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MIDWESTERN BUSINESS AND ECONOMIC REVIEW

FOREWORD

Warren E. Moeller, Editor
Bureau of Business and Government Research
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This issue of the *Review* gives our readers a wide choice of topics which will be of interest. We are pleased with the list of authors in this issue; they represent a wide geographical area from the east coast to the Philippine Islands.

The articles in this issue include:

- "The Role of Risk-Taking in the Lending Policies of West Texas Banks" by Professors Martinez and Horner is of particular interest in this region.

- Professors Barnes and Geurin give us insights for "Integrating Personnel and Strategic Planning into an Entrepreneurial Organization."

- "Developing Microcomputer Security Strategies for Small Businesses" by Professors Robbins and Bush make us aware of a serious problem area, especially for small businesses.

- Professor Larimore's "3-D Marketing Paradigm" provides a new way for structuring complex marketing relationships.

- "Retail Management Training: An Overview of Current Practice" by Henthorne and Easterling remind us of the necessity of education and training in a retail organization.

- Professor Rao and Bill Neff provide a clear analysis of the "Environmental Industry and the Economy."

- "Corporate Strategies for Electric Utilities: Adapting to the Changing Competitive Environment" is an insightful analysis by Professors Ryan and Crossland.

- Bruce Swindle and Daryl Burckel analyze "Prepaid Tuition Plans" as an alternative to funding higher education.

- Professors Garrido and Tokle provide us with a model of factors influencing business growth. Although this model is for the State of Washington, it should have applications for other states as well.

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THE ROLE OF RISK-TAKING IN THE LENDING POLICIES OF WEST TEXAS BANKS

JOHN E. MARTINEZ, Professor of Economics, Cameron University
JIM HORNER, Professor of Economics, Cameron University

INTRODUCTION

The collapse of oil prices in late 1985 and early 1986, the concurrent downturn in agriculture, and the ensuing distress encountered by the real estate industry created enormous problems for financial lenders in West Texas.[1] What followed was a drastic increase in non-performing loans among commercial banks in the region.

Much attention has been given to the role of energy and agricultural prices as precipitating factors in the poor loan performance of commercial banks in energy producing states. Less attention has been devoted to analyzing the role of deliberate risk-taking as a causal factor. Further, little or no analysis has been devoted to analyzing loan problems in narrowly defined regions such as that of West Texas. In addition to exploring the relative significance of deliberate risk-taking, this paper also explores the importance of local economic and industry conditions as competing factors explaining the wide diversity of loan performance among banks in West Texas.[2]

The diversity in loan performance among banks in any particular region has important policy implications.[3] If a substantial part of the total variation in troubled assets is attributed to differences in local economic conditions and/or the poor performance of particular industries (for example, petroleum and agriculture), then measures that support geographic expansion should be given high priority in reforming the banking system. The logic of pursuing such a strategy is that geographic barriers to expansion make diversification difficult, causing some banks to become unnecessarily vulnerable to local economic downturns.

If, on the other hand, it is excessive risk-taking by management which is primarily responsible for the severe loan problems encountered by some banks, then geographic deregulation will not be sufficient to insure a stable banking system.[4] This situation may require initiatives that seek to curb excessive risk taking, either through stricter supervision of bank management, variable insurance premiums, or risk-based capital standards.[5]

As would be expected, this study suggests that local economic conditions and the poor performance of the petroleum and agriculture industries are significant factors in explaining the wide diversity in loan performance among banks in the West Texas region. What is significant, however, is the surprisingly large role which excessive risk-taking plays in explaining the variation.

THE STRUCTURE OF THE STUDY

A series of financial ratios are constructed from the balance sheets and income statements of individual banks located in metropolitan statistical areas (MSAs) in West Texas. The ratios are compared and analyzed to determine the extent to which deliberate risk-taking influenced the severity of loan problems at some banks. Principal component regression analysis is used to investigate the relationship between non-performing loans and the various independent ratios designed to measure risk performance.

The sample data consist of a set of pooled observations on individual banks over a three year interval and across six geographic markets (MSAs).[6] The period covered is from December, 1988 through June, 1990. Annual data are collected for each bank for each of the three years.[7] Information for some banks was not available for each of the three years, perhaps because it failed or was merged out of existence before 1990.

To control for market size, only banks located in MSAs with less than 150,000 inhabitants are included in the sample. In West Texas, there are six MSAs (Abilene, Laredo, Midland, Odessa, San Angelo, and Wichita Falls) which meet this criteria. Altogether, there are 57 banks in the sample with the number and size distribution more or less evenly distributed across the six MSA's.

Principal component analysis is used as a means of combining the risk-taking proxies into a smaller number of uncorrelated components. The principal

1

components serves as explanatory variables in the regression equation (hence the term "principal component regression"). The estimation equation also incorporates a number of other explanatory variables including the location of the sampled banks, their loan composition and asset size, and their legal status as either affiliated or independent banks.

METHODOLOGY

The loan performance of a bank can be analyzed by the following:

$$Y = a + m*M + l*L + s*S + r*R + t*T + e$$

[Equation 1]

Variable definitions and model specifications are explained in Table I. To reduce any possible problems associated with heteroscedasticity in the residual terms, all variables in Equation 1 (other than those which are binary-coded) are formed by dividing the various measures by total assets. Tests were also performed to determine if variances were equal across the different geographic markets as well as across the three year period of the study.[8]

TABLE I

EQUATION 1
Variable Definitions and Model Specifications

$Y = N \times 1$ vector of observations measuring non-performing loans
$M = N \times i$ matrix of binary observations defining MSA areas
$m = i \times 1$ vector of estimated coefficients
$L = N \times i$ matrix of observations measuring loan composition
$l = i \times 1$ vector of estimated coefficients
$S = N \times i$ matrix of observations measuring market structure
$s = i \times 1$ vector of estimated coefficients
$R = N \times i$ matrix of observations measuring concurrent risk
$r = r \times 1$ vector of estimated coefficients
$T = N \times 1$ matrix of binary observations defining year
$t = t \times 1$ vector of estimated coefficients
$e = N \times 1$ vector of normally distributed random errors with zero mean, constant variance, and zero covariance over time and MSAs,
a = estimated intercept coefficient.

The two most direct measures of bank asset problems are (1) the percent of loans charged off during the year and (2) the percent of loans classified as non-performing. If a loan is considered uncollectible, the bank writes off the loan and charges it against its loan reserve. The rate at which banks write off loans is influenced by a number of factors. To avoid the problems associated with banks charging off loans at different rates non-performing loans are used as the primary measure of a bank's loan problems.[9] Nonperforming loans are divided by total assets to form the "loan loss ratio" (the dependent variable in the study). This adjustment ensures the consistency of the non-performing loans with respect to other computed measures in the equation. The term "loan loss ratio" is synonymous with "loan loss rate" in this study.

Part of the variation in loan loss rates among banks could possibly be explained by differences in local economic conditions. However, economic conditions appear to be fairly homogenous across metropolitan banking markets of West Texas. Part of the variation could have resulted from some markets depending more heavily on troubled industries (agriculture and energy) while others may have experienced strictly random economic shocks such as unexpected bad weather or the closing of a local plant.[10] To account for the impact of local economic conditions, the model incorporates a set of binary variables (M) to delineate geographic markets.[11]

It is possible for loan performance to vary **within markets** as there are differing degrees of specialization among banks with respect to loans to troubled sectors; therefore, some banks may ultimately have a larger proportion of non-performing loans strictly as a result of their loan composition. Banks with expertise in agriculture or energy lending have historically relied more heavily on loans in these specific industries. Hence, the model employs four variables (L) to define loan composition. Loan composition is measured by the percent of total assets committed to (1) commercial and industrial, (2) real estate, (3) agricultural and (4) consumer loans. Loan composition variables are necessary to sort out the potential effects of specialization on loss rates.

Some banks may deliberately choose to make loans with greater probability of default because of the expectation of greater profit on those loans. The more diversified a bank's loan portfolio, the less variable will be its profits. Hence, some banks may have invested in loans with a higher probability of default because of greater diversification opportunities. Two structural variables (D) in the model reflect the diversification potential for banks. Large banks and banks affiliated with multibank holding companies (MBHC) within any market are likely to have more diversification opportunities than smaller unaffiliated banks. Accordingly, the influence of size and holding company status must be taken into consideration in estimating the loan performance of a bank.

Finally, some banks may have been willing to make loans with a higher probability of default, not because of greater diversification possibilities, but simply because they were more inclined to incur more risk. This paper hypothesizes that banks which were willing to incur a high degree of loan risk should also have been

willing to engage in other forms of concurrent risk. Included in the estimating equation is a set of financial ratios (r) which serve as concurrent measures of risk. Only those financial ratios which are subject to the direct control of management are selected to serve as risk proxies.[12]

THE ESTIMATING MODEL

The initial regression model formulated in the previous section utilizes 18 explanatory variables to estimate non-performing loan rates. However, multicollinearity results from efforts to include all 18 variables. This problem arises because of the consequence of a high degree of multiple correlation among the explanatory variables. Its presence tends to inflate the variance of the parameter estimates and makes the coefficients appear statistically insignificant when they are, in fact, significant. It can also lead to an incorrect sign for the coefficients.

Principal component analysis (PCA) is used to combat the effects of multicollinearity. This study incorporates PCA to find interrelationships among the explanatory variables and to reduce multicollinearity through a data-based redefinition of the variables.[13] By transforming the original variables into a set of principal components, the regression model for estimating the loan loss ratio is reformulated as:

$$y = a + m*M + l*L_{pc} + s*S + r*R_{pc} + t*T + e$$
[Equation 2]

with the various coefficients and variables having the same interpretation as in equation (1), except for those subscripted with ($_{pc}$). Variables subscripted with ($_{pc}$), represent a matrix of observations designating uncorrelated principal components. In principal component analysis, linear combinations of the observed variables are formed with the first component accounting for the largest amount of variance in the sample. Successive components explain progressively smaller portions of the total sample variance and all are uncorrelated with each other.[14]

CONCURRENT MEASURES OF RISK

The focal point of this analysis is the role of risk, as a deliberate choice of action, in the loan problems of commercial banks in West Texas. If the hypothesis set forth in this study is correct, then banks which exhibit a higher tolerance for risk should not only be willing to make loans with a higher probability of default, but should also be willing to incur other forms of risk as well. If risk preferences are assumed to be inherent traits, decisions to invest in riskier loans should be accompanied by a willingness to invest more funds in loans and comparatively less in safe short-term liquid assets such as U.S. Treasury securities. Such banks would also tend to rely more on volatile sources of funds and be less willing to back their assets with equity capital.

Two ratios, the percent of assets in the form of loans and government securities, measure the exposure of a bank to asset risk. Loans are generally considered to be the most risky assets that banks hold. U.S. Treasury securities, on the other hand, are generally considered to be risk free and accordingly provide banks with both safety and liquidity. This suggests that decisions leading to relatively higher loan-asset ratios and correspondingly lower security-asset ratios would concurrently lead to riskier asset portfolios.

One of the most important tasks in the management of a bank is ensuring adequate liquidity. Recent research indicates that inadequate liquidity is often one of the most important signals that a bank is in serious financial trouble. Of course, there are trade-offs in ensuring adequate liquidity while seeking to maintain high profitability. The more resources that a bank devotes to its liquidity needs, the lower will be its expected profitability (assuming all other factors constant).[15]

A bank has two strategies available to meet short-term liquidity needs: (1) storing liquidity in the form of short-term assets, or (2) relying on borrowed liquidity to meet cash demands. Achieving liquidity by investing in short-term assets is less risky than a strategy of relying on borrowed funds but it is also less profitable. Borrowing as a source of liquidity is the most risky approach to solving bank liquidity problems. It is also the strategy with the highest expected rate of return because of the volatility of money market interest rates.

This study utilizes the ratio of net liquid assets to total assets as a means to determine the ability of a bank's ability to meet unanticipated cash demands. Net liquid assets are defined as the difference between short run liquid assets and short-term highly volatile liabilities. Although a bank can strengthen its liquidity position by holding more liquid assets, it will not necessarily be in a strong position if the demands for liquidity being made against it are excessive. Banks which rely on large, relatively volatile sources of funds (such as negotiable CD's and other liabilities with short-term maturities) are more likely to have unanticipated deposit outflows. It follows that banks whose strategy is to accept lower net liquidity ratios (either because they hold a smaller fraction of liquid assets or because they rely more heavily on volatile sources of funds) are those which

should be inclined to accept higher levels of risk.

The ratio of core deposits to total deposits are included in this model to measure vulnerability to deposit outflows. Core deposits are defined as total deposits less time deposits over $100,000. Thus, core deposits are small-denomination accounts from local customers that are considered unlikely to be withdrawn on short notice and which are not thought to be particularly interest-rate sensitive. Large negotiable CD's and other purchased funds in the open market have much greater risk of being suddenly withdrawn than core deposits obtained from local customers.

A bank might be able to acquire more assets and earn higher average profits by relying more on volatile funds and less on core deposits. However, purchased funds tend to be more responsive to changes in interest rates and, hence, may provide a less stable source of funds to banks than do deposits such as demand and passbook savings deposits. For that reason, banks with high ratios of core deposits to total assets (and conversely low ratios of volatile funds to total assets) are more likely to be risk-averse than banks with low core deposit ratios.

A final form of concurrent risk stems from decisions to adopt low capital-asset ratios. Lower capital ratios provide less cushion against any given loss and create incentives for banks to make loans with higher probabilities of default. The incentive to increase asset risk and bankruptcy risk as capital-asset ratios decline can explain why banks may very well choose to hold much riskier loan portfolios than they would have with higher capital-asset ratios. Bank owners have less to lose in the event their investments fair poorly if capital ratios fall. But they also have much to gain if the more risky loans perform well. Several studies suggest that poorly capitalized institutions actively seek to take additional risk which confirms the go-for-broke strategy.[16] Alternatively, those banks anxious to avoid losses should also be averse to making high risk loans and investments.

The equity ratio is not a perfect proxy for risk taking because it is subject to forces over which management may not have full control. Regulatory agencies specify acceptable capital ratios and then pressure banks to maintain adequate ratios. A problem arises whenever the capital-asset ratio cannot be viewed solely as the outcome of managerial choice. The same argument holds less weight with respect to the more recently adopted risk-based capital-asset requirements. The risk-based ratio used in this study takes into consideration the riskiness of a bank's investment activities. Bank managers have greater flexibility with risk-based requirements and as a result have more influenc in meeting their capital requirements.

According to the new capital guidelines, banks can reduce their capital asset ratio by shifting into safer activities. Alternatively, the new guidelines also allow banks to shift to riskier activities as long as they adhere to higher capital requirements.[17] Either way, banks have more freedom in meeting their capital requirements.

FINDINGS

Regression analysis has been used to estimate the relationship between the severity of asset problems of commercial banks in West Texas (measured by loan loss ratios) and their risk-taking initiatives. Ratios constructed from the balance sheets of individual banks were used as concurrent measures of risk-taking and were combined into a single composite explanatory variable. Additional explanatory variables were included in the regression model to control for the effects of location, size of bank, loan specialization, and diversification opportunities. The estimates derived from PCA regression analysis are shown in Table II.

Table II

Principal Component Regression Analysis

Dependent Variable: Non-performing Loans to Total Assets

Explanatory Variables	Coefficient	T-ratio	Sig T
Location Dummies			
MSA1 (1 if Abilene)	-.1845	-0.479	.6332
MSA2 (1 if Laredo)	.5480	1.222	.2246
MSA3 (1 if Midland)	.4214	1.170	.2445
MSA4 (1 if Odessa)	.4305	0.891	.3749
MSA5 (1 if San Angelo)	.6487	1.735	.0858
Loan Specialization			
Principal Component 1	-.4094	-2.151	.0338
Risk Measures			
Principal Component 1	-.4934	-3.614	.0005
Principal Component 2	.5177	3.066	.0028
Diversification Potential			
BHC Status (1 if MBHC)	.5637	2.296	.0237
Size (Total Assets)	-.0234	-0.230	.8183
Year Dummies			
Year-90 (1 if 1990)	.7244	2.604	.0106
Year-89 (1 if 1989)	.5866	2.108	.0375
R^2	.5789		

Source of Primary Data: Call Reports

The statistical results in the table confirm the importance of risk taking as a major contributor to the loan problems of banks in the region.[18]

4

PCA regression combines the risk-taking proxies into a single linear combination while retaining as much information as possible concerning their total variation. Five financial ratios were used in this study to model risk-taking. The first three consist of loans, securities, and net liquid assets expressed as a percentage of total assets. Core deposits is expressed as a percentage of total deposits and equity capital is expressed as a percentage of risk-adjusted assets. The ratios are considered concurrent measures of risk and serve as explanatory variables in the regression model for estimating loan loss ratios. The statistical findings indicate that banks which make loans with a higher probability of default are those which are concurrently engaged in other forms of risk. More specifically, banks that were making high risk loans in the late 1980's were also investing more of their funds in loans and less in securities and other liquid assets. Also, high risk banks concurrently rely more on volatile sources of funds and tend to be less willing to back their assets with equity capital.

The results of the PCA analysis support the interpretation of the first principal component as a composite measure of risk-taking. The first principal component measuring the concurrent forms of risk explains 42.2% of their standardized variance and has an eigenvalue of 2.11. As expected, only the loan ratio had a negative coefficient. The other four measures loaded positively on the first eigenvector.[19]

CONCLUSION

The recent increase in loan problems among banks in West Texas has been accompanied by exceptionally large variation. This study examined the factors responsible for the level and diversity of loan performance by using a sample of 57 commercial banks from six metropolitan areas in the region. The statistical results indicate that a substantial part of the variation in loan performance in recent years was due to differences in local economic conditions within the six metropolitan areas. The adverse effects of unusually poor performance of particular industries (such as energy and agriculture) were even more significant than local economic conditions in explaining the variation. But neither local economic conditions nor the performance of particular industries turned out to be the major factor accounting for the wide diversity in loan performance.

The statistical analysis in this study found (after controlling for other factors) that a substantial part of the remaining variation in loan performance could be explained by different strategies adopted by bank managers for dealing with risk. The evidence suggests that some banks deliberately sought to invest in loans with a high probability of default, while others pursued more conservative strategies, seeking to avoid risky lending opportunities.

The results also seem to suggest that banks would be less exposed to economic downturns in local markets if they were allowed greater geographic investment opportunities. Opportunities for diversification could be strengthened through policies that seek liberalization of interstate and intrastate branching restrictions; nonetheless, given that excessive risk-taking was found to be the primary factor responsible for the wide diversity in loan performance, policies to promote greater diversification will not be adequate within themselves to ensure a healthy commercial banking system.

The costs of excessive risk-taking in a system of fixed rate deposit insurance are imposed on society as a whole if premiums are assessed independent of an institution's risk profile. This indicates that banks will continue to make investments with a high probability of failure so long as they do not have to bear the full cost of their risk-taking activities. It follows that policy makers must take steps to curb excessive risk-taking in order to achieve a sound banking system. Policies which tend to reduce risk-taking incentives should prove helpful in establishing a sound banking system.[20] These policies could take the form of tighter supervision, variable insurance premiums, or higher capital standards.[21]

NOTES

1. See Tim R. Smith (1987), Keith R. Phillips (1989), and Harvey Rosenblum (1990) for a detailed analysis of the difficulties encountered in energy producing states.

2. West Texas is defined in this study as the geographic region of the state which is west of a line running from Wichita Falls to Laredo.

3. See C. F. Muckenfuss III, R. C. Eager, and C. H. Neilson (1991).

4. Some researchers have pointed to excessive risk-taking rather than the lack of diversification as the primary factor. See Lynn D. Seballos and James B. Thomson (1990) for a general discussion of the role of managerial factors in the failure of commercial banks. The study by William R. Keeton and Charles Morris (1987) is the seminal work in the area of risk-taking and its role as a causal factor in loan loss problems.

5. For an excellent summary of banking reform proposals, see Mitchell Berlin (1988).

6. The information is collected from the Reports of Condition (Call Reports) and Income which banks regularly file. The December reports are used as the source of information for each year. The exception to this is the year 1990 because only the mid-year report is available.

7. Data for this report are obtained from CD/Banking which is compiled from the authoritative Sheshunoff Information Services Database. Sheshunoff obtains its data from the following government sources: Federal Deposit Insurance Corporation, Federal Reserve Board, and Federal Home Loan Bank Board. The product is a trademark of Lotus Development Corporation.

8. Two sets of time-denominated binary variables (T) detect cyclical or trend components that may occur during the time period 1988-90. Two rather than three, sets of variables are employed in the model as we use G types of variables and G-1 variables must be employed. See Jan Kmenta, *Elements of Econometrics*, (New York: Macmillan 1971), p. 409-413.

9. A non-performing loan is a loan that has not been charged off but is overdue by 90 days or more, is failing to accrue interest, or renegotiated to facilitate overpayment.

10. The role of regional influences is discussed by Lynn D. Seballos and James B. Thomson (1990).

11. There are six MSAs analyzed in this study. Using the G-1 rule, we employ five binary variables.

12. This study uses proxies for modeling risk that are similar to those found in the work of Eugene Short (1987) although he uses a different estimating technique.

13. Starting with a set of observed values on a given set of variables, this method uses a set of linear transformations to create a new set of variables -- the principal components. There is no multicollinearity in the regression model as the components are uncorrelated. The regression may shed light on the underlying regression relationships if the coefficients of the principal component transformation imply meaningful interpretation of the component variables.

14. William R. Dillion and Matthew Goldstein (1984) provide a thorough explanation of PCA. Gunter (1989) emphasizes the applications of PCA to banking.

15. A general discussion of bank liquidity is found in Thomas S. Cargill (1991) at 161-163.

16. In banking, this phenomena is known as "moral hazard". Herbert Baer (1990) provides an excellent discussion of this concept. Jeffery W. Gunter and Kenneth J. Robinson (1990) explore the connection between moral hazard and the problems in Texas banking.

17. See James M. Moulton (1987) for a discussion of the new capital guidelines.

18. Different subsets of variables were also tested for significance. In order of importance, the variable group names with their (significant F values) in parenthesis are as follows: Risk Proxies (.000), Time (.022), Loan Specialization (.0338), Diversification Proxies (.0759), and Location (.2327).

19. The coefficients of the eigenvector are as follows: loan-asset ratio, +.7201; security-asset ration, .3811; net liquid asset ratio, .8369; core deposits ratio, .3607; and the capital-asset ratio, -.7837.

20. There are practical limits to the implementation of such policies. Although the implementation of banking policy is beyond the scope of this paper, it certainly deserves further research.

21. Mitchell Berlin (1988) provides an excellent bibliographic guide to restructuring proposals.

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A SYSTEMATIC PROCESS FOR INTEGRATING PERSONNEL AND STRATEGIC PLANNING IN THE ENTREPRENEURIAL ORGANIZATION

FRANK C. BARNES, Professor of Operations Management, The University of North Carolina at Charlotte
VIRGINIA T. GEURIN, Associate Professor Of Management, The University of North Carolina at Charlotte

INTRODUCTION

Entrepreneurial firms are characterized by change and uncertainty. At the same time that they must protect their scarce financial resources, they must build and staff expanded services. Failure can result from moving too fast or too slow. The personnel resource is central to survival and the rewards from good personnel planning are high for the entrepreneurial firm. In small business there is very little advanced planning done for recruitment of employees. In a survey done by McEvoy, 1983, seventy-three percent of 54 responding small firms planned less than a month in advance for recruitment.

The record among all firms in developing good personnel plans and integrating these with strategic plans is not good. Small organizations face an even greater challenge. This paper outlines a scientific process for developing credible staffing plans based on strategic goals in the organization. The process is demonstrated for a new, community bank and the contributions throughout the bank are shown. Good personnel planning played a critical role in the continued success of this entrepreneurial venture.

HUMAN RESOURCE PLANNING IN BUSINESS

Most managers acknowledge the critical value of people within an organization, yet research shows that a majority of firms do not fully integrate human resource planning with strategic business planning (Ulrich, 1987). Even among Fortune 500 firms human resource planning is still in its infancy and appears to be carried out in isolation from strategic business planning (Nkomo, 1987). Alpander and Botter (1981) found while a few progressive organizations seem to be moving ahead with more strategically oriented human resource activities, the vast majority have yet to establish an integral relationship between strategic business planning and human resource planning. Human resources considerations as a rule are factored into business plans after finance and marketing decisions. And human resource planning characteristically has been reactive rather than integral to organizational strategic integral planning (Tichy, Fombrun, and Devanna, 1984). Also personnel executives are usually absent from corporate planning sessions (Burack, 1985).

In many organizations future staffing needs are derived from business plans in a one-way process. In business planning, management projects an organization's future in terms of financial objectives, product mix, technologies resource requirements, and the like (Walker, 1980). However, practices vary among organizations in estimating future staffing needs. In some firms statistical projections are made. Regression analysis and productivity ratios based on such workload factors as sales volume, production levels, value added, productivity ratios, and budgets can be used to forecast future staffing needs (Dyer, 1988). Another common technique relies on personnel ratios, relative patterns of employment levels in various units or among selected occupational groups. Time series analysis simply extrapolates past staffing levels, sometimes without regard to business planning (Dyer, 1988).

The labor needs of an organization should be directly related to the projected business strategies of the organization, e.g. growth, diversification, retrenchment, and strategies (Gatewood and Gatewood, 1983). These projected strategies ultimately lead to forecasts of the number and type of needed managerial, technical, and professional staff, as well as when they will be needed (Gatewood and Gatewood, 1983).

Several reasons account for the lack of integration between human resource planning and strategic planning. First, human resources have traditionally been taken as a "given" in the formulation

and implementation of strategic plans. Planners often seem to assume that an adequate supply of labor will be available when needed and that employees are a highly flexible resource which can be recruited, trained, and laid off on reasonable short notice. Since human resource managers have not been accustomed to thinking of behaving in strategic terms they have often been reactive and transactional in nature (Craft, 1988).

Ideally, organizations would incorporate human resource planning at the strategic level. Yet research indicates that even very large organizations fail to do so. When companies having the tools that could facilitate human resource forecasting at a sophisticated level fail to use them, it is not surprising that smaller organizations fall short. Entrepreneurial firms are apt to have smaller staffs and less formal procedures. They are likely to do few projects without immediate pressure. Thus personnel planning is rarely beyond the short range. The utilization of rudimentary planning tools in the human resources area would be a vast improvement for many small firms.

PERSONNEL PLANNING PROCESS

The key to increasing the role of personnel planning is to use a scientific, fact based approach. Clear and credible bases must be identified and developed to explain the needs for personnel. A systems approach is useful.

The steps in the process are:

1. **Determining specific objectives**
Precisely what are we trying to accomplish? "Good personnel planning" is too broad for small firms. It is more useful to ask "Approximately how many people will be needed in a year", "When will we need a certain position", "What staffing will be necessary to support the firm's specific goals" and "How can we make the Board of Directors more comfortable with staff additions". Specific statements have more credibility and stimulate the next needed steps.

2. **Identifying the relevant systems and how they interact**
The systems which result in the objectives must be identified along with the way in which they operate. For example, the number of people needed next year depends generally on how much activity there will be. Plans to undertake new ventures, provide new services, or open new sites will require staffing activities.

3. **Developing a factual basis (data) for key relationships**
Credibility, and even usefulness, comes from the soundness, or factual support, of the proposed relationships. To project total staffing needs, we can develop data about 1) the volume of activity of the firm with trendlines on important activities, 2) relationships between activity and number of people for the industry, firm and/or departments, and 3) information about the competition and how it affects services or the turnover of key people.

4. **Building a logical system with the data to guide decisions**
If the process has been successful, difficult and vague problems will have been developed into a logical framework of more specific and clear dimensions. The same results might be confirmed by several approaches. For example, managers can look at the information and form an opinion on size, then on the relationship between size and staffing levels, then on staffing levels and types of positions, and so on. They can see and weigh the risks and usually be more comfortable with the decision.

ILLUSTRATION

The experience of a small community bank will be used to illustrate this process. In 1984 a local group founded a new bank in a small town with a commitment to serve the community. The bank experienced rapid growth, doubling its size annually causing great strains on the bank's systems and its personnel. Since there was no mechanism to anticipate personnel needs, pressures built and the president would have to go to the board to plead for authority to hire more staff. Systems development was slowed and customer service threatened while the president diverted his effort to convincing the board that more staff were necessary. Neither management nor the board were satisfied. A process of systematic personnel planning was needed. The objectives were to get personnel issues into the ongoing, continuous management of the bank, identify likely staffing at future points, and build an improved framework for management-board decision making.

An important variable was the size of the assets base of the bank. Management quoted an old rule-of-thumb that a bank needed one employee per million dollars of assets. A trend-line analysis of assets of their bank documented a steady pattern of growth. (See Figure 1.) The good fit of this line made it very effective in getting the board to think about scenarios six, twelve, or more months in the future.

FIGURE 1
GROWTH IN TOTAL ASSETS
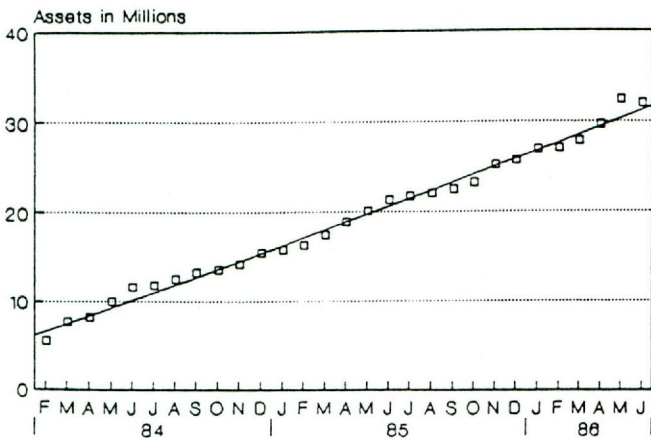
$Y = 5678.37 + 881.53X$

What relationships could be found between size and staffing needs? Data was available from an association of small banks in the region providing basic information, such as assets, number of employees, and income information, on 10 similar banks. Possible relationships between the data, focusing on bank size were posed for exploration. Figure 2 shows the relationship between assets and number of employees for the group of banks. The banks are ranked and labeled alphabetically, with "A" being the largest. The graph shows a strong relationship between assets and FTE's. Additionally management could discuss any deviations in the context of an individual bank's operations, and thus stimulate strategic discussion with the board.

FIGURE 2
ASSETS & FULL TIME EQUIVALENT EMPLOYEES
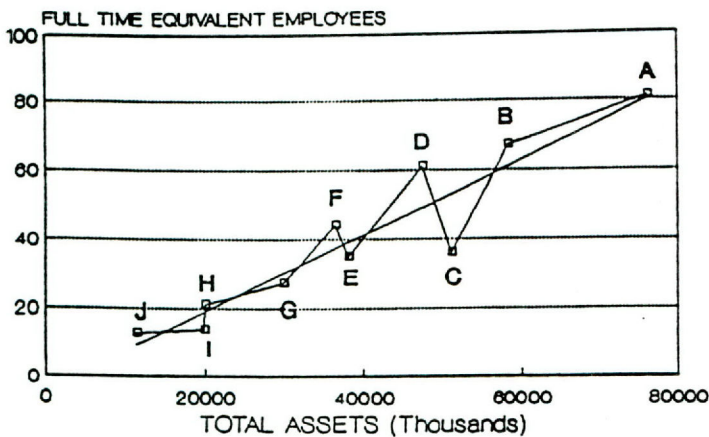
$Y = -2.6698 + .0011X$

The relationship between assets and full-time equivalent employees was explored in as many ways as possible. Figure 3 shows that the relationship between asset size and FTEs is strong and would be useful in projecting staff size.

FIGURE 3
RATIO OF ASSETS TO FTE
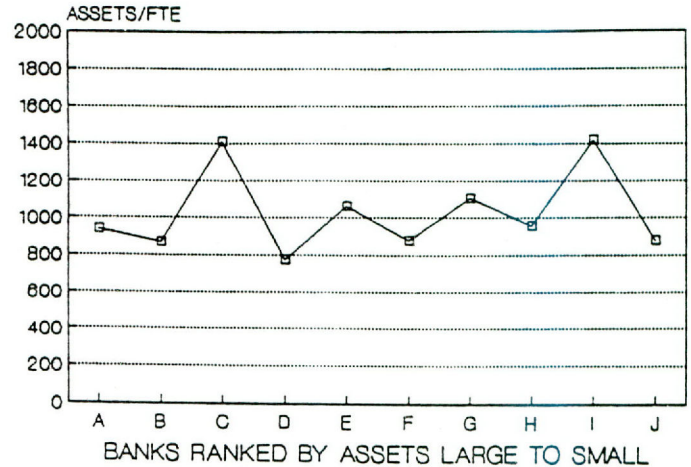
Personnel expense as a percentage of total expense was examined for the comparison banks. The percentage was rather uniform, varying from 19.6% to 25.8%. The mean was 22.4%, with a standard deviation of 1.99% (See Figure 4). Again, certain banks were known to be especially well or poorly run.

FIGURE 4
PERSONNEL EXPENSE TO TOTAL EXPENSE
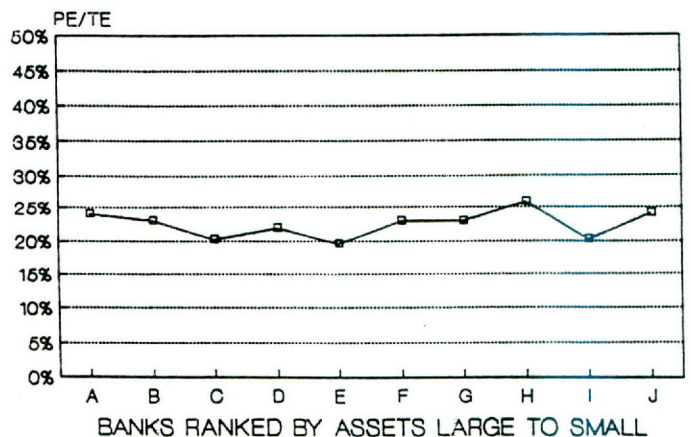
Mean = 22.49%   Std. Dev. = 1.99%

Three area banks were particularly well regarded by management, which could discuss their philosophies and strengths in detail. A graph of number of employees and asset size over time is shown in Figure 5

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for these highly successful banks. This graph facilitated practical discussion of future strategies and current decision making about personnel and other issues.

FIGURE 5
ASSETS AND EMPLOYEES FOR MODEL BANKS
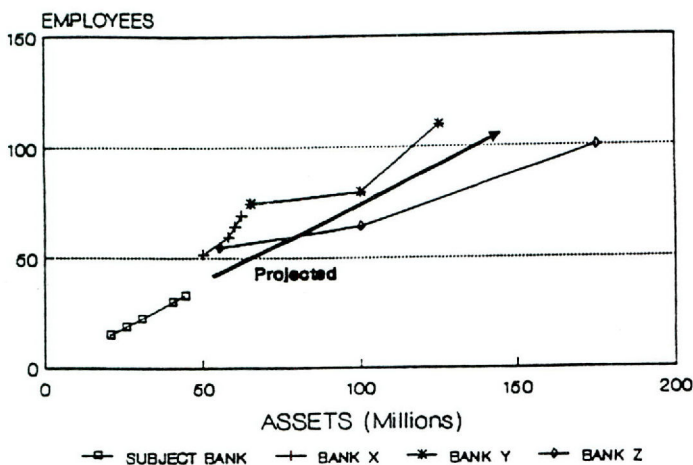
These simple analyses presented data which clearly established that:

1) personal expense was highly related to size of the bank,
2) number of employees was highly related to size, and
3) this bank had a steady, uniform pattern of growth

This information gave the president a factual basis on which to base staffing needs and prepare requests to the board. This would allow them to proactively plan for adequate staff.

The board already felt that growth was certain, the charts confirmed this and added numbers to support the conclusions. The charts showed that all the other small banks experienced personnel costs as a similar percentage. Management could point to the expected volumes 6, 12, and 18 months into the future and indicate the number of people to be expected. With this information and the demonstrated relationships differences of opinion would be marginal. A review of organization charts of banks the board felt were comparable could indicate what type of people might be needed. A consideration of unique objectives of this bank could then bring attention to acquiring the proper staff to achieve them. With the sense of order and control provided by this process, the board felt comfortable providing the staff additions ahead of time.

In the high growth entrepreneurial environment, it is critically important to provide staff slightly early to keep up with systems development. The board was also encouraged to look out further and consider the strategic goals of the bank, rather than focusing on details, such as each individual's work.

This straight forward analysis made a major contribution to the operation of the bank in allowing it to project its personnel needs and hire new staff in a timely way. Management saved a good deal of time, and the role of the board was strengthened. It was a first step in human resource planning for the bank.

CONCLUSIONS

The benefits of integrating personnel planning into strategic planning have been known for some time. However, the limited extent to which even large firms follow this practice makes it evident that much remains to be done in getting this point of view accepted. If the practice lags behind theory in large established firms, it is easy to see why small entrepreneurial firms have an even greater problem. In such companies with few staff resources it is necessary to use a systematic approach to take full advantage of information that is available. Secondary information may be used as a starting point in planning. In this case a small, rapidly-growing service organization used such an approach to dramatically improve personnel planning, and in the process, gained time and energy to focus on strategically important issues. In addition to predicting the number of personnel needed, the bank, by incorporating this planning at the strategic level, was better able to focus on the types of employees needed to accomplish its objectives and assure its continued success.

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DEVELOPING MICROCOMPUTER SECURITY STRATEGIES FOR SMALL BUSINESSES

STEPHANIE S. ROBBINS, Associate Professor, MIS/OM Department, The University of North Carolina at Charlotte
CHANDLER M. BUSH, Associate Professor, MIS/OM Department, The University of North Carolina at Charlotte

INTRODUCTION

Over the last decade, the use of microcomputers by non-computer professionals, particularly by small business managers, has grown dramatically due to ease of use, unrestricted access and rapidly declining prices (Kovach). Despite economic uncertainties due to a slowing economy, PC expenditures are expected to continue to grow through the nineties (Franchi). Part of this continued growth can be attributed to the purchase of computers by small businesses who are beginning to recognize the competitive advantages that can be gained through the adoption of these new technological opportunities previously only affordable to large corporations. Today, small businesses currently have available to them reasonably priced equipment and easy to use general purpose computer programs that can be specifically adapted to their special needs. Therefore, small businesses are now able to use computer technology to support planning, controlling, strategy development and decision-making activities. While the use of computer technology can bring rewards, it is not without risk, and the owners and operators of small businesses often lack the sophistication and experience to recognize the potential problems associated with computer usage (Campbell and Cermak).

The characteristics that make microcomputer technology attractive (i.e. ease of access and use) can also lead to security problems. For example, three to five billion dollars are lost annually by US firms as a result of computer fraud (Ernst and Whinney). While some of this criminal activity has involved mainframe computers, one must recognize that PC's are particularly vulnerable to security problems because they are located in open access areas and typically store vast quantities of easily accessible information (Gordon and Wichmann, Jr.). Large organizations, having developed security systems for their mainframe computers, have begun to recognize the need to devise similar policies for their microcomputers. In addressing this issue, large corporations have hired computer security managers, have developed employee training sessions and have purchased insurance policies covering the fraudulent use of computer hardware and software by employees as well as outsiders. Thus, large firms are undertaking activities designed to reduce microcomputer security hazards.

Unfortunately, it would appear that many small business managers are either unaware of, or are disregarding the need for computer security perhaps because they believe initiating protective measures would be financially prohibitive (Bradbard and Kahai). While it is true that small businesses usually do not have the resources to emulate the strategies used by large corporations, they are still vulnerable to the same threats. Furthermore, errors, fraud or computer disasters have a greater impact because financial losses are not as easily absorbed by small businesses given their size and limited resources. Therefore, small business managers can no longer ignore the issue, nor should they hide behind unrealistic expectations (i.e., it won't happen to me). Security measures appropriate to the small business environment must be identified and adopted if the rewards of using microcomputer technology are to continue.

PURPOSE

A small business' ability to devise effective microcomputer security strategies is predicated on understanding the security associated with using this type of technology. Therefore, the purpose of this paper is to: 1) identify the types of computer security problems that might threaten a small business; 2) present a risk assessment analysis that can be used to pinpoint problem areas; and 3) discuss appropriate computer control

strategies that can be employed by small business managers. Specifically, preventive and detective microcomputer security measures appropriate for adoption by small businesses will be discussed.

TYPES OF SECURITY ISSUES

The first step in devising effective microcomputer control strategies is recognizing the nature and extent of the problem. The identification of specific issues is necessary so that measures to eliminate or reduce the impact of each can be implemented. In examining a microcomputer environment, it becomes clear that security problems can be characterized as stemming from either technical or human factors. (See Figure 1). A discussion of each follows.

FIGURE 1

COMPUTER SECURITY THREATS	
TECHNICAL SOURCES	HUMAN SOURCES
POWER SUPPLY TEMPERATURE MAGNETISM ACCIDENTS	SABOTAGE THEFT FRAUD ACCIDENTS VIRUSES

SECURITY ISSUES STEMMING FROM TECHNICAL FACTORS

Electrical Power Supply

The successful operation of a computer is dependent on an uninterrupted supply of electrical power. While most mainframes require dedicated conditioned power sources, PCs typically operate on normal house power. Experience, often bitter, has taught mainframe installation managers the need for a backup power source to ensure against the possibility of public utility failure. Uninterruptible power supplies (UPSs) are available for PCs, just as they are for larger computers. However, PC UPSs cost on the order of $300 each, and each supports only one PC. Typically, few PCs in industry are so equipped. Power failure, even momentary, will result in loss of all work in progress in the computers main memory which could represent hours of work. Fortunately, there is an easy and cheap way to protect the company against this type of accident. The solution is to first train, and then require, employees to save their work in progress to disk

frequently. Thus, when the power fails (and it will) only the work done since the last save will be lost, and that work will be fresh in the employee's mind.

Electrical Power Surges

A surge in the electrical power supply such as that caused by a lightning strike following an incoming power line can cause permanent damage to computer equipment. While microcomputers can withstand a remarkable amount of physical abuse, they are extremely sensitive to electrical mistreatment. Each PC should be equipped with a surge protector which is a device that senses the beginning of a power surge and trips a circuit breaker before the surge reaches a level sufficient to damage the attached equipment. Surge protectors are widely available with prices ranging from $30 to $50 and are cost effective when compared to the cost of replacing the affected computer system.

Plug and Wire Placement

While most power supply interruptions result from external forces, plug and wire placement should not be overlooked. The loss of work in process can also result when a fellow employee inadvertently trips over a wire causing the plug to be pulled out of the socket. Microcomputer power cords should not be located in office traffic patterns. If, due to the office layout, cords must be placed in busy areas or must cross hallways, they should be covered by tunnels which are available from any major office or computer equipment supplier at nominal cost. Frequent saving of work in process is further protection against this kind of loss.

Location Factors

Microcomputers are tools of personal productivity and as such should be located where they are needed. Prudence, however, should be exercised in their placement since uncontrolled, high traffic areas permit easy access to corporate information. Furthermore, equipment left in the open is subject to being stolen unless anti-theft mechanisms are put into place. Small businesses should be more aware of this problem than a large corporate organization since they have fewer computer assets and the loss of only one computer can have a significant impact on daily operations. Furthermore, small businesses are typically under-insured and may not have the cash flow necessary to replace the lost equipment in a timely manner.

Another location factor relates to temperature. While personal computers will withstand a certain amount of physical abuse, the temperature of the room

must be kept within a range specified in the Owners Manual. If the temperature is exceeded, the electronics of the machine can be damaged. Since the computer generates heat when operating, placement must allow cooling air generated by an internal fan to flow freely. Equipment vents are clearly recognizable and should not be blocked by manuals, books, or other equipment. Also, the PC should not be located either directly in the sun or in the path of a hot air vent.

The location of equipment is important and, so too, is the location of floppy disks used to store important business data, information, and programs. Floppy disks are easy to copy, and easy to transport. Therefore, any floppy containing sensitive information must be safe-guarded. Furthermore, floppy disks are particularly vulnerable to environmental factors such as heat, dust, and humidity. Diskettes containing valuable programs and data should not be left in a closed car parked in the sun.

Magnetism

Information is encoded on floppy or hard disks magnetically through the presence or absence of magnetic charges at specific locations on the media. Exposing the disk to a magnetic field can destroy that information, and therefore, protection of disks from magnetic fields is necessary. Although the risk is small, one must remember that even such items as magnets used in conjunction with bulletin boards and magnetic typing props represent potential hazards and should not be located in the vicinity of computer equipment.

SECURITY ISSUES RELATING TO HUMAN FACTORS

Security issues stemming from technical sources are readily resolved assuming the small business manager is aware of the potential problems and appropriate solutions. However, security issues arising from human factors (i.e., employees, customers, and other outsiders) are much more difficult to predict, detect and resolve. As small businesses become increasingly computerized, more company resources will be invested in equipment and computer programs. Furthermore, the amount of valuable data entrusted to computer storage media will grow. Equipment, computer programs, and, most of all, data represent investments that are vulnerable to accidental or deliberate loss or destruction. Small businesses should be especially aware of these threats because a larger percentage of their assets is at risk when compared to their larger counterparts. Also the small business managers may not have the benefit of many years of

hard lessons learned by large corporations in their lengthy computer experience. Small businesses should institute security measures that will help detect potential problems and minimize the probability of their occurrence.

Accidents

Whether "deliberate" or not, accidents can take many forms, but always result in the loss of time, money and sometimes valuable information. Liquids (i.e., coffee) spilled into a keyboard, printer, or the central processing unit will make the equipment inoperable. Furthermore, cigarette ashes can also do damage as well as paper clips accidentally dropped into printers. Major damage may put the equipment in the repair shop for a long period of time thus interrupting the daily operations of the firm. Software programs and data files are subject to mysterious erasure. Furthermore, mistakes can be made in updating or processing data files. The best protection against accidental damage to equipment, computer programs and/or data includes: adequate training; employee awareness; and, maintenance of backup copies of software and data files.

Sabotage and Fraud

After computerizing the organization, the small business manager must take steps to protect the programs and data files from deliberate illegal copying (i.e., customer account information), program or file alternation (i.e., a billing program that has been altered to automatically undercharge a specific customer), or destruction (i.e., erasing all files or specific aspects of a file such as the amount owed by a specific customer) by a disgruntled employee or thief. This type of manipulation is easy to perform, difficult to trace and can have tremendous financial consequences to the firm.

One solution that will help deter this type of unauthorized activity involves the use of passwords. All sensitive data files should be password protected with knowledge of the password limited to those with a need to know. Temporary passwords can be created when regular employees are absent thus helping to maintain password integrity. While password protection is not fool-proof, the time and effort required to break this type of security in order to tamper with the programs and data files will deter most from any attempt.

Other solutions that can be used to control sabotage and fraud include the development of audit trails, reasonableness checks, and date and time stamps. Audit trails permit the identification of irregularities and errors that may occur as the information flows through the system. Periodic reasonableness checks should be

applied to computer generated reports. If the report does not make sense given corporate activity, further investigation into the input data may reveal that either sabotage or fraud is occurring. Finally, a clocking mechanism can be installed in each microcomputer that automatically keeps a log of the date and time each data file or program is accessed. While not perfect, this method can help identify file and program usage during unauthorized time periods such as after business hours.

Computer Viruses

Another form of sabotage is the deliberate introduction of a computer virus into the computer operations. This relatively new and potentially destructive phenomenon consists of hidden program code that can alter or destroy data and programs as well as interrupt or freeze computer processing. Further, a virus introduced into a computer system can copy itself to other disks even after the original is removed. As a result, viruses are capable of rapidly spreading throughout the computer installation. Computer viruses gain access into the system in three ways: 1) from an outside source; 2) through electronic communications; 3) by a disgruntled employee.

The small business manager can protect the company system against viral infection by prohibiting employee use of personal data and program disks on company systems, by not copying programs from electronic bulletin boards, and by using only original distribution software. Additionally, anti-viral programs are available although the variety of virus types makes the usefulness of any one anti-viral program questionable. Detection is basically an exercise in common sense by a trained user. Typically, the user will notice that the computer is not performing normally or that files thought to be in good order are either missing from the disk in total or in part.

RISK ASSESSMENT ANALYSIS

The introduction of computing power into the small business environment has provided managers with the ability to process data quickly and accurately so timely and more informed decisions can be made. However, if strategies are not devised to control computing activity, security problems can arise that can have major implications for the survival of the firm. Measures must be developed that will either help prevent security problems or will help detect security breaches. However, before any strategies can be created, the organization should undertake risk assessment analysis so that only necessary protection is created.

Any organization that uses microcomputers should undertake a thorough analysis of the consequences of each type of security issue in terms of the impact on the organization. Once that has been accomplished, cost-effective microcomputer security strategies can be developed that will help minimize those risks. Obviously, large businesses have the ability to designate an expert whose major responsibility is the development and maintenance of a secure computer environment. Unfortunately, most small businesses cannot afford the luxury of hiring a specialist, nor do they usually have staff with expertise in this area. Given that the small business owner cannot typically hire an outside consultant, an employee should be assigned to develop a risk profile for the organization.

The following guidelines will assist the designated individual to accomplish this task. First, to undertake a successful risk analysis, top management must understand the importance of this project and must be committed to spending resources (such as time spent in reviewing project progress) and supporting any necessary changes that may be needed to increase security. Second, a set of questions similar to those found in Table 1 should be developed that specifically address technical and human factors. The questions

TABLE 1
RISK ASSESSMENT ANALYSIS

QUESTIONS TO BE ANSWERED
1. Who has access to the microcomputers?
2. What type of information is being processed?
3. Has responsibility for data accuracy been clearly assigned?
4. How sensitive is the data?
5. How serious a problem would occur if the data was altered, lost, or stolen?
6. Is anyone directly responsible for overall company computer security?
7. What type of internal controls are being used?
8. Who is responsible for reviewing control mechanisms?
9. How vulnerable is the company to sabotage and fraud?
10. What are the chances for a virus to be introduced?
11. Are there any company policies that address the management and use of computer software and hardware?
12. Are there any personnel policies that help promote computer security?
13. Have provisions been made for training and periodic retraining of computer users?
14. Has a disaster recovery plan been established?

should be directed to all levels of managers and support staff and the answers should be as detailed as possible so a composite picture can be developed. Once these questions have been answered a report can be generated that provides upper-level management some direction for establishing a secure computer environment.

COMPUTER CONTROL STRATEGIES

Once a risk assessment analysis has been completed, top management can begin to devise strategies that will help ensure a safe computer environment. (Figure 2). While solutions for specific issues arising from technical and human factors have already been presented, management needs to take additional steps that will help integrate the solutions and create an environment conducive to good security practices.

FIGURE 2

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┌─────────────────────────────────────────┐
│  MANAGEMENT COUNTER STRATEGIES            │
│                                           │
│   *  RISK ASSESSMENT                      │
│   *  PROGRAM/DATA BACKUP POLICIES         │
│   *  EMPLOYEE BACKGROUND CHECKS           │
│   *  JOB ROTATION                         │
│   *  TERMINATION POLICIES                 │
│   *  ADEQUATE TRAINING                    │
│   *  PERIODIC RETRAINING                  │
│   *  MORALE MONITORING                    │
└─────────────────────────────────────────┘
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Policies that address both technical and human factors should be developed. Technical policies should relate to the development of up-to-date back-up data and program files. Serious consideration should be given to whether employees should be allowed to take work home. Personnel policies should be established which relate to hiring and termination. Background checks should be conducted on all potential employees and individuals about to be terminated should not have access to computer files. Morale levels should be monitored because computer accidents and sabotage are more likely to occur when employees are unhappy. Job rotation policies should be created so no individual becomes irreplaceable. Furthermore, employees should be required to take regular vacations so that any irregularities that an employee is trying to hide will become apparent through the use of mini-audits and replacement workers. In other words, an employee who is practicing fraudulent behavior generally prefers not to take leave time so that the illicit activity will go undiscovered. Therefore, all employees should be required to take their earned vacation time.

After policies have been established, on-going training programs must be formulated so that employees understand and abide by the rules. Periodic retraining helps ensure standardization and helps prohibit employees lapsing into poor computing habits. Furthermore, training programs can be used to monitor morale problems. While most small business managers may not feel that they have the luxury of time or money that can be used on this type of activity, in fact it is a good investment because it reduces any potential problems.

Contingency disaster/recovery plans should be developed so that if a misfortune occurs, the disruption is minimized. Provision should be made for rapid acquisition of replacement equipment software so that the business can continue in the event of computer accident. Furthermore, if a company has critical programs that must be run at certain intervals (i.e., payroll), an alternative processing site should be established that will bridge the repair or replacement period. Finally, when possible, insurance that covers computer equipment should be carried.

CONCLUSIONS

Microcomputers have become popular because of the ease of use, ease of access, and adaptability of PC software. Moreover, small business managers are finding that computerization offers improved control and timely information. However, these advantages are coupled with risks that if not recognized and addressed can lead to increased vulnerability that is particularly difficult for a small business to absorb.

Microcomputer security problems stem from technical and human factors which, if understood, can be controlled by preventing measures such as physical location of computer equipment and monitoring employee morale. Detective measures such as the development of audit trails can also help to uncover breaches in security. However, before preventive and detective measures are instituted, a risk assessment analysis should be undertaken so that areas vulnerable to security problems can be identified. Appropriate security levels can then be identified and managerial strategies can be developed which institute computer-related policies and suitable preventive and detective measures. If these guidelines are followed, the small business manager will be able to take advantage of the benefits offered by computerization without increasing risk.

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A 3-D MARKETING PARADIGM

L. KEITH LARIMORE, Professor of Marketing, Radford University

BACKGROUND

The field of marketing is so dynamic, and involves such a vast array of complex interrelated functions, activities, and considerations (Bagozzi, 1975) that even the so-called "marketing experts" often have difficulty seeing the proverbial forest for the trees. What is needed to comprehend this critical link between the economic activities of production and consumption is a more basic understanding and structuring of existing fundamental marketing principles and accepted relationships.

This article develops a simplified framework for analyzing marketing problems and for integrating basic marketing concepts. The emerging paradigm is an analytic tool for marketing academics, marketing practitioners, and nonmarketers alike. The process involves a true three dimensional technique that has nearly unlimited applications to many other areas of business administration such as power, macro and microeconomics, finance, and leadership (Larimore, 1988). The focus of this article is, however, limited to the topic of marketing.

The distinction between controllable and uncontrollable elements is a fundamental aspect of the decision making process. The uncontrollable elements can be thought of as environmental from the perspectives of the marketing decision maker and can be grouped into categories of macroenvironmental and microenvironmental (Kotler, 1991). The marketing practices of the company or organization are controllable within limits. The relative importance of these controllable variables given some situation are often called the four P's or the marketing mix and include PRODUCT, PRICE, PROMOTION, and PLACE (distribution). The aim of marketing is to make selling superfluous (Drucker, 1973) and with that in mind the marketing executive's task is to adapt creatively to a changing environment by adjusting the controllable variables or the organization's marketing mix, in such a way as to further the organizations long-run interests (Pride and Ferrell, 1991).

THE 3-D REASONING PROCESS

The real world is three dimensional. However, communications about real world phenomenon are usually in one or two dimensional formats (paper, screens, telephones, and so on). Complex three dimensional relationships can be illustrated or communicated effectively in a two dimensional format if done with an element of precision and within a common frame of reference. The common frame of reference used here is a transparent cube or a glass box.

This three dimensional reasoning process involves describing a significant variable in terms of its two most relevant, **positively** related determinants or variables. When the significant variable has more than two relevant determinants, these must be grouped into two determinants in some logical manner and each group assigned an appropriate descriptor or label. In turn, each of the two most relevant determinants an be defined in terms of their most relevant determinants or variable and so on, as illustrated in figure 1.

FIGURE 1
3-D REASONING PROCESS
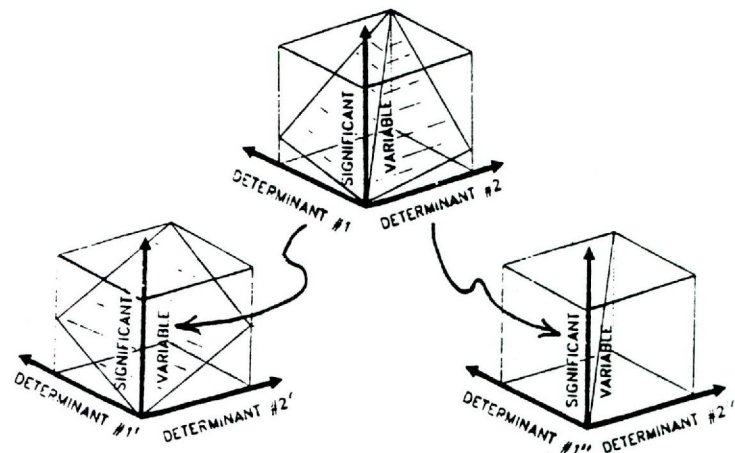
DIAGNOSING GOODS/SERVICE CLASSIFICATION

Diagnosing the category of the generic good or service is the starting point in the process. The 3-D box provides a qualitative diagnostic framework for most goods/services. A continuum going from convenience goods to shopping goods in the consumer goods market and from operative services/supplies to installations in the industrial goods market is the significant variable. The amount of "time and effort", the buyer is willing to put into the purchase decision and the "significance of the purchase" are assumed to be the most relevant positively related determinants. The reciprocating significant variable is a continuum going the other way or from shopping goods to convenience goods (consumer market) or from installations to operative services/supplies (industrial market). The positively related determinants of the reciprocating significant variable are "repurchase rate" and "perishability rate". The descriptor "perishability rate" is another way of describing the durability of the good/service. The durability of the good/service is inversely related to the reciprocal significant variable while perishability rate is positively related and is consistent with the 3-D reasoning process described previously.

Each circle in figures 2 and 3 should be thought of as a bubble that encloses the coordinate/s for a hypothetical good/service based on a typical buyer's logical assessment of the value/s of each of the four diagnostic determinants. The bubbles (examples) run the gambit of possible goods categories and will tend to cluster around

FIGURE 2
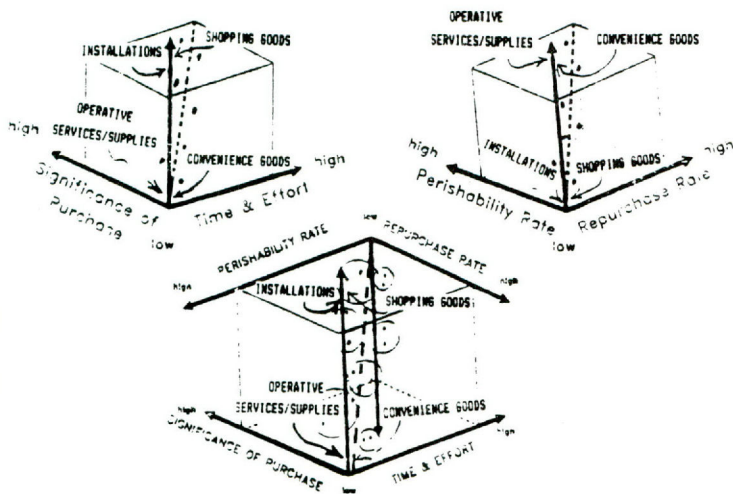
FIGURE 3
2-D VIEW OF THE DIAGNOSIS MODEL
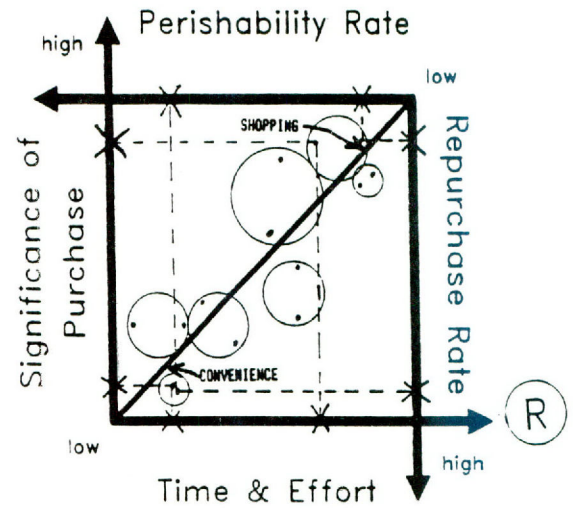
the heavy dark broken line or curve that goes from origin to origin and forms a continuum from convenience goods to shopping goods and from operative supplies/services to installations. The location of a particular good or service along this continuum gives an indication of the category classification.

Although purely linear relationships seldom occur in the real world linear relationships are often assumed to exist when building analytic or conceptual models. Common examples of conceptual models that use linear assumptions include break-even and supply and demand analysis. Linear relations are assumed here and all of these relationships are defined in such a way that they are approximated by curves (compound 45 degree) from the origin and are shown separately and then combined into the glass cube or box in figure 2. The 2-D top view of the product category diagnosis box is illustrated in figure 3.

The dominant determinant among the four is the time and effort the buyer is willing to expend to obtain the good/service. In a few cases he coordinates of all four diagnostic variable will not converge, in such situations, the category diagnosis should be tempered by judgement and based primarily on the assessment of the dominant determinant (time & effort). The process of category diagnosis is a crucial step in determining the optimum benchmark marketing mix.

Since the product/service has been fixed or is a given as a result of the previous step, product is no longer a variable. The remaining (3) controllable variables in the marketing mix are price, place (distribution), and promotion. Personal selling and advertising now replace promotion which brings the number of controllable variables back to four (4). Personal selling and advertising are assumed to be self explanatory at this point but the context in which price

and place or distribution are used requires some further clarification. The variable of price as used here refers to the actual mark-up or the absolute dollar spread between the cost of a good/service and the selling price to the next stage or level of the distribution process. It is extremely important not to confuse the absolute or dollar mark-up with the percentage mark-up when dealing with the pricing variable. The place variable refers to the length of the distribution channels in terms of the number of middlemen or institutions involved between the producer and the user of the good/service. Channel length can range from very short (exclusive) to very long (intensive).

Figure 4 provides a tabular illustration of the relationships between the marketing mix components. The arrows pointing up indicate a direct or positive relationship and the arrows pointing down indicate an inverse or negative relationship. Figure 4 also shows how the directly related determinants (price and personal selling and advertising and channel length) can be positively related to the goods/service category continuums developed previously. The inverse relationships between price and channel length and between advertising and personal selling are also illustrated in figure 4 and are important in understanding the reciprocal nature of the marketing box model.

THE 3-D MARKETING PARADIGM

The relationships previously presented are now brought together within the framework of the "glass box". In figure 5 the 3-D category diagnosis box from figure 2 is superimposed over the marketing mix box from figure 4 to form the THE 3-D MARKETING PARADIGM which is the basis for the proverbial "picture that is worth a thousand words". The 3-D glass box appears very complex at this point in that there are four origins and ten variables and determinants described by four curves (broken lines which all occupy the same space. By mentally shifting back to a more comfortable 2-D model, the complex 3-D relationship/s now become extremely simple. This process involves viewing the box from above and compressing the vertical axis of the complex box back into two dimensions. The relationships have been defined and positioned within the 3-D framework in such a way that when viewed from the top, all four of the compound 45 degree descriptive curves line up or they appear as one curve or continuum (broken lines) running from origin to origin.

FIGURE 4
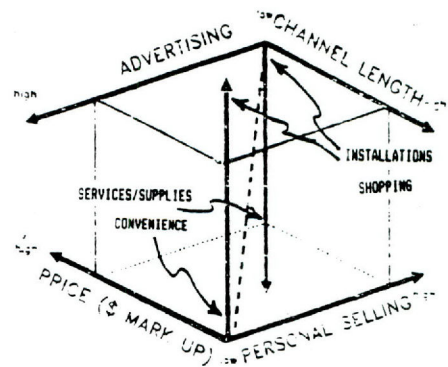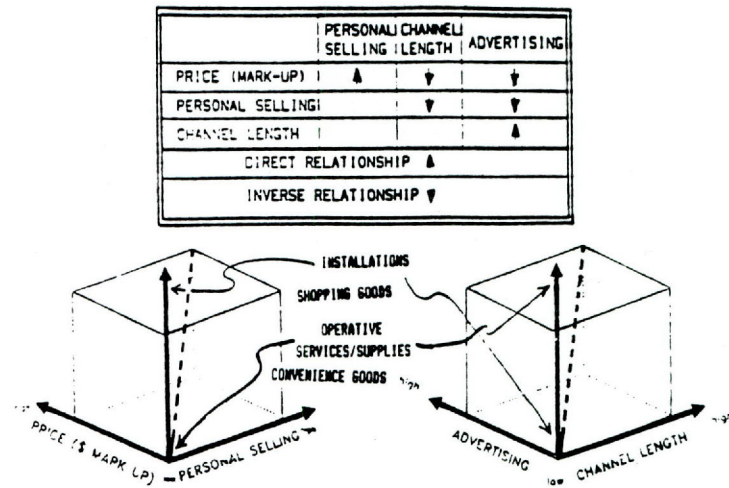
FIGURE 5
3-D MARKETING BOX
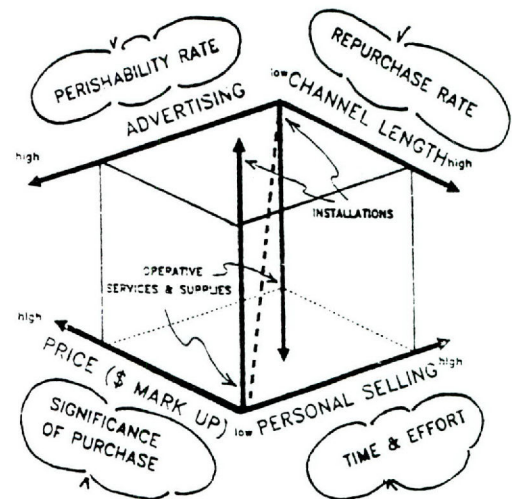
Figure 6 shows the simplified 2-D top view of the 3-D marketing paradigm for the consumer and industrial goods markets with sample products logically positioned along the category diagnosis continuum/s. The optimum benchmark marketing mix is determined by simply reading from any position on the diagonal curve or the product/service diagnostic continuum to the four variables of the marketing mix. The resulting value/s on each of the four axes provides a benchmark indication of the relative importance of each variable in the mix for each of the goods/services classifications. A consumer convenience good such as a can of soda, for example, should be marketed using a lot of advertising and very little if any personal selling. The absolute mark-up for the can of soda would be small and the channels of distribution would be very long. The optimum benchmark marketing mix for a shopping good such as a new family car would suggests that personal selling is relatively more important than advertising, the absolute mark-up will be high and the distribution channels will be short. The same technique applies to the industrial goods market.

SUMMARY

Marketing is the critical link in the economic chain between producers and consumers of goods and services. An analytical three dimensional framework or paradigm was developed and provides structure to existing or known marketing relationships. The structure was applied sequentially in determining:

1. Classification/categorizing of consumer and industrial goods/services.
2. Optimum marketing mix benchmark/s for consumer and industrial goods/services.

A glass cube or box provides the three dimensional paradigm for structuring the complex marketing interrelationships. The resulting two dimensional representation of the complex phenomenon of marketing is remarkably simple and, therefore, quite useful. When properly developed and understood, the 3-D marketing paradigm provides a framework to basic marketing that is easy to remember, easy to communicate, and most importantly it works under varying circumstances or situations.

FIGURE 6
2-D VIEW OF THE MARKETING BOX

2-D VIEW OF THE MARKETING BOX

22
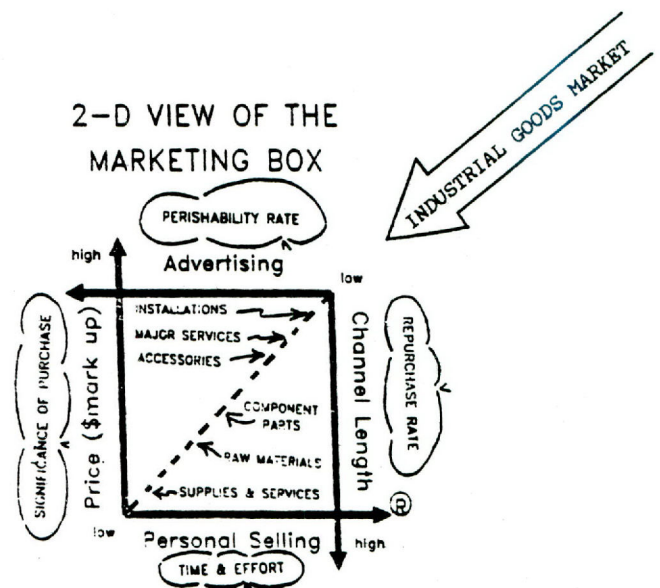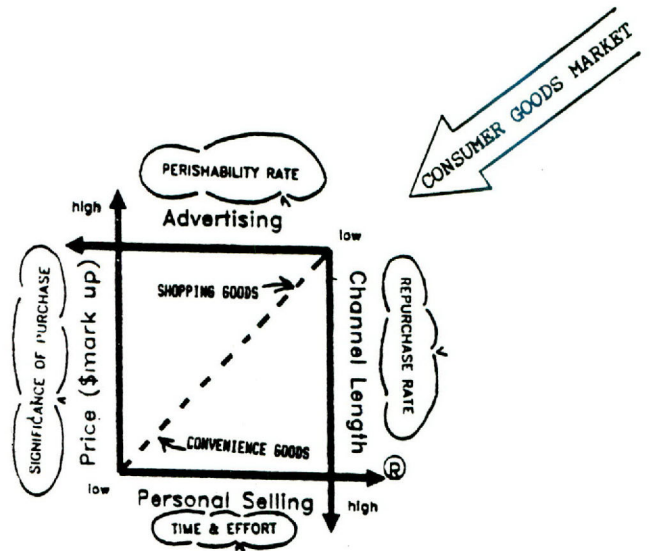
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RETAIL MANAGEMENT TRAINING: AN OVERVIEW OF CURRENT PRACTICE

TONY L. HENTHORNE, Assistant Professor of Marketing, The University of Southern Mississippi

CYNTHIA R. EASTERLING, Professor of Fashion Merchandising, The University of Southern Mississippi

INTRODUCTION

The highly competitive and volatile nature of the modern retailing environment has dictated that retail establishments become more effective and efficient in the utilization of their most valued asset -- personnel.

The efficient use of retail sales personnel is dependent upon those individuals receiving adequate initial sales training, coupled with continual on the job refresher training and motivation enhancement (Lochhead 1983; Lusch and Moon 1984; Powell 1977). Although sales training is a common practice in other industries, retailers have traditionally dismissed it as an inefficient utilization of scarce financial resources because average annual turnover in the retail sales ranks has typically fallen between 30 and 60 percent (*Business Week* 1980; Cohen and Schwartz 1980.) However, retailers have been forced to reevaluate this tradition-bound position in the face of increasingly fierce competition which has come in the form of saturated markets, homogenous merchandising strategies, and a more particular and demanding clientele (Caminite 1989; May and McNair 1979; Jones 1988).

Without additional support, training and motivation of sales personnel are not sufficient to give the retail organization that "competitive edge" necessary to effectively compete in the currently existing environment. Proper training and motivation of retail management is a necessary additional component in the quest for competitive superiority (*Chain Store Age Executive* 1977; Feinberg and Gifford 1984b).

Gone is the era of "seat of the pants" management, the era of "management by intuition," and the era of "anyone can succeed in retailing." These bygone times have been supplanted by an era comprised of ever more professional management that is scientific, practical, and trained in their approach to the competitive environment. Such management have been responsible for the uncompromising success of such firms as Nordstrom and Dillard's (Caminiti 1989; Kahn 1989; *Stores* 1989).

The nature and structure of modern retail management training is both diverse and complex. Training programs are continuously changed, expanded, and updated to incorporate topics of current interest and to provide additional depth into these topical areas deemed to be critical success factors by top management (*Chain Store Age Executive* 1986; Dyer 1978; Feinberg and Gifford 1984a).

THE STUDY

In order to evaluate current practices in retail management training, the present study was undertaken. The research had as its primary objective the examination of current training programs in an attempt to determine any specific "standards" in training which may exist in the industry.

The Human Resource Managers of the top 100 department stores (derived from *Stores* July 1990) were surveyed through the use of a mail questionnaire. The instrument was developed, in part, through a jury of executive opinion and was presented by the Human Resource Managers of several large department stores. Specific information obtained included: history of the program (length of time in operation), duration of the program, average number of participants in each class, and utilization of various training methods.

RESULTS

As a result of the initial mailing and a follow up mailing, questionnaires were returned by 56 of the top 100 retail stores surveyed for a response rate of 56 percent. Of the stores responding, two questionnaires were incomplete and were therefore deleted from the

study. This resulted in a 54 percent usable response rate.

Of the 54 usable responses, 81 percent utilized a formal training program covering one or more of the following areas: retail management, merchandising techniques, and/or buying.

A review of Table 1 indicates that of those stores having a formalized training program, 79 percent combined the areas of management, merchandising, and buying. The remaining 21 percent utilized some combination of management, merchandising, and buying in their programs.

TABLE 1

TYPE OF TRAINING PROGRAMS OFFERED BY THE RETAIL STORE DIVISIONS

	N[a]	%
Management Training Program	3	6.98
Merchandising/Buying Program	3	6.98
Two Separate Programs, One Management and the other Merchandising/Buying	3	6.98
One Combined Program for Management/ Merchandising/Buying	34	79.06

[a]Number based on responding stores with formalized training program

Length of time required by the participant to complete the training program varied significantly. The shortest program was only two days in length, while the longest ran two years. The mean time required for completion of the "typical" retail management training program was 12 weeks. This approximately three month period is broken into various "modules" whereby students are exposed to differing aspects of the organization. To accomplish this exposure, retail organizations use primarily class lecture and on-the-floor training (refer to Table 2).

Table 2 displays the percent of time dedicated to the various training methods currently in use. Table 2 indicates that approximately 70 percent of respondents dedicate 40 percent or less of their training programs to classroom lecture. Additionally, well over one-half of those stores responding (58 percent) utilize over 60 percent of their programs for on-the-floor training. Various other training methods are used on a somewhat more sporadic basis. These include written class projects, technical seminars, and individual written work (all mentioned less than 10 percent of the time).

The increasingly competitive retail environment may be a factor in the fact that over 50 percent of responding stores indicate their training programs have been in existence less than 10 years. Only 12 percent of currently existing retail training programs have been in existence for more than 20 years. Interestingly, accompanying this increase in training has been an increase in manager loyalty to the organization. 58 percent of respondents indicated that their manager trainees typically remain with the organization for at least three years. Historically, turnover has been shown to be between 30 and 60 percent annually (Cohen and Schwartz 1980; Swinyard 1981).

CONCLUSIONS

The complex and competitive retail environment of today dictates that management be well trained and responsive. The relatively high response rate (54 percent) associated with this study indicates that management training is one area of intense concern for retailers today. The results of the study indicate that, although many retail training programs are finding the value of formal classroom at work, the majority of organizations are still relying heavily on "on the job" training.

If retail organizations are not going to provide extensive classroom training to their future managers, it is essential that the necessary basis for a successful retail management career be laid through the formal education provided by our colleges of business.

TABLE 2

PERCENTAGE OF TIME INVOLVED IN THE TRAINING METHODS

	10%	20%	30%	40%	50%	60%	70%	80%	90%	Total Respondents N	%
Number Using Class/Lecture	9	12	6	4	4	1	2	0	0	38	88.37
Number Using Floor/Apprentice Training	3	1	6	2	5	6	4	10	3	40	93.02
Other	5	1	3	4	1	1	1	0	0	16	37.21

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THE ENVIRONMENTAL INDUSTRY AND THE ECONOMY

SPUMA M RAO, Assistant Professor of Finance, University of Southwestern Louisiana
BILL NEEF, Environmental Engineer, Dominque Szabo & Associates Consulting Engineers

INTRODUCTION

The debate over issues such as population growth, pollution, resource depletion, distribution of resources between developed and less developed countries, the relationship between economic growth and social welfare, the rate and direction of technological change, etc. began to take shape during the late 1960s. Over the past fifteen years, issues concerning the environment have been at the forefront of the American scene and the environment has taken on a new urgency as we approach the eve of twenty-first century. Whether it be concern over the solid waste problem, ground water pollution thought to have been propagated by hazardous waste land fills, smokestack industries pumping millions of pounds of toxic substances into the atmosphere each year, smog and the automobile, leaking underground gasoline storage tanks, thermal pollution, pesticide pollution, another abandoned hazardous waste dump added to the ever growing list of superfund sites, radioactive, chemical and biological warfare materials or the "greenhouse effect", someone is always pushing the environmental issue.

It has been estimated that in the very near future, the U.S. Environmental Protection Agency alone will force remedial actions around the U.S. to the tune of approximately $2 billion annually (Rosenberg, 1989). This does not include cleanup expenditures from the Department of Defense, Department of Energy, state environmental agencies, and private work performed without any governmental intervention. It has further been projected that by the year 2000 the hazardous waste industry alone will account for $27 billion annually.

For these reasons a relatively new industry, the environmental industry, is beginning to emerge. Many new companies have started up over the last ten to fifteen years and many existing companies have diversified into the environmental industry in order to capitalize on the existing and future market. To date there are approximately 120 companies traded on the NYSE, the AMEX, and/or the OTC market that are considered part of the environmental industry

(*Environmental Business Journal*, 1989). Their services range from analytical laboratories to environmental consulting to sales of pollution control equipment. The revenues generated by these listed companies exceeded $175 billion in 1988. This does not include the revenues generated by the numerous private companies that are also involved in the environmental industry.

STATEMENT OF THE PROBLEM AND OBJECTIVES

The environmental industry is rapidly becoming a strong and powerful member in today's business world. But it must be stated that the environmental industry is somewhat different from any other industry. As a case in point, the Environmental Protection Agency has been given authority by Congress to force remediation actions at those sites where environmental problems exist. The Superfund Act alone allows the EPA to mobilize on a contaminated site and perform $1 million in remedial activities and issue a bill for the cost to the current owner. It is then up to the current owner and the courts to decide who will ultimately reimburse the EPA for the cost of the cleanup. The EPA does not have to ask how business has been lately or test the economic climate prior to proceeding with the cleanup project. With this type of governmental agency forcing revenues to be generated for the environmental industry, it may be quite difficult to make accurate predictions utilizing commonly used economic indicators.

There are two objectives for this paper: first, to determine if the progress of the environmental industry is strongly related to the U.S. economy; second, to evaluate the environmental industry in relation to the general market to determine if the industry can be expected to outperform the market.

METHODOLOGY

The relationship between return on environmental industry portfolio (the dependent variable) and (1) the gross national product, (2) the Standard and

Poor's 500 stock index, (3) the consumer price index, (4) M1 money supply (5) the residential housing starts (6) the three month treasury bill yield, and the yield on new issues of high grade corporate bonds published in the *Business Conditions Digest* (the independent variables) is examined through linear regression.

To evaluate performance, 34 stocks traded on the NYSE, the AMEX, and/or the OTC market are selected from various sub industries within environmental industry. These 34 stocks were evaluated both individually and as a single portfolio with an equal number of shares of each stock making up the portfolio. Each stock's quarterly returns and later the portfolio's returns were calculated for the period 1980-III through 1989 and compared to the rates of return on S&P 500 for the same time period. To answer the question as to whether an investor can select an environmental company with above average performance, the predictability for two types of data was examined.

SAMPLE DATA AND ASSUMED RELATIONSHIPS

It is hypothesized that total return on industry is a function of percentage change in gross national product (market growth), percentage change in M1 money supply, percentage change in the consumer price index, level of housing starts, return on S&P 500, and the level of interest rates. Gross national product was selected as one of the independent variables because it is the broadest available measure of economic activity and provides the official scale with which fluctuations in the U.S. economy are measured. Market growth hypothesis is based on the relation between level of aggregate demand and investment needed to satisfy this demand. Fluctuations in the M1 measure of stock of money directly affect the pool of funds on which environmental companies can draw and thus may influence their activity. To the extent environmental activity is sensitive to the credit availability, changes in M1 could affect this activity, independent of their influence on interest rates. Purchasing power risk affects portfolio return, hence the inclusion of CPI. Stocks are affected by alternating bull and bear markets during which their market prices rise and fall. Good economic forecasting is the key to anticipating changes in the stock market. So housing starts and S&P 500 are chosen as independent variables. In fact, construction expenditures may be a better variable instead of housing starts because it generates a large amount of revenue for the environmental industry. With today's litigious society and environmental remediation costs commonly running into seven figures, commercial real estate transactions carry a high level of liability for the buyer, the seller, the agent and the

lending institution. As a matter of common practice today, environmental assessments are performed at commercial locations prior to any change of ownership. This practice is rapidly becoming an additional cost of purchasing commercial property. Some state legislatures are passing laws requiring site assessments for all changes in ownership of commercial properties. Changes in interest rates may affect the profitability of environmental activity, hence variables on interest rates were included.

The empirical testing is based on time series quarterly data for the floating rate period starting in the third quarter of 1980 and extending through 1989. Stock price and dividend data were collected from Merrill Lynch, data on GNP, S&P 500, CPI and other variables were collected from *Federal Reserve Bulletin* and *Business Conditions Digest*. One limitation is that not all companies are homogeneous in environmental management. Some companies had only established a division for some form of environmental management. An example of some homogeneous companies involved in environmental management are Browning Ferris Industries which is one of the largest providers of solid and liquid waste collection, processing, recovery and disposal services for commercial, industrial, governmental as well as residential customers. Its Cecos International unit collects and disposes of hazardous chemical wastes. Another example is Waste Management which is another provider of comprehensive waste management services, offering collection and disposal services for residential, commercial and industrial generators of solid, liquid, chemical, nuclear and hazardous waste. Examples of companies which do not fully participate in environmental management are Hydraulic Co. which provides water service to approximately 118,000 customers. Non-utility activities include forest products, energy cogeneration, water management, environmental and utility service. Valmont Industries is a major producer of steel pole structures, steel tubing, slurry equipment, waste disposal systems and large turnkey projects.

The primary hypothesis is that there is positive relationship between the environmental industry and the economy and the secondary hypothesis is that the environmental industry generally outperforms the market.

RESULTS

Environmental Industry Versus the Economy

The intent of this section is to determine if accurate predictions can be made regarding the future of the environmental industry. Specifically the intent is to

determine if future quarterly industry returns can be predicted using the common economic indicators.

A step-wise multiple regression was run with portfolio return as the dependent variable and the GNP, M1 money supply, CPI, Housing Starts, Return on S&P 500, 3-month T-bill yield, Long term rates on new issues of high grade corporate bonds as the independent variables. T-values are given in parentheses, with ** showing the 1% significance level and * showing 5% significance level.

Portfolio return =
$$-.0638 + .9928(\text{Return on S\&P 500})$$
$$(9.855)**$$
$$+ .1856(\text{Housing Starts}) + .6576(\text{Long-term rates})$$
$$(2.501)** \qquad\qquad (2.058)*$$

Portfolio return does not have any significant relationship with GNP.

Adj. R square = .82041
F = 57.34
Sig F = .000

CORRELATIONS

	Portfolio
S&P 500	.88
GNP	-.13
M1	-.037
CPI	-.116
Housing Starts	.6
T-Bill	-.014
Long-Term rates	-.059

The correlation between portfolio return and the GNP was insignificant.

Performance of Portfolio and the Firms

For the entire period 1980-III to 1989-IV, a total of 38 quarters, performance of the portfolio is shown in Appendix A. The mean return per quarter for environmental portfolio and the S&P 500 were respectively 6% and 4.5%. Standard deviation of returns for the portfolio was .101 while for the S&P 500 it was .083. However, when coefficient of variation (i.e., standard deviation/mean) was calculated for both, environmental portfolio happens to be more preferable because it has less risk per unit return. The portfolio's performance after the stock market crash, i.e., from 88-I through 89-IV and also for 80-III through 85-I and 85-II through 89-IV was evaluated and these figures are in Appendix B. These figures indicate that portfolio

performance i⌐ very sensitive to the time period studied. While in the first half of the decade the portfolio outperformed the market, in the second half of the 80s and also in 1988 and 1989 the portfolio underperformed the market.

Each individual company's return performance for two periods, 1980-III through 1985-I and 1985-II through 1989-IV was calculated and it is shown in Appendix C. Last three year return performance ending 1989-IV is in Appendix D.

Predictability of Performance

To answer the question as to whether an investor can select an environmental company with above average performance, the predictability for two types of data was examined. In light of studies done on mutual funds, we are aware that future performance can not be predicted on the basis of past performance. However, it is possible that longer term performance can be predicted by longer term past performance. We calculated quarterly compounded returns for all stocks and then calculated rank order correlation coefficient between the past 19-quarter return and the subsequent 19-quarter return.

$$r_s = 1 - 6 * \Sigma d_i^2 / (N^3 - N)$$

where

r_s = Spearman Rank Correlation Coefficient
d_i = disparity between 2 sets of rankings
N = Number of firms

Ranking of performance of the companies from quarter 1 through 19 (i.e., from 1980-III through 1985-I) and again their performance from quarter 20 through 38 (i.e., from 1985-II through 1989-IV) are shown in Appendix E. The rank order correlation coefficient for the 34 firms in the sample was .3069 which is significant at any normal level.

We also divided the sample into three groups on the basis of past performance. The subsequent performance of the one-third with the highest past performance was 45%. The middle group returned 45%, while the average subsequent performance of the bottom one-third was 50%. The difference between the best, average, and the worst groups was small.

CONCLUSIONS

While we still do not have much history of performance of firms from Environmental Industry, a preliminary examination of this question revealed that (1) there is significant relationship between portfolio return and the market (S&P 500), Housing starts, and long term rates, these 3 variable explaining over 82% of the

variability in the portfolio return (2) no significant correlation exists between the market growth (percentage change in GNP) and the return on a portfolio of stocks from the environmental industry (3) though this portfolio outperformed the stock market in 1980s, performance of the portfolio is very sensitive to the period of study (4) longer term performance can be forecast by longer terms past performance. The reader should be cautioned that the sample size was small and there was also the problem of homogeneity.

NOTES

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Appendix A

RETURN PERFORMANCE 1900-III TO 1989-IV

	Environmental Portfolio	S & P 500
Average Return/qr.	0.05960786	0.0446842105
Std. Deviation	0.10015054	0.0828482110
C.V.	1.68015641	1.85408246

Appendix B

RETURN PERFORMANCE 1988-I TO 1989-IV

	Environmental Portfolio	S & P 500
Average Return/qr.	0.04176037	0.0555125
Std. Deviation	0.05473597	0.0328797216
C.V.	1.31071565	0.59229401

RETURN PERFORMANCE 1980-III TO 1985-I

	Environmental Portfolio	S & P 500
Average Return/qr.	0.0735972	0.0398157894
Std. Deviation	0.010567125	0.0731484090
C.V.	1.43580521	1.83717088

RETURN PERFORMANCE 1985-II TO 1989-IV

	Environmental Portfolio	S & P 500
Average Return/qr.	0.04561852	0.0495526315
Std. Deviation	0.09220869	0.0912664195
C.V.	2.02129935	1.84180772

Appendix C

INDIVIDUAL RETURN PERFORMANCE

COMPANY	RETURN 1980-III TO 1985-I QTR 1 TO 19	COMPANY	RETURN 1985-II TO 1989-IV QTR 20 TO 38
Hydraulic	.5767	Waste Mgmt	.1042
Trion	.1338	Valmont	.0953
Valmont	.1127	Dupont	.0843
American Wtr. Wks.	.1055	Browning Ferris	.0825
Safety Kleen	.1020	Ameron	.0705
Browning Ferris	.0916	Corning	.0694
Waste Mgmt.	.0833	Crane	.0687
Osmonics	.0764	Westinghouse	.0643
Varian	.0746	Ogden	.0618
United	.0740	Nalco	.0553
Westinghouse	.0731	Safety Kleen	.0547
California	.0723	Exxon	.0539
Autotrol	.0628	American Filtrona	.0527
American Filtrona	.0591	Autotrol	.0483
Johnston	.0590	Mine Safety	.0468
Dupont	.0584	Advance	.0454
Connecticut	.0562	United	.0424
Ameron	.0511	Osmonics	.0423
Hewlett Packard	.0507	Betz Labs	.0415
Exxon	.0493	California	.0401
Betz Labs	.0487	Dexter	.0391
Ogden	.0411	Johnston	.0391
Advance	.0399	Hydraulic	.0386
Crane	.0377	Connecticut	.0378
Corning	.0374	American Wtr.Wks.	.0324
Philadelphia	.0354	Millipore	.0286
Nalco	.0349	Hewlett Packard	.0257
Dexter	.0343	Trion	.0224
Mine Safety	.0340	Goulds	.0217
Millipore	.0313	Philadelphia	.0188
Franklin Elec.	.0301	Franklin Elec.	.0130
Groulds	.0295	Perkin	.0111
Perkin	.0223	Foxboro	.0080
Foxboro	.0221	Varian	-.0107

Appendix D

RETURN PERFORMANCE LAST THREE YEARS ENDING 1989-IV

COMPANY	RETURN %
Valmont Inds.	429.71
Waste Management	159.66
Osmonics Inc.	112.07
Dupont EI DeNeours	100.75
Nalco Chemical	99.72
Browning Ferris	81.20
Ogden Corp.	76.87
Advance Ross Corp.	76.09
Mine Safety Appliances	73.37
Corning Inc.	69.93
Crane Co.	68.76
Ameron Inc.	64.63
Exxon Corp.	63.83
Betz Labs.	62.09
S&P 500	**61.51**
Autotrol Corp.	52.17
Westing-House Elec.	46.49
Safety Kleen Corp.	41.05
Trion Inc.	40.85
American Filtrona	40.79
United Water Res.	29.82
California Wtr. Sev.	24.78
Johnston Ctls.	24.24
Goulds Pumps Inc.	24.01
Hydraulic Co.	14.53
Hewlett Packard Co.	14.48
Connecticut Wtr. Sev.	12.34
Dexter Corp.	7.56
American Wtr. Wks.	0.41
Varian Assoc.	- 2.69
Foxboro Co.	- 3.02
Philadelphia Subn.	- 4.34
Perkin Elmer Corp.	- 4.72
Millipore Corp.	-12.94
Franklin Electric	-50.20

Appendix E

RANK CORRELATION COEFFICIENT TEST

PERFORMANCE RANKING

COMPANY	1980-III TO 1985-I QTR 1 TO 19	1985-II TO 1989-IV QTR 20 TO 38	d_i	d_i^2
Hydraulic	1	7	-6	36
Trion	2	3	-1	1
Valmont	3	16	-13	169
American W.	4	6	-2	4
Safety	5	18	-13	169
Browning-Ferris	6	25	-19	361
Waste Mgmt.	7	24	-17	289
Osmonics	8	11	-3	9
Varian	9	22	-13	169
United	10	27	-17	289
Westinghouse	11	5	6	36
California	12	20	-8	64
Autotrol	13	14	-1	1
American F.	14	13	1	1
Johnston	15	29	-14	196
Dupont	16	23	-7	49
Connecticut	17	10	7	49
Ameron	18	8	10	100
Hewlett-Packard	19	21	-2	4
Exxon	20	12	8	64
Betz Labs	21	28	-7	49
Ogden	22	15	7	49
Advance	23	1	22	484
Crane	24	17	7	49
Corning	25	4	21	441
Philadelphia	26	30	-4	16
Nalco	27	19	8	64
Dexter	28	2	26	676
Mine Safety	29	32	-3	9
Millipore	30	26	4	16
Franklin	31	31	0	0
Goulds	32	33	-1	1
Perkin	33	34	-1	1
Foxboro	34	9	25	625
			Total	**4540**

$"r" = .30688$

CORPORATE STRATEGIES FOR ELECTRIC UTILITIES: ADAPTING TO THE CHANGING COMPETITIVE ENVIRONMENT

EDWARD J. RYAN, JR., Professor of Marketing, Millsap College
PHILIP P. CROSSLAND, Assistant Professor of Business and Public Administration, University of Missouri-Kansas City

INTRODUCTION AND PURPOSE

Chakravarthy [5] suggested the process of strategic management is essentially one where those individuals responsible for the organization position the firm in such a way as to ensure long-term adaptation to a changing competitive environment. Kotler [18] put forth several primary ways excellent companies can manage this corporate strategy process. These are, take an outside-inside view of the business, monitor changing competitive environments, and continuously adapt to the best opportunities. This prescription is particularly appropriate to firms operating in the electric utility industry which is under pressure from a number competitors and stakeholders. The increased competition comes primarily from substitution suppliers while the source of political and legal pressures are special interest consumer groups ([6], [8], [14], [20], [22]). Survival for utility companies depends on developing dynamic competitive strategies which allows adaption to increased competition in the rapidly changing regulatory framework ([9],[10],[24]).

The electric utility industry is composed of four interrelated principal market segments. These are residential, commercial, industrial, and wholesale off-system sales markets. Although each segment has distinct facets, activity in any one segment impacts all others because of the demand for single product. However, this paper focuses on the wholesaling and off-system sales markets, they are that will require the most attention if a company is to adapt and prosper.

Several factors contribute to the imperative that utilities must develop adaptive strategic plans in the wholesale off-system sales area. On a broad scale these include the following:

(1) The gentlemen's agreements about the sanctity of other utilities' territories will disappear as each firm behaves as an oligopoly rather than a regulated monopoly ([2],[6],[13]).

(2) As potential deregulation of the industry becomes more pronounced utilities will find additional small competitors entering their local markets ([13],[7],[16]).

(3) Due to the current socio-political moratorium on constriction of generating facilities, electrical shortages will become more frequent.

Both small and large suppliers will be entering the market to take advantage of profit opportunities ([12],[25]).

The purpose of this paper is to examine various competitive strategies that are emerging within the electric utility industry's wholesale and off-system sales programs. We discuss strategic business opportunities that will develop as the industry moves through an era of short supply and increased deregulation.

DEVELOPING COMPETITIVE STRATEGIES

O'Connor [21] predicted that early in the next century there will be only two or three dozen major electric generating companies. They will resemble the larger individual or holding companies in existence today. However, business will be conducted in an open market rather than a monopolistic one.

Table 1 illustrates three generic strategies that appear to be emerging within the electricity supply industry; business as usual, focusing within the industry, and differentiation through diversification. Proper employment of the most appropriate generic strategy or

combination of strategies will result in profitable operations for both interim entrepreneurs and the longer-term major firms. Each of the three generic strategies is discussed below.

Business as Usual

Those utilities that continue business as usual will probably cease to exist. They will either be merged or acquired by other utilities or they will be forced out of business by interim unregulated independent power producers (IPPs) or co-generators. Within their territories profitable opportunities exist for companies that construct, serve, operate, or own co-generation units and IPPs. Non-innovative utilities that have excess capacity and interconnected transmission capacity will become primary targets for their off-system sales. Additionally, the business as usual firms could also become takeover targets when their generating capabilities no longer meet territorial demands. The attraction is a large market base of end users that will spread fixed operating cost. Equally attractive is the opportunity to expand into new territories at minimal cost and little need for capital outlay by the acquiring firm ([13],[14],[22]).

TABLE 1

EMERGING CORPORATE STRATEGIES
WITHIN THE ELECTRIC INDUSTRY

Strategy	Components
1. Business As Usual	a. None
2. Generation and Distribution	a. Short Capacity
	b. Approaching Capacity
	c. Excess Capacity
3. Diversification	a. Unrelated Business
	b. Compatible Business

Focusing on Generation and Distribution

A second strategy emerging within the electricity supply industry is to focus exclusively on electricity generation and distribution. Three variations of this generic strategy are applicable to either capacity short utilities, utilities approaching capacity limits, or utilities with excess capacity.

Capacity Short Utilities

The first application of focus strategy pertains to those utilities that currently operate in regions of the country which are experiencing energy shortages. Most representative of this group are firms in the northeastern part of the United States. These utilities rely on a strategy that consist mainly of consumer awareness programs in residential heating and cooling. Their goal is to encourage consumer conservation and efficient electricity use. In addition many companies have established dividends to help commercial and industrial users develop and run cogeneration units that remain under the parent company's control. These utility subsidiaries could become key marketing entities critical to a firm's long-term survival by enhancing the firm's electricity supply and reliability. However, these utilities will have to be innovative and aggressive in their efforts to maintain current consumers and keep entrepreneurs out of their territories. In the long run these firms will likely become takeover or merger candidates. However, these firms possess the resources necessary to dictate terms favorable to their current customers and owners. This in itself could offer opportunities for financial marketing activities ([11],[17],[26]).

Utilities Approaching Capacity Limits

A second focus strategy applies to those utilities that are located in regions with rapidly increasing demands and are rapidly approaching capacity limits. Most notable among these are Southern Company and San Diego Gas and Electric. These companies appear to be adopting strategies similar to the first subset for consumer conservation and co-generation development. However, these firms are not starting from a relatively weak position but are more aware of what the future will be like if they do not develop adaptive strategies. This results from their adjacent locations to other large, financially strong, utilities. Therefore companies in this second subset are developing IPPs in adjacent utility territories. This is a deviation from the past and is a strategy that should be pursued by other firms as their regional areas experience increased energy shortages.

The overall implication is to seek out large users in adjacent territories who can be convinced to co-generate. By assisting them developing generating facilities as venture partners the utility may be able to obtain inexpensive additional generating capacity. The reason for this is because these are often unregulated sources and do not have the overhead requirements associated with regulated facilities. Positioned as a win-win circumstance the partnership offers significant benefits. The user as generator is no longer a consumer but is a supplier which reduces production costs of the primary product while also providing a profit on excess electricity. Specifically, the following arrangements results:

(1) The utility partner does not have to make off-system electricity purchases or construct a production unit.

(2) By maintaining the generator outside their territory, the partner utility maintains its current customer base.

(3) By developing the generator in an adjacent territory, the partner utility financially weakens the adjacent utility, possibly positioning them as a potential take-over candidate.

In the long run utilities pursuing this focus strategy have an improved chance of survival since they are attuned more closely to current and developing market conditions. These firms currently have extensive conservation, public education and R&D programs. Additionally, some firms have already established engineering subsidiaries for developing co-generators both inside and outside their territory and have explored or implemented merger and acquisition activities ([1],[19],[23],[27]).

Utilities With Excess Capacity

A third application of focus strategy pertains to those firms that will maintain generation over-capacity. These utilities will place the bulk of their marketing activities in the wholesale off-system sales area. However, they are often faced with two difficulties. Their primary utility customers (other utilities) are not often in adjacent territories and transmission links between the two locations are inadequate. This necessitates a two prong strategy. The first will be to sell the distant customer and the second will be to enter into agreements with utilities whose territory is being crossed. A perceived weakness about utilities pursuing this focus strategy is complacency. They primarily focus on their internal marketing effort to expand residential customers through co-generation. The utilities also tend to have small industry related R&D effort and often depend on other firms to introduce new products and services.

These utilities have a moderate chance of survival. Their current secure position may indeed be their downfall if comprehensive long-term competitive strategies are not developed. Complacency and failure to maintain market innovation similar to utilities approaching capacity limits may result in these firms becoming takeover targets. These cash cows may not be able to tool up quickly enough to prevent adjacent utilities from capturing their customers and as a consequence, putting the remaining customer base in jeopardy due to increasing costs. Strategies for this third group should focus as much on internal resources as on developing balanced long-term plans to cope with external activities in their four primary program areas ([4],[14],[15]).

Differentiation Through Diversification

The third generic strategy being employed by utilities is differentiation through diversification into other businesses. These utilities divide into two basic groups; (1) those that acquire unrelated businesses with the intent of stabilizing overall earnings, and (2) those that take calculated risks by diversifying into compatible lines of business. Notable examples are Florida Power and Light Company, Pinnacle West Corporation, and PacifiCorp. Unlike previously discussed strategies which have groups and subsets that can be regionally clustered, these utilities can be found in areas of high growth and under-capacity, low growth and overcapacity, and several other situational combinations.

Acquisition of Unrelated Businesses

In the first group, if acquisition is poorly executed the overall impact on the parent utility company can be adverse. An example may be the recent experiences of Pinnacle West. Since the acquisition of a financial services group the parent utility, Arizona Public Services, has experienced losses in corporate earnings. This is coupled with a cash outflow used to prevent an industrial customer from developing co-generation capability [15]. Problems like these are likely to place this firm and others in similar situations in a position where they find their utility subsidiary has become a takeover target [17].

Diversification Into Compatible Business

The second subgroup, particularly PacifiCorp, presents a very different picture. This utility carefully chooses markets which to expand into before acquisition. Of recent interest are PacifiCorp's merge with Utah Power and Light and its bid for the Arizona Public Service Company [28]. What's unique about firms like PacifiCorp is their willingness to accept a federal mandate that they permit open access for moving power across their transmission equipment by other firms as a merger condition. The "open access" to transmission lines for all suppliers in the market place is an idea feared by many electric utilities. However, as demonstrated by PacifiCorp's innovative strategy this trend may increase in the future. This flexibility to innovate in the transmission arena could very well provide a major strategic marketing opportunity for PacifiCorp in their handling of bulk power sales. Having full knowledge of new suppliers and consumers will allow PacifiCorp to more quickly adapt and control developing markets. By knowing the suppliers they will be able to work on developing regional co-generators who can supply adjacent territories without adversely effecting their own customer base. Finally, by making "open access" transmission work they will be in a better position to expand territories by mergers and acquisitions when opportunities arise.

Another recent competitive strategy developed by these diversifying utilities is their entry into venture partnerships with related businesses in developing market niches. An example is expansion into a market of home security and individual surge protectors that protect sensitive electronic products such a personal computers. The initial targets are primarily areas which are experiencing frequent outages due to mismatched supply and demand or insufficient transmission capabilities (e.g., New England and the Mid-Atlantic).

Utilities that engage in aggressive environmental scanning and constantly explore the environment for new strategic opportunities that fit their overall mission and goals will be the most likely to survive. By being aware of customer needs, the status of competing utilities, and working closely with potential regional competitors, they should meet customer needs in a profitable and socially responsible manner.

SUMMARY AND CONCLUSIONS

Utilities are struggling to adjust to a changing regulatory environment, new competitive pressures, takeover attempts, and a growing unwillingness among customers to pay higher electric bills. To survive and prosper, utilities must employ competitive strategies that best adapt to a changing environment.

Three generic strategies appear to be emerging within the electricity supply industry; business as usual, focusing within the industry and differentiation through diversification. Utilities that choose to continue business as usual will likely be merged or acquired by other utilities. In the short run, these non-innovative firms will become primary targets for the off-system sales of other firms that have excess capacity and interconnected transmission capacity. In the long run, they will be acquired by more aggressive firms that attempt to increase their customer base while spreading fixed operating costs.

The second strategy is to focus exclusively on electricity generation and distribution. Three variations involve capacity short utilities, utilities approaching capacity limits, and utilities with excess capacity. Those utilities operating in energy-short regions of the country will continue to rely on consumer awareness programs in residential heating and cooling. They will also continue to pay dividends to help commercial and industrial users develop and run co-generation units that remain under the parent's control. In the long run however, the co-generation units may become take-over or merger candidates. However, they will possess the resources necessary to dictate terms favorable to their current customers and owners. Another variation of focus strategy concerns utilities that are rapidly approaching capacity limits in regions with rapidly increasing demand. They are adopting programs similar to the first subset for consumers. However, they are not starting from a weak position and have begun developing IPPs in adjacent territories. This is a strategic deviation from the past and is a strategy that could be pursued by others as their regional areas experience greater energy shortages. In the long run these utilities will have an improved chance of survival since they are attuned more closely to developing market conditions.

The final focus strategy relates to firms that will maintain generation overcapacity. These utilities will place the bulk of their efforts in the wholesale off-system sales area. They will have to sell to the distant customer while entering into agreements with utilities whose territory is being crossed. A major weakness with this strategy is complacency. The firms often focus primarily on internal marketing efforts to expand residential and commercial use, while attempting to prevent loss of industrial customers to co-generators. Therefore, this third group should focus on internal resources in addition to developing long range plans to address external activities in their primary program areas.

The third basic strategy being employed within the electricity supply industry is differentiation through

diversification. Two basic subgroups are involved; (1) those that acquire unrelated businesses in an attempt to stabilize overall earnings, and (2) those that take calculated risks by diversifying into compatible lines of business. In the first subgroup, if acquisition is poorly executed the overall impact on the parent utility company will have an adverse effect on corporate earnings. These firms will most likely lose their utility subsidiary through a takeover. The second subgroup consists of utilities that carefully choose acquisition candidates. These firms are unique because they willingly permit open access for moving power across their transmission equipment by outside organizations as a merger condition. The "open access" to transmission lines for all suppliers is an idea feared by many electric utilities. By having full knowledge of new suppliers and consumers they will also be able to more quickly tap and control developing markets.

Future research should focus on the relative importance of each strategy described in this paper and other emerging strategies. Of particular importance to the strategist would be the development of a contingency model that suggest when certain situational variable point to the adoption of a specific strategy. Use of the model would ensure maximal adaptability by the firm while simultaneously insuring customer needs are met in a profitable and socially responsible manner.

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PREPAID TUITION PLANS MAY BE A VIABLE ALTERNATIVE TO FUND A COLLEGE EDUCATION

BRUCE SWINDLE, CPA, Department of Accounting, McNeese State University
DARYL V. BURCKEL, CPA, Department of Accounting, Mississippi State University

INTRODUCTION

As legislators and governors struggle to balance spending and revenue, some states have slashed higher-education budgets to help close the budget gap. Many lottery states facing budget gaps have attempted to divert lottery proceeds meant for schools and other causes. These circumstances have led to some disturbing findings in a survey by the American Association of State Colleges and Universities (AASCU). The survey revealed that in fiscal year 1990-91, thirty states cut higher education budgets by an average of 3.92 percent. These budget cuts have led to double-digit tuition increases and a sharp rise in student fees.

Higher education costs for universities and tuition fees for students have increased dramatically during the 1980s and likely will continue to rise during the 1990s. One estimate is that by the year 2000 the cost of tuition, fees, room and board, plus other miscellaneous expenses of a four year degree will be $52,400 at public institutions and twice that, $104,800, at private universities [1]. Competitive faculty salaries, modern educational equipment, insurance, travel costs and many other factors have institutions struggling to keep their cash flow positive. College presidents in twenty-two states have indicated that their budgets for academic year 1991-92 will be less than the 1990-91 year's appropriations, while officials in seven other states said they would receive an increase in funding that will be less than the rate of inflation. All of this put together will mean that students will carry more of the burden of the costs of their education as states struggle to provide funding for higher education. Still worse, increased funding for higher education in the future is also unlikely.

In order to address their populations' concerns, several states have created trusts, some separate from their states' influence, with the mission to aid parents in paying for a college education. Michigan was the first state to adopt such a program. "However, nine other states (Alabama, Florida, Indiana, Maine, Missouri,

Ohio, Oklahoma, West Virginia, and Wyoming) have adopted similar programs. . . . at least 40 other states have enacted or are considering some type of program to help cover future college costs" [5]. Most plans generally limit the guarantees for future tuition to in-state institutions; however, private groups are making attempts to offer plans that could be more broadly transferable.

Parents are concerned that a college education may be prohibitive in the near future. Consideration of prepaid tuition programs as a means of funding a college education may provide a means to ease that concern. This article discusses the strengths and weaknesses of prepaid tuition programs and provides an analysis to illustrate their use as a possible alternative in funding a child's future education.

THE PREPAYMENT PLAN

A creative tuition prepayment program is an option for parents who wish to "lock in" the tuition cost of a college education for their children. A prepayment plan sponsored by Michigan was the subject of an IRS private letter ruling outlining the federal tax treatment of the state's proposed prepayment plan. The IRS is challenging some areas of the trusts' structures [2]. At least one financial advisor is recommending against investment into such programs because of the IRS "attack" [3]. However, as of January, 1991, 55,000 students are enrolled in Michigan's educational trust plan and over $350,000,000 has been invested since August, 1988. The tuition program addressed in *IRS Letter Ruling 8901027* offers three different plans from which individuals may choose.

Under the first of the three plans addressed in the Ruling, an individual (e.g., a parent) would make a current payment, or a series of payments, into the education trust. The trust would then contract to arrange for four years of educational services at one of the state's public educational institutions for an irrevocably designated beneficiary (e.g., son or daughter) when that

beneficiary matriculates. The contract would also provide that upon the occurrence of certain specified events, a cash refund of the contributor's payments, less an administrative fee, would be made to a person instead of being utilized for post-secondary education. This person would be irrevocably designated at the time the contract is executed.

Refunds would be allowed to the contributing individuals only if:

(1) the beneficiary dies;
(2) the beneficiary certified that he/she had reached the age of 18 and would not be attending one of the state's colleges or universities;
(3) the beneficiary was denied admission to one of the state's public education institutions; or
(4) the grantor (parent) had elected to make a series of payments into the trust and then failed to complete the series.

However, no refund would be provided if the beneficiary had completed more than one-half of the credit hours required by the educational institution for a bachelor's degree.

Plans two and three were almost identical to the contract under the first plan. Plan two discussed in the Letter Ruling would allow the grantor to receive more than the contributions actually deposited into the trust. This increment would be due to and vary because of the education trust's investment experience. Plan three in the Letter Ruling would operate under the same conditions as the first plan but was set up to provide two years of educational services instead of four.

IMPLICATIONS TO STATES

Income earned by an integral part of a state or a political subdivision of a state is generally not taxable in the absence of specific statutory authority. The state's position is that the trust **is** part of the state, and its income should **not** be subject to federal income tax. In determining if the trust is an integral part of the state or one of its political subdivisions, the Service noted that the education trust was operated autonomously by a board of directors. The board's decisions, including those involving investing activities, could not be vetoed by any state agency. The board of directors of this state's trust consists of the state treasurer and six other persons appointed by the governor. The state's enabling legislation provides that funds collected by the trust are not subject to claims of the state's creditors and are not considered state funds. The funds could only be used for the tuition payment or refund purposes expressly provided in the enabling legislation. Also in this legislation, the state is prohibited from raising the trust's funds for any other purpose, while income earned and property held by the trust are not subject to state taxation. Due to the trust's independence from the state, the IRS found that the education trust "is not an integral part of the state or one of its political subdivisions . . ." and that the trust's income is subject to federal taxation [4].

The consequence to the state is that as the tax expense increases on the trust, the trust will experience higher administrative costs. With higher administrative costs the trust would have to reduce other costs, raise the initial investment, reduce the return to the investor, or invest in higher risk ventures. Any of these possibilities could tarnish the goal of the state by offering such plans. However, one plan (Michigan Education Trust) has incorporated the impact of a negative legal ruling on this issue into its contribution rates and projected return. This process does not, however, negate the fact that the trust must overcome these additional costs.

INCOME TAX IMPLICATIONS TO INDIVIDUALS

In discussing the tax implications for individuals, assume a father has two children, one son and one daughter. The father has made contributions in the education trust for both of his children. The Internal Revenue Service held that when a father executes the contract with the trust and names his son and daughter as beneficiaries, both the son and the daughter realize an accession of wealth. The Service concluded that son and daughter may exclude the father's contributions from gross income as a gift. However, the Service held that the children must include in gross income the excess of the fair market value of the educational services received over the child's basis in this gift from the father.

For example, assume Father contributed an amount to provide tuition of $4,000 per year for four years into an educational trust for Son's benefit at a future date. Son does not recognize income at that point. However, when Son starts school at the educational institution, if the tuition is $6,000 per year, he will recognize income of $2,000 per year.

In a second example, assume Father contributed an amount to provide for tuition for four years into an educational trust for Daughter's benefit. However, at the appropriate time, Daughter certified that she would not be attending one of the state's institutions of higher education and applies for a refund. The Service held that Daughter would realize a gross income to the extent that the amount refunded exceeded Daughter's basis. The service added that neither Father, Son, nor Daughter would be considered in actual or constructive receipt of

income between the time Father contracted with the trust and the time Son received the educational services and/or Daughter received the refund.

With respect to Son's taxable income, the IRS held that Son must substitute Father's basis as his own. Son, therefore, would recognize income to the extent that the fair market value of the educational services to be received for each year exceeded one-quarter of Son's substituted basis in the tuition prepayment contract. Also, Daughter's income would equal the amount of the refund received less the amount of Daughter's substituted basis.

GIFT TAX IMPLICATIONS

The IRS also considered the gift tax implications of the tuition prepayment program. The Service decided that the parents made a completed gift to their child at the time the contract is purchased. However, since the contribution is to a trust, rather than to an educational organization of Section 2503 (e) (2) (A), the payment is **not** excluded from the application of gift tax. Since the child's use or enjoyment of the parents' gift would be delayed, the parents' payment does not constitute a gift of a present interest in property, and is not eligible for the $10,000 annual exclusion under 2503(b). Therefore, gift tax implications should be considered when a tuition prepayment arrangement is contracted.

ANALYSIS

The prepaid plans may be advantageous, provided the guarantee of future tuition is secure. An issue of concern may be the soundness of the guarantee. Prepayments, much like mutual-fund purchases, are pooled for investment. Sponsors are counting on their ability to keep ahead of tuition inflation with investment returns. Investment managers will be under pressure since returns must stay ahead of inflation on an **after-tax basis**. This additional cost may be a serious drawback since current data indicate that college costs are rising faster than the rate of inflation. Plan participants may also be speculating, some with borrowed funds, on a start-up investment fund with no track record. This speculation may also be a cause of concern for such plans. Based on historical rates of return, a 100 percent stock portfolio, indexed to the market, would have kept up with tuition and taxes in the 20th century. However, sponsors might not pick the stocks that will match the market, and a conservative investment strategy may lean to more fixed income securities whose returns after tax have trailed tuition increases.

A question that remains is what happens to plans that do not have enough cash to pay future tuition.

Florida and Wyoming have backed their plans with the full faith and credit of the state governments, meaning that taxpayers will pick up the cost. This, however, is not the case in Michigan where the plan is an independent agency that must make enough on its investments to provide for future tuition payments. Therefore, the risk of the trust going bankrupt is passed on to the parents and could leave the parents having to contribute additional funds to provide college tuition.

The initial contribution to the plan is considered a taxable gift which should not cause a serious drawback. The $192,800 lifetime estate and gift tax credit shelters $600,000 in taxable lifetime gift transfers from tax, which should cover the prepaid tuition payments. The purchaser of the prepayment plan is also insulated from tax on the investment since the tax on the current earnings will be paid by the trust. The prepaid plan also defers tax on the difference between the contribution and fair value of the educational services received until the child attends college. Furthermore, the tax on the increase in value will be taxed to the child, not the parent, which should result in a lower tax liability.

While some financial planners may be steering clients away from prepaid tuition plans, the program may yield significant savings to parents. Table I lists the probable four year cost of a higher education determined under certain assumptions. Note that the cost for a ten-year-old child will probably be $76,286, requiring a one-time investment of $41,215. The total cost in Table I contains tuition, books, fees, room and board, and miscellaneous expenses. The percentage of total costs that tuition usually represents is between 35-50 percent. Therefore, assume that 40% of the one-time investment represents tuition. The tuition portion of the costs would be $16,486 (40% x 41,215). Under a prepayment tuition plan, Table II, the parent of a ten-year-old child would make a one-time investment of $10,356 to provide for four years of college tuition when the child matriculates.

The child will receive a gift of $10,356 from the parents when the prepaid tuition plan is purchased. This payment also does not qualify for the $10,000 annual gift exclusion. However, despite the IRS's characterization of the up-front payment as a taxable gift, it is unlikely that a gift tax will have to be paid as noted earlier. Also since the payment is characterized as a gift, there is no tax to the child, and the child has a basis of $10,356 in the contract.

When the child enters college, the child will realize income to the extent the fair market value (projected cost in Table I) of four years' tuition $30,514 (40% x $76,286) (assuming tuition is equal over four years) exceeds the child's basis in the contract, $10,356.

The basis will be recovered annually over four years. Thus, in the first year the child will realize $5,039 of income (($30,514 ÷ 4) - ($10,356 ÷ 4)). This process would be repeated for each of the next three years. The $5,039 will be included in the child's income and will be taxed at the child's rate.

TABLE I

Projected Cost and Required Funding For Four Years of College
(The exhibit assumes a 7% inflation rate for college costs and an 8% after tax return on investments and current college costs of $10,000 annually.)

| | | Required Funding | | |
Child's Age	Projected four-year college cost	Single payment	Annual	Monthly
1	$140,250	$37,905	$3,848	$323
2	131,074	37,905	4,002	336
3	122,499	38,617	4,177	352
4	114,485	38,978	4,378	369
5	106,996	39,342	4,609	389
6	99,996	39,710	4,879	413
7	93,454	40,081	5,199	441
8	87,340	40,456	5,582	474
9	81,627	40,834	6,052	515
10	76,286	41,215	6,641	566
11	71,296	41,600	7,398	632
12	66,632	41,989	8,410	719
13	62,272	41,382	9,828	842
14	58,199	42,778	11,959	1,026
15	54,391	43,177	15,513	1,333
16	50,833	43,581	22,629	1,947
17	47,505	43,988	43,988	3,791

Source: *AICPA Personal Financial Planning Manual*

TABLE II

1990 Michigan Education Trust Full Benefits Plan Contract Enrollment and Price Chart

Beneficiary's Age or Grade in School. If in School, Use Grade. If not in School, use age.	Academic Year Beneficiary Expects to Enter College	Prepaid Tuition Amount for Four Years
AGE (as of 12-1-90)		
0	2008	$8,380
1	2007	8,540
2	2006	8,704
3	2005	8,888
4 or older and not in school	2004	9,084
Grade (As of Fall 1990)		
Kindergarten	2003	9,296
1	2002	9,516
2	2001	9,748
3	2000	9,972
4	1999	10,196
5	1998	10,356
6	1997	10,504
7	1996	10,648
8	1995	10,780
9	1994	10,860
10	1993	10,908
11*	1992	15,496
12*	1991	15,496

* Contract prices for students who are scheduled to attend college prior to the 1993-1994 Academic Year are based on the current tuition cost for the university with the highest prevailing tuition.

Source: Michigan Education Trust Promotional Brochure.

CONCLUSION

Because the prepaid higher education plan appears to have significant federal tax complexities for both the offering state and the individuals involved, the big losers may likely be potential future university students. Some financial planners seem to be steering people away from these prepaid plans [1]. Nevertheless, states are pursuing this investment opportunity for their residents and people are investing ($350 million for 55,000 future Michigan students). While states are searching for both novel and traditional methods to support their institutions of higher education, it is possible that prepayment trust plans may not receive the investment it expected from parents. The tax implications to the state will increase the cost of the plan along with burdensome record keeping and reporting. These trusts will be "under the gun" to keep investment earnings above tuition increases on an after-tax basis

which could impact on the future security of such an investment.

Curiously, the federal government allows a federal tax exclusion on interest earned for individuals investing in U.S. Savings Bonds when the proceeds are used for qualified educational expenditures. Also, the treasury department is advertising that Series EE U.S. Savings Bonds are "tax-free" without disclosing that the interest earned on these bonds is taxable to persons whose income exceeds certain levels. The advantages of such an exclusion slants the tax benefits of investing in favor of the federal government. Thus, it appears states may not be able to offer innovative plans to their constituents through the use of prepaid tuition contracts in an efficient and effective manner. An available alternative might be for the federal government and the states to coordinate their educational program efforts in

order to provide incentives for investing in a child's higher education, regardless of which governmental entity institutes the program.

These plans do offer significant potential benefits to parents in regard to locking in the cost of college tuition. As seen in the analysis, a parent of a ten-year-old child invested $10,356 and received tuition benefits in excess of $30,500. Parents must remember that the prepaid tuition covers only that -- tuition -- and they must fund the remaining portion of the child's college education, i.e., books, fees, room, board, etc. This cost can be quite considerable and parents also must not neglect to plan for these costs.

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FACTORS INFLUENCING THE BUSINESS GROWTH IN THE STATE OF WASHINGTON 1976-1987

J. ROBERTO GARRIDO, Assistant Professor of Economics, University of the Philippines
ROBERT TOKLE, Associate Professor of Economics, Idaho State University

INTRODUCTION

The purpose of this paper is to show some empirical evidence as to which factors are more important for growth in a state's business activity. There is much controversy over which factors are important. For example, the business-climate ranking of states by Grant Thorton, a Chicago-based accounting firm, emphasizes business costs. On the other hand, the Corporation for Enterprise Development, a non-profit research group based in Washington D.C., uses 100 factors that chart a broad economic and social agenda, such as the education of the labor force, income distribution, and whether government's fiscal and social policies contribute to an entrepreneurial environment. Not surprising, some states like North Dakota rank very high in the Grant Thorton rankings but at the bottom in the Corporation for Enterprise Development (*Wall Street Journal*, 1988).

The effect of business tax rates on business growth and location is one issue that has received a lot of attention in the recent years. Yet in the literature, no consensus has developed on this issue. Due (1961) looked at a number of studies that used econometric or survey methods in establishing a relationship between taxation and industry location within the taxing jurisdiction. The results of his study indicate no significant relationship between location decision by the firm and taxes. Due stated that "While the statistical analysis and study of location factors are by no means conclusive, they suggest very strongly that the tax effects cannot be of major importance" (p.171). In a recent survey of econometric analyses of business tax impacts on firms' locations, Newman and Sullivan (1988, p.232) conclude that this issue is an "open rather than a settled question" and further empirical work is needed.

This study uses a linear regression model to analyze factors that influence business activity (measured by total gross business revenue) for the State of Washington, 1976-1987. An increase in business activity can come from growth of existing firms and/or

entry by new firms. In Washington State, the business tax is based on gross sales and not on profits nor income of the firms. This tax is known as the Business and Occupations (B&O) tax. As of 1987, the only other states whose business tax was based on gross receipts were Indiana and Hawaii.

THE BUSINESS TAX BASE MODEL

The business tax revenue (R_{bus}) is defined as the tax base (B) times the tax rate (r). The tax base for the business tax is the amount of goods that the firms sell multiplied by their prices or its gross revenue. Let the business tax revenue be written in the form:

(1) $R_{bus} = r*B$

and

(2) $B = f$ (INDEX, UR, STB)

where INDEX is a composite index of the rates of sales tax and the business tax paid by the business sector in the state, UR is the state's unemployment rate, and STB is the sales tax base.

VARIABLES

The variable INDEX will capture the effects of changes in the rates of the sales and the business taxes on the decision of the firm to supply goods and services. This is a proxy measure of the effects of a given tax structure on the firm's decision to establish residency in a particular state.

The state's unemployment rate UR captures the effects of business cycles on the firm's output. The sample period between 1976 and 1987 for the State of Washington witnessed various economic phases of the business cycle. The graph below shows the changes in the economic environment as measured by the rate of unemployment for the State of Washington. From the first quarter of 1976 up to about the middle of 1979, the economy experienced a drop in the unemployment rate.

This period is characterized by strong economic activity. The following period from the middle of 1979 up to about the third quarter of 1983 exhibited a sharp rise in unemployment. This rise in unemployment is typical in an economy experiencing recession. The third and final period is a recovery period where the unemployment rate starts decreasing and economic activity starts picking up. This started from the third quarter of 1982 and went through the end of the sample period, the first quarter of 1987.
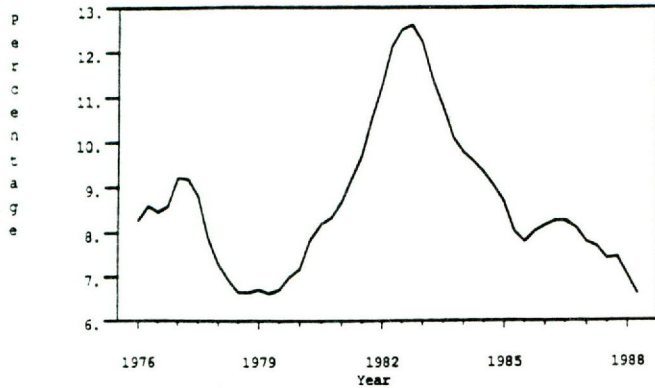

Figure 1 The Rate of Unemployment for the State of Washington

The last variable, STB, represents a measure of the firm's sales from the previous year. This is the sum of the sales tax collection from the household and the business sector. A firm's decision to supply the market this year may depend on last year's level of sales.

Following Wasylenko (1987), the unemployment rate (UR) is a function of population (POP), electricity price (SEATE) and natural gas price (NGAS) such that:

(3) $UR = h$ (POP, SEATE, NGAS)

We can rewrite equation (2) as:

(4) $B = f$ (INDEX, POP, SEATE, NGAS, STB)

If the elasticities are constant, then taking the logs of equation (4) gives us the following form:

(5) $\ln B = \ln A + \ln INDEX + \ln POP + \ln SEATE + \ln NGAS + \ln STB$

where A is some constant. Equation (5) is estimated in the regression analysis.

DATA

The data for this study were obtained from the Department of Revenue, Washington State. This data set contained detailed information on the two main taxes in Washington State as well as the other economic variables. The period analyzed by the study was from the first quarter of 1976 until the first quarter of 1987, for a total of 45 quarterly observations for all of the variables.

The tax base model in equation (5) has six variables including the dependent variable ln B, the log of the total taxable output of the business sector.

The distribution of the business tax burden for the State of Washington may be broken down according to the percentage shares of the different taxes that the business sector pays. The shares are: Sales and Use (33%), State B&O (28%), Property (28%) and Miscellaneous (11%). The property tax rate showed very little change while both the sales and the business tax rates changed significantly during the period. And since the business tax rates across industry varied, a simple average of the rates was used as the proxy for the business tax rate. Then, the log of the weighted average of the sales tax rate and the business tax rate was calculated for the variable ln INDEX.

Ln POP is the log of the total population of the State of Washington. The logs of the prices for electricity and natural gas are represented by ln SEATE and ln NGAS respectively.

The variable ln STB is the log of actual taxable sales for the whole economy, lagged four quarters. This variable was included to capture the effects of last year's sales on the current year's output.

EMPIRICAL RESULTS

Elasticity Estimates for the Business Tax Base Model

Dependent Variable: ln B

Explanatory Variable	Parameter Estimate	Standard Error
Constant	37.78	3.14
ln INDEX	0.13	0.10
ln POP	3.96	0.38
ln SEATE	-0.12	0.03
ln NGAS	-0.15	0.03
ln STB	0.49	0.05
R-Squared	0.98	
DW Statistic	1.60	

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Squares (OLS). All of the variables are statistically significant at the 5% level except for ln INDEX. Hence, the rates for the sales and the business tax for Washington State were not a significant factor in the level of output of the firms. This may suggest that other factors included in the regression were more important in influencing the business output. The variable ln POP has a coefficient of 3.96. This means that a 1% increase in the population leads to about a 4% increase in the base of the business tax. Both energy prices are significant with the expected signs. Wasylenko (1987) reported the same signs when he did a similar study for the State of Nebraska.[1] The last variable ln STB, the log of the sales tax base, is significant and inelastic having a value of 0.49. If the assumption that a firm's last year's output affects current level output is true, then a 1% rise in the previous period's output leads to roughly a 0.5% rise in the current period's output.

CONCLUSION

This study analyzed some factors which were hypothesized to influence growth in business activity for the State of Washington, 1976-1987. The tax rate index is the only variable that is not significant, suggesting that the tax rates in the range of their current levels were neither a help nor a deterrent to business growth. One possible explanation comes from Helms (1985, p. 581), who states that

> "...taxes cannot be studied in isolation. To the extent that tax revenues are devoted to the provision of public services which are valued by businesses and their employees, a state may encourage economic activity within its borders with appropriate expenditures.... States which seek to devote substantial tax revenues to transfer payments will experience significantly reduced growth prospects."

Since the tax revenues in the State of Washington is spent in both public services valued by the business and transfer payments, the insignificance of the business tax index is no surprise.

All the other variables had significant effects on business growth. Population is positive with an elasticity of nearly 4. Population growth should especially impact the service industries, which cannot be imported from outside Washington State. Sales tax base is also positive, but inelastic at 0.49. Lastly, both energy prices have negative signs, as expected for any production input, and had very inelastic effects on the business activity for the State of Washington.

NOTES

1 Wasylenko (1987) regressed the employment rate on several explanatory variables which included prices for natural gas and electricity and population size for eight industries between 1980 and 1985. The employment rate variable was used as a measure of growth in these eight industries.

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