Working Paper 76-2

THE MOTIVATION FOR BANK HOLDING COMPANY ACQUISITIONS

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February 1976

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I. Introduction

The commercial banking system in this country has undergone an unparalleled consolidation movement since the mid-1960's. Bank holding companies (BHCs) have been active since the turn of the century, yet they have become an important force in the banking structure only since 1965. The phenomenal growth in the number of corporations that hold stock in one or more banks and the increased concentration of banking resources in such entities have prompted much discussion and a wealth of analytical studies of the potential impact of this development on the nation's financial system. Central to many of these studies has been the question of how acquisition by a holding company may affect the performance of an acquired commercial bank. Related to this issue, and often confused with it, is the question of the motivation for such acquisitions. The latter question has yet to be adequately answered.

Most efforts to explain the economic basis for bank holding company acquisitions have evolved from a framework designed to measure the resulting impact on the community served by an acquired bank. Attention has been centered on the consistent findings that the profitability of a bank has not been improved, relative to similarly situated independent banks, through acquisition to an extent that would clearly justify

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*This paper is based on the author's unpublished Ph.D. dissertation, "The Acquisition of Commercial Banks by Bank Holding Companies: A Valuation Approach," Texas A & M University, 1975.

acquisition by a wealth-maximizing bank holding company. But conclusions based on measurements of bank profitability alone ignore the possibility that owners' claims on earnings streams are altered significantly by the transaction.

This paper examines the hypothesis that the incentives for acquisition lie primarily in potential benefits accruing to <u>owners</u>, i.e., shareholders, who have claims on the earnings streams of the two firms involved. The framework for the analysis centers on a comparison of the valuation of expected future earnings streams for both sets of stockholders under the alternative assumptions, first, that the acquisition is not consummated and second, that it is consummated. Rational behavior implies that owners will exchange claims to earnings only if they value those received more than those released. Subsequent sections will investigate the motivation for acquisition from both theoretical and empirical constructs.

Some Previous Evidence

Among efforts to establish the existence of a "valuation disparity" sufficient to justify a BHC acquisition have been those by Thomas Piper and Steven Weiss.[1] In a study of acquisitions during the period 1947 through 1967, Piper argued that the economic incentives for acquisitions of banks "center on the resultant changes, both in the cash flows and earnings of the acquired banks and in the valuation of these cash flows" [14, p. 98]. He emphasized the importance of comparing the <u>value</u> of

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[1]Piper's analysis of bank acquisitions [14] and his subsequent work with Weiss [15] clearly recognized that an alteration in ownership positions resulted from acquisitions. Their consideration of this point was an important shift from concentration on bank performance alone.

alternative ownership interests. For the acquisitions studied, Piper
compared the value received by the stockholders of the bank being
acquired with the value they relinquished and found that the value of
the claims bank stockholders obtained was significantly greater than
their previously held claims on the bank.[2] In fact, the ratio at
which the holding company stock was exchanged for that of the bank was
so favorable to the bank's shareholders that a careful examination of
possible earnings differentials between the firms was not necessary. The
market values of the stocks have been an adequate (albeit imperfect)
gauge of this differential. A much closer look, however, is necessary
when trying to explain why BHCs have been willing to pay such premiums.

Piper's original study and his later work with Weiss shifted
emphasis from the valuation of the stocks traded in the acquisition
to the profitability of acquisitions to the stockholders of the parent
holding company. Each study concluded that, due to the high premiums
paid for bank stock, acquisitions have failed to improve the earnings
of the holding companies. The shift from valuation to profitability,
however, begs questions concerning the manner in which owners value a
given income stream.

A valuation framework that includes a constant discount rate,
adjusted for expectations of risk, rules out any possibility that the
manner in which earnings are valued may change in response to the
operating policies and earnings performance of the firm. While such

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[2]Piper's results showed that the market value of BHC stock received
exceeded the book value of the bank by 30 percent. In his later study
with Weiss, comparing the claims on holding company earnings received
by former stockholders of the acquired bank relative to earnings of the
bank stock, the median premium was found to be 16 percent.

an assumption greatly simplifies the analysis, it ignores a potentially important source of the valuation disparity underlying the incentives for the acquisition of commercial banks by BHCs; i.e., changes in owners' discount rates due to their evaluation of risk.[3]

Valuation Via A Risk-Adjusted Discount Rate

The most widely used model for valuing risky, multiperiod earnings streams is the risk-adjusted discount rate. Through this technique, a measure of the magnitude of the earnings flow, usually expected value, is evaluated by a discount rate that takes into account the rate of time preference and some measure of the degree of riskiness associated with an earnings flow. Individuals must make estimates of future earnings and apply a subjectively determined discount rate to them.

Since this approach is not based on any specific assumption as to what constitutes the risk associated with expected earnings, it has serious shortcomings. Unless a specific, dynamic measure of risk is incorporated within the framework, the detection of differences in valuation due to differences in risk is not possible. In order to measure the effect on valuation of an acquisition, knowledge of the pre-acquisition capitalization rate and the response of that rate to the acquisition is required. It is entirely possible that the addition of another income stream with a different discount rate may alter owners' capitalization rates in subsequent periods.

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[3]If owners are concerned with more than just the mean level of earnings, and a measure of risk does affect their discount factor(s), a reduction in the risk associated with a given earnings distribution will reduce the discount factor if owners are risk averse and result in a higher valuation of those earnings. Comparison of earnings means alone will not detect this disparity.

A specific present value of earnings cannot, however, be derived without information concerning owners' attitudes toward risk and the trade-off they are willing to make between risk and return. This becomes a serious stumbling block in the search for the motivation for acquisition, but it need not be insurmountable. There are two distinct sets of investors involved in any acquisition: the independent bank shareholders and those of the BHC. Each group obtains a claim on an earnings stream that is somewhat altered from its previous holdings. The acquisition is beneficial if the capitalized value of the transformed earnings stream is greater than that the stockholders perceive would have been available through holding on to their existing claims. A change in this valuation through a shift in capitalization rates, then, could result from either a shift in the investor's measure of risk following the acquisition or the manner in which a given change in risk affects his capitalization rate. Since the individuals making the valuation comparisons have not changed, it seems reasonable to assume, for simplicity, that the exact form of the capitalization rate function in terms of risk does not change.[4] As long as an increase (decrease) in the measure of risk faced by owners is reflected in an increase (decrease) in the discount factor used to evaluate an earnings stream, emphasis may be placed on the expected behavior of risk under alternative situations. If it is assumed that a detected

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[4]For a discussion of the dependence of the form of an individual's capitalization rate function in the presence of uncertainty on the form of his underlying utility function, see Douglas Vickers, Chapters 2 and 4. Vickers suggests that the capitalization rate function is nonlinear in the coefficient of variation of net income and concave upward.

difference in the measure of risk results in different capitalization rates, valuation disparities may be sought by comparing alternative earnings performances and measures of risk. These comparisons are made in Section IV of this paper.

The Basis For Acquisition

The suggested approach for analysis of the economic basis for acquisition is founded upon the premise that the firm that engages in banking determines its operating and organizational structure on the basis of optimization of the economic value of the ownership of the firm, i.e., the owners' wealth position. Owners' wealth is perceived as the capitalized value of the expected future earnings stream. Since the objective to be maximized is in value terms, specific attention must be given to its components. In general terms, $V = \pi/\rho$, where V, π, and ρ represent, respectively, value, profit, and the owners' capitalization rate (which is adjusted for considerations of time preference and risk).

The essential consideration of the analysis for bank owners is the difference in the valuation of their ownership position if they (a) continue their present structure of organization and production as opposed to (b) trading their bank stock for partial interest in a holding company. For BHC owners, it is the difference in the valuation of their ownership claims perceived through (a) the present BHC structure and (b) the expanded organization created through acquisition. The first disparity provides an incentive for the present bank owners to make the transaction, while the second provides the incentive for holding

company acquisition activity. The purchase price of the bank stock, usually in terms of a stock-exchange ratio, is then determined by the relative bargaining power of the buyer and sellers and the degree of competition in the buying and selling of bank equity.

Regardless of the measure of risk utilized, acceptance of the proposition that owners' conceptions of risk may change over time and may be altered by specific actions of the firm has important implications for the risk-adjusted discount rate and may significantly alter valuation of the earnings accruing to owners. The provision of a dynamic capitalization rate (ρ), which is a function of the risk associated with a given earnings stream, provides a valuation framework that considers both the earnings experience and the behavior of the discounting function used by owners in evaluating their ownership position. In present value terms,

$$(1) \qquad V = \sum_{t=1}^{H} \frac{\pi_t}{\rho_t}$$

where V is the present value of the future earnings stream to owners, π_t is net earnings on owners' equity in period t, ρ_t is the owners' capitalization rate[5] applied to earnings in period t, and H is the economic horizon of ownership in the firm. In this framework, valuation disparities may be sought for both sets of participants in the transaction--the bank stockholder and the shareholder of the BHC.

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[5]The owners' discount rate in period t (ρ_t) may be further specified: $\rho_t = (1+r_1) (1+r_2) \ldots (1+r_{t-1}) (1+r_t)$, where r_t is dependent on the owners' time preference pattern i (assumed constant) and an appropriate measure of risk, e.g., the coefficient of variation of net income (V_n), which is the standard deviation of the probability distribution of expected net incomes divided by the mean of the probability distribution function. ρ, then, may also be expressed as functionally dependent on these same variables: $\rho = \rho(\bar{i}, V_n)$.

Bank owners will have an incentive to trade their stock only if a valuation disparity is established between the capitalized value of the stream of bank profits accruing to owners through continued ownership in the bank and that realizable from gaining an ownership interest in the holding company. Specifically, they have an incentive to trade their stock for that of a holding company only if:

$$(2) \quad V_B = \sum_{t=1}^{H} (\pi_t/\rho_t)_B \;\; < \;\; \alpha \sum_{t=1}^{H} (\pi_t/\rho_t)_{HC} = \alpha V_{HC}$$

where V_B is the ownership valuation of the bank, α is the share in the total ownership of the holding company obtainable by bank owners, and V_{HC} is the total ownership valuation of the BHC. The bank owners' valuation of their portion of holding company earnings will, in this case, be greater than their valuation of expected bank earnings. Previous findings, in terms of this framework, suggest that α has been large enough to assure the necessary disparity in valuation of earnings.

Similarly, an incentive for holding company acquisitions exists on the demand side for bank stock only if present company stockholders view a similar valuation disparity. In particular, only if the acquisition of a commercial bank improves the capitalized value of owners' earnings over that perceived without acquisition will present owners move to acquire the bank, i.e., only if:

$$(3) \quad (V_{HC})_{\sim B} = \sum_{t=1}^{H} (\pi_t/\rho_t)_{\sim B} \;\; < \;\; \beta \sum_{t=1}^{H} (\pi_t/\rho_t)_B = \beta (V_{HC})_B$$

where $(V_{HC})_{-B}$ is the ownership valuation of the holding company without acquiring the bank, β is the proportion of ownership interest in the company retained by present owners ($\beta = 1-\alpha$), and $(V_{HC})_B$ is the capitalized value of the earnings stream of the holding company including the proposed acquired bank. Even though their percentage ownership (β) falls with an acquisition, present owners may still benefit if earnings increase significantly or if risk, and, therefore, the vector of owners' capitalization rates following acquisition is reduced.

For an acquisition to occur, then, both valuation disparities must exist. The present owners of an independent bank and of a holding company will agree to participate in an exchange of stock if each group perceives a positive shift in its ownership valuation resulting from the transaction. Equations (2) and (3) represent the conditions necessary for consummation of an acquisition agreement. Of particular interest is the fact that nowhere in (3) is there any implication that the bank's profitability must be increased following acquisition. If the owners are assumed to maximize the value of their ownership position, they will be concerned with the valuation of their share of the holding company rather than that of a single subsidiary. It may be that factors such as the structure of organization, production considerations, and costs that optimize the economic valuation of the consolidated company's earnings stream conflict with the attainment of the maximization of one of its subsidiaries' returns. Such an hypothesis is consistent with empirical results heretofore obtained that suggest that bank profitability is not significantly enhanced through holding company affiliation.

In fact, if it is recognized that the acquisition of a bank may have a positive impact on the level and/or stability of earnings of other subsidiaries within a BHC organization, consideration of changes in bank profitability is an inadequate tool with which to examine the economic basis for acquisition. It is essential that the analysis consider both the earnings experience and associated expectations of risk of each ownership position. An examination of both levels of alternative earnings and the manner in which those earnings are valued is necessary before conclusions may be reached.

II. Components of the Valuation Framework

Within our generalized valuation framework ($V = \pi/\rho$), it is essential to carefully specify each of its components, i.e., (a) the firm's profit function, and (b) the capitalization rate function as perceived by the firm's stockholders.

Profit Function

Each period's profits are determined by the difference between revenue generated form the firm's product markets and the costs associated with their production.

Revenue   To allow for varying degrees of demand elasticity, then, the demand conditions in the ith product market are represented by $P_i = P(q_i)$; $i = 1, 2, \ldots, n$; n is the number of distinguishable product markets. These show the relation between the alternative

supplies of output and the price the firm can charge. The firm can influence the price of at least some of its products by varying its production. With negatively sloped demand curves, the firm can only sell more of a good by lowering its price. Hence, $dP_i/dq_i < 0$; except in those markets that may be represented by pure competition.

Revenue is defined as $\sum_{i=1}^{n} P(q_i)q_i$, and marginal revenue is the change in revenue as output changes: $MR_i = (dP_i/dq_i)q_i$. Marginal revenue is, for all but the perfectly elastic demand curves, less than price. The purely competitive product markets are special cases of the more general representation.

The revenue function of independent banks and holding companies can be expected to differ. Banks are effectively limited to several specific loan, investment, and service categories and frequently further restricted to geographic markets. A holding company has a much wider, diverse scope of product and geographic markets in which it may operate.

Cost Conditions   The firm (bank or holding company) purchases the services of fixed assets (building, equipment, etc.) and incurs the direct costs of labor services (salaries). In addition, it must pay interest costs on the various forms of money capital (funds) obtained. These include debt capital (K_d), equity capital (K_e), demand deposits (DD)--paid in the form of services rendered, time and savings deposits (TD), and other borrowing sources (B) such as the Federal Reserve discount window, federal funds, etc. The interest cost on equity is in the form of net earnings accruing to owners.

In addition, the firm must bear other costs that may be summarized under an administrative cost heading. Within this category, we include expenditures on the replacement of management (search costs, direct training or orientation costs, and the loss of realizable returns or foregone earnings incurred during the training period). Also, the delegation of authority from owners to a smaller management group that arises under the corporate structure requires stockholders to incur costs to insure that management is acting in the owners' best interests. These "monitoring costs" result from "team production" where the marginal products of cooperating inputs are not separably observable. Alchian and Demsetz argued that this phenomenon allows input "shirking" that can be detected only by observing the behavior of individual inputs--which is not costless.

The search costs (C_S) for management replacements are a function of the number of replacements that must be found (R) and the expenditure on information on candidate capabilities (I_c) necessary before the choice may be made. There will be some direct training cost (C_T) involved with a new employee as well as indirect costs associated with on-the-job training that may be represented by the foregone earnings (E_f) that could have been realized during the training period had the original employee not left. Each of these is dependent on the number of replacements necessary (R) and the level of firm production (Q). During this period of training it should be expected that the marginal productivity of labor will be diminished somewhat. Monitoring costs (C_M) are a function of the number of employee replacements (R) it is necessary for owners to supervise, the information on management capabilities available to the

owners (I_c), the degree the incentives of management (I_M) have been made to correspond with that of the owners--i.e., the degree to which management returns are linked to the returns to the firm (salary, bonuses, fringe benefits, stock options, etc.), and the aggregate level of firm production (Q). The administrative cost function (θ) may be represented, then, as follows:

(4) $\theta = \theta[C_S(R, I_c), C_T(R, Q), E_f(R, Q), C_M(R, I_c, I_M, Q)]$

where $\partial\theta/\partial C_S$, $\partial\theta/\partial C_T$, $\partial\theta/\partial E_f$, $\partial\theta/\partial C_M > 0$; $\partial C_S/\partial R$, $\partial C_S/\partial I_c > 0$; $\partial C_T/\partial R$, $\partial C_T/\partial Q > 0$; $\partial E_f/\partial R$, $\partial E_f/\partial Q > 0$; $\partial C_M/\partial I_c$, $\partial C_M/\partial I_M < 0$; and $\partial C_M/\partial R$, $\partial C_M/\partial Q > 0$.

To complete the representation of the firm's cost function, it is necessary to include expenditures on the provision of various supportive business services (C_B) and costs of providing additional labor support programs or fringe benefits (C_F) incurred by the firm. Many independent banks must rely on other banks or firms to provide such items as computer facilities, data processing and analysis, investment counseling, and other management services. These are frequently provided through a correspondent relationship with a large bank. In addition to explicit payments for some services, the bank maintains correspondent balances on deposit with other banks. These funds are not available to generate loans and investments for the original bank but can be used by the correspondent as any of its other deposits. A full account of expenditures on these business services, then, must include the opportunity cost (in the form of reduced revenue) associated with their provision. Such expenditures are assumed dependent on the bank's level of production, Q.

A holding company, on the other hand, usually provides these services internally. The parent company, either itself or through one of its subsidiaries, will meet the different needs of the organization and its affiliates. Typically, the bank will be charged directly for these services. What is unique about the holding company, however, is that what is a cost for the user of these services is a revenue for another subsidiary. The payment for these services is not lost, therefore, but merely transferred within the company.

As is frequently the case, established holding companies operate at a scale where such services are already produced within the company structure (by one of its large banks or nonbank affiliates). The large initial costs of establishing these services (computer facilities, research staff, building, etc.) have already been sunk. The decision criterion becomes the marginal cost of providing such services to one more customer. If this is less than the price of purchase from an outsider, the holding company's earnings are enhanced.

Most previous studies of holding company acquisitions and investigations of bank profitability ignore the fact that these payments are simply a transfer from one subsidiary to another and, therefore, do not affect the ownership valuation of the holding company itself. These transfers allow potential cost savings from internal provision of business services.

The level of expenditures on fringe benefits for employees (insurance programs, retirement plans, conveniences, etc.) is considered to be a variable under the control of the owners and subject to their

manipulation and perception of what its appropriate level should be. It will be argued that owners authorize expenditures in these areas in an effort to increase the retention of present employees (and thereby reduce necessary search and training costs and foregone earnings associated with replacing personnel) and to increase management loyalty to owners (reducing owners' monitoring costs). Specifically, it will be posited that, optimally, owners will incur these costs until the value of these expenditures is just offset by the value of the expenditures saved in the above areas.

Labor is very much concerned with the explicit payment for its services. If labor is also assumed to maximize the present value of its future earnings (wage and benefits stream), the chance for advancement to higher paying jobs must affect labor's behavior. The holding company, through its usual policy of promoting from within, offers a wide range of higher paying positions with increased responsibility that add lustre to the organization.

The small independent bank cannot do the same. There are relatively few top positions attainable through the process of management succession. As a consequence, banks frequently have trouble securing and retaining qualified people. They have no comparable incentive to provide extensive fringe benefits as do larger holding companies. Such expenditures may not significantly enhance the retention of personnel.

The cost function of the firm for each period, then, may be represented by:

(5) $C = \gamma_1 F + \gamma_2 N + r_d (K_d/K_e, G) K_d + r_{DD}DD + r_{TD}TD + r_B B$
$+ \theta[C_S(R, I_c) + C_T(R, Q) + E_f(R, Q) + C_M(R, I_c, I_M, Q)]$
$+ C_B(Q) + C_F$

where: γ_1, γ_2, r_{DD}, r_{TD}, and r_B are the direct costs associated with

fixed assets (F), labor services (N), demand deposits (DD), time and

savings deposits (TD), and other borrowings (B), respectively. They

are assumed exogenously determined either in competitive markets or

by regulatory authority. r_{K_d} is the cost of debt capital (K_d), a function

of the debt/equity ratio (K_d/K_e) and of a measure of the degree of product

and geographic diversification (G) attained by the firm.

Combining the firm's revenue and cost functions, then, gives the

profits generated during each period:

$$(6) \quad \pi = \sum_{i=1}^{n} P(Q_i)\, Q_i - C$$

where n is the number of distinguishable product markets in which the

firm operates.

The Capitalization Rate Function

The firm's capitalization rate is a function of both the time

preference pattern of owners and the level of risk that owners associate

with any given stream of earnings. In examining this capitalization

rate function, it will be assumed that owners' time preference patterns

are identical and constant. Any change in capitalization rates, there-

fore, must result from shifts in owners' evaluation of risk conditions

following a holding company acquisition.

As a measure of the level of risk perceived by the firm, this study

utilizes the coefficient of variation (V_n) of net income expectations.

This measure is computed by dividing the standard deviation of the

distribution of net incomes by its expected value. It is a ratio, there-
fore, describing the relative variability of a set of numbers. V_n measures
the risk due to variability of earnings flows. From the definition of
the coefficient of variation, $V_n = \sigma_n/E(N)$; or, since net income (N) equals
net operating income (O) minus the total interest paid on debt capital
$(r_{K_d}K_d)$, and assuming $\sigma_n = \sigma_0$:

(7) $$V_n = \frac{\sigma_0}{E(0)-r_{K_d}K_d}$$

where $E(0)$ is the expected value of net operating income and σ_0 is the
standard deviation of net operating income.

The coefficient of variation is dependent on the elements on the
right hand side of (7). The debt capital supply cost will be assumed
to be a function of both the debt/equity ratio (K_d/K_e) and a proxy for
the level of product and geographic diversification (G) of the firm:

(8) $r_{K_d} = r_{K_d} (K_d/K_e, G)$

where $\partial r_{K_d}/\partial(K_d/K_e) > 0$ and $\partial r_{K_d}/\partial G < 0$, that is, as the debt/equity
ratio rises so does the interest cost of debt capital and as the measure
of diversification of the firm's product market increases, the cost of
debt capital falls.

This last result assumes that potential lenders view the risk associated
with the placement of debt capital to be reduced if the firm expands the
scope or location of its operations. A holding company structure, with
production in a wider range of product markets than allowed commercial
banks and, except possibly where statewide branching is allowed, a
greater geographic dispersion of activities, may expose the total organi-
zation to less risk. Earnings variations at individual banks and nonbank

subsidiaries tend to cancel out unless a strong positive correlation exists between profit performances. Profit variability between a company's bank affiliates may offset each other due to the extension of loans across a wide geographic area or to a wide range of borrowers.

The variance of the profits associated with combining activities a and b may be represented by: $\sigma_{a+b}^2 = \sigma_a^2 + \sigma_b^2 + 2r\sigma_a\sigma_b$; where r is the correlation coefficient ($-1 \leq r \leq 1$). This equation states that the variance of the firm's profits is equal to the sum of the variance of the profits of the separate activities plus the covariance between them. As Hall suggested, the combination of disparate activities leads to less total variance and thereby to less total risk. This "reduced risk through risk-spreading" can be expected to occur unless a strong positive correlation between the profits exists. Independence or negative correlations will reduce variance.[6] Hall does, however, caution that the closer the linkages among activities--the less important are the advantages of risk spreading.

The functional representation of the coefficient of variation is given by:

(9) $V_n = V_n (\sigma_0 \; E(0), r_{K_d}(K_d/K_e, \; G))$

where $\partial V_n/\partial\sigma_0 > 0$, $\partial V_n/\partial E(0) < 0$, $\partial V_n/\partial (K_d/K_e) > 0$, $\partial V_n/\partial G < 0$.

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[6]Adleman argued that additional profit centers resulted in larger samples and greater stability of profits. A perfect negative correlation between two activities ($r = -1$) would completely eliminate variability (assuming $\sigma_a^2 = \sigma_b^2$ and $n_1 = n_2$) while zero correlation would result in a reduction in the standard error of the mean from $\sigma_{\bar{x}}$ to $\sigma_{\frac{\bar{x}}{2}}$.

The capitalization rate is, therefore, also seen to be a function of the standard deviation of net operating income, the expected value of net operating income, the level of the debt/equity ratio (or leveraging) of the firm, and the degree of diversification of the firm's activities.

(10) $\rho = \rho(i, V_n)$; $i = \bar{i}$; $\rho = \rho(\bar{i}, \sigma_0, E(O), K_d/K_e, G)$

where $\partial\rho/\partial\sigma_0 > 0$, $\partial\rho/\partial E(O) < 0$, $\partial\rho/\partial K_d/K_e > 0$, $\partial\rho/\partial G < 0$.

For convenience, assume that bank owners' patterns of time preferences are identical with each other and with those of holding company stockholders. Therefore, any change in the coefficient of variation of net income will have a positive impact on the owners' capitalization rate and will affect the owners' valuation of the firm's earnings stream.

An increase in the degree that the firm is diversified may have an important impact on the capitalization rate. Specifically, at a constant debt/equity ratio, increased G may reduce the coefficient of variation (through its effect on r_{K_d} or σ_0), which should reduce ρ. Increased diversification may, on the other hand, allow the firm to make greater use of debt without adversely affecting its capitalization rate and offsetting potential gains from financial leveraging.

The determinants of the coefficient of variation of net income as postulated provide insight into this question: $V_n = V_n(\sigma_0, E(O), K_d/K_e, G)$. Totally differentiating yields:

(11) $dV_n = \dfrac{\partial V_n}{\partial\sigma_0}d\sigma_0 + \dfrac{\partial V_n}{\partial E(O)}dE(O) + \dfrac{\partial V_n}{\partial(K_d/K_e)}d(K_d/K_e) + \dfrac{\partial V_n}{\partial G}dG$.

For the moment, assuming that the expected value and standard devia-
tion of net operating income are held constant, we may see the relation-
ship between the debt/equity ratio and measure of diversification that
must hold for any given value of the coefficient of variation of net
income. For $\overline{dV_n}$, $\overline{dE(O)}$, $\overline{d\sigma_0}$: $\frac{d(K_d/K_e)}{dG} = - \frac{\partial V_n / \partial G}{\partial V_n / \partial (K_d/K_e)} > 0$; since
$\partial V_n / \partial G < 0$ and $\partial V_n / \partial (K_d/K_e) > 0$. This positive relationship is reflected
in Figure 1.

The acquisition of a commercial bank by a holding company will increase
the firm's degree of diversification from G_0 to G_1. The acquisition it-
self (through an exchange of stock) adds equity capital and immediately
reduces the firm's debt/equity ratio to $(K_d/K_e)^1$. This is maintainable
only at a reduced value for V_n (V_n^2). If the firm decides to expand its
use of debt capital to the original debt/equity ratio, it still must be
accompanied by a lower V_n (V_n^1) than the original position. Unless the
impact of increased diversification is offset by either an increased
standard deviation associated with net operating income $(\sigma_0 > \sigma_0^0)$ or a
decreased expected value of operating income $(E(O) < E(O)^0)$, the coefficient
of variation (V_n) and, therefore, the firm's capitalization rate (ρ)
should decline through the acquisition activity. It is evident that
increased diversification may allow the firm to utilize a much higher
debt/equity ratio, to $(K_d/K_e)^2$, at the original values of V_n, σ_0, and $E(O)$
and, therefore, ρ.

This opportunity is not available to bank owners. Since commercial
banks are restricted by regulation in the degree of diversification into
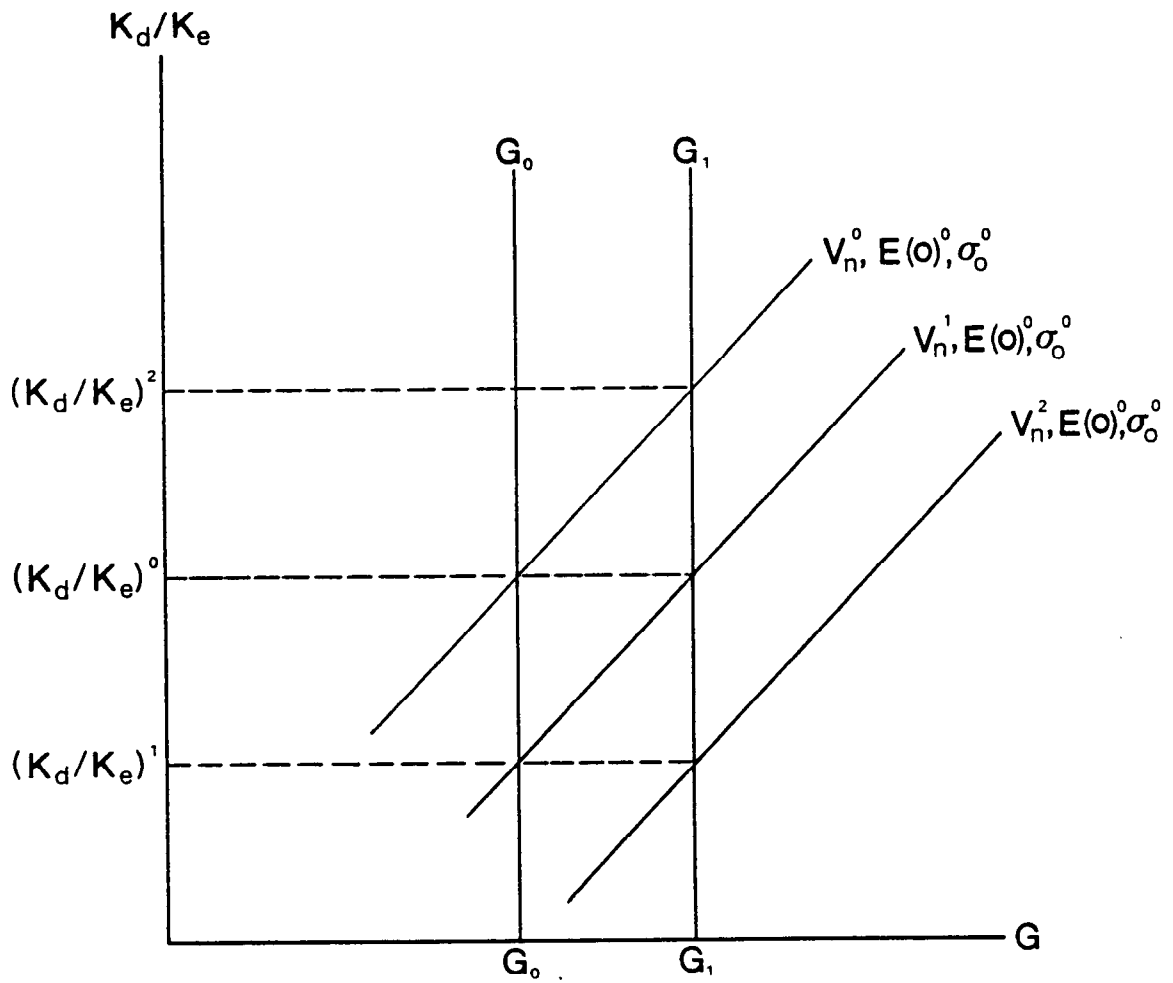additional product and geographic markets they may attain, they may

FIGURE 1. FINANCIAL LEVERAGE, DIVERSIFICATION, AND THE
COEFFICIENT OF VARIATION OF NET INCOME

realize a similar decline in V_n only through a direct reduction in

K_d/K_e along G_0G_0, reduced σ_0, or an increase in E(0).

Another useful relationship to be examined within this context

is that between G and σ_0. For $\overline{dV_n}$, $\overline{dE(0)}$, and $\overline{d(K_d/K_e)}$:

$$d\sigma_0/dG = -\frac{\partial V_n/\partial G}{\partial V_n \; \partial \sigma_0} > 0 .$$

As mentioned previously, the acquisition of a commercial bank by a

holding company increases the firm's measure of diversification (G_0 to G_1

in Figure 2). It is unlikely, however, that this results in an increase

in σ_0. As a matter of fact, it may reduce σ_0. Even at σ_0^0, though, the

coefficient of variation is reduced (to V_n^1). This is not attainable by

an independent bank restricted to G_0. Given these results and previous

assumptions, the firm's capitalization rate should be reduced through

diversification.

A firm limited to G_0 that tries to use more debt capital is faced with

an increased coefficient of variation of net income unless it can reduce σ_0

or increase E(0). The use of additional leverage does not necessarily in-

crease the coefficient of variation of net income. Given σ_0 and G_0, an

increase in operating income induced by a larger debt/equity ratio may result

in the initial value for V_n. If increased leverage does have a positive

impact on "net earnings on equity" as proposed by Lintner[7] and Robichek and

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[7]For a discussion of the competing theories on the effect of leverage on
equity values, see John Lintner. The "entity value" theory (as represented
by Modigliani and Miller) holds that the net operating income of the corporation
as a whole (sum of debt and equity values) is capitalized and is reduced by
the market value of outstanding debt to determine the market value of the
corporate equity. Since the "entity value" is held independent of the propor-
tion of debt in total capital, the sum of the market values of equity and debt
is a constant. An addition to debt will reduce net earnings due to additional
interest and increase the discount rate due to added risk on equity--together
reducing equity values in an amount equal to the value of the debt issued.
The "net earnings" theory, in contrast, values corporate equity as determined
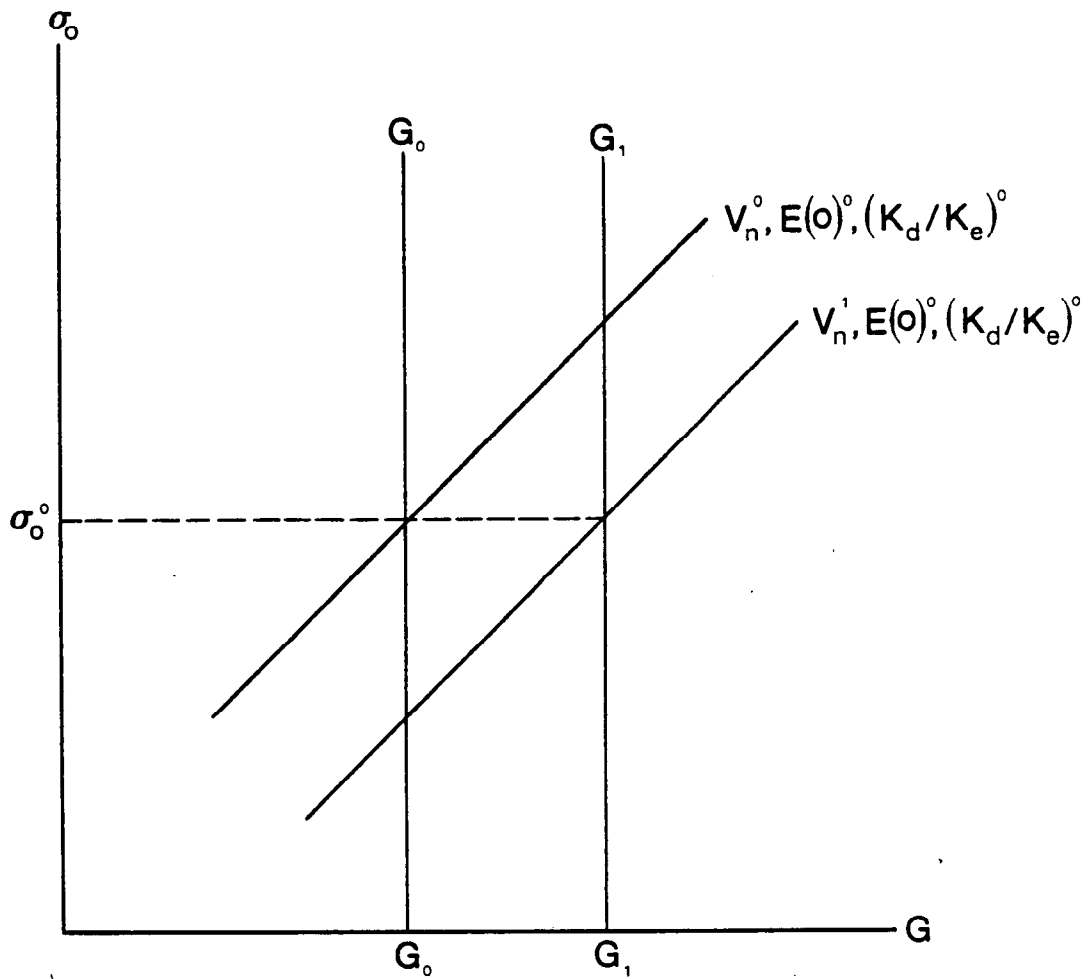
FIGURE 2.   DIVERSIFICATION, VARIABILITY OF EARNINGS, AND THE
COEFFICIENT OF VARIATION OF NET INCOME

Myers, the attainment of greater earnings at no higher coefficient of variation reveals that leverage may improve ownership valuation substantially.

The representation of the coefficient of variation in functional form, then, aids in the understanding of the factors that determine its value. It is not realistic to assume that additional use of debt automatically increases the firm's concept of uncertainty associated with its earnings stream. This effect may be offset or even dominated by increased operating income and/or diversification. Recognizing this functional dependency, it is feasible that firms adhering to different operating policies may experience different values for the coefficient of variation of net income. It is also true that the alteration of a firm's organizational structure, which changes its ability to use financial leverage and diversification, may alter the behavior of owners' risk-adjusted discount rates.

The acquisition of a bank by a BHC presents such a possibility. Each participating owner alters the structure of the claims on earnings he holds. The independent banker gains partial claim on BHC earnings in exchange for bank stock, while the holding company shareholder attains interest in the bank in return for partial interest in the expanded BHC's future earnings.

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by the capitalization of net earnings (after depreciation, taxes, and interest). Equity values, therefore, represent the direct capitalization of "net earnings on equity." The debt-equity ratio may have an impact on market values in this approach. Solomon and Kuh are representative of this approach. Lintner endorsed the net earnings approach in his conclusion: "The sum of the market values of the corporate equity and debt will not be invariant to changes in the finance mix (as asserted in the entity value theory)--in particular stock values will not be equal to equity value less corporate debt--except under fully idealized conditions of certainty. Moreover, with uncertainty admitted, the earnings yield is a continuously rising (and non-linear) function of corporate leverage-- at least beyond some initial range--and not a declining function of leverage beyond some point as inferred from the entity value theory" (p. 268). The analysis in the present study incorporates the net earnings approach.

The acquisition drastically expands the measure of diversification and extent of leveraging associated with the claims of the original bank owners while more moderate changes are experienced by the BHC shareholders. It is entirely possible that the behavior of the coefficients of variation of net income (and thus owners' capitalization rates) may be affected by the transaction.

Production Function

Before these concepts are combined to describe the valuation framework owners use in determining acquisition activity, the production function must be described briefly. Basically, the banking or financially-related firm is dependent for its production on three classes of factor inputs—fixed assets (F), labor resources (N), and money capital (M). Fixed assets represent bank premises, equipment, etc. N is the labor input utilized in the productive process. Money capital is the amount of funds actually available to the firm to place into the production of its various loan and investment categories. Additions to M evolve from expansions of equity capital, debt capital, deposits (demand or time and savings), or other borrowing sources (B) such as Federal funds or the Federal Reserve discount window. The firm's level of production in any period t, therefore, may be represented in general form by: $Q_t = f(F_t, N_t, M_t$

III. THE MODEL

Now that each of its components has been discussed, the valuation framework on which owners base their decisions may be more completely specified. Substituting the production function into the revenue function and discounting the firms' future earnings stream in accord with owners' time preferences and the degree of risk perceived (represented by ρ) yields:

$$(12) \quad V = \sum_{t=1}^{H} \frac{1}{\rho t} \left[\sum_{i=1}^{n} P_{it}(q_{it}) f(F_t, N_t, M_t) - \gamma_{1_t} F_t - \gamma_{2_t} N_t \right.$$

$$- r_{K_{d_t}} \left(\left(\frac{K_d}{K_e} \right)_t, G_t \right) K_{d_t} - r_{DD_t} DD_t - r_{TD_t} TD_t - r_{B_t} B_t$$

$$- \theta \left\{ C_{S_t}(R_t, I_{c_t}) + C_{T_t}(R_t, Q_t) + C_{M_t}(R_t, I_{c_t}, I_{M_t}, Q_t) \right\}$$

$$\left. - C_{B_t}(Q_t) - C_{F_t} \right]$$

The expression within the brackets is the profit function across the firm's horizon. Foregone earnings (E_f) are included within training costs (C_T) for simplification.

To create the valuation disparities posited essential for acquisitions to occur, (12) must be specified further to represent the firm under alternative organizational structures. (12a - 12b) and (12c - 12d) represent, respectively, the valuation frameworks that a set of owners may use to determine whether the decision to trade stock with a holding company (in the case of independent banks) or to acquire an additional bank (for a present holding company) is in their economic interest.

Both disparities must favor acquisition before the transaction will take place.

For the bank owners' decision, the relevant functions are:

(12a)
$$V_B = \sum_{t=1}^{H} \frac{1}{\rho_{B_t}} \left[\sum_{i=1}^{n} P_{it}(q_{it}) f(F_t, N_t, M_t) - \gamma_{1_t} F_t - \gamma_{2_t} N_t \right.$$

$$- r_{K_{d_t}} \left(\left(\frac{K_d}{K_e} \right)_t, G_t \right) K_{d_t} - r_{DD_t} DD_t - r_{TD_t} TD_t - r_{B_t} B_t$$

$$- \theta \left\{ C_{S_t}(R_t, I_{c_t}) + C_{T_t}(R_t, Q_t) + C_{M_t}(R_t, I_{c_t}, I_{M_t}, Q_t) \right\}$$

$$\left. - C_{B_t}(Q_t) - C_{F_t} \right]_B$$

and

(12b)
$$V_{HC} = \sum_{t=1}^{H} (\alpha) \frac{1}{\rho_{HC_t}} \left[\sum_{i=1}^{n} P_{it}(q_{it}) f(F_t, N_t, M_t) - \gamma_{1_t} F_t - \gamma_{2_t} N_t \right.$$

$$- r_{K_{d_t}} \left(\left(\frac{K_d}{K_e} \right)_t, G_t \right) K_{d_t} - r_{DD_t} DD_t - r_{TD_t} - TD_t - r_{B_t} B_t$$

$$- \theta \left\{ C_{S_t}(R_t, I_{c_t}) + C_{T_t}(R_t, Q_t) + C_{M_t}(R_t, I_{c_t}, I_{M_t}, Q_t) \right\}$$

$$\left. - C_{B_t}(Q_t) - C_{F_t} \right]_{HC}$$

where α is the percentage of holding company ownership offered to bank owners in exchange for their stock, and ρ_{B_t} and ρ_{HC_t} are the effective capitalization rates of original bank owners applicable to period t under assumptions of (a) continued ownership in the bank or (b) obtaining interest in a holding company, respectively.

Holding company stockholders view the transaction by comparing ownership valuations of continued operation without acquiring the bank (12c) and that thought obtainable with the addition of the bank (12d).

$$(12c) \qquad V_{HC} = \sum_{t=1}^{H} \frac{1}{\rho_{HC_t}} \left[\sum_{i=1}^{n} P_{it}(q_{it}) f(F_t, N_t, M_t) - \gamma_{1_t} F_t - \gamma_{2_t} N_t \right.$$

$$- r_{K_{d_t}} \left(\left(\frac{K_d}{K_e} \right)_t, G_t \right) K_{d_t} - r_{DD_t} DD_t - r_{TD_t} TD_t - r_{B_t} B_t$$

$$- \theta \left\{ C_{S_t}(R_t, I_{c_t}) + C_{T_t}(R_t, Q_t) + C_{M_t}(R_t, I_{c_t}, I_{M_t}, Q_t) \right\}$$

$$\left. - C_{B_t}(Q_t) - C_{F_t} \right]_{HC}$$

$$(12d) \qquad V_{HC}^* = \sum_{t=1}^{H} (\beta) \frac{1}{\rho_{HC_t}^*} \left[\sum_{i=1}^{n} P_{it}(q_{it}) f(F_t, N_t, M_t) - \gamma_{1_t} F_t - \gamma_{2_t} N_t \right.$$

$$- r_{K_{d_t}} \left(\left(\frac{K_d}{K_e} \right)_t, G_t \right) K_{d_t} - r_{DD_t} DD_t - r_{TD_t} TD_t - r_{B_t} B_t$$

$$- \theta \left\{ C_{S_t}(R_t, I_{c_t}) + C_{T_t}(R_t, Q_t) + C_{M_t}(R_t, I_{c_t}, I_{M_t}, Q_t) \right\}$$

$$\left. - C_{B_t}(Q_t) - C_{F_t} \right]_{HC}^*$$

where β is the proportion of ownership in the holding company retained by original stockholders ($\beta = 1 - \alpha$), and ρ_{HC_t} and $\rho_{HC_t}^*$ are the perceived effective capitalization rates applied to each period's earnings for holding company owners (a) under continued operation without purchasing the bank and (b) incorporating the bank within the company structure, respectively.

For any acquisition to occur, economic incentives must be established for both participants. Specifically, V_{HC} must be greater than V_B (in 12a - 12b) and V_{HC}^* must be larger than V_{HC} (in 12c - 12d).

Insight into the comparative magnitudes of these measures may be gained by viewing the relative responses of these functions following shifts in owners' relevant decision variables. There are several variables

that will affect the paths of ownership valuation of the firm. The crucial factor within the present context, however, is the impact shifts in each have on the capitalized value of future earnings streams under the alternative banking organizations.

Of particular interest in this respect are expansion of debt and equity capital, increased deposits, the emergence of the need to make replacements in the managerial staff, and the opportunity to diversify the firm's activities into new product and/or geographic markets. In addition, advantages for holding companies will result from familiarity with employees' abilities and extensive provision of fringe benefits to their staffs. Each of the above will be examined in more detail. The analysis will first concentrate on determining whether bank owners have an economic incentive to enter the transaction before the holding company's position is inspected.

The valuation schema, as posited above, places dual emphasis on profit and risk expectations (embodied in ρ) in the effort to explain the incentives present for bank holding company acquisitions to occur. Since the significance of a greater earnings flow for one organization concerning this motivation is obvious, the present analysis will inquire into the possibility that owners foresee different capacities for dealing with risk under the alternative ownership structures. If this phenomenon is present, a valuation disparity is established even if expected earnings flows of the two are judged equivalent (which will be assumed for the present). Differences in the responses of the valuation of earnings streams (by bank or BHC stockholders viewing alternative structures) provide an

important incentive for owners to enter into acquisition negotiations. Time preference patterns are assumed identical and constant, and for convenience, the time subscript will be suppressed in the following presentation.

The Bank Stockholder

Expansion of Equity For a bank to facilitate an expansion of production (loans, investments, other services) it must eventually expand its capital base to meet regulatory demands. In their ownership decisions, bank owners view the comparative impacts on ownership valuation between the different organizational structures as the use of equity capital increases. The maximizing behavior of the independent bank is represented by:

$$(13) \quad \frac{\partial V_B}{\partial K_e} = - \frac{\frac{\partial \rho_B}{\partial K_e}}{\rho_B^2} (\pi_B) + \frac{1}{\rho_B} \left[\left(P_i \frac{\partial q_i}{\partial K_e} + q_i \frac{\partial P_i}{\partial q_i} \frac{\partial q_i}{\partial K_e} \right) - \left(\frac{\partial r_{Kd}}{\partial K_e} K_d \right. \right.$$

$$\left. \left. + \frac{\partial K_d}{\partial K_e} r_{Kd} \right) \right] = 0$$

or

$$(14) \quad \frac{\frac{\partial \rho_B}{\partial K_e} (\pi_B)}{\rho_B} = \left[\left(P_i \frac{\partial q_i}{\partial K_e} + q_i \frac{\partial P_i}{\partial q_i} \frac{\partial q_i}{\partial K_e} \right) - \left(\frac{\partial r_{Kd}}{\partial K_e} K_d + \frac{\partial K_d}{\partial K_e} r_{Kd} \right) \right]$$

(14) states that the change in the valuation of the firm's earnings resulting from the impact of an increase in the use of equity on the capitalization rate must equal the additional net marginal revenue

product (i.e., MRP less the net change in the level of interest payments
on debt capital) for ownership wealth maximization to occur. In the
case of banks with total deposits of less than $30 million, a strong
tendency to use only equity capital in their capital structure has been
observed.[8] If the bank does not use debt capital, no change in debt
interest payments will occur and the change in valuation induced by a
change in the capitalization rate will equal the full measure of the
marginal revenue product of more equity. Since MRP_{K_e} may normally be
considered positive, and since ρ_B and π_B are both positive, $\frac{\partial \rho_B}{\partial K_e}$ is also
positive for the independent banker in this case. In other words, the
marginal revenue product of additional equity is equal to the required
return to investors to compensate them for the use of their funds.

On the other hand, if the firm does make use of debt capital to some
extent, the magnitude of the change in ownership valuation (that portion
due to a changed capitalization rate) is dependent on the relative sizes
of the components on the right-hand side of (14). The net change in
debt interest payments caused by expanded equity has two components:
(1) a reduction resulting from a decreased rate of interest on debt capi-
tal as lenders view an improved equity position; and (2) an increase
resulting from the use of more debt induced by a reduced debt/equity
ratio. It is quite conceivable that an increase in equity may elicit
a strong enough increase in the use of debt capital to actually increase
the total interest payments on debt. In such a case, the change in
ownership valuation resulting from a changed capitalization rate will be

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[8]See Piper, p. 121.

less than the marginal revenue product of equity, i.e.,

$$\frac{(\partial \rho_B / \partial K_e) \pi_B}{\rho_B} \quad < \quad MRP_{K_e}.$$

The increase in the capitalization rate for firms that do use debt capital to this extent will be less, therefore, than the identical firm would experience without the use of debt capital. Identical profit performances would result in a greater ownership valuation for the debt users.

This is an advantage holding company organizations may provide to owners. The expansion of a firm's equity base may allow a reduction in the interest rate it must pay on its debt. A BHC may, however, expand debt capital significantly in response to the decreased cost and the decline in its debt/equity ratio. As debt increases, the public will re-evaluate the firm's debt instruments and adjust their required rates of return upward. If this process continues to the point where net interest payments are increased, the required change in the owners' capitalization rate to assure valuation maximization becomes less than the marginal revenue product realized from the investment of additional equity. From (14) it is evident that between two firms with equivalent profit performances the firm that makes greater use of debt capital can realize a greater valuation of those earnings than, say, a firm that makes little or no use of debt. If that same firm has the further advantage of freedom of diversification (through acquisition) it may make use of even more debt without disturbing the rate it pays on debt capital. This may allow an even greater disparity in valuation of equivalent earnings flows.

Diversification Bank holding company acquisitions, in effect, provide owners with an additional way to expand equity that is not available to independent banks. The acquisition itself brings increased diversification to the firm's operations as well. This may have a further impact on the availability of debt capital and the valuation of the firm's earnings. This is made clearer by examining the effect on ownership valuation of expanding equity through an acquisition that also increases the firm's diversity in product and/or geographic markets (G).

$$
(15) \quad \frac{\partial V_{HC}}{\partial K_e} = \frac{-\alpha \frac{\partial \rho_{HC}}{\partial K_e} \cdot (\pi_{HC})}{\rho_{HC}^2} + \frac{\alpha}{\rho_{HC}} \left[\left(P_i \frac{\partial q_i}{\partial K_e} + q_i \frac{\partial P_i}{\partial q_i} \frac{\partial q_i}{\partial K_e} \right) \right.
$$

$$
\left. - \left(\frac{\partial r_{K_d}}{\partial K_e} K_d + \frac{\partial K_d}{\partial K_e} r_{K_d} \right) \right] - \frac{\alpha \frac{\partial \rho_{HC}}{\partial G} (\pi_{HC})}{\rho_{HC}^2}
$$

$$
- \frac{\alpha}{\rho_{HC}} \left[\frac{\partial r_{K_d}}{\partial G} K_d + \frac{\partial K_d}{\partial G} r_{K_d} \right] = 0
$$

Rearranging (4.6) and multiplying and dividing through by $\frac{\alpha}{\rho_{HC}}$ gives:

$$
(16) \quad \frac{\frac{\partial \rho_{HC}}{\partial K_e} (\pi_{HC})}{\rho_{HC}} + \frac{\frac{\partial \rho_{HC}}{\partial G} (\pi_{HC})}{\rho_{HC}} = \left[MRP_{K_e} - \left\{ \left(\frac{\partial r_{K_d}}{\partial K_e} K_d + \frac{\partial K_d}{\partial K_e} r_{K_d} \right) \right. \right.
$$

$$
\left. \left. + \left(\frac{\partial r_{K_d}}{\partial G} K_d + \frac{\partial K_d}{\partial G} r_{K_d} \right) \right\} \right]
$$

The combined effect, then, of increased equity and diversification on the capitalization rate is extended to include the net change in debt interest payments allowed by an increase in G. This change also consists of two components: (1) a decrease as a result of reduced rates as lenders view the increased scope of the firm's operations, and (2) an increase

due to an expansion in usage of debt. The firm that is afforded the
use of additional debt capital to the extent that total interest payments
increase as a result of an increase in the firm's degree of diversifica-
tion will actually realize a smaller increase in the owner's capitaliza-
tion rate than a bank that is not allowed to diversify to such an extent.
For firms with identical profits and originally identical ρ's, this will
result in greater valuation for the diversified debt user. As long as
the net effect of diversification on interest payments is positive,
owners' capitalization rates will be smaller than they would be without
diversification and debt usage. Valuation advantages under a holding
company organization are, therefore, obvious for similar profit levels.

This is the situation of interest to us at present. The original
bank owner, faced with alternative paths of his capitalization rate in
future time periods, will choose the path of lower ρ values if earnings
are expected to be roughly equivalent. The motivation for owners of
small banks to choose to trade their interest in the bank for that of a
holding company is, therefore, enhanced if they view the prospect of
expanding the equity base of the firm by acquisition.

The above discussion has assumed that the independent bank and
holding company owners have equal access to additional equity capital.
It has ignored a very real problem facing smaller commercial banks in
recent years--the limited scope for expanding their equity base that
has placed an effective ceiling on growth potential. The uncertainty
attached to the bank's future capital expansion capabilities, therefore,
could cause a further divergence between the capitalization rates of
bank owners and holding company owners that (given profit performance)

will lead to a greater valuation of equivalent earnings through a BHC than through an independent bank.

Expansion of Deposits   Commercial bank deposits is a variable that most bankers can reasonably expect to increase as the economy expands. To examine the impact deposit growth has on ownership valuation, (12a) and (12b) must be differentiated with respect to deposits (time deposits for convenience). For the independent bank:

$$(17) \quad \frac{\partial V_B}{\partial TD} = \frac{1}{\rho_B} \left[P_i \frac{\partial q_i}{\partial TD} + q_i \frac{\partial P_i}{\partial q_i} \frac{\partial q_i}{\partial TD} - r_{TD} \right] - \frac{\frac{\partial \rho_B}{\partial TD}(\pi_B)}{\rho_B^2} = 0$$

Rearranging we have:

$$(18) \quad MRP_{TD}^B - r_{TD}^B = \frac{\frac{\partial \rho_B}{\partial TD}(\pi_B)}{\rho_B}$$

The equivalent term under the holding company structure is:

$$(19) \quad MRP_{TD}^{HC} - r_{TD}^{HC} = \frac{\frac{\partial \rho_{HC}}{\partial TD}(\pi_{HC})}{\rho_{HC}}$$

which reveals that the portion of the change in the valuation of the firm attributable to the effect an increase in deposits has on the owners' capitalization rate is equal to the difference between the marginal revenue product of increased deposits and the marginal factor cost of those funds. If it is assumed that growth in deposits will not affect the capitalization rate of the firm, the familiar results evolve that each firm must expand its use of deposits until its marginal revenue product equals marginal factor cost. No information advantageous to the holding company structure is discernible from this situation. Even if

deposit growth does have an impact on ρ, there appears to be no basis
for the argument that equivalent deposit increases would affect alterna-
tive organizational structures differently.

Personnel Replacements and Provision of Employee Benefits   Owners
realize that occasionally it will become necessary to fill employee
vacancies. Whether it is due to death, retirement, or the resignation
of a staff member, the firm must make some expenditures on finding a
qualified replacement. Retirement is predictable and gives the firm
enough notice where it can attempt to make the transition as smoothly
as possible. Death and resignation, however, give little warning and
can greatly affect the total working efficiency of the firm's staff.
All require explicit expenditures of searching for and training a replace-
ment. They also involve the loss of potential earnings due to decreased
marginal productivity during the orientation and training period.

As has been suggested,[9] banks are often concerned with the lack of
an efficient and well defined program for management succession. The
holding company organization provides a program that not only reduces the
costs involved with hiring and training a successor, but can often avoid
the loss of foregone earnings by promoting or transferring an experienced,
competent person from within the company with little loss in productivity.
In addition, owners may experience a reduction in the costs of observing
or "monitoring" his performance in comparison with someone hired from
outside the company.

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[9]See Lawrence (1969), pp. 44-45.

Neither the holding company nor the independent bank can control deaths or retirements. The holding company, however, provides a means to retain personnel by reducing the frequency of resignations. The corporate structure, with its several bank and nonbank subsidiaries, provides an attractive network of possibilities for advancement for the young executive--where the independent bank is limited in this respect. Holding companies frequently initiate a centralized training program that provides a pool of management talent to the whole company. Employees within each holding company system are usually given priority when positions become available at subsidiary banks. An employee's chance for advancement to a position of added responsibility and increased remuneration, therefore, is not limited to openings that develop within a single bank.

The holding company also provides its subsidiaries with fringe benefits (health and accident insurance, retirement plans, etc.) that add to the lustre and provide additional incentive for the employee to remain with the company. The combination of these factors suggests that holding companies may be more effective at retaining present employees than smaller, less-diversified banks. This undoubtedly has important implications for cost savings and owners' uncertainties connected with personnel replacement.

It becomes immediately apparent, however, that expenditures on employee benefits have an impact on other components within the model. Money capital (M) is diverted from production to provide these benefits-- thus an opportunity cost in the form of foregone revenue is present. On the cost savings side, however, in addition to reduced search, training, and monitoring costs associated with improved staff retention, training

costs and owners' monitoring costs are somewhat diminished by the reduction in the level of production. Monitoring costs are further affected through a possible improved alignment of managements' motives with owners' welfare. As owners' trust in senior management increases, they expend less time and worry over the need for supervision—freeing them to attend to other matters.

Examination of these expenditures will not add directly to the establishment of valuation disparities between the organizational frameworks, but it is an aspect of the firm's behavior revealed by the model and may lend support to the concerns for employee retention, managerial succession, and owners' trust in management. Differentiating (12) with respect to C_F yields:

$$(20) \quad \frac{\partial V}{\partial C_F} = \rho \left[\sum_{i=1}^{n} \left(P_i \frac{\partial q_i}{\partial M} \frac{\partial M}{\partial C_F} + q_i \frac{\partial P_i}{\partial q_i} \frac{\partial q_i}{\partial M} \frac{\partial M}{\partial C_F} \right) - \left\{ \left(\frac{\partial \theta}{\partial C_S} \frac{\partial C_S}{\partial R} \frac{\partial R}{\partial C_F} \right) \right. \right.$$

$$+ \left(\frac{\partial \theta}{\partial C_T} \frac{\partial C_T}{\partial R} \frac{\partial R}{\partial C_F} \right) + \left(\frac{\partial \theta}{\partial C_M} \frac{\partial C_M}{\partial R} \frac{\partial R}{\partial C_F} \right) + \left(\frac{\partial \theta}{\partial C_T} \frac{\partial C_T}{\partial Q} \frac{\partial Q}{\partial M} \frac{\partial M}{\partial C_F} \right)$$

$$\left. + \left(\frac{\partial \theta}{\partial C_B} \frac{\partial C_B}{\partial Q} \frac{\partial Q}{\partial M} \frac{\partial M}{\partial C_F} \right) + \left(\frac{\partial \theta}{\partial C_M} \frac{\partial C_M}{\partial I_M} \frac{\partial I_M}{\partial C_F} \right) - 1 \right\} \right] = 0$$

Rearranging and dividing by ρ gives:

$$(21) \quad 1 + MRP_M = \left[\left(\frac{\partial \theta}{\partial C_S} \frac{\partial C_S}{\partial R} \frac{\partial R}{\partial C_F} \right) + \left(\frac{\partial \theta}{\partial C_T} \frac{\partial C_T}{\partial R} \frac{\partial R}{\partial C_F} \right) + \left(\frac{\partial \theta}{\partial C_M} \frac{\partial C_M}{\partial R} \frac{\partial R}{\partial C_F} \right) \right.$$

$$+ \left(\frac{\partial \theta}{\partial C_T} \frac{\partial C_T}{\partial Q} \frac{\partial Q}{\partial C_F} \right) + \left(\frac{\partial \theta}{\partial C_M} \frac{\partial C_M}{\partial Q} \frac{\partial Q}{\partial M} \frac{\partial M}{\partial C_F} \right) + \left(\frac{\partial \theta}{\partial C_B} \frac{\partial C_B}{\partial Q} \frac{\partial Q}{\partial M} \frac{\partial M}{\partial C_F} \right)$$

$$\left. + \left(\frac{\partial \theta}{\partial C_M} \frac{\partial C_M}{\partial I_M} \frac{\partial I_M}{\partial C_F} \right) \right]$$

(21) reveals that the explicit cost of providing the benefits to employees plus the foregone revenue from decreased production is exactly offset by the sum of the marginal savings from (a) reduced search, training, and monitoring costs due to a reduction in R, (b) reduced training, monitoring, and business services costs associated with a reduction in production, and (c) reduced monitoring costs due to the greater trust in management that owners experience.

This implies then that owners may be willing to make additional explicit net expenditures if compensated by certain implicit cost savings (e.g., marginal time savings for owners). Expenditures on employee benefits for banks and holding companies alike appear in the annual earnings reports of each. Reductions in owners' monitoring costs do not. If a monetary value were assigned to this time savings and deducted from the cost side of the earnings statement, it could have a significant impact on the reported earnings of the firm. For this reason, the earnings statement of the firm that experiences savings in monitoring costs through its activities may be somewhat understated.

The BHC Stockholder

Holding company owners will decide to acquire a bank only if they can similarly establish that the valuation of their earnings stream will be enhanced as a result. Company shareholders compare the ownership positions attainable under the alternative organizational structures. In the case of a proposed acquisition, the comparison is between the perceived performance of the BHC (inclusive of the bank) following the acquisition of a banking subsidiary and that performance expected without its acquisition. If the former is deemed superior to the latter,

the motivation for the company to pursue the acquisition is established.

The distinction between organizational structures will not be as precise as the comparison provided independent bank owners. Instead of the alternatives presented in the choice between an independent bank and the holding company organization, the present situation involves whether or not an extension of the company structure will be positively reflected in the ownership valuation of the firm. The search for the valuation disparity necessary for acquisition to occur must again focus on both profit and risk considerations. Equations (12c) and (12d) (representing the alternative structures) will be differentiated with respect to the variables of crucial importance to company stockholders. The case for an extension of the company structure to include a new acquisition lies chiefly in the owners' views of the comparative effects of expansion of equity capital, availability and use of debt capital, and an increased degree of product and/or geographic diversification on their positions of ownership. In addition, the importance of employee retention and owners' monitoring costs will again be examined.

Increase in Equity Capital   The holding company may increase its equity position through retained earnings, the sale of stock on the market, the purchase of additional shares by present owners, or issuing new stock and trading for the stock of another firm (acquisition). The last method delivers a portion of the ownership of the holding company to the bank owners with the original company stockholders retaining a smaller percentage ownership than before ($\beta = 1 - \alpha$) but of a larger unit (holding company plus the newly acquired bank). Searching

for a difference in ownership valuations, a comparison of the second and fourth alternatives can be made--i.e., issuing new stock, selling it for cash to outsiders, and maintaining the present company structure versus trading those same new issues for the stock (and thus the assets) of a bank. Each method will leave the original company owners with $\beta(0 < \beta < 1)$ of the ownership. A comparison of the first and fourth or third and fourth alternatives would be just as easy with present owners maintaining total ownership $(\beta = 1)$ in the first and third cases.

Differentiating (12c) and (12d) with respect to K_e yields:

$$(22) \quad \frac{\partial V_{HC}}{\partial K_e} = -\frac{\beta \frac{\partial \rho_{HC}}{\partial K_e}(\pi_{HC})}{\rho_{HC}^2} + \frac{\beta}{\rho_{HC}}\left[\left(P_i \frac{\partial q_i}{\partial K_e} + q_i \frac{\partial P_i}{\partial q_i}\frac{\partial q_i}{\partial K_e}\right)\right.$$

$$\left. - \left(\frac{\partial r_{K_d}}{\partial K_e}K_d + \frac{\partial K_d}{\partial K_e}r_{K_d}\right)\right] = 0$$

and

$$(23) \quad \frac{\partial V_{HC}^*}{\partial K_e} = -\frac{\beta \frac{\partial \rho_{HC}^*}{\partial K_e}(\pi_{HC}^*)}{\rho_{HC}^{2*}} + \frac{\beta}{\rho_{HC}^*}\left[\left(P_i \frac{\partial q_i}{\partial K_e} + q_i \frac{\partial P_i}{\partial q_i}\frac{\partial q_i}{\partial K_e}\right)\right.$$

$$\left. - \left(\frac{\partial r_{K_d}}{\partial K_e}K_d + \frac{\partial K_d}{\partial K_e}r_{K_d}\right)\right] - \frac{\beta \frac{\partial \rho_{HC}^*}{\partial G}(\pi_{HC}^*)}{\rho_{HC}^{2*}}$$

$$- \frac{\beta}{\rho_{HC}^*}\left[\frac{\partial r_{K_d}}{\partial G}K_d + \frac{\partial K_d}{\partial G}r_{K_d}\right] = 0$$

Rearranging and dividing through by $\dfrac{\beta}{\rho_{HC}}$ and $\dfrac{\beta}{\rho^{*}_{HC}}$, respectively, yields:

$$(24) \quad \frac{\dfrac{\partial \rho_{HC}}{\partial K_e} (\pi_{HC})}{\rho_{HC}} = \left[MRP_{K_e} - \left(\frac{\partial r_{K_d}}{\partial K_e} K_d + \frac{\partial K_d}{\partial K_e} r_{K_d} \right) \right]_{HC}$$

and

$$(25) \quad \frac{\left(\dfrac{\partial \rho^{*}_{HC}}{\partial K_e} + \dfrac{\partial \rho^{*}_{HC}}{\partial G} \right)(\pi^{*}_{HC})}{\rho^{*}_{HC}} = \left[MRP_{K_e} - \left\{ \left(\frac{\partial r_{K_d}}{\partial K_e} + \frac{\partial r_{K_d}}{\partial G} \right) K_d \right.\right.$$

$$\left.\left. + \left(\frac{\partial K_d}{\partial K_e} + \frac{\partial K_d}{\partial G} \right) r_{K_d} \right\} \right]_{HC}^{*}$$

As before, (24) and (25) represent the owners' wealth maximization conditions that result from the expansion of equity capital through the sale of stock and an acquisition through the transfer of new company stock for that of the acquired firm, respectively. The latter method may or may not have an increase in the firm's degree of diversification associated with it. For present purposes, it will be assumed that the acquisition does introduce the company into a new product and/or geographical market represented by a simultaneous increase in G.

If the increased diversification (G) combined with the expansion of equity resulting from the acquisition induces a greater usage of debt capital (with resultant increased debt interest payments) than experienced through an expansion of equity with no diversification, and if $(MRP_{K_e})^{*}_{HC}$ is not any larger than $(MRP_{K_e})_{HC}$, the right-hand side of (25) is less than that of (24). Therefore, the left-hand side of (25) is also smaller than its counterpart in (24). If $\pi_{HC} = \pi^{*}_{HC}$ and if $\rho_{HC} = \rho^{*}_{HC}$ originally, $\dfrac{\partial \rho^{*}_{HC}}{\partial K_e} + \dfrac{\partial \rho^{*}_{HC}}{\partial G} < \dfrac{\partial \rho_{HC}}{\partial K_e}$, i.e., the acquisition method results in smaller increase in the owners' capitalization rate than the alternative method of

equity expansion. Comparing equivalent profit expectations, company shareholders will choose that organizational structure that provides the smaller ρ value. This action will maximize the owners' valuation of earnings.

Expansion of Debt Capital Present company stockholders consider the possible positive impact an acquisition may have on the future ability of the firm to raise funds through the issuance of debt instruments. This is precisely the case just presented where (a) an expansion of equity may allow the company to also increase its usage of debt, and/or (b) an increase in the measure of diversification in production (G) further extends the company's debt capacity. If the latter does not accompany the acquisition, it is difficult to argue that owners anticipate lower ρ values than if the acquisition did not take place. The establishment of a valuation disparity in favor of acquisition associated with the expanded use of debt capital is then dependent upon distinguishable profit expectations.

Implicit Returns Through BHC Activity If an extension of the holding company structure (through acquisition) results in an improvement for the company in employee retention through increased opportunities for company personnel—thereby inducing reductions in certain administrative costs (search, training, monitoring) associated with replacements—over that possible without acquisition, a valuation disparity may be created. Further, if the additional opportunities for advancement and prosperity persuade present employees that their future lies in the well-being of the company and its owners rather than pursuing their own self-interests (i.e., causes

a shift from a management-interest oriented firm to an owner-interest
oriented firm[10]), owners may realize additional monitoring cost savings
through the reduced time spent in supervision of management. Even if
the explicit cost savings are not reflected in improved earnings perfor-
mances, implicit savings (not accounted for in earnings statements) may
form the basis for the necessary disparity in valuation if reported
earnings are equivalent.

Rather than attempting to quantify these implicit savings and adjust-
ing earnings, they may be accounted for within the model by assuming that
they are reflected in the manner in which owners value reported earnings
flows. Specifically, the owners' capitalization rate is adjusted to
reflect these developments. The reduction in owners' monitoring costs
are in the form of less time and worry that owners must spend supervising
(a) the filling of personnel vacancies and (b) the behavior of management.
As owners gain additional confidence and trust in management and as the
frequency of necessary replacements declines, the owners' measure of
uncertainty accompanying a given income stream will likely be affected.
If this is reflected in a smaller value than would occur with greater
monitoring costs, a valuation disparity arising from extending the BHC
structure may appear. For this purpose, equation (12) will again be
differentiated with respect to expenditures on employee benefits (C_F).
Unlike in equation (18), however, it will presently be assumed that the

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[10]For discussions of the effect of separation of ownership and con-
trol see Baumol, Cohen and Reid, and Monsen, Chiu, and Cooley. Each
argue that management-controlled firms may place less emphasis on profit-
associated variables than owner-controlled firms, sacrificing them for
performance goals regarded as more consistent with management interest.
In a study with Downs, Monsen suggests that management-controlled firms
may sacrifice profit rate and growth rate for reduced risk acceptance.

firm's capitalization rate is affected by the consequences. This will occur through an upward adjustment in the expected earnings of the firm following improvements in both staff retention and owners' trust in management. Decreased monitoring of the replacement and productive processes result in time savings to owners that may be as important as expected dollar earnings. Owners certainly would prefer an earnings stream plus leisure time to equivalent earnings without leisure. This effect may be incorporated within the capitalization rate function by redefining expected operating income E(0) to include an addition for time savings E(t), i.e., $E(0)^* = E(0) + E(t)$. The coefficient of variation of net income (V_n) would then become: $V_n^* = \dfrac{\sigma_0}{[E(0)+E(t)]-r_{K_d}(K_d/K_e,G)K_d}$. ρ then becomes dependent on [E(0) + E(t)] rather than just E(0).

Further, as owners gain more faith that management will not seek to cheat them or pursue non-owner goals, they may allocate more of their time to other matters and less to the supervision of management. This is brought about through an improved alignment of management's motives with stockholders' interests that may result from an addition to employee benefits. The reduced monitoring costs, therefore, are reflected in ρ through an impact on E(t). As E(t) increased (E(0) remaining constant), the coefficient of variation (V_n^*) declines and, thus, ρ declines. The comparable expression to (18), adjusted to allow for this impact on ρ, is given by (26).

$$(26) \quad \frac{\dfrac{\partial \rho}{\partial E(t)} \dfrac{\partial E(t)}{\partial C_M}\left(\dfrac{\partial C_M}{\partial R}\dfrac{\partial R}{\partial C_F} + \dfrac{\partial C_M}{\partial Q}\dfrac{\partial Q}{\partial M}\dfrac{\partial M}{\partial C_F} + \dfrac{\partial C_M}{\partial I_M}\dfrac{\partial I_M}{\partial C_F}\right)\pi}{\rho} =$$

$$1 + MRP_M - \left[\left(\frac{\partial\theta}{\partial C_S}\frac{\partial C_S}{\partial R}\frac{\partial R}{\partial C_F}\right) + \left(\frac{\partial\theta}{\partial C_T}\frac{\partial C_T}{\partial R}\frac{\partial R}{\partial C_F}\right) + \left(\frac{\partial\theta}{\partial C_T}\frac{\partial C_T}{\partial Q}\frac{\partial\theta}{\partial C_F}\right)\right.$$

$$\left. + \left(\frac{\partial\theta}{\partial C_B}\frac{\partial C_B}{\partial Q}\frac{\partial Q}{\partial M}\frac{\partial M}{\partial C_F}\right)\right]$$

(26) implies that the ownership valuation maximizing firm will increase expenditures on employee benefits until the change in ownership due to a percentage decline in the owners' capitalization rate just equals the <u>net</u> cost of such benefits. The net cost is the explicit cost of the benefits plus the marginal revenue product of the funds diverted from production minus the explicit savings on search, training, and business services expenditures that result. A shift in the capitalization rate from this source could have very important implications for the valuation of earnings streams.

It appears, therefore, that the firm that provides additional benefits to its employees (in the form of higher salaries, insurance and retirement plans, stock options, attractive vacation plans, etc.) may receive implicit returns that offset the loss in potential profits caused by the diversion of funds from production to the provision of fringe benefits. These returns are present in the form of a solution to the firm's management succession problem, reduced staff turnover, and monitoring cost reductions. This is frequently the experience of BHCs. They provide extensive benefit programs to their employees and charge each subsidiary directly. Such increases in operating expenses have often been cited as the primary reason why banks have not experienced

an improvement in profitability following acquisition. Although operating revenues "generally increased significantly after acquisition, . . . , revenue increases were typically matched by correspondingly large increases in operating costs" (Piper and Weiss, p. 5). BHC operating expenses may similarly offset an improved revenue experience due to a shift in product mix or efficiencies of the company structure. However, the implicit (not reported) returns thereby gained may cause the ownership valuation to be significantly increased. Though important, improved profitability is not the only source of the valuation disparity sought to explain BHC acquisitions--that source may rest in the capitalization rates used to evaluate a given income stream.

IV. EMPIRICAL INVESTIGATION

The argument presented to this point suggests that a valuation framework, by taking expectations of future earnings and a measure of risk associated with the pattern of future earnings into account, can explain the economic motivation of both independent bank owners and BHC shareholders to negotiate an acquisition. The remainder of this paper investigates the gains accruing to holding company shareholders through acquisition.

A BHC's acquisition of a commercial bank involves the dilution of its present ownership in an attempt to increase the present value of the ownership retained. This result is assured if the original BHC owners believe that following the acquisition their earnings will be greater, with equivalent or reduced risk, than they would be without acquisition.

This result could also occur, however, through a reduction in owners'
risk with equivalent or improved future earnings. Any motivation for
acquisition arising from the combination of reduced earnings and reduced
risk or increased earnings and increased risk following acquisition is
entirely dependent on trade-offs between risk and return within individual
preference functions. Since such information is not known, substantiation
of our hypothesis must rest on those cases where movements in risk and
return do not have conflicting effects on valuation.

The tendency in recent experience for multi-bank holding companies
to acquire numerous commercial banks, and at relatively short intervals,
seriously complicates the empirical task of isolating the impact of
individual bank acquisitions on BHC earnings performance. The only
feasible empirical test has to involve the entire acquisition program of
the holding company and concerns itself with whether or not the policy of
expansion through acquisition improves the value of earnings accruing to
owners.

Benefits of acquisition may be explored by a direct comparison of
the trends in the earnings experienced over the post-acquisition period
under the alternative ownership positions. The appropriate comparison
involves the values of earnings accruing to those owners holding stock
in a BHC at the time of acquisition--for they are the individuals con-
templating the transaction. A major problem with this approach is that
data that would reveal the earnings of a holding company had the acquisi-
tion not taken place, are not available.

Fortunately, however, this technique is applicable to one group of acquisitions within the last decade. Many of the acquisitions in the late 1960's were facilitated by the simple reorganization of an independent bank into another corporate form that was permitted to acquire additional banks. This was especially prevalent in states where mergers and/or branching were prohibited or limited by state law. The corporate transformation often involved nothing more than the exchange of new BHC stock for the stock of an existing bank. At the same time, additional BHC shares were issued in exchange for the stock of one or more additional banks. In other words, lead bank owners traded 100 percent ownership in the bank for less than total ownership in an expanded banking organization. Comparison of the earnings trend of that specific set of owners following reorganization with what they would have realized had they retained their independent ownership in the bank provides a measure of the potential benefits to owners via acquisition through a BHC organization.

Such a comparison is possible making use of previous empirical results that have shown commercial bank profitability to be relatively unaffected by acquisition.[11] This comparison was chosen because it provides the only appropriate data available that examine the incentives for acquisition. Reports of Income exist for the years following acquisition for the holding company on a consolidated basis and for the lead bank separately. These provide the basis for the direct comparisons of owners' valuation. There are no comparable data available that reveal the earnings performance of a multi-bank holding company excluding any particular acquired bank. Benefits accruing to original owners of these lead banks

[11]The reader is referred to Fischer, Lawrence (1967), Piper, Talley, and Ware for a good sample of this literature.

through reorganization and acquisition, then, may be used as a subsample

to shed light on the economic incentives present in the larger population

of BHC acquisitions. If bank earnings are not affected by acquisition,

the appropriate comparison to be made is between the trends of the owner-

ship valuations of (a) the original bank owners' equity interest in the

bank and (b) the interest obtained by that same group of owners in the

expanded BHC organization through an exchange of stock.

This comparison, requiring complete knowledge of stock splits, divi-

dends, and dilution of owners' percentage share of total earnings, began

the year immediately preceding the acquisition and continued for at least

five years after the time of acquisition.[12] The sample was restricted

to those reorganizations occurring between 1962 and 1969, with all but

three occurring since 1966. The average levels of earnings, average

growth rates in earnings, and coefficients of variation of levels and

growth rates of earnings (as measures of owners' risk) were computed

over the period for both of the ownership alternatives. These sample

data permit mean difference tests to be performed on the arguments of

the valuation function.

Table I shows that the mean difference in average annual earnings

over the entire post-acquisition period was substantial. Previous owners

of the lead banks realized an average improvement of $330,978 per year

through the reorganization. This sum was not statistically significant,

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[12]The sample consisted of 18 BHCs and associated lead banks located
in seven Federal Reserve Districts with data available for at least
five years after reorganization. The lead banks, all members of the
Federal Reserve System, ranged in deposit size from approximately $100
million to $650 million at the time of reorganization. The necessary
information was available for the sixth year for seven of these holding
companies and banks and was incorporated into the analysis. Earnings
accruing to original owners were computed by multiplying total net income
of the firm by their percentage ownership in the firm for each year.

TABLE 1

COMPARISON OF EARNINGS PERFORMANCES THROUGH BHC AND

CONTINUED OWNERSHIP IN LEAD BANK FOLLOWING REORGANIZATION

Banking Firm	Avg. Income of Lead Bank That Would Have Accrued to Owners of Lead Bank	Avg. Income of BHC Accruing to Owners of Lead Bank	Difference (BHC-Lead Bank)	Avg. Growth Rate in Net Income of Lead Bank	Avg. Growth Rate in Net Income Through BHC	Avg. Difference (BHC-Lead Bank)
1	$1,078,111	$1,305,487	$ 227,376	12.55%	16.02%	3.46%
2	2,305,407	2,702,661	397,254	13.63	12.57	- 1.06
3	5,071,545	5,147,484	75,939	9.13	10.10	0.97
4	1,679,674	1,862,217	182,543	13.92	18.63	4.71
5	1,632,975	2,185,064	552,089	17.15	27.13	9.97
6	2,022,951	1,918,527	- 104,424	17.36	18.84	1.48
7	1,506,681	1,778,686	272,005	8.00	14.64	6.64
8	1,455,996	1,455,526	- 470	21.65	22.00	0.35
9	2,369,669	2,635,102	265,433	4.18	10.82	6.64
10	7,676,530	8,849,941	1,173,411	9.22	13.28	4.07
11	3,722,490	3,809,746	87,256	8.11	10.59	2.48
12	6,955,577	6,650,758	- 304,819	10.99	9.40	- 1.60
13	5,382,316	4,999,337	- 382,979	13.58	11.56	- 2.02
14	3,155,189	3,528,637	373,448	16.92	22.98	6.07
15	4,815,430	4,726,720	- 88,710	7.93	6.90	- 1.02

TABLE 1 (continued)

Banking Firm	Avg. Income of Lead Bank That Would Have Accrued to Owners of Lead Bank	Avg. Income of BHC Accruing to Owners of Lead Bank	Difference (BHC-Lead Bank)	Avg. Growth Rate in Net Income of Lead Bank	Avg. Growth Rate in Net Income Through BHC	Avg. Difference (BHC-Lead Bank)
16	$2,300,507	$2,103,128	$- 197,379	35.11%	30.83%	- 4.28%
17	3,387,176	5,972,261	2,585,085	- 4.82	6.35	11.17
18	1,775,490	2,620,029	844,539	2.36	16.34	13.98
Mean	$3,238,536 (568,712.187)	$3,569,512 (698,058.187)	$ 330,978	12.05% (19.954346)	15.50% (16.037262)	3.45%* "t"=1.345

*significant at the .20 level

Note: Standard deviations given in parentheses

Sources: Moody's Bank and Finance Manual and internal records of seven Federal Reserve Banks.

however, due largely to the considerable variance within sizes of firms included in the sample. The growth rates in net income did display a significant difference, though only at the .20 level. Specifically, the growth rate in earnings through the BHC was an average of 3.45 percent greater per year than would have been the case had the owners maintained their interest in the bank alone. Growth rates may be especially revealing since they, at least partially, compensate for size discrepancies within the sample. At the same time there was no significant difference between coefficients of variation of net income over the entire period. The coefficients of variation of growth rates of income, however, exhibited a significant difference at the .05 level over the interval. Specifically, this measure of risk was substantially reduced through the acquisition program as reflected in Table 2.

A comparison of earnings experience over time, shown in Table 3, indicates that holding company owners actually experienced reduced earnings through reorganization and acquisition in the first year relative to the experience of the bank alone. This first-year reduction in earnings appears attributable to the large premiums paid for bank stock. Each year thereafter, however, earnings are progressively larger under the BHC structure. This trend is also reflected in the difference in growth rates of earnings.[13] In general, therefore, it appears that earnings for the BHC not only increased faster on an absolute basis when compared to the bank but also on a percentage basis, indicating that the difference between the two increases over time.

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[13]If BHC earnings are depressed in the immediate post-acquisition period, the experience of the third and fourth years following reorganization is not surprising, since most of the BHCs in the sample made additional acquisitions in those years.

TABLE 2

COMPARISON OF COEFFICIENTS OF VARIATION OF GROWTH RATES

OF NET INCOME THROUGH BHC AND LEAD BANK

FOLLOWING REORGANIZATION

Banking Firm	Coefficient of Variation of Income Growth Rates For Lead Bank	Coefficient of Variation of Income Growth Rates Through BHC	Difference (BHC-Bank)
1	1.071895	0.594423	-0.477472
2	2.645937	1.851482	-0.794455
3	1.242849	1.181919	-0.060930
4	1.130456	0.234433	-0.896023
5	1.007689	1.402617	0.394928
6	1.248705	1.160084	-0.088621
7	2.543271	1.520361	-1.022910
8	1.649359	1.323782	-0.325577
9	4.325461	0.560705	-3.764756
10	3.987330	0.941209	-3.046121
11	1.770638	2.029515	0.258878
12	0.605394	0.795784	0.190390
13	1.570596	1.168754	-0.401842
14	1.196462	0.772820	-0.423642
15	1.877712	2.031342	0.153629
16	0.729631	0.571625	-0.158007
17	4.253756	1.354321	-2.899434
18	3.889851	0.564985	-3.324865
Mean	2.041496 (1.260457)	1.114450 (0.530057)	-0.927045* "t"=3.026

* significant at the .05 level

Note: Standard deviations given in parentheses.

Sources: See Table 1.

TABLE 3

COMPARISON OF EARNINGS THROUGH BHC AND

LEAD BANK BY INDIVIDUAL YEAR

	1 year	2 years	Years Following Reorganization 3 years	4 years	5 years	6 years
Owners' Net Income Through BHC	$2,659,982	$3,189,644	$3,529,352	$3,936,692	$4,138,920	$5,004,592
Owners' Net Income Through Lead Bank	2,867,316	3,009,613	3,268,524	3,520,821	3,545,288	3 247,005
Difference (BHC-Bank)	- 207,334	180,031	260,829	416,144	593,632	1,757,589
Growth Rate of Net Income Through BHC	21.49% (17.635)	25.07% (23.100)	9.27% (12.966)	16.37% (16.855)	6.11% (9.427)	12.01% (11.622)
Growth Rate of Net Income Through Lead Bank	26.08% (25.869)	11.47% (16.958)	10.92% (16.048)	14.43% (24.288)	0.93 (14.228)	- 0.86 (20.027)
Difference (BHC-Bank)	- 4.59%	13.50* "t"=1.999	- 1.65	1.94	5.18	12.87** "t"=2.358

*significant at the .10 level

**significant at the .05 level

Notes: Sixth year data based on seven BCHs and associated lead banks. Other years based on sample size of 18. Standard deviations given in parentheses.

Sources: See Table 1.

If owners are aware of this trend, they may willingly accept losses in the first year after acquisition in order to receive claims on increasingly improved earnings in later years. If primary interest is placed on later years by omitting the first year's results from the analysis, the inference is altered somewhat (see Table 4). The average annual difference in net income increases to $444,784 while the difference in coefficients of variation of net income remains slightly negative. These differences are still not significant, however. The difference in average income growth rates increases to 5.27 percent, significant now at the .10 level, while the difference in coefficients of variation of income growth rates widened, i.e., became more negative. This difference remained significant at the .05 level.

V. SUMMARY AND CONCLUSIONS

Trends are established within the first few years following acquisition, therefore, that improve the present value of earnings flowing to owners relative to that attainable without reorganization. Owners have experienced improvements in the level of earnings to which they hold claims and, apparently, this improvement grows over time. Figures 3 and 4 chart the relative experiences in mean earnings and income growth rates for the alternative ownership positions, respectively. In addition, to the extent that the owners' conception of risk is accurately measured by the coefficient of variation of income growth rates, risk was reduced through the acquisition program. If, as assumed, this is reflected in lower capitalization rates associated with the expanded banking organization, a basis for disparity in both the numerator and denominator of the

TABLE 4

COMPARISON OF EARNINGS PERFORMANCES THROUGH BHC AND LEAD BANK

DELETING FIRST YEAR FOLLOWING REORGANIZATION

Mean Difference in Average Annual Net Incomes (BHC-Lead Bank)	Mean Difference in Coefficients of Variation of Net Incomes	Mean Difference in Average Income Growth Rates	Mean Difference in Coefficients of Variation of Income Growth Rates
$444,784	-.005253	5.27%*	-1.708652**

*significant at the .10 level

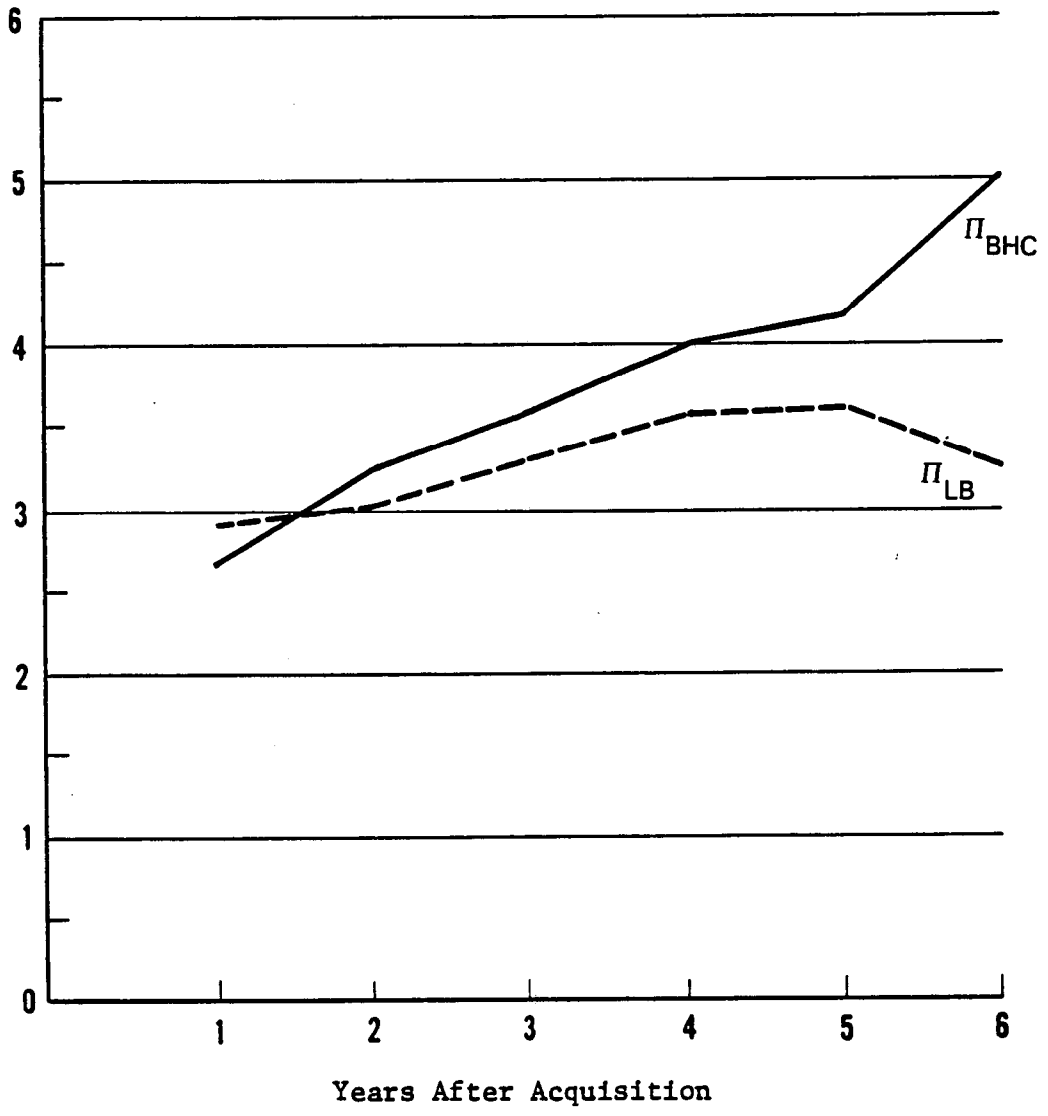**significant at the .05 level

Net Income
($ millions)

FIGURE 3.   LEVELS OF EARNINGS THROUGH BHC AND LEAD BANK

Income Growth
Rges (%)

FIGURE 4.   INCOME GROWTH RATES THROUGH BHC AND LEAD BANK

valuation framework ($V = \pi/\rho$) is present.

The existence of significant disparities in either or both of the variables specified does not guarantee a significant valuation disparity in favor of acquisition. Without specific information of underlying utility functions (e.g., how risk affects the capitalization rate function or the relative importance of earnings and uncertainty in the valuation function), all that can be determined is an ordinal ranking of alternative ownership valuation positions--much as described in Figure 5. If owners are risk averse, they prefer a position with greater income ($\pi_1 > \pi_0$) and no increase in ρ. The same result may be obtained with equivalent earnings and a reduced capitalization rate function (increase from $\frac{1}{\rho_0}$ to $\frac{1}{\rho_1}$), where ρ_0 and ρ_1 represent vectors of expected capitalization rates in future periods and $\rho_0 > \rho_1$. V_1 is preferred to V_0 and owners choose the value of the earnings stream associated with the expanded BHC structure. Since the exact shape of the owners' preference pattern is not known, we can only be sure that positions between and including points A and B are preferred to point C. Points to the left of AC (such as D) and below BC (E) involve movements in π and ρ that have conflicting effects on valuation and may not legitimately be compared to point C.

These results become even more meaningful when it is realized that earnings streams attained through a BHC structure may be somewhat depressed by subsequent acquisitions during the period of analysis. This tendency would decrease the difference in earnings performance when comparisons are made over a short post-acquisition interval and with firms that acquired other institutions after the time of the original acquisition.

Vector of
Expected Earnings

Π

V_0' V_1'

V_1

V_0

D

A

Π_1

Positions Preferred to Point C

B

Π_2

C

V_1'

V_0'

E V_1

V_0

$1/P$

$(1/P)_0$ $(1/P)_1$
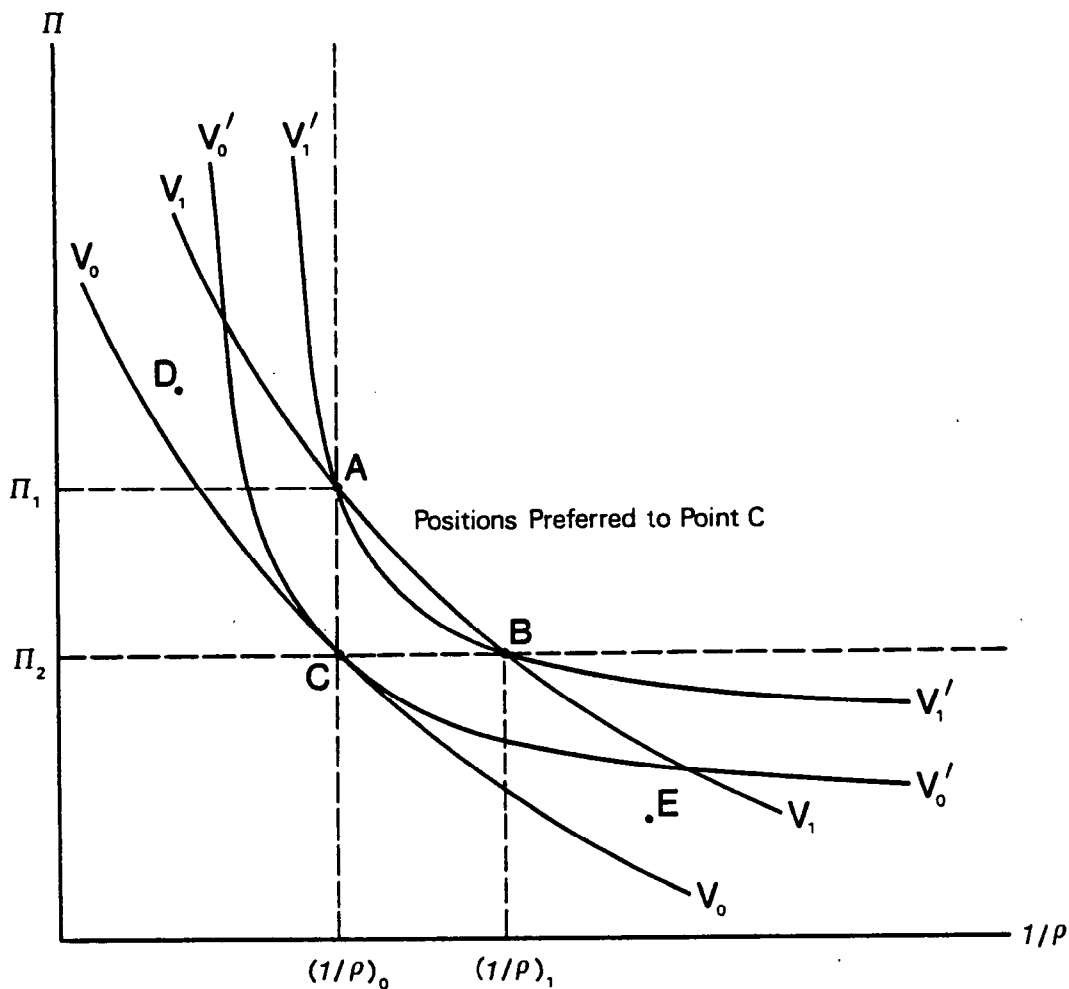
Inverse of Vector of Expected Capitalization Rates

FIGURE 5.   VALUATION INDIFFERENCE CURVES: TRADE-OFF

BETWEEN RETURN AND RISK (OWNERS ASSUMED RISK AVERSE)

A note of caution should be injected, however. The sample used represents a special class and a very small proportion of the total population of acquisitions taking place. Whether or not measuring benefits to lead bank owners who formed holding companies to acquire other firms is representative of the benefits accruing to stockholders of established BHCs through acquisition may be questioned. It does, however, provide a rational explanation for the formation of many BHCs that is consistent with the theory of wealth maximization.

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