THE SOCIAL COSTS OF UNIT BANKING RESTRICTIONS

By

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I. Introduction

Unit banks in the United States fall into (at least) two categories: those located in branching states that remain unit banks by choice, and those constrained by state law to operate with only one full service office. The fact that some firms remain unit banks by choice suggests that unit banking is not inefficient or unprofitable in all instances: unit banks located in branching states have revealed that they cannot increase profits by adding a second branch office. Branch state unit banks (BSUB) are thus equally efficient as branch banks in the same state. Yet the wholesale restriction of all banks in selected states to operate as unit banks seems likely to involve considerable inefficiency. Unit state unit banks (USUB) are prohibited from operating additional branches even if physical expansion would constitute the least-cost (most profitable) means of servicing their clientele. USUB tend to substitute other competitive devices for the prohibited branches, perhaps raising their costs above the (unconstrained) cost of producing bank services. Such technological inefficiencies, if they exist, would constitute a social cost of unit bank restrictions. A second cost of unit bank restrictions might derive from price inefficiency (that is, bank output priced at something other than marginal cost). If entry is less difficult (cheaper) in branching states--where the market entrant need not necessarily acquire a new charter--than in unit states, USUB would tend to earn higher monopoly rents on their charters.

Prior studies have documented cost and profitability differences between branch banks and the set of all unit banks. Early studies (Benston [1972], Bell and Murphy [1968]) applied relatively crude dummy variable adjustments to capture these effects. Mullineaux [1975] went considerably further, demonstrating that unit and branch banks have significantly different cost functions and scale economy characteristics. In a profit function context, Mullineaux [1978] demonstrated that the marginal profitability of a branch office is significantly higher in unit banking states than in branching states, suggesting some sort of market disequilibrium. Despite such evidence, no prior study has evaluated the differences between the sets of constrained and unconstrained unit banks. Yet this is the most direct means of measuring the social cost of unit banking restrictions. As with any government regulation, these restrictions can only be justified if the attendant social benefits outweigh their estimated costs.

This paper evaluates both the technological and price efficiency effects of unit bank restrictions in the United States. Section II describes the range of locational restrictions imposed by the twelve states characterized as unit banking states in 1978. Upon careful inspection, so-called "unit" banking varies from the strict requirement that banks operate at only one physical location, to regulations that allow an unlimited number of limited service branches within 35 miles of the single full service office. (Unit banking states also differ in their treatment of multibank holding companies.) The Functional Cost Analysis data used to evaluate bank cost and profit functions are described in Section III. Section IV then addresses technological efficiency issues by estimating a translog cost function for unit banks. A translog profit function is described and estimated in the following section to detect any structure-related price inefficiencies. The empirical evidence implies substantial and statistically significant technological and price inefficiencies associated with unit bank restrictions. The final section discusses the social cost implications of these inefficiencies.

II. Unit Banking Restrictions in the United States

Table I summarizes the banking structures allowed in each of twelve states characterized by the Conference of State Bank Supervisors [1977] as having unit banking "prevalent" during 1978. The sole common denominator to these state laws is that banks may operate no more than one full service office. Only Wyoming interprets "unit banking" literally, allowing no remote facilities of any kind. The other eleven "unit" states permit varying numbers of limited service branches (or "paying and receiving stations") at which customers can conduct the routine aspects of bank business. New account or loan relationships may not be established at these "facilities," but customers can cash checks, deposit funds, make loan payments, determine account balances, and so forth. The set of USUB therefore contains two subsets of potential empirical interest: those unable to establish any additional facilities vs. those that have chosen to limit themselves to their existing number of physical locations. The latter might be producing bank output in a technologically efficient manner, especially if limited service facilities substitute closely for full service branches. The constrained USUB are more likely to be servicing customers with an inefficient combination of branch and other factors of production.

Unit banking laws also differ in their treatment of multibank holding companies (MBHC), which are permitted in only seven unit banking states. This form of organization might be expected to attain at least some of the economies associated with multi-office representation even if the corporation's individual subsidiary banks cannot. The extent of this substitution is an empirical issue.

Three dummy variables are used to summarize unit banking restrictions in the regression analyses presented below. The first two describe state laws

Table I: Unit Banking Restrictions in the United States,

December 31, 1977

1.	Colorado*	One facility permitted within 3,000 feet of main office.
2.	Illinois	One facility permitted within 1,500 feet of main office, another within 3,500 yards.
3.	Kansas	One auxilliary attached facility plus up to three detached facilities within same city or township as main office. With any detached facilities, at least one must be within 2,000 feet of the main office.
4.	Minnesota*	Facilities permitted.
5.	Missouri*	Up to two facilities permitted within the same town.
6.	Montana*	One facility permitted within 1,000 feet of main office.
7.	Nebraska	One auxilliary attached facility permitted, plus up to two additional detached facilities within the same city as main office. With two detached facilities, one must be within three miles of the main office.
8.	North Dakota*	Facilities permitted in the home county or any adjoining county within 35 miles of the main office, provided no other bank's main office is already located in the city.
9.	Oklahoma	One facility permitted within 1,000 feet of main office.
10.	Texas*	Facilities permitted.
11.	West Virginia	One facility permitted within 2,000 feet of main office.
12.	Wyoming*	No facilities permitted.

*State allows multibank holding companies.

Source: Information summarized from A Profile of State-Chartered Banking (1977 Edition), Conference of State Bank Supervisors (Washington, D.C.), pp. 95-112.

and therefore take the same value for all banks in a given state:

UNIT = 1 for unit banks located in a unit banking state;
       0 for unit banks located in a branch banking state.

MBHC = 1 for USUB located in a state that allows multibank holding companies;
       0 for other USUB.

If BSUB could reap additional profits by establishing a second full service office, they would. This implies that they are as technologically efficient (approximately) as branch banks in the same market. With free entry, competition would lead USUB to produce an output level corresponding to minimum average social cost, making them equally efficient as BSUB. However, most observers agree that entry to banking is severely limited. USUB will therefore maximize profits by expanding beyond their least-cost output level. Prohibited from establishing additional branches, these unit banks must expand by substituting other (more costly) methods of serving their clientele.[1] Consequently, UNIT should have a positive coefficient in the estimated cost function, indicating a deadweight social loss. UNIT has an ambiguous impact on bank profits. Any associated cost inefficiencies would tend to depress profits, but UNIT bank profits might still be higher (*ceteris paribus*) if entry to concentrated markets is more difficult *de novo* than via a branch or acquisition of an existing bank.

The MBHC variable is somewhat unconventional. It describes state law and not each individual bank's affiliation (or lack thereof) with a multibank holding company. With equilibrium in the market for bank ownership, unaffiliated banks must be as efficient as they would be if affiliated. Otherwise a MBHC would likely acquire the less efficient banks. The law should therefore affect all banks in the state, regardless of their affiliation.[2] If holding company affiliation bestows cost savings on unit banks, MBHC should have a negative coefficient in the cost function. The effect of MBHC on bank profits is theoretically indeterminant. The presence of multibank holding companies might discourage new entrants (Curry and Rose [1981]), reinforcing the anticipated cost effect and raising bank profits. On the other hand, MBHC could increase the extent of potential competition, depressing profits and offsetting any production cost economies. The fact that prior studies have failed to produce a robust assessment of the effects of holding company affiliation suggests that none of these factors is terribly powerful.

Finally, limited service facilities may substitute for full service offices, at least in part. A third dummy variable describes the ability of each individual bank to establish additional limited service branches

$$\text{BOUND} = \begin{cases} 1 & \text{if the unit bank is unable to establish an additional facility;} \\ 0 & \text{otherwise.} \end{cases}$$

This variable was constructed by comparing each bank's actual number of facilities with the number allowed under state law.[3] (All banks located in branching states have BOUND = 0.) Cost functions were estimated with both UNIT and BOUND among the explanatory variables. If limited service facilities substitute perfectly for full service offices, UNIT should have no statistical significance, while BOUND should carry a positive coefficient in the cost function. Alternatively, limited service facilities may substitute only partially for full branching: both UNIT and BOUND would then carry positive coefficients. An individual bank's ability to establish further branches should not affect its own revenues, because this datum implies nothing about the competitive abilities of other banks in the state. The profit function's coefficient on BOUND is therefore expected to reflect solely its effect on bank costs.

III. Data

The 1978 Functional Cost Analysis (FCA) survey of 806 member banks in all twelve Federal Reserve provided data for estimating bank cost and profit functions. Of the survey population, 439 banks report only one full service branch, making them unit banks for purposes of this study. A majority (304) of the unit banks reside in unit banking states, though the sample contained 135 BSUB as well. These two types of unit banks differ substantially in their size distributions, since few banks in branching states grow to be large without establishing additional branches. Because the composition of bank output tends to vary with asset size in ways that are difficult to measure precisely, two steps were taken to assemble a comparable set of unit banks in branching and unit states. First, all USUB larger than the largest BSUB (assets of about $189 million) were permanently eliminated from the sample, leaving 406 unit banks. Even within this group, there were considerably more large USUB ($60.7 million average total assets) than large BSUB ($45.6 million). Each BSUB was therefore matched with a USUB of similar asset size, yielding a sample of 268 matched unit banks.[4] Separate empirical estimates were computed for the full sample of 406 banks with assets below $189 million, and for the matched subsample of 268 banks. Results from the larger sample imply a greater impact of bank structural constraints on bank profits and costs, but this sample seems less pertinent *a priori*. In order to provide a conservative estimate of the social costs of unit banking restrictions, only the matched sample results are discussed in the text, with the full sample results reported in abbreviated form in the Appendix.

Bank Output. Defining bank output has always been a serious problem for bank cost studies. Here, a Divisa index of accounts was constructed to measure (proxy) sample banks' aggregate level of output. In the index, each account type is weighted by the sample average proportion of total costs arising from that activity. (Benston, Hanweck, and Humphrey [1982] use a similar output measure.) The ith bank's output is therefore

$$(1)\ \log(O_i) = \sum_{j=1}^{6} \alpha_j \log(N_{ij})$$

where N_{ij} = number of accounts of type j at bank i;

α_j = sample average proportion of total costs attributed to activity j;

j = index of six FCA activities: demand deposits, time deposits, commercial and agricultural loans, installment loans, real estate loans, and safe deposit boxes.[5]

(The cost variable explained in the regressions below is the sum of operating costs for these six FCA areas.)

Input Prices. Banks employ two factors of production whose prices must be measured to estimate a translog cost function. Labor costs (P_L) are approximated by the average wage paid by each bank to its employees. Banks' cost of physical capital (P_K) should be relatively uniform across sample banks, except for occupancy expenses. To capture these cross-sectional variations, the price of capital was represented alternatively by two constructed variables.

1. RENT1 = occupancy expenses plus the cost of furniture and equipment, divided by the number of offices operated.[6]

2. RENT2 = the ratio of occupancy expense to the cost of furniture and equipment. If the prices of bank furniture, equipment, and structures are relatively constant across the sample, this ratio captures geographical variation in land rentals.

Results using each alternative P_K variable are presented below.

IV. Branching Restrictions and Bank Operating Costs

Translog Cost Function

The difference between USUB and BSUB operating costs is estimated using a translog cost function. Developed by Christensen, Jorgenson, and Lau [1973], this function places no prior restrictions on the underlying production function's elasticities of transformation, and is therefore more general than the log-linear functional form often used in the past. The translog can be viewed as a cost function in its own right or as an approximation to some "true" cost function. The basic function to be estimated here is:

$$(2)\ \log(\text{Cost}) = A_0 + A_1(\log O) + \tfrac{1}{2} A_{OO}(\log O)^2 + \sum_i A_i(\log P_i) + \tfrac{1}{2}\sum_i \sum_j A_{ij}(\log P_i)(\log P_j) + \sum_i A_{Oi}(\log O)(\log P_i)$$

where Cost = operating cost for the six FCA activities comprising the Divisia index of output;

O = Divisia index of bank output;

P_i = price of labor (i = L) or capital (i = K).

Theory requires that a cost function be homogeneous of degree one in input prices. This property is imposed on the estimation through the constraints (Christensen and Greene [1976], p. 660):

$$A_{OL} + A_{OK} = 0$$

$$A_L + A_K = 1$$

$$A_{LK} + A_{KL} = -A_{LL} = -A_{KK}.$$

Two additional variables were added to the standard cost function (2) to account for interbank differences in operating environment. OFFICES measures the total number of locations at which each bank conducts business. Prior studies have concluded that additional offices raise bank operating costs, *ceteris paribus*. Banks may also differ in the type of customers they serve, with some clienteles demanding more services per account than others. To control for these cross-sectional differences, the variable ACTIVITY was constructed as a weighted average of the quantity of deposit services provided by each bank. (The number of checks cashed, deposit items, "on-us" checks, etc., were combined using weights derived from in-bank time and motion studies. See Longbrake and Haslem [1975], footnote 12.) Greater ACTIVITY should translate into higher bank costs, *ceteris paribus*.

Empirical Results

The estimated regression form is given by (2), plus the two additive homogeneity variables (entered as logs) and some combination of the three bank structure dummies.[7] Table II presents results for each alternative P_K measure (RENT1, RENT2) from the matched bank sample. (Table A-I in the Appendix reports structural variable coefficients estimated over the full sample.) The most obvious test of unit bank restrictions occurs in the first two columns of Table II. The structure variable UNIT carries a significant positive sign, indicating that USUB operating costs exceed those of similar sized BSUB by somewhere between 4.5% and 5.9% (the antilogs of .0191 and .0250 respectively). It may be that USUB have greater costs not because they may operate only a single full service branch, but because they are BOUND. In other words, do limited service facilities substitute effectively for full service offices in producing bank services? This possibility is evaluated in the last two columns of Table II, where the cost function coefficient on BOUND is significantly positive. BOUND USUB have operating costs 12.6% to 13.4% greater than similar unit banks that may still establish additional facilities. UNIT has become statistically insignificant, though the estimated

Table II: Cost Functions for the Matched Sample of Unit Banks

Dependent Variable:
Operating Costs of Producing Six FCA Services

	1.	2.	3.	4.	5.	6.
UNIT	.0191* (1.72)	.0250≠ (1.56)	--	--	.0111 (.957)	[illegible] (.966)
BOUND	--	--	.0521* (2.20)	.0637* (1.98)	.0545* (2.41)	.0515≠ (1.56)
MBHC	--	--	.0101 (.625)	-.0428* (2.06)	--	--
Constant	-.638 (.808)	2.45≠ (1.422)	1.053 (.998)	3.972* (1.83)	-.347 (.457)	2.31≠ (1.34)
O	.682 (1.387)	-.753 (1.01)	-.00840 (.0124)	-1.381≠ (1.46)	.516 (1.09)	-.6952 (.939)
O^2	-.0651 (.392)	.199 (1.04)	.0796 (.324)	.363≠ (1.44)	-.0158 (.0977)	.198 (1.04)
P_L^a	.643 (1.946)*	.287 (.7068)	1.47* (2.60)	.104 (.206)	.648* (1.97)	.326 (.806)
$(P_L^2)^b$	.402* (1.76)	-.152≠ (1.32)	.334 (.763)	-.0873 (.770)	.389* (1.71)	-.148≠ (1.30)
RENT1[a]	.357 (1.08)	--	-.473 (.834)	--	.352 (1.07)	--
RENT2[a]	--	.713* (1.75)	--	.896* (1.77)	--	.674* (1.66)
$(Rent^2)^b$	.402* (1.76)	-.152≠ (1.32)	.334 (.763)	-.0873 (.770)	.389* (1.71)	-.148≠ (1.30)
$(P_L \cdot P_K)$	-.201* (1.76)	.0758≠ (1.32)	-.167 (.763)	.0436 (.770)	-.195* (1.71)	.0738≠ (1.30)
$(P_L \cdot O)^c$	.0187 (.157)	.269* (2.36)	-.223 (1.04)	.299* (2.15)	.0155 (.131)	.254* (2.24)
$(P_K \cdot O)^c$	-.0187 (.157)	-.269* (2.36)	.223 (1.04)	-.299* (2.15)	-.0155 (.131)	-.254* (2.23)
ACTIVITY	.106* (2.08)	.309* (4.29)	.0519 (.603)	.233* (1.97)	.101* (2.04)	.306* (4.32)

Table II (continued)

	1.	2.	3.	4.	5.	6.
OFFICES	.526* (12.9)	.0767* (1.88)	.474* (7.19)	-.0154 (.238)	.506* (12.5)	.0610≠ (1.49)
$\bar{R}^2$	.896	.780	.902	.814	.899	.782
F-statistic	287.1*	118.7*	138.7*	65.33*	263.9*	106.4*
Mean of Dependent Variable	6.020	6.021	6.025	6.023	6.022	6.021
SER	.0897	.130	.0849	.115	.0891	.130
Number of Observations	267[d]	266[d]	134[e]	133[e]	267[d]	266[d]

[a]Coefficients constrained to sum to unity.

[b]Coefficients constrained to be (-2) times the Coefficient on (P_L*Rent).

[c]Coefficients constrained to be equal in absolute value but of opposite sign.

[d]Sample size given by the number of matched BSUB and USUB with the indicated P_K variable defined.

[e]Sample size given by the number of matched USUB with the indicated P_K variable defined.

≠Significantly different from zero at 10% level, one-tailed test.

*Significantly different from zero at 5% level, one-tailed test.

Numbers in parentheses are t-statistics.

All variables are common logarithms.

coefficient remains positive and is large enough to be economically relevant (2.6% to 3.8%).

Columns three and four provide further information on the availability of full service branch substitutes. A cost function with BOUND and MBHC was estimated for the set of matched USUB. The coefficients on BOUND indicate (again) that a restriction on geographic expansion significantly raises bank operating costs (by somewhere between 12.7% and 15.8%). Evidence about multi-bank holding company effects on bank costs emerges as distinctly mixed: the regression using RENT1 implies no significant effect of MBHC, while the RENT2 result shows unit banks in MBHC states have 10.4% lower costs than those in unit banking states that prohibit MBHC. The latter finding supports the hypothesis that MBHC transmit some branch-related economies to subsidiary banks. The ambiguity surrounding this result is hardly novel: prior studies have failed to reach a consensus on virtually every aspect of holding company operations that has been evaluated. (See Jessup [1980] or Curry and Rose [1981].)

These estimated cost inefficiencies due to unit banking restrictions are substantial. Total noninterest operating expenses at all USUB in the nation under $100 million (which are most similar in size to the matched sample) were $4.5 billion in 1980. Applying the average estimated cost of unit banking from columns one and two of Table II (5.2%), the deadweight loss associated with UNIT restrictions in 1980 was approximately $237 million.[8] Extending the estimates to all USUB regardless of size more than doubles this estimate. As an alternative measure of unit banking's inefficiency, the results in columns five and six can be used to estimate the deadweight cost of BOUND USUB. Such banks represent approximately 15% of USUB in the matched sample. Assuming this proportion is representative of the USUB population,[9] the average coefficient on BOUND in columns five and six implies an annual cost of $88 million. Any social costs of the UNIT restriction on full service branches would be additional.

To summarize, it appears that limited service facilities substitute for full service branches in the production process, though not necessarily completely.[10] Banks unable to establish additional branches must employ less efficient means of production to service their customers, giving rise to the significant positive coefficients on UNIT and BOUND in Table II. Whether holding companies bestow any cost efficiencies on affiliated banks remains an unresolved issue.

V. Branching Restrictions and Bank Profits

Mullineaux [1978] first estimated a translog profit function for commercial banking firms. While the cost function reflects only technical productive efficiency, the profit function allows inferences about price efficiency as well. Though Mullineaux' primary concern was to evaluate bank scale economies, he made several intriguing empirical observations about the profitability of additional branches in unit versus branch banking states. In particular, he found that the estimated marginal profitability of a full service branch was approximately 15% higher for USUB than for a bank in a branch banking state,[11] suggesting that unit banking states have fewer than the competitive number of banking offices. (Savage and Humphrey [1979] also present evidence that branching restrictions caused unit banking states to have a significantly smaller number of banking offices than branching states in 1975.) This observation is, of course, consistent with the significant positive coefficients on UNIT and BOUND reported above. Further information about the effects of unit banking restrictions can be obtained by estimating a bank profit function.

Translog Profit Function

A one-to-one correspondence exists between a translog profit function and the underlying production technology. (See Mullineaux [1978] for details and references.) As with the translog cost function, then, the translog profit function can be viewed either as a profit function in its own right or as an approximation to the true profit structure. The basic profit function is given by[12]

$$(3)\ \log(\text{Profits}) = B_o + B_L(\log P_L) + \tfrac{1}{2}B_{LL}(\log P_L)^2 + B_K(\log P_K) + \tfrac{1}{2}B_{KK}(\log P_K)^2 + B_{LK}(\log P_L)(\log P_K) + B_B(\text{OFFICES}) + B_A(\text{ACTIVITY})$$

where Profits = pretax operating revenues minus operating costs;[13]

P_i = price of the factor input i (i = L for labor, K for capital).

In addition to the terms shown in (3), estimated regressions included some combination of the three bank structure dummy variables.[14] A high correlation between factor prices and their square terms causes the estimated B_o, B_L and B_{LL} coefficients in Table III to be implausibly large in absolute value with correspondingly large standard errors. (Mullineaux encountered the same difficulty.) Deleting the squared factor price terms from (3) has no substantial effect on the estimated structural coefficients. (These results are available from the author.)

Empirical Results

Estimated profit functions for the matched bank sample are reported in Table III using the two alternative P_K measures. (Table A-II in the Appendix reports coefficients on the structure variables for regressions estimated over

Table III: Profit Functions for the Matched Sample of Unit Banks

Dependent Variable:
Operating Revenue Minus Operating Costs (Before Taxes)

	1.	2.	3.	4.	5.	6.
UNIT	.077* (2.41)	.098* (2.52)	--	--	.070* (2.05)	.090* (2.15)
BOUND	--	--	.027 (.405)	.065 (.814)	.045 (.682)	.047 (.585)
MBHC	--	--	.054 (1.30)≠	.018 (.347)	--	--
Constant	60.7 (1.49)≠	89.5 (1.99)*	35.0 (.601)	101.1 (1.52)≠	60.5≠ (1.49)	88.7* (1.97)
P_L	-27.7 (1.41)≠	-44.3 (1.89)*	-15.6 (.540)	-50.3 (1.45)≠	-27.4≠ (1.39)	-43.9* (1.87)
$(P_L)^2$	7.86 (1.56)≠	11.7 (1.92)*	5.24 (.703)	13.2 (1.46)≠	7.73≠ (1.54)	11.6* (1.90)
RENT1	-1.31 (.343)	--	-.285 (.056)	--	-1.46 (.384)	--
RENT2	--	-.122 (.028)	--	2.74 (.484)	--	.025 (.006)
$(P_K)^2$	.737 (2.93)*	-.226 (1.27)	.895 (2.20)*	-.367 (1.77)*	.736* (2.93)	-.228 (1.28)
$(P_L \cdot P_K)$	-.452 (.480)	.064 (.057)	-.926 (.784)	-.663 (.454)	-.411 (.435)	.027 (.024)
ACTIVITY	-.239 (1.63)	.033 (.193)	-.097 (.400)	.193 (.663)	-.242≠ (1.65)	.031 (.180)
OFFICES	.796 (10.75)*	.569 (6.70)*	.795 (6.02)*	.462 (3.03)*	.781* (10.05)	.553* (6.21)
$\overline{R}^2$	.402	.146	.384	.098	.400	.144
F-statistic	20.64*	6.107*	9.229*	2.423*	18.53*	5.407*
Mean of Dependent Variable	5.687	5.689	5.716	5.719	5.687	5.689

Table III (continued)

	1,	2.	3.	4.	5.	6.
SER	.261	.312	.234	.282	.261	.312
Number of Observations	264[d]	263[d]	133[e]	132[e]	264[d]	263[d]

For footnotes, see bottom of Table II.

the full sample.) The most basic hypothesis is again tested in the first two columns of Table III: the significant postive coefficient on UNIT implies that USUB enjoy 19.4% to 25.3% higher pre-tax profits than similar BSUB. This result is consistent with the hypothesis that entry is more difficult in unit banking states, which allows existing banks to reap higher monopoly rents from their charters. In the process, consumers of bank services are charged prices above marginal production costs, giving rise to allocational inefficiencies. Restrictions against full service branching therefore impose two separate social costs: productive efficiency is lower (from Table II) and bank outputs are priced inefficiently as well.[15]

The additional effect of limited service facility restrictions on bank profits is evaluated in columns five and six of Table III. Unlike the cost function case, BOUND has no effect on bank profits, while UNIT's effect is similar to that shown in columns one and two (17.5% to 23.0%). The implication that a particular bank's characteristics (BOUND) have no significant effect on bank profits is entirely predictable, since the costs of entry to banking depend on state law (UNIT) and not the branching characteristics of existing banks. Despite the fact that BOUND banks have significantly higher operating costs, their profits are at least equal to those of un-BOUND banks. In equilibrium, BOUND banks apparently pass along cost inefficiencies by charging their customers higher output prices.

Columns three and four confirm again that BOUND has no effect on bank profits, and also assess the impact of MBHC. If the ability to make multibank holding company acquisitions increases actual or potential competition, MBHC would carry a negative coefficient in columns three and four. Instead, both coefficients are positive, failing to support the hypothesis that multibank holding companies increase the degree of competition or lower entry barriers in unit banking states.

The results in Table III imply that unit banking restrictions redistribute a substantial amount of income from bank customers to shareholders. Pretax 1980 operating profits for the universe of USUB under \$100 million (which are most comparable to the matched sample banks) were \$2.56 billion. The average UNIT coefficient in Table III implies that USUB earn 20% higher pretax profits than BSUB. Unit restrictions thus cost bank customers \$512 million in 1980 alone. (Applying the estimates from Table A-II to the entire set of USUB in the country yields a dollar figure about three times as large.) This pretax income transfer arises solely from regulatory control of the banking structure. In addition, noncompetitive prices for bank output translate into deadweight resource misallocation costs to the society, though the magnitude of these social costs cannot readily be calculated.

VI. Conclusion

The results of this empirical analysis strongly indicate that all unit banks are <u>not</u> alike. As BSUB expand in size there comes a point where profit maximization requires that a second full service branch be established. Being (in general) free to do so, the bank proceeds to serve its market in the socially efficient way. At a similar growth stage, however, USUB (or BOUND USUB) can expand no further. They are forced to substitute less efficient competitive devices for branching. USUB are therefore "too big" in a social sense, but without free entry there is no market mechanism to drive down the average USUB size. A direct implication of the results presented here is that consumers in unit banking states receive higher-priced and less convenient banking services than do consumers in branching states. Actual or potential competition from branch banks forces BSUB to be technologically efficient and to price their services competitively, making consumers indifferent between unit and branch banks in the latter states. A further conclusion is that multibank holding companies have no unambiguous effect on bank technological or price efficiency. Any efficiency effects associated with nationwide banking via holding company acquisitions cannot be documented with the data used here.

Total excess production costs associated with unit bank restrictions are difficult to measure precisely, but exceed $88 million annually. (They may run as high as $450 million per year, if one applies the UNIT coefficients in Table II to all USUB in the country.) These costs represent pure deadweight social losses. In addition, pretax income transfers occur in the amount of at least $512 million annually. Normative evaluations of this phenomenon must be undertaken with care. At a minimum, one could oppose circumlocutious governmental income redistributions on principle. Deadweight inefficiency costs result when output is priced above marginal cost, though these losses cannot be estimated without knowing supply and demand schedule elasticities for banking services. Posner (1975) argues, however, that rational investors will compete away anticipated excess profits via costs expended to enter the industry. In his view, the entire $512 million might correspond to a deadweight cost of monopoly in unit banking states.

Regardless of how unit banking costs are actually divided between income transfers and deadweight losses, the amounts involved are far from trivial. Overall, these estimates raise a rather strong presumption against the continuation of unit banking restrictions in the United States.

Appendix: Empirical Results from the Full Sample of Unit Banks

Regression results for only the matched subsample of unit banks were presented in Tables II and III. Because it controls for bank asset size, this sample was deemed preferable to the full sample of the unit banks, which includes considerably more large USUB than large BSUB. Since the composition of bank output varies substantially with asset size, the structural dummy variables (especially UNIT and BOUND) might capture size-related differences in the full sample in addition to any effects of the branching restrictions. Nevertheless, estimated structural coefficients from the full bank sample are reported here for completeness. This additional evidence indicates that the social costs of UNIT and BOUND reported in Tables II and III are, if anything, understated. Unfortunately, the MBHC results further confound the assessment of multibank holding companies' efficiency effects.

Cost function results in Table A-I show a positive coefficient on UNIT, though its magnitude is somewhat larger than in Table II. Unlike the matched sample case, however, the UNIT effect persists even when BOUND is added to the regression (columns five and six). BOUND here shows a significant effect on bank costs <u>beyond</u> that associated with the UNIT restriction, implying once again that limited service facilities substitute for full service branches in producing bank output. For the USUB subsample (columns three and four), BOUND retains its positive coefficient. The mixed significance of MBHC carry over from Table II, providing no resolution to the question of whether MBHC can substitute for full service branching.

Table A-II reports profit function results for the full unit bank sample. Here, columns one, two, five, and six are fully consistent with the corresponding results in Table III. Columns three and four, however, differ from the matched sample results. MBHC now carries a significant positive

Table A-I: Cost Functions for the Full Sample of Unit Banks: Structural Dummy Variables

Dependent Variable:
Operating Costs of Producing Six FCA Services

	1.	2.	3.	4.	5.	6.
UNIT	.0271* (2.723)	.0497* (3.306)	--	--	.0192* (1.85)	.0372* (2.37)
BOUND	--	--	.0498* (2.59)	.0804* (2.84)	.0413* (2.47)	.0649* (2.48)
MBHC	--	--	-.00945 (.789)	-.0572* (3.22)	--	--
Number of Observations	406	402	265	261	406	402
$\bar{R}^2$	.917	.809	.925	.836	.918	.811

Estimated regressions correspond to similar-numbered columns in Table II.

Table A-II: Profit Functions for the Full Sample of Unit Banks: Structural Dummy Variables

Dependent Variable:
Operating Revenue Minus Operating Costs (Before Taxes)

	1.	2.	3.	4.	5.	6.
UNIT	.0934* (3.24)	.177* (5.05)	--	--	.0918* (3.03)	.162* (4.38)
BOUND	--	--	.023 (.460)	.109 (1.28)	.0084 (.173)	.075 (1.24)
MBHC	--	--	.071 (2.22)*	.053 (1.69)*	--	--
$\bar{R}^2$	.476	.187	.487	.156	.475	.189
Number of Observations	402	398	263	259	402	398

Estimated regressions correspond to similar-numbered columns in Table III.

coefficient, suggesting that the ability to form multibank holding companies raises pretax bank profits. This may occur because MBHC affiliation reduces operating costs or because the ability to form multibank holding companies somehow decreases actual or potential competition. (One hypothesis consistent with this coefficient is that holding companies use their "deep pockets" to engage in predatory pricing vis-a-vis small competition (thus deterring entry).) It is worth repeating that the ambiguity surrounding this variable is well documented in the literature.

Footnotes

[1]For example, advertising, bank by mail, longer hours, extra services, free checking.

[2]Prior studies have tried to measure the effect of holding company affiliation on bank prices or profitability. (See Jessup [1980], pp. 496-7 or Curry and Rose [1981] for a summary.) The underlying hypothesis that affiliated banks differ from nonaffiliated banks rests on a basic assumption about disequilibrium in banking structure. In long run equilibrium, no bank that could be substantially more efficient or profitable within a holding company will remain unaffiliated. Instead, this paper assumes that the banking industry is near its long run ownership equilibrium structure. All banks in a state that allows MBHC are assumed equally efficient and profitable, regardless of affiliation. Without this assumption, the MBHC variable used here is senseless.

[3]Some states (Minnesota, North Dakota, Texas) have no explicit limit on the permitted number of facilities. Banks in these states all have BOUND = 0.

[4]With 135 BSUB, the matched sample should have included 270 banks. One matched pair of banks was omitted due to clerical error. The matched USUB averaged total assets of $47.26 million, compared to $47.10 million for the matched BSUB subsample.

[5]Other activities identified in the Functional Cost Analysis--for example, investments or nondeposit sources of funds--were omitted from the analysis because they do not provide data amenable to quantifying output.

[6]Weighting the limited service facilities by one-half relative to the main office in this denominator had no substantive effect on the structural variables' estimated coefficients.

[7]Early in the study, Chow tests failed to reject hypotheses that bank cost functions were homogeneous across institutions with different structural characteristics (BOUND vs. un-BOUND, BSUB vs. USUB, etc.). Structural constraints were therefore incorporated into the cost function only as shift variables.

[8]This estimate of societal loss is biased in (at least) two ways. First, the true figure should be somewhat smaller than $237 million since some USUB would undoubtedly remain unit banks even if branching were allowed. Second, the estimate in the text omits any costs borne by bank customers in <u>their</u> efforts to substitute for prohibited branches.

[9]BOUND banks also make up about 15% of USUB in the full sample. The procedure used here further assumes that the probability of being BOUND is unrelated to bank size. To the extent larger banks are more frequently BOUND, $88 million represents an underestimate of this restriction's social cost. See also footnote 7.

[10]This conclusion could bear on the regulatory question of whether automated teller machines (ATMs) are functionally equivalent to branches.

[11] Mullineaux [1978] correctly assumes that the marginal profitability of an office is the same for unit and branch banks within the branch banking states. See also footnote 2 above.

[12] Note that the profit function contains no bank output variable, obviating a major measurement problem.

[13] Technically, the profit variable should exclude all fixed operating costs. As an empirical matter, however, the inclusion or exclusion of fixed costs has no noticeable effect on the estimated coefficients. Mullineaux [1978] reports the same phenomenon (see his footnote 11).

[14] A perfectly competitive firm's profit function also includes output prices as explanatory variables, but output prices add no explanatory power in the profit function of firms with market power. Mullineaux [1978] found several statistically significant output prices (in particular, the implicit return on demand deposit balances), but most prices were not significant in his analysis. Since the output prices that can be constructed with FCA data are crude and subject to large measurement errors, no such prices were included in the profit functions estimated here.

[15] This conclusion differs from Peltzman [1968], who reports no significant effect of UNIT on the ratio of bank stock market value to book value. Two features of the Peltzman study might be responsible for the conflicting results. First, his banks are substantially larger than those evaluated here. (Peltzman's 1962 sample of large banks averaged $600 million in assets, which would have been $1,310 milion in 1978 dollars; a second sample of smaller banks averaged $64 million, corresponding to $140 million 1978 dollars.) Branch availability should be less important for the product mix of larger banks than for the institutions in this paper's sample. Secondly, Peltzman included geographic regional dummy variables in his analysis. The dummy representing the North Central Census Region might be correlated enough with the unit banking dummy to mask the latter's true significance.

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