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ECONOMIES OF SCALE IN THE US BANKING SYSTEM:

A SURVEY

by

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INTRODUCTION

Operating costs in commercial banking are of great concern for a variety of reasons. They are of importance to customers who want to obtain bank services at the lowest possible price. Banks want to provide these services at the lowest possible cost in order to increase profits and market share at the expense of their competitors. Legislators also need information on bank operating costs in order to create and maintain an efficient banking system.

Issues such as bank competition illustrate this widespread interest. For example, if significant economies of scale exist in the banking industry, larger banks may offer lower prices and perform a wider range of services than their smaller counterparts. In an unregulated banking sector, therefore, larger institutions may overcome smaller ones, thus reducing competition. The possibility of scale economies in banking might also be connected to the organizational structure chosen by a given institution, be it branching or holding company affiliation. Policy-makers, therefore, would be primarily concerned with bank operating costs while attempting to establish rules regarding interstate or interjurisdictional banking and other services performed by branch banks and bank holding companies.

Because of the multiproduct nature of the banking industry, regulators also need information on the cost of individual services. For example, when investigating the issue of competition between commercial banks and savings and loan

associations for regulatory purposes, the authorities' main concern should be to consider the existence of scale economies in time deposits and mortgage lending, as opposed to the entire range of banking services. In this way, policies governing commercial banks and savings and loan associations, as well as consolidation among various types of financial institutions, can be decided upon effectively.

In international banking, the decision of banks to expand their operations to foreign markets might also depend to a certain extent on the potential existence of economies of scale.

Given the importance of the issues related to economies of scale in commercial banking, this paper will evaluate the US banking sector, using a survey approach. This study is divided into three main sections. The first one is a chronological review of the empirical research that tested directly for the existence of cost-related scale economies in the American banking industry. The shortcomings of the existing studies are also examined. The remaining two sections of this paper will take an indirect approach to the issue in question. In particular, the second part will attempt to determine whether economies of scale played a significant role in the rapid growth of multibank holding company (MBHC) acquisitions experienced during the past 25 years. The final section will then concentrate on the potential effects that

bank size might have on competition between banking firms in terms of market performance, risk, and technology.

SECTION (1): Review of Studies on Bank Costs

The progression of studies on bank operating costs can be classified into six phases, according to the researchers' definitions and measurement of output, and to the form of the cost functions used in their procedures.

The earliest studies of bank costs (see Alhadeff [1954], Schweiger and McGee [1961], Gramley [1962], and Horvitz [1963]) investigated the relationship between bank costs and bank size by using figures derived from the balance sheets and income statements of selected banks. Bank output, defined in terms of dollars of assets, was measured as total loans plus investments (Alhadeff [1954] and Horvitz [1963]), or as total deposits (Schweiger and McGee [1961], and Gramley [1962]). All the studies found indications of economies of scale. In particular, larger banks were shown to have lower average costs over the entire range of bank output examined. Furthermore, Schweiger and McGee (1961) found evidence that, for banks of a determined size, branch banks have higher costs than unit banks.

Various criticisms have been raised regarding this research. Alhadeff (1954) and Horvitz (1963), for example, did not consider factors that could account for differences

among banks, such as the composition of their earning assets, the organizational structure (unit or branch), the type of deposit (demand or time deposits) and location (rural or urban). Also defining output as dollars of assets seems to have been the cause of biased conclusions regarding the existence of economies of scale, since it implies the incorrect reasoning that large and small banks are equally expensive per dollar outstanding. Consequently, banks with a greater average loan size appear to be more efficient. It should also be noted that none of these studies included variables that could test for the existence of U-shaped cost curves; neither did they formally explain that a U-shaped curve was unnecessary in order to interpret correctly the figures they used. Finally, the use of an unweighted stock as a measure of output indicates that bank output is homogeneous and ignores the multiproduct nature of banking operations.

By advancing the argument that "if the ultimate findings of bank cost studies are to have cogency, the measures of output employed must be related to community well-being"¹, the second group of studies (see Greenbaum [1967a, 1967b], Powers [1969], Schweitzer [1972], Kalish and Gilbert [1973], and Drum [1979]) used total revenue to determine bank output. All regressions reported strong evidence of U-shaped cost curves underlying the existence of diseconomies of scale. Mixed outcomes were instead obtained when separating the

banks in the original sample according to their type of organization. On one hand, Greenbaum (1967a) showed branch banks to have lower costs than similar-sized unit banks. On the other hand, according to Kalish and Gilbert (1973) and Schweitzer (1972), costs were lower for unit banks.

A number of technical problems may have compromised the performance of these studies. One shortcoming, the omission of variables that consider a bank's deposit structure as well as differences in input prices, leads to a probable overestimation of the average costs of smaller banks. Also, the evidence of larger economies or lower diseconomies of scale for larger banks shown by these studies may partly be due to the inclusion of interest in the total operating expenses used as a measure of bank costs. Finally, using assets as a measure of output may have once again biased the conclusions since they show a greater efficiency for banks that service larger accounts.

The major exponents of the third group of studies (see Benston [1965a, 1965b], Bell and Murphy [1968] and Durham [1981]) revolutionized the approach taken by their predecessors. Their procedures involved the introduction of two new features: (a) the use of Functional Cost Accounting (FCA) data to estimate cost functions,² and (b) the assumption of a Cobb-Douglas functional form used to estimate separate cost curves for various types of bank output. The latter was measured as the

average number of accounts serviced and the average size of accounts. Their findings exhibited continuous economies of scale for most types of bank output. Evidence of higher costs for branch banks with respect to unit banks that serviced the same number of accounts was also found.

The validity of these results can, however, be questioned in light of the criticism surrounding the new approach. First of all, it is argued that although they offer a greater deal of detail with respect to particular types of bank output than balance sheet and income statement figures, even FCA data cannot be considered a reliable source of information. Various reasons have been forwarded to justify this conclusion.³ For example, the majority of the banks belonging to the FCA system have less than \$1 billion in total assets. The fact that the program is voluntary also rules out the assumption of choosing a random sample of banks. Furthermore, FCA data do not distinguish between unit, branch, and holding company banks. Another illogical assumption based on the use of these figures is that expenses are not influenced by the bank's location. Finally, as Benston, Humphrey and Hanweck (1982a) remarked: "the analyst either must remove the allocated overhead expenses or accept the essentially arbitrary allocations made in the FCA data".⁴

The rationale underlying the utilization of the functional form of the cost equations can also be called into question.

Firstly, it is assumed that the costs of producing each type of bank output is unrelated to the output of the other bank services. The idea of joint costs is therefore excluded. Secondly, the use of the Cobb-Douglas type function does not allow for estimation of the traditional U-shaped cost curves and does not consider "distance or service differentials between offices or, usually, new technology such as electronic funds transfer systems or computers".⁵

The next series of studies (see Longbrake [1974], Longbrake and Haslem [1975], and Mullineaux[1975]) used similar procedures as in the previous stage while at the same time stressing the impact that bank organizational structure might have on costs. They therefore estimated separate cost equations for unit, branch, and holding company banks. Cost functions were found to be different for each type of bank organization. As in the prior stage of research, unit banks seemed to have lower operating costs than comparable branch banks. However, although the evidence on economies of scale provided by these authors is mixed, the common conclusion of their studies is that "the organizational form of banking offices with lowest operating costs depend on the level and mix of bank output".⁶ Because of the similarity of the procedures, the criticisms proposed in the previous phase also hold at this stage.

The fifth stage of development includes studies (see

Benston, Hanweck and Humphrey [1982a, 1982b], Flannery [1983]) that tested the idea of multiproduct nature of the banking industry. Empirical procedures involved the use of two indices for the measurement of bank output. One index was the total number of accounts serviced by a bank. The other was based on the weighted sum of the number of accounts "by their proportionate share in total operating costs".⁷ These authors also replaced the Cobb-Douglas type function with the translog functional form to estimate cost functions. According to Benston, Hanweck and Humphrey (1982a), this would allow for conclusions about scale economies and the effects of organizational structure in a more direct way than the earlier studies. In total, this research showed evidence of U-shaped cost curves for both branch and unit banks. In particular, as indicated by Benston, Hanweck and Humphrey (1982a), unit banks holding more than \$50 million in total deposits seemed to experience diseconomies of scale for the three different measures of output used. The optimum cost size of bank office was estimated to occur between \$10 million and \$25 million in deposits. Finally, the costs of managing a branch of a larger bank appeared to be higher than those incurred operating a unit bank.

Among the shortcomings of this study is, as usual, the exclusive reliance on FCA data. The authors themselves point out that the conclusions of their research may to a certain extent be limited by the fact that economies of scope were estimated independently from economies of scale,⁸ and that

scale economies of individual banking functions were not separately estimated.

The last phase (see Murray and White [1983], Benston, Berger, Hanweck and Humphrey [1983], and Gilligan, Smirlock and Marshall [1984]) includes studies that investigate the existence of joint costs among different categories of bank services. This was done by estimating a translog cost function with different measures of output introduced separately. The results of this empirical analysis show joint costs for a limited number of bank services. As well, evidence of economies of scale was found only on a restricted range of bank output. However, problems due to multicollinearity impose some doubts on the appropriateness of using the translog functional form to test for joint costs in the banking industry.

To summarize, this overview of the literature on scale economies in commercial banking shows that given the limitations of the empirical research, the evidence is far from conclusive. The results of the existing studies that directly test for the possibility of economies of scale in the American banking sector appear to be biased for a number of reasons. For example, some of the procedures did not allow for U-shaped cost curves, thus ruling out the possibility of determining optimal bank size. Some others ignored the multiproduct nature of banking activities by measuring scale economies for single services rather than considering the joint costs of banking functions. Often, scale elasticities calculated for branch banks were

overstated and led to incorrect conclusions regarding the efficiency of these institutions. Even the use of more sophisticated techniques, such as the translog functional form introduced to capture the joint cost effects of banking activities, appeared to have its shortcomings. It should also be noted that relying on FCA data restricts the analysis of operating costs to small and medium banks. It is, therefore, inappropriate to extend the results of the current research to banking institutions with more than \$1 billion in total deposits. Parenthetically, this conclusion would also apply to the major chartered banks in Canada.

Notwithstanding their weaknesses, the most relevant studies suggest that any economies of scale in banking are relatively small, decrease quickly as the size grows, and depend on the organizational structure and the types of services. However, it should be stressed that further research may be required in order to fully develop these conclusions. Within this framework, as will be discussed later in this paper, bank consolidation may occur as a result of factors other than economies of scale related to costs. For example, according to Baltensperger (1972a, 1972b), there is a possible connection between bank operating expenses and financial characteristics. In other words, some scale economies might be associated with risk. Gilbert (1983) also reported that, given the greater short-run stability in total demand balances, a larger bank may achieve economies of scale "in managing its reserve position".⁹ As stressed by Heggestad and

King (1982), the structure of bank capital requirements may also provide some incentives to encourage banks' consolidation.

Shifting the implications of this research from a domestic to an international context, the issue of consolidation related to economies of scale might to a certain extent be used to explain the rise of consortium banks. In fact, in the United States, as well as in many other countries, an increasing number of banks (mostly regional or savings banks) aim to expand their banking operations by serving customers overseas and getting involved in the Eurocurrency market. Very often, however, these financial institutions do not have personnel trained in international banking. Therefore, the idea of pooling resources for the organization of banking groups rather than going it alone would certainly appear more reasonable in terms of cost savings and a decrease in the risks involved if these banks were to operate separately.

Despite these possibilities, at present, there is not enough relevant evidence for definite answers. Economies of scale will therefore be dealt with indirectly in the next sections. In particular, the second part of this paper will examine whether there is a connection between scale economies and multibank holding company behaviour.

SECTION (2): Economies of Scale and Multibank Holding Companies

Since the late 1960s, multibank holding companies (MBHCs) have become a very significant factor in the US banking structure. Originally created as a means of circumventing the branch banking limitations that prevail in many states, MBHCs have experienced an increasingly greater involvement in managing banks' activities. At the end of 1965, the existing 53 MBHCs in the United States controlled about 8 percent of all commercial bank deposits. By 1980, their number had dramatically increased to 361, and their share of aggregate bank deposits had more than quadrupled in size reaching 34.4 percent.

The purpose of this section is to investigate whether and to what extent potential economies of scale may have provided an incentive for the recent growth of the MBHC movement. First, based on the existing literature, the analysis will attempt to assess the impact of MBHCs on the performance of the acquired banks. Second, the overall MBHC structure will be examined.

In an attempt to measure the effects of MBHC acquisition at the affiliate bank level, empirical research focused primarily on three basic areas: profitability, market performance (in terms of market share), and efficiency of the acquired banks.¹⁰ Authors using conventional (see Drum [1976] and Bowsheer [1978]) and univariate analysis (see Fisher [1961], Lawrence [1967], McLeary [1969], Gady [1971], Smith [1971], Talley [1972], Ware [1973], Lee and Reichert [1975], Darnell [1977], and Hobson, Maston and Severiens [1978]) to investigate the first issue, compared the performance of MBHC affiliates with similar-sized

independent banks operating in the same markets. The evidence that resulted from these techniques showed that the profitability of banks acquired by MBHCs was basically the same as for independent banks. These studies, involving "before and after" comparisons, are also consistent in concluding that acquired banks showed some alterations in their asset portfolios as well as increases in their operating expenses and income. This, however, did not seem to put affiliate banks in a position of profitability advantage with respect to independent banks. Also, studies that used multiple regression (multivariate) analysis (see Mingo [1973], Fraas [1974], Jackson [1975], Johnson and Meinster [1975], Mingo and Heggstad [1975], Hoffman [1976], Light [1976], and Mingo [1976]) in order to account for variables such as demand factors (i.e. income and population) in banking markets, and more sophisticated measures of bank size, confirmed the results of the previous research.

The second criterion is concerned with the market performance of individual banks since their acquisition by MBHCs (see Goldberg [1976], Burke [1978], Rose and Savage [1981, 1982a, 1982b, 1982c], and King [1982a]). Basically, these studies followed the operations of samples of acquired banks throughout several years in order to see if their market share had changed due to acquisition. The evidence provided by the researchers leads to the conclusion that market share changes, if any, were very small (Goldberg [1976], Burke [1978], and King [1982a]). Burke (1978) also found that, when occurring due to acquisitions,

market share changes seemed to come in the form of losses for larger banks and gains for smaller ones.

The third argument involves empirical work on the efficiency of banks acquired by MBHCs (see Kalish and Gilbert [1973], Duggar [1974], Martell and Hooks [1975], and Drum [1978]). The common conclusion of these studies is that, in general, affiliate banks seem to be operating less efficiently than independent banks. On the other hand, Schweitzer (1972) and Mullineaux (1978) find evidence to the contrary. They argue that subsidiaries of MBHCs enjoy an efficiency advantage relative to independent banks, due to their ability to garner affiliation-related economies of scale. In their analysis of the possibility of economies of scale at the affiliate bank level, Benston and Hanweck (1977), however, do not agree with giving a definitive answer by stressing that there is still much speculation surrounding the means by which cost savings are passed on to affiliates.

In summary, the most relevant findings of the studies reviewed thus far provide evidence that the reasoning according to which subsidiaries of MBHCs enjoy significant competitive advantage over their independent rivals is of questionable validity. These studies, however, are not conclusive. Although to a lesser extent than those examined in Section (1), they all present some technical shortcomings. In fact, as King

(1982a) argued:

... their weaknesses in today's world relate to their treatment of all multibank holding companies as the same, their lack of coverage of recent years and their lack of control groups. If holding company size is important only, large companies may confer advantages. Recent innovations may have increased large companies' ability to help their subsidiaries. Without a control group of independent banks we do not know whether bank holding companies or some other factor accounts¹¹ for acquired banks' performance...

Having acknowledged that the existing research has not proven the existence of potential cost savings at the affiliated bank level, we will now attempt to identify whether any economies of scale exist within the MBHC as a whole. If such is the case, then what are the economic incentives underlying the growth-by-acquisition behaviour of multibank holding companies? Tentative answers to this question have been given by researchers using the valuation approach (see Piper [1971], Piper and Weiss [1971], Varvel [1975], and Frieder and Apilado [1980, 1982]) and stock market analysis (see Jessup and Upson [1972], Brewer, Buding and Reiff [1975], Kohers [1975], and Brewer and Dukes [1976]). The first method involves examining the effect of acquisitions on accounting measures of MBHC profitability. Piper (1971)'s seminal study found significant evidence that shareholders of the parent bank benefit by acquisition in terms

of increased earnings per share after acquisition.¹² Varvel (1975) also found evidence of increased earnings as well as a reduction of risk.

Frieder and Apilado (1980) identified potential channels through which an acquired bank could prove beneficial to a multibank holding company by outlining a number of organizational factors. For example, cost savings may be achieved due to the fact that services (such as computer facilities, property/buildings and research/planning staff) are already built into the bank holding company framework. If the MBHC management chooses to supply these services at a marginal rather than full cost, the bank holding company might benefit by charging a price to its affiliates that is lower with regard to outside suppliers of the same services. A bank holding company might also profit by making the affiliates pay its operating costs through the charge of 'service fees'. Finally, these authors bring to our attention the fact that affiliates may not need as much equity capital as was required before acquisition by the MBHC. Accordingly, the parent bank may take advantage of the situation by obtaining 'excess' equity capital and eventually transferring it to other affiliates.

The second procedure measures MBHC impact on stock market returns. This approach is consistent with valuation analysis, since it stresses that in order to measure the effect of an acquisition on the profitability of a MBHC, it is

essential to examine its entire organizational structure. An advantage to market analysis is that it allows for detailed comparisons between independent banks and acquired banks in terms of risk and changes in share prices. Nevertheless, the evidence provided by these researchers is inconclusive. Whereas the results obtained by Brewer, Buding and Reiff (1975), and Jessup and Upson (1972) showed MBHC returns to increase as a result of acquisitions, the findings of Kohers (1975) and Brewer and Dukes (1976) indicated lower returns (and in Brewer and Dukes [1976], a higher degree of risk was also found). These conflicting outcomes may have been caused to a certain extent by flaws in the procedures.¹³ For this reason, one cannot completely rely on the existing market analysis studies. However, in combination with the valuation approach, stock market analysis is considered the basis for further research.

The evidence reviewed in this section leads to some interesting conclusions regarding the relationship between economies of scale and MBHC performance. Because of the failure of existing studies to find significant economies of scale by comparing operating expenses of independent banks with banks acquired by MBHCs, Benston and Hanweck (1977) suggested that "if bank holding companies are able to exploit any economies, it must be at the organizational level".¹⁴ They therefore imply that an examination of

the overall bank holding company activities is necessary to detect the presence of economies of scale. In other words, in order to evaluate the effects of bank holding company affiliation, the researcher should take into account not only the performance of an individual subsidiary (i.e. univariate and multivariate studies) but also that of the entire bank holding company (i.e. valuation and stock market approaches).

Frieder and Apilado (1982) explain this reasoning by stressing the significance of distinguishing between economies of 'operation' and economies of 'organization'. Economies of 'operation' only apply to the activities of the individual affiliate bank. Economies of 'organization' instead exist at the bank holding company level when various banks are acquired and organized within the same holding company. These authors explain the rationale for this classification by arguing that:

... even if the holding company acquired only banks that have already achieved an optimal size, significant operational or cost efficiencies could have been achieved at the level of the holding company ... these efficiencies may be derived from items such as coordination of activities, elimination of duplication of facilities and affiliate sharing of the parent, lead bank or nonbank 'fixed' expenses ...¹⁵

It can, therefore, be argued that the bank holding company may eventually retain the efficiencies that are achieved

rather than transferring them to their affiliates. This conclusion seems valid, especially when one considers some of the issues raised in the first section of the paper. Although, in fact, there may not be economies of scale related to cost, other factors could eventually induce bank mergers as well as MBHC acquisitions. Conceivably, the same arguments could be used to explain some of the reasons for forming banking groups and consortium banks (i.e. Western America, Royal Orion, MAIBL); however, no empirical evidence exists to prove or disprove this premise. Although most consortium banks have proven to be a successful experiment in recent years (at least in terms of profit growth), there is no direct indication as to who may benefit the most by forming these banking groups (whether the banks themselves, or their clients, or their shareholders). Finally, MBHC performance shows further interesting developments when applied to the issue of bank competition. These issues will be discussed in the following section.

SECTION (3): Economies of Scale and Bank Competition

A major fear of some bank observers is that small banks will not be able to survive in competition with larger institutions if there are important economies of scale. This concern stems from the conviction that lower-cost operations, risk taking and a greater access to technology would allow larger banks to offer lower prices and a wider range of services than smaller competitors.

Consequently, larger banks would likely capture more sizable market shares at the expense of smaller banking institutions. The purpose of this final section is to assess the impact of the above-mentioned factors on the competitiveness of small banks vis-à-vis large ones in local markets.

In order to test whether or not larger banks overall enjoy significant advantages in local markets, the existing research has focused on examining their performance relative to smaller competitors in the same markets (see Whitehead and King [1976], Talley [1977], King [1979], Rhoades [1979], Whitehead [1980], Erdevig [1981], King [1982a, 1982b], and Rhoades and Savage [1981, 1985]. Talley (1977), Rhoades (1979) and Erdevig (1981) examined changes in market shares of larger banks with respect to smaller rivals by using data from institutions in Standard Metropolitan Statistical Areas (SMSAs) as well as from non-SMSA regions. The common outcome of these studies is the strong evidence of a decline in larger banks' market shares during the period of time covered. The most extensive of these studies, Talley's analysis, examined 213 SMSA and 233 non-SMSA regions between 1966 and 1975. The results showed that 86 percent of the largest banks belonging to SMSAs lost market share as well as 79 percent of those in non-SMSAs. Erdevig (1981) and Rhoades (1979), although considering smaller samples, provided similar conclusions.

Whitehead and King (1976) and King (1979, 1982a, 1982b),

although primarily concerned with determining the impact of MBHC entry on market concentration, also investigated the issue of large bank performance in local markets. The conclusion of this research is summarized by King (1982b): his findings suggest that "large banks in markets with higher initial market concentration were likely to lose a greater market share"¹⁶. (For a summary of the possible reasons explaining large banks' market share losses, see Appendix A.) Another group of studies attempting to assess whether concentration in markets increased after MBHC entry (see Rhoades [1977], Whitehead [1977] and Rose [1982]) found evidence of relatively no change in market structure. This result can be considered tenable with respect to the conclusions of the previous section. The fact that market concentration remained the same after MBHC entry shows that eventual scale economies within the holding company itself may not be transferred to the subsidiary. Therefore, if there are no economies of 'operation' for the affiliate bank, then MBHC affiliation might not be a factor significant enough to affect bank competition.

Even empirical analyses aiming to assess directly the performance of small banking institutions (see Kohn [1966], Darnell and Keen [1974], and Rhoades and Savage [1981, 1985]) indicated that small banks can compete successfully in markets when they face larger banks (at least in terms of deposit growth and profits). This, again, casts serious

doubt regarding the potential for cost-related scale economies in commercial banking. However, as suggested in Section (1), even if economies of scale in operating costs are not significant, there may be economies of scale related to risk. In other words, bank size may confer some competitive advantages to larger banking firms in terms of risk.

There has been little research on the specific relationship between size and risk for financial institutions. The existing literature, however, recognizes four types of risks in commercial banking. First, credit risk, which is associated with the concept that borrowers may not make payments on the stipulated due date, if at all. Second, interest rate risk, which depends on the bank's ability to react to changes in interest rates. Third, operating risk, which is related to the performance of the bank in controlling expenses and liquidity. Fourth, management risk, related to fraud and dishonesty of bank employees and managers. Unfortunately, there is no direct empirical evidence of a connection between bank size and any of these risks. However, capital requirements literature provides some tentative answers in terms of 'overall' risk.

Authors in favor of this type of research argue that larger banks are allowed to operate with lower capital to asset ratios than smaller banks because regulators assume that larger banks are less risky. Among these studies, Wolkowitz

(1975) argued that, although small banks are essentially riskier, they compensate for that risk by holding more capital. For this reason, "when management decisions are made, actual risk appears to balance out for small and large banks"¹⁷. Rhoades and Savage (1981) reported that small banks, although less profitable, are also less risky. Evidence that risk can be positively related to bank size is provided by Rosenberg and Perry (1981). Whitehead and Schweitzer (1982) argued that there is no proof of a systematic relationship between bank size and risk while Dince and Fortson (1983) concluded that the differences in capital requirements for small and large banks are arbitrary and therefore do not reflect differences in risk.

To summarize, although this issue requires a greater amount of study, a review of the existing evidence shows that there is no proof that small banks operate with higher risks than their larger competitors. In other words, the possibility of economies of scale related to risk cannot be, at present, completely ruled out; at the same time, however, it can be argued that differences in risk may not directly affect bank competition. In this context, therefore, size constraints might not impede the performance of small banking institutions in financial markets.

The last part of this section examines the impact that financial innovation is likely to have on bank competition.

For one thing, some observers argue that the development of payment-system technology may constitute a threat to the future of small banks.¹⁸ Their argument is based on the view that only larger banks "have the capital and technical expertise to support large electronic networks and offer broad product lines".¹⁹ Smaller banking institutions may therefore disappear, swept away by the greater access to technology of their larger competitors. There is, however, consistent evidence that, notwithstanding the significant economies of scale in technology, small banks may not necessarily be at a disadvantage with respect to large ones.

Several studies on Electronic Funds Transfers (EFTs) and bank costs (see Daniel, Longbrake and Murphy [1971], Lee [1977], Baxter, Cootner and Scott [1977], Walker [1979], and Rhoades and Savage [1985]) show that small banks may reduce potential cost disadvantages relative to large competitors by adoption of computer technology. However, EFTs can offer significant cost reductions for given levels of service output provided that these institutions generate a sufficient volume. The fact that most small financial institutions "probably will not generate sufficient volumes in electronic payment systems to develop proprietary, completely in-house hardware, software, and communication functions"²⁰, imposes serious constraints to this process. This is the main reason why more and more small banking firms are forming or joining networks to overcome these difficulties.

ATM shared networks are just an example of such cooperation (for a more detailed explanation, see Appendix B). There are two major reasons explaining how small banks may benefit from technology. First, the cost of computer equipment is experiencing a downward trend while the assortment and availability to unsophisticated users is expanding. Second, shared efforts in using this technology may certainly help the small bank to decrease potential risks in automation investments as well as to foster prompt reactions to the innovative changes in the marketplace.

In light of this evidence, it can be concluded that technology should not hamper the competitiveness of small banks. In fact, since it is available to them at a reasonable cost, it should actually stimulate and improve bank competition.

SUMMARY AND CONCLUSIONS

This paper has attempted to determine whether the production of banking output is subject to economies of scale. As seen in Section (1), a number of studies directly tested the possibility of scale economies related to costs in the US banking sector. The most relevant ones concluded that economies of scale, if any exist, are not very significant, decrease quickly as bank size grows, and depend on the organizational framework and the type of services offered. The results of this research, however, appear to be biased

because of flaws in procedures and data collection. One cannot, therefore, rely exclusively on the evidence presented by those studies; in other words, Section (1) by itself does not provide any definite answers. The validity of these conclusions was then tested using an indirect approach. This method consisted in investigating the implications of potential scale economies on issues such as MBHC performance and bank competition. More specifically, to determine whether economies of scale might have been a determinant factor influencing the increasing number of MBHC acquisitions during the past 25 years, Section (2) reviewed empirical literature concerning the performance of MBHCs and their subsidiaries. The evidence presented in this section shows that in general MBHCs do not improve the profitability, market performance and efficiency of their affiliates, even many years after acquisition. The parent bank may, however, benefit by exploiting economies of 'organization'. Stated another way, this means that the bank holding company may eventually retain the efficiencies that are achieved rather than passing them on to the acquired banks. Some studies also argue that the shareholders of the parent bank may stand to gain the most from an acquisition. They could benefit in terms of increased earnings per share and/or reduced risk. All of these results have interesting developments when used to investigate the issue of bank competition.

In fact, if MBHC acquisition does not provide significant advantages to the acquired bank, then holding company affiliation might not be a factor relevant enough to affect bank competition in local markets. Evidence provided in Section (3) shows not only that larger banks do not seem to enjoy any significant advantages over smaller ones but, also, that larger banking institutions have generally lost market share vis-à-vis smaller competitors operating in the same markets. In addition, small banks were found to compete effectively with larger ones in terms of risk and use of payment-system technology.

In light of these findings, this study suggests that large size does not appear to bestow on a banking institution any relevant advantages over its smaller competitors. It could be argued therefore that bank consolidation would be unlikely to result in improved productive efficiency or to guarantee the safety of the banking industry in the United States. Conversely, a mixed banking sector, composed of banks of different sizes and organizational frameworks might maintain the competitive health of that country's financial system.

APPENDIX A

POSSIBLE REASONS FOR THE DECREASES IN LARGE
BANKS' MARKET SHARES

Studies that attempted to explain large banks' losses of local market share have ruled out the possibility that outside competitors such as non-local and non-bank institutions are taking business away from big banks rather than from smaller ones. Instead, recent empirical evidence (see King [1982b], Rose and Savage [1982a, 1982b]) found that the entry of new (or de novo) banks²¹ had a considerable impact on reducing concentration of local market deposits in larger banking institutions. King (1982b) summarizes the rationale for this argument by stating that:

The new banks should gain market share for several reasons. Their organizers would not start them nor would regulators approve them without considerable confidence that they would attract profitable business, that is, gain market share. In addition, new banks are often organized by investors who do substantial banking themselves and who move their business to the new institution. Finally, most new banks in larger markets have opened in suburban areas that grow more quickly than the downtown areas that are the headquarters of larger banks.²²

An alternative theory states that large banks aim to maximize profits at the expense of market share while smaller banks behave to the contrary. The results stemming from an unusual test of this theory (Whitehead and Lujytes [1982]) are consistent with the assumption that smaller banks stress the importance of increasing their market

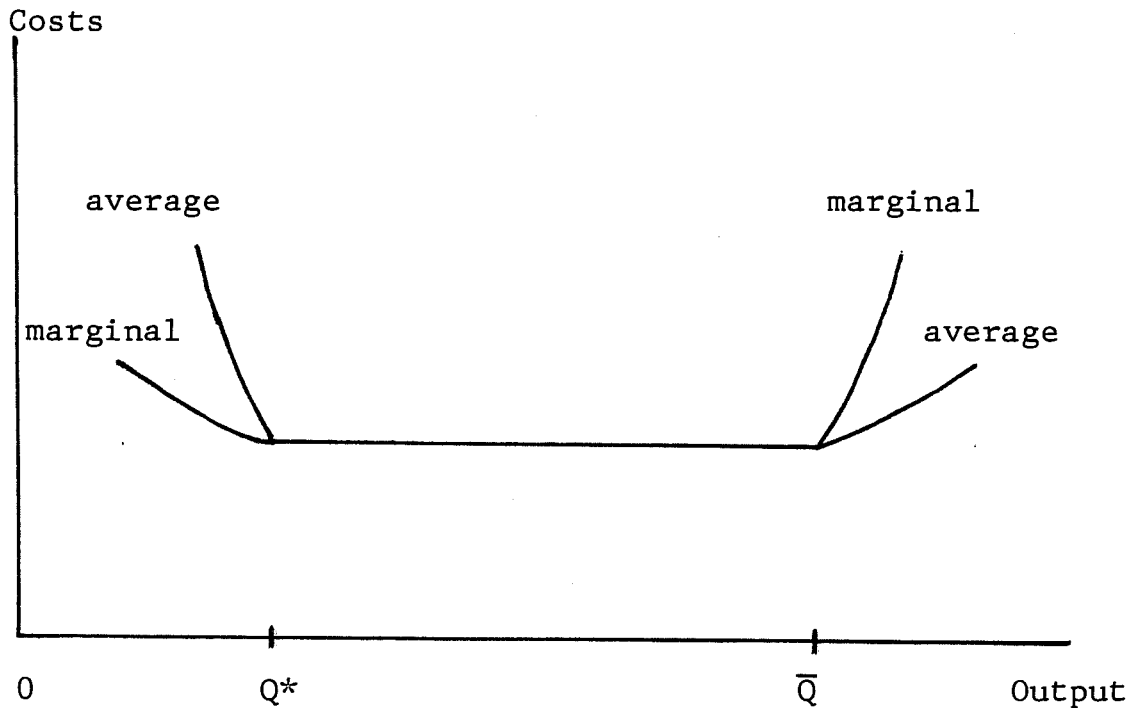
share. These results, therefore, are compatible with the existing evidence that larger banks are not a threat to smaller ones in local markets, although the profit of the latter may not be as high.

APPENDIX B

ECONOMIES OF SCALE AND TECHNOLOGY: AN ILLUSTRATION

The following discussion is excerpted from Walker (1982). He reported consistent evidence of economies of scale related to bank technology by showing that:

... average costs per transaction decline as cash dispenses and automated teller transactions increase (as shown in figure). Lower average costs are expected to be observed until approximately 45,000 transactions per month (Q^* in the figure) that occur at a particular retail terminal.²³



0 to Q^* - average costs may decrease as output increases (economies of scale)

Q^* to $\bar{Q}$ - average costs may remain constant as output increases (constant return to scale)

above $\bar{Q}$ - average costs may increase as output increases
(diseconomies of scale)

Metzker (1982) generalized Walker's findings to explain how shared networks may allow small banks to compete effectively with larger institutions by showing that:

A small financial institution quite possibly can only generate a volume of transactions in the range of 0 to less than Q^* . If so, the small institution is not operating in the portion of the cost curves that allows its unit costs to be most competitive with larger competitors. But, if several small financial institutions use a third-party service, their combined transaction volume will more than likely allow them to operate in the Q^* to $\bar{Q}$ range of the cost curves. In this range, each of the small financial institutions will achieve unit costs that are competitive with larger institutions.²⁴

FOOTNOTES

1. Greenbaum (1967b), p. 466
2. FCA data provide information on the number of accounts serviced by a bank in different categories of bank output and on the allocation of bank costs relative to those bank functions.
3. Heggstad and Mingo (1978) inquired to what extent the banks in the FCA program truly represent the banking system. They found evidence of significantly lower cost ratios for FCA banks. Moreover, the relationship between bank size and operating expenses was different for banks in the FCA program and other banks. As quoted in Gilbert (1984), p. 640, they concluded that "the use of FCA data to estimate bank cost functions may be appropriate if the objective is to estimate the relation between costs and output for the most efficient banks."
4. Benston, Humphrey and Hanweck (1982a), p. 42
5. McCall (1980), p. 96
6. Gilbert (1984), p. 638
7. Benston, Humphrey and Hanweck (1982a), p. 13
8. A financial institution is subject to economies of scope when the joint production of some services (i.e. time and demand deposits) causes costs to be lower than if the same services are produced separately.
9. Gilbert (1983), p. 483
10. There is contrasting evidence on the preacquisition characteristics of banks acquired by MBHCs. Mingo (1975) found that MBHCs tend to acquire less profitable and higher capitalized banks relative to comparable independent banks. According to Lawrence (1967) and Curry (1981), instead, MBHC acquisitions are generally typical commercial banks.
11. King (1982a), p. 43
12. In Piper and Weiss (1971), this evidence is questioned. Their study showed that out of a sample of 102 bank acquisitions, there were 54 unprofitable acquisitions

against 48 profitable ones. However, due to technical bias in their procedure, these results are not very reliable.

13. Limited sample size, inadequate joined comparisons, and ignoring risk are the major weaknesses of stock market analysis.
14. Benston and Hanweck (1977), p. 167
15. Frieder and Apilado (1982), p. 86
16. King (1982b), p. 37
17. Whitehead and Schweitzer (1982), p. 34
18. The expression 'technology' in this context refers to Electronic Funds Transfer (EFT) systems (i.e. branch automation, ATMs, point of sale terminals, computer devices).
19. Rogowski and Simonson (1984), p. 24
20. Metzker (1982), p. 62
21. Whether independent or started by bank holding companies.
22. King (1982b), p. 39
23. Walker (1982), pp. 5-6
24. Metzker (1982), p. 67

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