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## Credit Union Growth as Related to Dividends

John W. Lewis

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CREDIT UNION GROWTH AS  
RELATED TO DIVIDENDS

by

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Bachelor of Science in Mathematics

St. Lawrence University, 1964

An Independent Study

Submitted to the Faculty

of the

University of North Dakota

in partial fulfillment of the requirement

for the degree of

Master of Business Administration

April  
1974

This independent research report submitted by John W. Lewis in partial fulfillment of the requirements for the Degree of Master of Business Administration from the University of North Dakota is hereby approved by the Advisor under whom the work has been done.

  
\_\_\_\_\_  
Advisor

Permission

Title: CREDIT UNION GROWTH AS RELATED TO DIVIDENDS

Department: College of Business and Public Administration

Degree: Master of Business Administration

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## ABSTRACT

This study is a regression analysis of credit union growth upon dividend rates paid. It discusses credit union cash flows first, and then the developing problem of increasing demand for high dividends in the face of lawfully limited income. It shows a clear necessity to understand relationships between credit union growth and dividend policy.

In this study, 175 Department of Defense sponsored credit unions were divided into four groups according to size. For each group the growth rate of every credit union was plotted in a scatter diagram against the corresponding dividend per cent paid. Using regression analysis, a best-fit line was drawn through the data, thus representing a mean growth rate for the sample as a function of dividend rate. In each of the four size groups, this line was statistically compared to a hypothetical universe mean line with a zero slope. This zero slope line would imply a no-correlation situation between the two variables. Dependency of growth upon dividend rate was shown by rejecting the hypothesis that the sample slopes would likely be randomly selected from a universe with such a zero slope.

The study shows these computations in detail for one of the groups and presents the analysis results for the remaining groups. Dependence was shown in the very small credit unions and in the rather large ones, but it could not be shown with statistical significance in medium sized ones.

## CHAPTER I

### INTRODUCTION

#### Background

A credit union, whether chartered under state or federal laws, has the purpose of promoting thrift among its members by affording them an opportunity to accumulate their savings, and of creating for them a source of credit for provident or productive purposes. The credit union is simply a cooperative financial institution--a union of people pooling their money to help one another. The people who belong to the credit union both own it and control it. It multiplies the relatively modest financial resources of its members into a powerful economic force for the common good.

The credit union is different from other financial institutions in that it is a nonprofit organization serving its membership--its owners. The credit union philosophy recognizes that the man who needs credit the most is the least prepared to buy it. This philosophy also recognizes that "Enjoy now - pay later," though a way of life today, is not well understood and is frequently disastrous. This philosophy includes education and protection as well as convenience for its membership. Since the credit union is a nonprofit, tax exempt organization, excess income is returned to the members.

Figure 1, on the next page, summarizes the cash flow within a credit union. The picture is not complete, of course, until the cycle



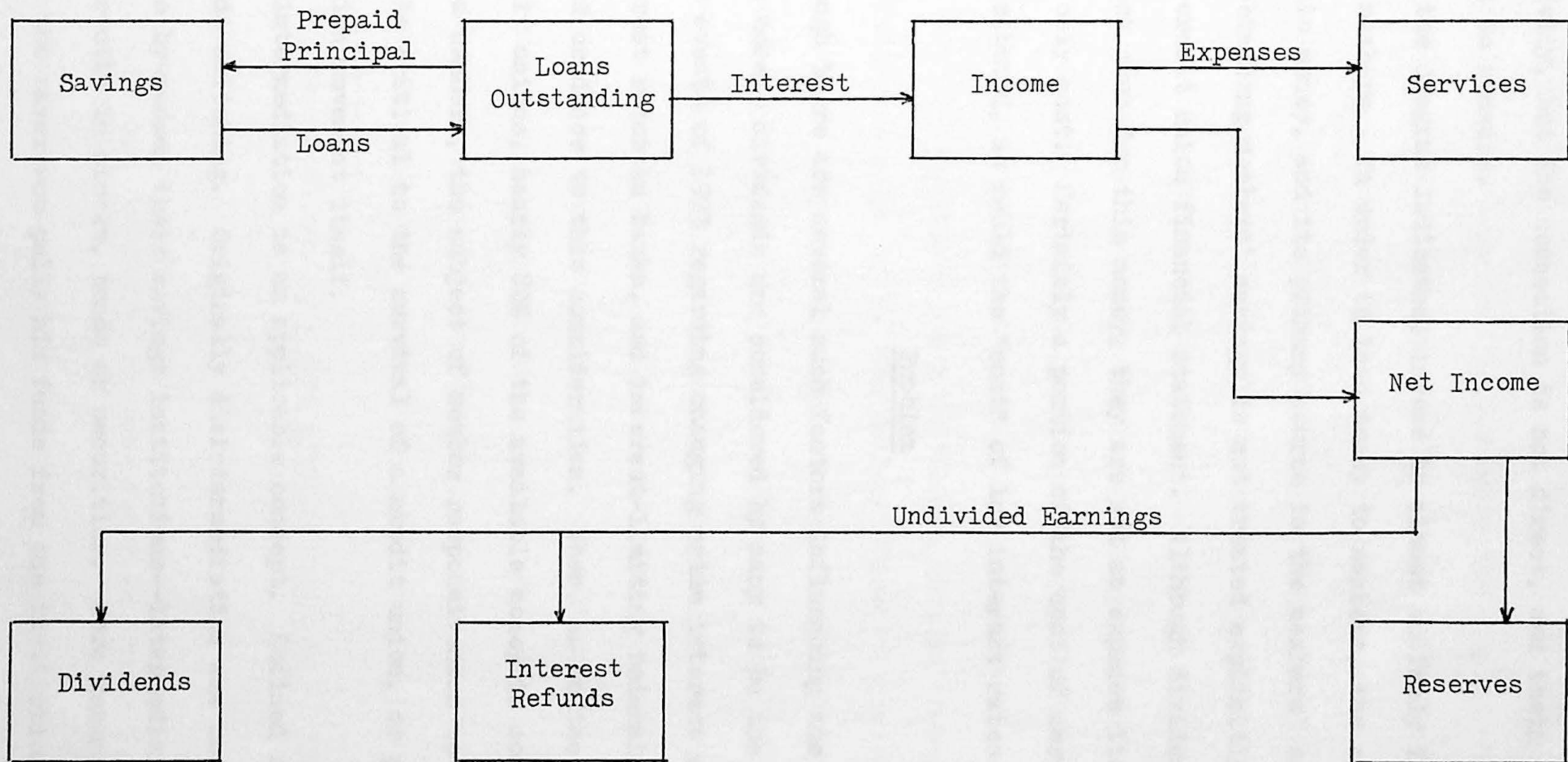


Fig. 1.--Cash Flow Within A Credit Union

is complete. Services, dividends and refunds stimulate savings and loan activity, but the connection is not direct, and their effect is difficult to measure.

As the diagram indicates, income is almost entirely interest on loans to members. In order to loan money to members, the credit union must obtain money, and its primary source is the members' savings. The cost of obtaining members' savings is not treated explicitly in the ordinary credit union financial statement. Although dividends are the most direct cost for this money, they are not an expense item, nor are they the only cost. Certainly a portion of the cost of services could be so attributed, as could the "cost" of low interest rates on loans.

#### Problem

Though there are several such factors influencing the cost of available money, dividends are considered by many to be the predominant one. The events of 1973 regarding changing prime interest rate, "wild-cat" interest rates in banks, and interest-limiting federal legislation would lend credence to this consideration. When, as is the case with most credit unions, nearly 80% of the available money is controlled by 20% of the members, the subject of member responsiveness to dividend rate may be critical to the survival of a credit union, or perhaps the credit union movement itself.

Disintermediation is an applicable concept. Defined simply it means funds switching. Originally disintermediation was used to describe savers who by-passed their savings institutions--intermediaries--to invest directly in stocks, bonds or securities. More recently the word describes the saver who pulls his funds from one institution to chase

after higher interest rates in another savings institution or in stocks, bonds and securities.<sup>1</sup>

Several studies have been conducted in the area of disintermediation and credit unions. One done by "The Credit Union Magazine" found conditions varying widely from no effect, to low interest rates with no funds to lend, to record high loans at high rates.<sup>2</sup> Another study, done by the Research and Development Division of the Credit Union National Association in the summer of 1973, found indications that some credit unions experienced net share decreases apparently related to changing interest rates on savings. But the effect was reportedly small and limited primarily to only the very largest institutions.<sup>3</sup> Nevertheless, disintermediation was blamed for a \$2 million national credit union savings decline in July, 1973. The National Credit Union Administration amended its rules to raise the legal savings dividend ceiling for federal credit unions from 6% to 7% as a direct result.<sup>4</sup>

Despite the confusing information available, there can be no doubt that there is an upward trend in demand for higher returns on savings. Figure 2 shows this trend in Department of Defense sponsored credit unions. Between 1971 and 1972 the percentage of credit unions paying between 5½% and 6% increased considerably, and the percentage paying over 6% doubled. When this upward trend is weighed against a 12% lawful

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<sup>1</sup>"Disintermediation," The Credit Union Magazine 38 (October, 1973), 26.

<sup>2</sup>Ibid.

<sup>3</sup>Credit Union National Association, Research & Development Division, "The Impact of Rising Interest Rates on Credit Unions," (Madison, Wisconsin, 1974).

<sup>4</sup>"Credit Union News," The Credit Union Magazine 38 (October, 1973), 13.



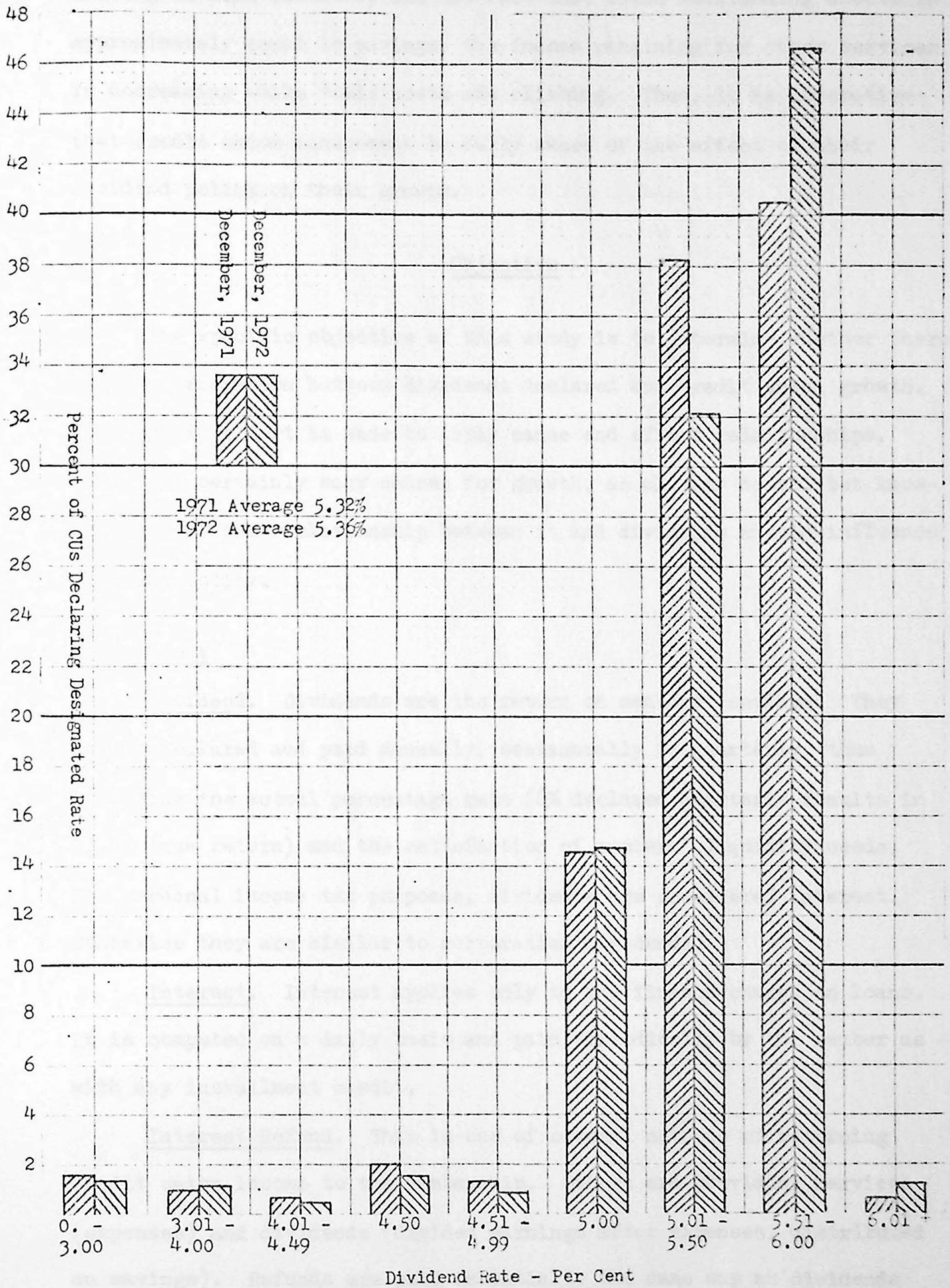


Fig. 2.--Defense Credit Union Dividend Distribution by December Rate

ceiling on loan interest, and the fact that loans outstanding should be approximately equal to savings, the income remaining for other services is decreasing while their costs are climbing. Thus, it is imperative that credit union management be fully aware of the effect of their dividend policy on their growth.

### Objective

The specific objective of this study is to determine whether there exists correlation between dividends declared and credit union growth. No specific effort is made to imply cause and effect relationships. There are certainly many causes for growth, as already noted, but knowledge about some relationship between it and dividends should influence dividend policy.

### Definitions

Dividend. Dividends are the return on members' savings. They may be declared and paid annually, semiannually or quarterly, thus affecting the actual percentage rate (6% declared quarterly results in 6.14% true return) and the satisfaction of members' liquidity needs. For personal income tax purposes, dividends are considered interest. Otherwise they are similar to corporation dividends.

Interest. Interest applies only to the finance charge on loans. It is computed on a daily basis and paid periodically by the member as with any installment credit.

Interest Refund. This is one of several methods of returning credit union income to the membership. Others are providing services (expenses) and dividends (divided earnings after expenses, distributed on savings). Refunds are paid essentially the same way as dividends





## CHAPTER II

### METHODOLOGY

#### Method Summary

The overall approach used toward investigating a potential relationship between growth and dividends is a logical sequence of steps as follows: Factors influencing growth were first identified. A number of assumptions were made about these factors, and they will be discussed with data selection. Characteristics of desired data were derived from these assumptions in order to develop homogenous groupings. Then the data itself was obtained and grouped as planned. Through regression analysis, a mean growth rate was estimated as a linear function of previously declared dividends. Regression was then statistically determined based on several other necessary assumptions.

#### Growth Factors, Assumptions and Selection Criteria

One of the most basic factors influencing growth of a credit union is the nature of the membership it serves. A requirement for chartering a credit union is that its members must have some common bond. That common bond can be virtually anything, but it is usually based on either employment or residence. This study samples a common bond that would cut as broad a cross section of American society as possible--the Department of Defense. This common bond is technically one of employment, but it resembles that of residence in that each "class" of society is

represented in a relatively small locale. The number of credit unions represented is one of the largest of any similar common bond groups, and data from this group is readily available through the Credit Union National Association, Inc.

Another significant factor influencing growth is the savings and loan market in which the credit unions compete. Credit unions sponsored by DOD (within the United States) are generally located in relatively urban areas so as to compete locally with several banks, finance companies, savings and loan associations, and other financial institutions.

Objectives of the credit union management may be a factor in growth. Some credit unions tend to favor the borrower rather than the saver. This can be done by charging lower interest rates, interest refunds, or through increasing expenses for borrower benefits (loan protection insurance, for example). Others favor the saver through life savings insurance, minimum expenses in the loan department, and maximum dividends. Yet others may attempt to provide the maximum benefits to both groups. In order to eliminate those credit unions which clearly do not aim their services toward savers, those paying less than the then current passbook interest rate of  $4\frac{1}{2}\%$  were not included in the sample.

An important criterion for the saver is the degree of certainty in receiving his expected dividend. For most savers the only indication in this area is the consistency with which the dividend has been paid in the past. To assure consistency in the sample, only credit unions paying their dividend regularly and unchanged over the analyzed growth period were included.



There are many other characteristics associated with an individual credit union which may affect its growth. There are so many that a study of this size must generally limit itself to merely one or two. To attempt analysis of more would preclude timely results. One of these characteristics, however, is commonly used in discussion of credit union growth, and that is the size of the business. In an effort to be consistent with other studies and discussion, credit unions were divided into four size groups in order to determine whether correlation between dividends and growth is constant.

#### Data Source

Data regarding growth in these groups was obtained from the National Credit Union Association, Inc., specifically from their Defense Credit Union yearbooks for 1971<sup>5</sup> and 1972.<sup>6</sup> These yearbooks provide detailed information on assets, savings, reserves, loans, dividend rates and many other areas for specifically named credit unions responding to the NCUA survey. In 1971 98% of all defense credit unions responded to NCUA's survey, and in 1972 a 100% response was received. All credit unions responding both years and which otherwise qualified as stated above, were included in the study.

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<sup>5</sup>Polner, Walter, Credit Unions Serving the Defense Establishment at the End of 1971 (Madison, Wisconsin: Credit Union National Association, 1972).

<sup>6</sup>Polner, Walter, Credit Unions Serving the Defense Establishment at the End of 1972 (Madison, Wisconsin: Credit Union National Association, 1973).

### CHAPTER III

#### ANALYSIS

There were 175 defense credit unions qualifying in this analysis. Their assets ranged from under \$200,000 to over \$50 million at the end of 1971. Each credit union was placed in one of four groups as follows: (1) those with one million dollars or less, (2) one to five million, (3) five to ten million, and (4) over ten million. Percentage growth in assets and dividends paid were plotted in scatter diagrams according to size grouping. An estimated line of regression was computed separately for each group using the linear regression formula, with variables " $\Delta$ " indicating per cent growth and "D" indicating dividend paid:

$$\Delta = \bar{\Delta} + b (D - \bar{D}), \text{ where}$$

$\Delta$  = the mean percentage growth for any given value of D.

$$\bar{\Delta} = \frac{\sum \Delta_i}{n} = \text{the sum of all growth percentages in the group}$$

divided by the number of pieces of data; the mean growth for the size of the group.

D = the declared dividend rate.

$$\bar{D} = \frac{\sum D_i}{n} = \text{the mean dividend for all credit unions in the}$$

group.

$$b = \frac{\sum D_i \Delta_i - \frac{\sum D_i \sum \Delta_i}{n}}{\sum D_i^2 - \frac{(\sum D_i)^2}{n}} = \text{the slope of the sample}$$

regression line.



Using the group of 0 - \$1 million:

$$\begin{aligned} \sum D_i &= 174.0 \\ \sum \Delta_i &= 648.8 & \bar{D} &= 5.4 \\ \sum D_i \Delta_i &= 3623.2 & \bar{\Delta} &= 20.3 \\ \sum D_i^2 &= 951.3 & n &= 32 \\ \sum \Delta_i^2 &= 17,770 \\ b &= \frac{3623.2 - 3527.8}{951.3 - 946.1} = 18.7 \text{ (figures rounded)} \\ \Delta &= 20.3 + 18.7(D - 5.4) = 18.7(D) - 80.68 \end{aligned}$$

The regression lines for each of the four groups was computed in this manner, and they are shown in Figures 3 through 6.

In making these estimates, two assumptions were made. This study has not examined either for any estimate of accuracy. First, it was assumed that regression is approximately linear through the range of dividends sampled, and second, that growth distributions for each dividend have a single common variance.

In the case of sample distributions, the computed value of individual variances is a mean-square deviation of sample points from the estimated regression line. The positive square root of this value is often called the standard error of estimate. In the case of the zero to one million dollar group again:

$$\begin{aligned} s^2 &= \frac{n-1}{n-2} (s_{\Delta}^2 - b^2 s_D^2) \\ s_{\Delta}^2 &= \frac{\sum \Delta_i^2 - \frac{(\sum \Delta_i)^2}{n}}{n-1} = \frac{17770 - 13154}{31} = 149 \\ s_D^2 &= \frac{\sum D_i^2 - \frac{(\sum D_i)^2}{n}}{n-1} = \frac{951 - 946}{31} = 0.16 \end{aligned}$$

$$s^2 = \frac{31}{30} [149 - 349.7 (0.16)] = 96.1$$

$$s = 9.8$$

The results of this analysis for each group are presented in Table 1 on page 15.

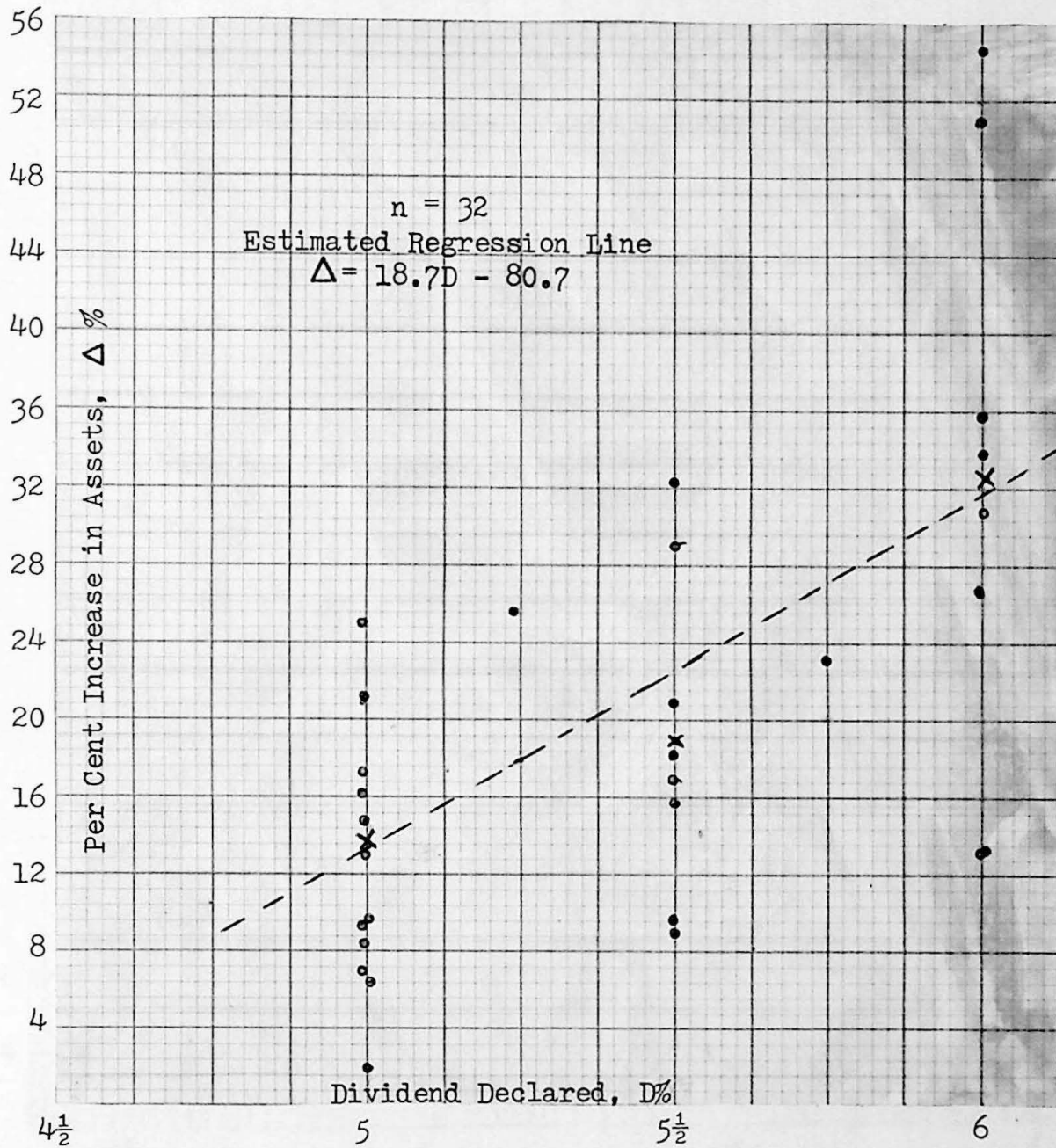


Fig. 3.--Growth Distribution by Dividend Rate, \$0-1 Million Group.

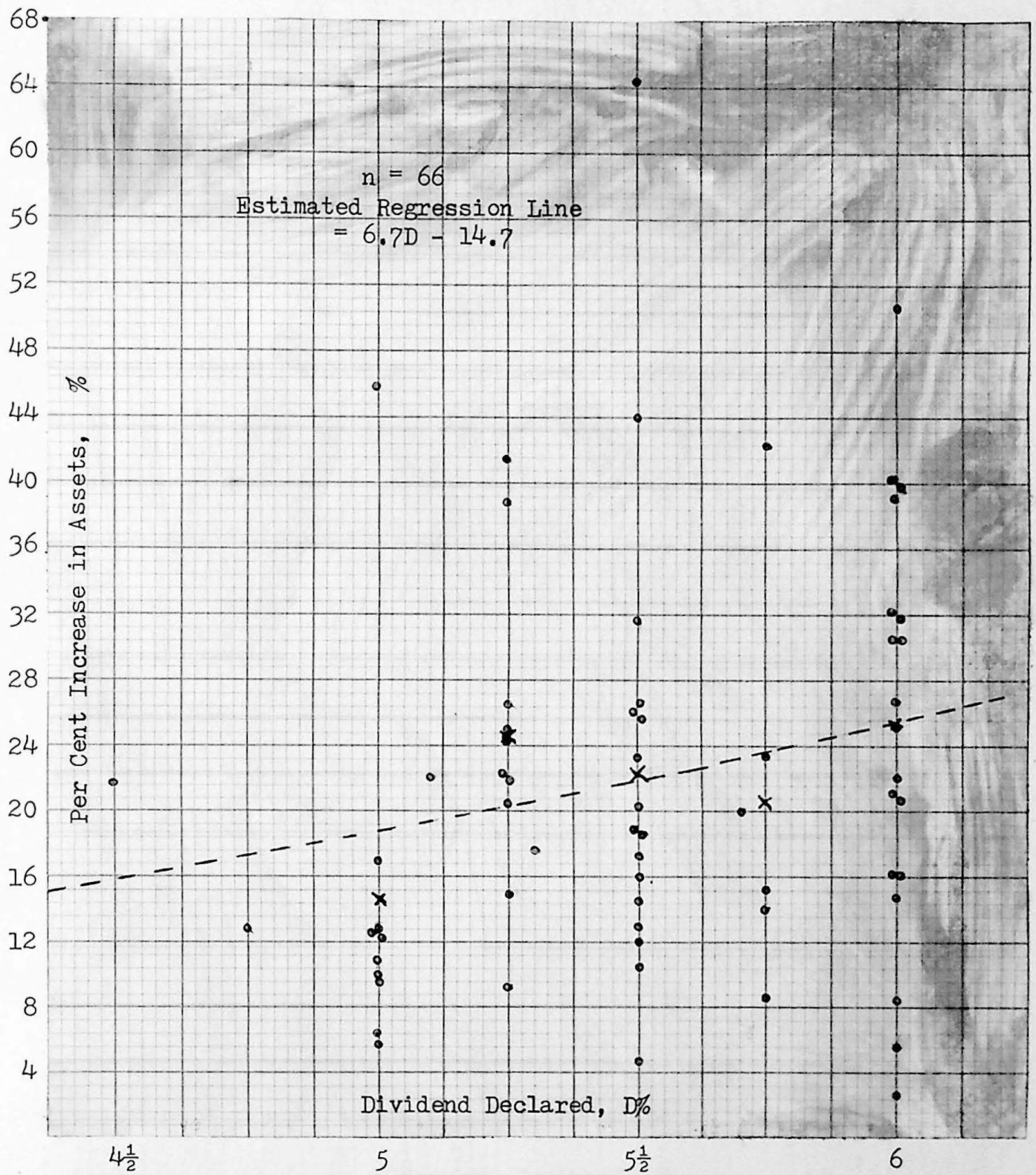


Fig. 4.--Growth Distribution by Dividend Rate, \$1-5 Million Group



TABLE 1

VARIANCE AND STANDARD ERROR  
FROM REGRESSION ANALYSIS

	GROUP			
	0 - 1	1 - 5	5 - 10	10 +
$s^2$ :	96.1	145.8	9.01	70.3
$s$ :	9.8	12.1	3.0	8.4

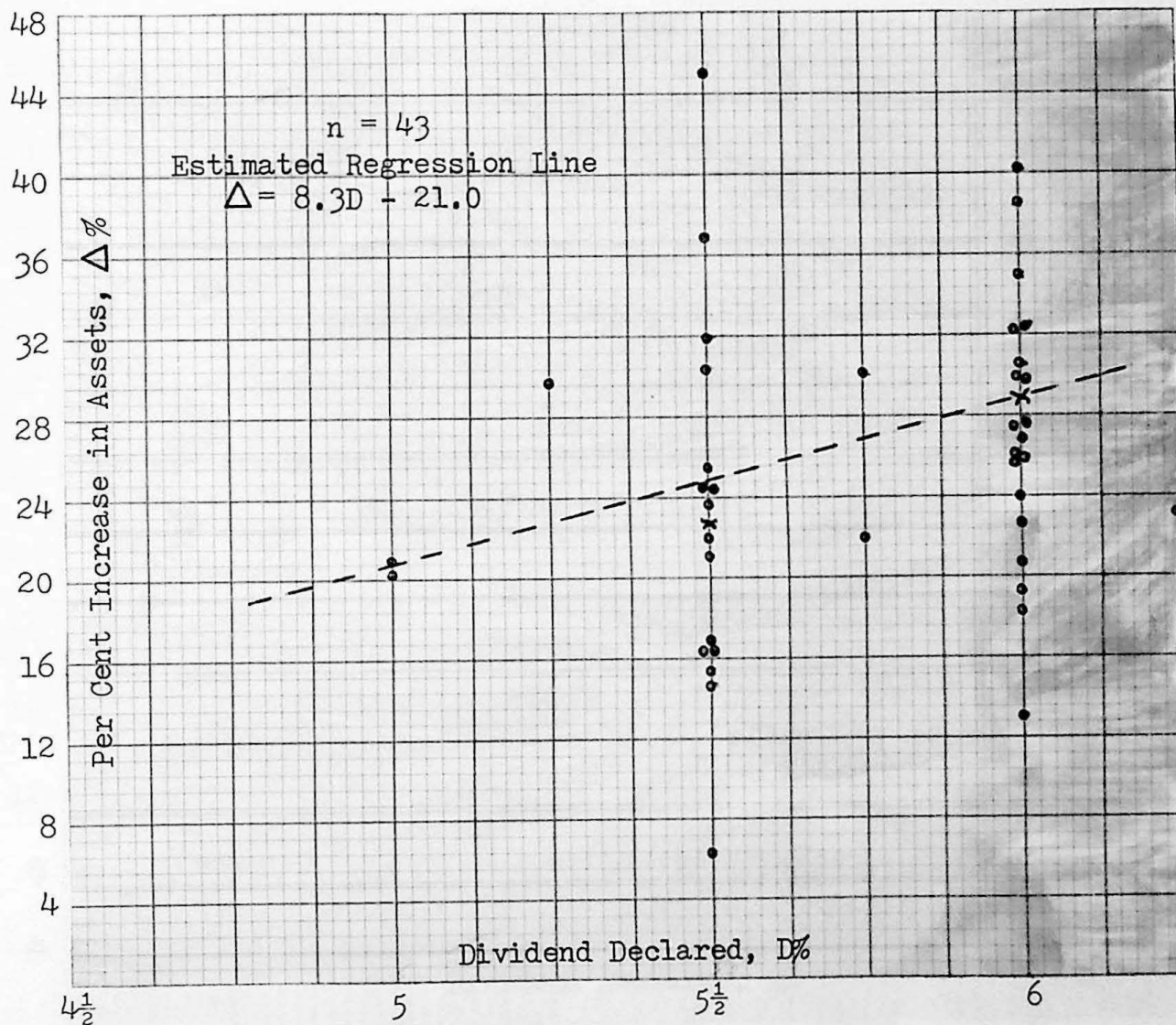


Fig. 5.--Growth Distribution by Dividend Rate, \$5-10 Million Group

In all of the analysis so far, the only assumptions were those stated previously. Assume now that the distribution of  $\Delta$  for any given  $D$  is a normal distribution. Using this assumption, it is possible to indicate by confidence intervals estimates of the regression line slope. This is an assumption, but one that is not entirely untested. A chi-square test for goodness of fit to the normal curve was applied to two of these distributions, the 6% dividend in both the \$1 million to \$5 million dollar and the over \$10 million dollar groups. In both cases the test showed the distribution to be normal at the 5% level of significance.

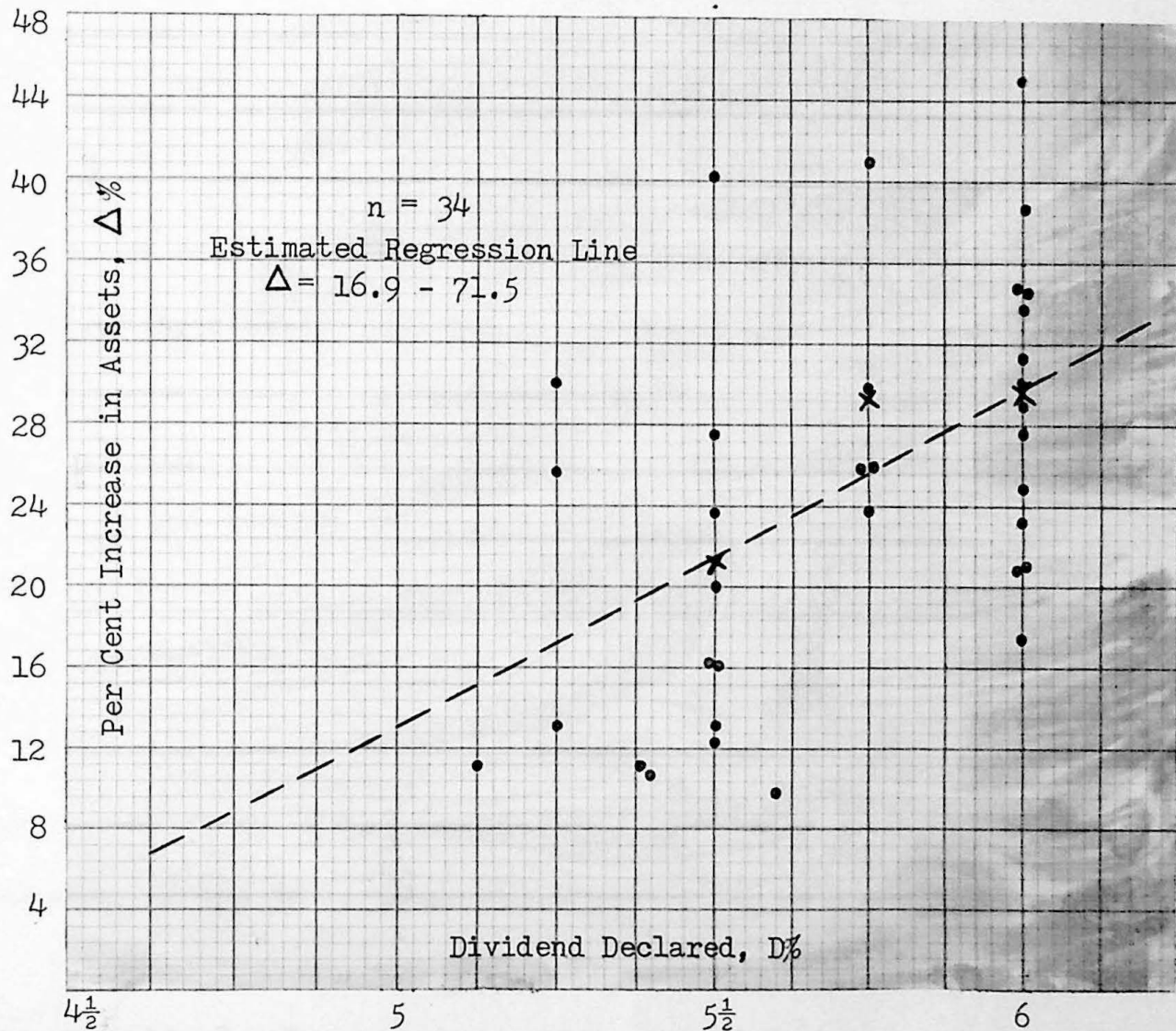


Fig. 6.--Growth Distribution by Dividend Rate, Over \$10 Million Group



If the normalcy assumption is satisfied, then the sampling distribution of "t" is a t distribution with (n - 2) degrees of freedom, where:

$$t = \frac{(b - M) s_D \sqrt{n - 1}}{s}$$

This t distribution can then be used to test for dependence using standard statistical tables.

One way to test for dependence is to disprove independence, or to disprove that the slope of the "population" regression line (M) equals zero. Substituting, the test statistic t then becomes:

$$t = \frac{(b - 0) s_D \sqrt{n - 1}}{s}$$

with n - 2 degrees of freedom. In the case of the zero to one million dollar group:

$$t = \frac{(18.7) (.4) (5.57)}{9.8} = 4.25$$

The "null" hypothesis, that M = 0, is rejected if:

$$t_{\frac{1}{2}\alpha} (n - 2) > t > t_{1 - \frac{1}{2}\alpha} (n - 2),$$

where  $\alpha$  is the desired level of significance. From standard statistical tables of percentiles of the t distribution with 30 degrees of freedom, reject the null hypothesis if:

$$-2.04 > t > + 2.04$$

Since t = 4.25, which is greater than 2.04, we have sufficient reason to accept, at the 5% level of significance, that  $\Delta$  is dependent on D.

The same test was applied to the remaining three groups with results shown in Table 2. Dependency is shown at the 5% level in the 0 - 1, the 5 - 10, and the 10 + groups, but not in the 1 - 5 group.

TABLE 2

VALUES OF THE T DISTRIBUTION AND  
CRITICAL RANGE FOR EACH GROUP

	GROUPS			
	0 - 1	1 - 5	5 - 10	10 +
t:	4.25	1.74	5.38	3.23
Critical Range :	<u>+2.04</u>	<u>+2.00</u>	<u>+2.02</u>	<u>+2.03</u>

## CHAPTER IV

### SUMMARY AND CONCLUSIONS

#### Conclusions

Given the assumptions made in gathering this data and in analyzing it, then there is indeed regression between credit union growth and the rate at which it pays dividends. Although there was insufficient data to show this regression in all size groups tested, it was shown, with only a 5% probability of error, that there is regression in credit unions with less than \$1 million dollars and in credit unions with assets over \$5 million dollars.

It appears that the rate of regression may depend on the size of the credit union. We can be most certain about regression in that group which showed the smallest standard error of the estimated regression line--the \$5 - \$10 million dollar group. However, in this group credit union growth regresses on dividends at a lower rate than it does in the groups of extremely large or small credit unions. The slope of the regression line here is smaller, but the probability of its accuracy is greater. In the extremely large or small credit unions, growth regresses twice as fast, but there is a slightly greater possibility of error in these estimates.

#### Implications

The rate of regression might be interpreted as responsiveness to dividends on the part of membership. If so, it would seem that in very



small credit unions there are probably very few members with sizeable deposits, but each of them is very aware of their credit union's operations. In the very large credit unions, services are more impersonal, and the membership deposits are drawn by the most visible credit union benefit, its dividend. It is still possible that services or other factors may be dominant in the medium-sized credit unions.

In another area of speculation, the assumption of linear regression may be challenged. This is indeed a possibility, for if the pattern resembles correlation between dividends and savings growth, the slope of a non-linear regression line would increase as dividends do over the tested range. If this is so, it would logically tend to confirm rather than dispute the correlation between growth and dividends.

The second assumption about distribution, that distributions of growth on each dividend rate all having a common variance, may also be challenged. If so, the trend would be toward an increasing variance as dividends increase (determined by observation of Figures 3 - 6). This would be an expected result of a non-linear regression with an increasing slope as discussed above, and hence also tends to reconfirm the correlation.

Therefore, if the assumptions made in this analysis are accepted, there is definite regression in most cases; and, if the assumptions are rejected, the likelihood of correlation seems perhaps even greater.

Clearly, with the increasing pinch between cash sources and uses, there is increasing need for research in dividend policy, services, and loan policy if the credit union movement is to continue.

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