1974], McCall and Merrill [1975], Heggstad and Mingo [1976, 1977], Stolz [1976], and Rhoades [1977a].

$\bar{B}(n)$. By definition, the price $P(n)$ is the minimum cost, $P(n) = C[n, \bar{B}(n)] + .0033\bar{B}(n)$.

We do not distinguish between minimum and average balances because the depositor could time his deposits and withdrawals so as to maintain a constant balance $B(n)$, in which case the minimum and average balances coincide. The depositor may, of course, choose to allow his balance to fluctuate, permitting the average to differ from the minimum, in which case he might pay something for the extra services of convenience and storage. These must be distinguished, however, from the basic checking-account service, which is to process checks.

The price per check, $P(n)/n$, generally depends on n , i.e., the bank has a price schedule rather than a single price. Few depositors know exactly how many checks they will write in a month. (The typical depositor averages twenty.) This uncertainty may lead a depositor to keep an unused balance that proves, at the end of the month, to be too large or too small to minimize his cost. His uncertainty lies in the amount of the service he will wish to buy, not in the price that he will pay for a given amount. The price is definite.

Figure 1 shows the price schedules in a sample town. The corners on a price schedule generally correspond to switches in the optimal balance, though occasionally they spring from a switch in the optimal plan—e.g., from the “special”

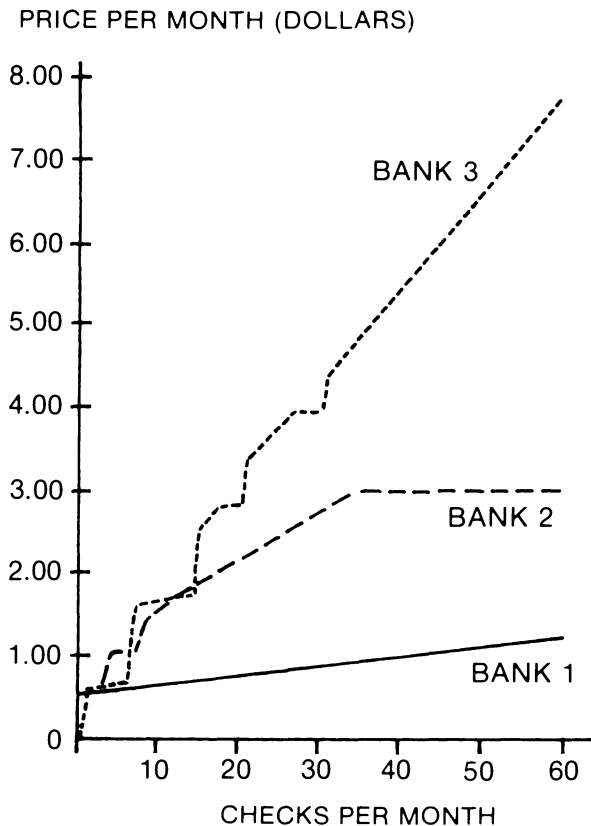


Figure 1. Price Schedules in a 3-Bank Town

account, with a fixed per-check fee, to the "regular" account where the processing fee depends on the balance. The inter-bank differences shown in Figure 1 are typical of our sample. (See Osborne and Wendel [1978b] for an analysis of the sample.)

II. Price Proxies

The most popular proxy for price is the service charge revenue per dollar of demand deposits. If a bank has k depositors, this proxy, P_D is

$$P_D = \sum_{i=1}^k C(n_i, B_i) / \sum_{i=1}^k B_i$$

The proxy is easy to obtain from published data but, as explained by Boyd [1976], it is not conceptually a price. (It is not even an average revenue per unit sold or per customer.)

We can evaluate the significance of the error introduced by the use of this proxy by comparing P_D with the actual price charged by our sample of 154 Texas banks during the summer of 1977. The calculated correlation coefficient between P_D and $P(20)$ (the price of writing twenty checks), for instance, is $-.04$, with a 99% confidence interval of $[-.25, .18]$. The correlation is not significantly different from zero. Even if the true value of this coefficient were at the upper bound of the confidence interval, the proxy would explain only three percent of the variations in price.

A second proxy, P_A , is the service-charge revenue per demand account:

$$P_A = \sum_{i=1}^k C(n_i, B_i) / k.$$

This is not much like a price, either, and correlates poorly with price. For example, the calculated correlation coefficient between P_A and $P(20)$ is $-.07$, with a 99% confidence interval of $[-.28, .14]$.

The third proxy is the explicit service charge for an account with specified characteristics—usually twenty checks per month and a \$100 minimum balance. Calling this proxy P_s , we have:

$$P_s = C(20, 100).$$

Clearly, this is a better proxy than the others. The problem, however, is that a \$100 balance might not be optimal for depositors who write twenty checks. Indeed, at only thirteen of our 154 sample banks is it so. Consequently, the calculated correlation coefficient between this proxy and $P(20)$ is only $.42$, with a 99% confidence interval of $[.22, .57]$. While the correlation differs significantly from both zero and one, variations in the proxy can explain at most about a third of the variations in price.

III. Regression Results

The effect of errors-in-the-variables on regression estimates depends, of course, on the nature of the errors. Since the errors are substantial in this case, we approach the question indirectly by comparing the estimates corresponding to

the various price measures. For this purpose we adopted Heggstad and Mingo's [1976] specification as a model, altering it, however, in two ways. First, we deleted one of their variables (the percentage of demand deposits in accounts under \$1000) that is expensive to sample and for which they obtained only insignificant coefficients. Secondly, we added a variable to control for cost differentials between markets: the average wage of check-file clerks, proof-machine operators, and telephone operators in each market. Hence the regressors, in addition to a concentration measure, were:

- TD: Total deposits of the bank (thousands of dollars);
- IG: Ratio of 1974 to 1971 personal income in the market;
- PI: Per capita personal income in the market, 1974 (dollars);
- DS: The bank's share of total deposits in the market (%);
- RD: Ratio of demand to total deposits in the bank (%);
- WG: Average low-skilled wage rate (dollars per year).

We approximated markets by counties (which in our sample largely coincide with Standard Metropolitan Statistical Areas (SMSA's) where these exist) and measured concentration by all the usual indexes. The Herfindahl index did better (in terms of R^2 and F) than the others, so we report only the regressions in which it was used. All estimates are obtained by OLS for comparability with previously published results.

The estimates obtained with the proxies are shown in Table I. The first line, for the most widely used proxy (P_D), shows estimates substantially similar to those reported by other investigators of this proxy (see Osborne [1977] and Rhoades [1977b]), thus indicating an absence of peculiarities in our sample. The negative Herfindahl-coefficient on line three is atypical, but unstable results are to be expected from poor proxies.

The coefficient estimates obtained when the dependent variable is the actual price of writing n checks per month are presented in Table II. We report the results for $n = 6, 20, 42$, and 84. Since the latter three present a coherent picture (while results vary greatly for $n < 10$), we focus on these three cases. To simplify the presentation, we indicate the presence of statistical significance by asterisks—one for the 5% level, two for the 1% level.

The tables highlight two points. First the best proxy from the standpoint of correlation with actual price (P_s) produces the lowest R^2 and F values. Secondly—and even more striking—no coefficient estimate is significant in both a price and a proxy equation. Hence, while the third proxy correlates better with price than the others do, its regression equation comes no closer to the price equations in the sense of capturing the significant influences on price.

Sweeping conclusions cannot, of course, be drawn from a single study. But the evidence presented here raises serious questions about the body of research that underlies our current understanding of bank competition.²

IV. Two Further Points

One striking characteristic of the 23 Texas towns fully covered by our sample is the wide range of prices found within towns. Although a town may not constitute

² See Osborne and Wendel [1978a] for our criticisms of the theoretical framework of this research.

Table I
Regression Coefficients and (In Parentheses) Their Standard Errors: Price Proxies
INDEPENDENT VARIABLES

Dependent Variable	Intercept	Herfindahl	$TD \times 10^{-6}$	IG	$PI \times 10^{-6}$	DS	RD	$WG \times 10^{-6}$	R^2	F
Service-charge Revenue per deposit dollar (P_D)	-.03* (.015)	.004 (.011)	-.07** (.02)	.026** (.009)	2.5 (1.4)	-.004 (.009)	-.035** (.012)	2.8 (1.6)	.304	9.09*
Service-charge Revenue per account (P_A)	-.030 (.023)	-.006 (.015)	-.07** (.02)	.030* (.015)	.65 (2)	-.006 (.014)	-.030 (.019)	4.8 (2.5)	.216	5.24*
Explicit service-charge for 20 checks (P_s)†	2.54* (1.14)	-2.32** (0.8)	.22 (1.1)	.812 (.720)	-70 (100)	.129 (.709)	-1.37 (.970)	-30 (100)	.122	2.90*

† 141 observations.

* Significant at the 5% level.

** Significant at the 1% level.

Table II
Regression Coefficients and (In Parentheses) Their Standard Errors: Actual Prices
INDEPENDENT VARIABLES

Dependent Variable	Intercept	Herfindahl	$TD \times 10^{-6}$	IG	$PI \times 10^{-6}$	DS	RD	$WG \times 10^{-6}$	R^2	F
$P(6)$	.79 (.65)	-.67 (.46)	.2 (.66)	.52 (.41)	40 (60)	.23 (.40)	-.39 (.55)	85 (70)	.043	.943
$P(20)$	2.91** (.846)	-.786 (.595)	-.27 (.86)	-.350 (.534)	200** (80)	.942 (.526)	-1.14 (.720)	-300** (90)	.127	3.02**
$P(42)$	5.27** (1.34)	-1.01 (.940)	-.65 (1.3)	-1.16 (.844)	400** (100)	1.31 (.831)	-1.96 (1.14)	-500 (100)	.156	3.86**
$P(84)$	8.19** (2.26)	-.750 (1.59)	-.7 (2)	-2.17 (1.43)	700** (200)	1.12 (1.41)	-3.39 (1.93)	-700** (200)	.129	3.09**

* Significant at the 5% level.

** Significant at the 1% level.

a "local market," the empirical work has invariably identified local markets with political or geographic regions equal to or larger than a town, so that a town is always part of a market. Hence intratown variations represent lower bounds for intramarket differences. On the average in the 23 towns, the highest price for 20 checks is 2.12 times the lowest. The factor ranges from 1.76 in 3-bank towns to 2.62 in towns with 6 to 10 banks. Such large differences raise two questions: first, how should the concept of a "market price" be interpreted in these towns, and does the concept of a local market provide an overly simplistic and misleading representation of the nature of the competitive forces linking individual banks? The second question springs from the fact that means and variances are positively correlated in the 23 towns fully covered by our sample. If high prices are indeed a measure of poor performance due to tacit or explicit collusion, high means would be accompanied by low variances. Is the supposed association between high concentration and a high probability of collusion also too simplistic?

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