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Debt and Dividend Decisions: Stock vs. Non-stock Firms

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ABSTRACT

This study tests the trade-off and pecking order theories about the debt and dividend decisions for stock and non-stock firms. The decision to finance investments with debt or equity determines the firm's capital structure. The trade-off theory posits an optimal balance of debt and equity, motivating the firm to use debt until its cost exceeds issuing equity thus deriving the firm's optimal capital structure. Meanwhile, the pecking order theorem contends the firm should use internal funds first, then debt, and equity as a last resort. Both theories have the same fundamentals for the payout of dividends. More profitable firms with less risk and debt should pay out more dividends. Unlike previous work, this study examines both stock and non-stock firms. Capital credits or dividends are the accumulated profits (or retained earnings) the not-for-profit cooperatives payout to their owners who are also the firms' customers. This study's non-stock sample consists of over 800 rural electric cooperatives (RECs) while the stock company sample includes the 1700 firms followed by Value Line Investment Survey. For both samples, this study analyzes financial data using OLS regression to test the effects of selected financial variables on the debt and dividend decisions. Debt and dividend decisions for the non-stock firms support the trade-off hypothesis. For the stock firms analyzed in this study, the dividend decisions support the trade-off theory while the debt decisions follow the pecking order hypothesis.

INTRODUCTION

The purpose of this study is to examine what drives debt and dividend decisions in stock and non-stock firms. In the case of non stock firms, the driving factors behind the payment of capital credits will be analyzed. Capital credits are the equivalent of dividends for a stock company. How do growth opportunities and the current financial structure influence these payments, and to what degree is profitability a factor for pay out decisions? Most importantly, what effect does the degree of financial leverage caused by debt financing have on pay out decisions?

This paper uses empirical models previously derived by scholars within the field to compare the effects of selected independent variables on payout and debt decisions within U.S. stock firms and, in particular, the electric utility industry. This includes the evaluation of payout and debt decisions for publicly owned firms vs. rural electric cooperatives (RECs). Pay out decisions in

both stock and non-stock firms are found in the literature, but a comparison of the two has been overlooked in previous research. The studies previously performed on dividend and debt decisions have been for firms in numerous industries. In order to gain a more accurate insight into these decisions this research examines a sample of firms from all industries along with a separate sample including only non stock firms in the electric utility industry. This research adds to the body of finance literature by analyzing debt and dividend decisions in both stock and non stock populations of firms.

LITERATURE REVIEW

A review of the finance literature claiming to explain the factors motivating the debt and dividend decisions lays the preliminary foundation for this research. Concepts and theories on debt and dividend decisions seem to be ever-changing. This could be contributed to different groups of firms being tested or changing market conditions. However, scholars seem to have agreed upon a select group of independent variables that affect the debt and dividend decisions. This study will utilize these variables suggested by the literature along with others, as deemed necessary with support by previous finance research within the relatively un-tested non stock firm population. As a starting point for understanding which variables drive debt and dividend decisions, Smiy's debt and dividend functions will be utilized. These functions are debt decision= f (size, profitability, investment opportunity, dividend payout, risk, fixed assets, growth, return on assets) and dividend decision= f (size, profitability, investment opportunity, financial leverage, risk, fixed assets, growth, liquidity) respectively. Review of the literature in this area provides a basic framework and explanation of the underlying theory of debt and dividend decisions.

Basis for Debt Decisions

Debt has a tremendous effect on pay out decisions within a firm; however several factors can affect a firm's sentiment on debt decisions. Debt financing can lead to increased risk which in a market crisis could lead to failure to meet obligations or bankruptcy. There are currently two main theories claiming to explain why firms use debt. The first is the pecking order theory, which states that firms would rather utilize retained earnings before moving towards debt or equity in order to finance investment opportunities. The second is the trade-off theory, which is the assumption that firms try to keep a balanced use of debt and equity to finance investment opportunities (Smiy 3). Another factor that scholars have brought forward is debt's effect on free cash flow problems. A free cash flow problem occurs when a firm has invested in all positive net present value investments and has cash left over. The manager must decide how to manage these funds. One scholar concluded that firms that have lower debt tend to pay out more to control for free cash flow problems (Kim 22). These debt decision strategies vary from company to company. This is one reason to look at a single industry because industries tend to generally follow the same strategies. Thus, type of industry can serve as a catch all variable in relation to debt decisions (Zimbelman 4).

Basis for Dividend Decisions

There are numerous theories provided in the finance literature purporting to explain the factors surrounding dividend payouts. The theories found in Smiy's research are based on the principals

of capital credits. However, these are still applicable to basic dividend payouts for stock firms. The first theory is the Modigliani-Miller Dividend Irrelevancy Theorem. This theory states that without tax considerations, investors are apathetic as to whether a firm pays dividends or reinvests them in profitable opportunities. This assumes that dividends are actually paid out for behavioral issues including market imperfections, such as taxes and agency costs, and the fact that people are generally risk adverse and typically enjoy the reliability of dividend income (Smiy 3).

The other two theories that Smiy discusses are the pecking order theory and the trade-off theory. Both of these theories have found that there is a positive correlation between profitability and dividend payout. It has also been found that firms with high financial leverage are less likely to pay out dividends (Smiy 3). This suggests that debt decisions and dividend payout may be negatively correlated. These two theories differ in that the trade-off theory assumes free cash flow problems and that firms need to be knowledgeable of when it is in the firm's best interest to pay out a dividend. This coincides with Kim's conclusion that firms with lower debt tend to pay out more dividends. This is because dividend payouts are preferred over debt activities when a firm is having significant free cash flow problems (Kim 22).

The Geography and tax law is significant as well when looking at dividend decisions. For the purpose of this study we will be looking at primarily corporations operating within the United States. The U.S. differs significantly in its tax codes for capital gains relative to dividend decisions. Since the 1980's Europe has taken steps to reduce the tax advantage of capital gains relative to dividends (Douglas 63). This is not the case in the United States. It appears that perception plays a key role in dividend decisions. While dividends can be more costly to corporations, they are at times viewed as optimal over debt decisions (Douglas 64).

Selected Variables

Size:

Since larger firms tend to bring in greater revenues, larger firms tend to have smaller bankruptcy costs. In fact, it appears that the ratio of bankruptcy costs to the market value of the firm drops as the value of the firm increases (Warner 337). In terms of the Value Line Survey, the natural log of total assets will serve as the proxy for size (Zimbelman). Zimbelman also suggests that size can serve as a proxy for available information within a firm. In regards to the REC sample total utility plant or TUP will serve as the proxy for size. The CFC Key Ratio Trend Analysis defines TUP as total "distribution, general, headquarters, intangible plant, transmission and all other utility plant. Along with electric plant in service, TUP includes electric plant purchased, sold or leased to others, other utility plant, nuclear fuel items and all incomplete construction work that is under way by cooperative staff or contractors, including expenditures on research, development and demonstration projects for construction of utility facilities" (CFC Key Ratio Trend Analysis). This value is expressed in thousands of dollars.

Profitability:

Profitability is relatively straight forward. Past research has found that high cash flow firms generally use less debt financing (Zimbelman). Therefore, for the Value Line Survey return on assets is used to proxy for profitability. Return on assets is a measure of profit per dollar of assets and is calculated as net income divided by total assets (Ross, Westerfield and Jaffe 55). The operating structure of electric utilities is funded primarily through long-term debt and equity with relatively long payback periods. Because of this, return on equity will serve as the proxy for profitability in the REC sample. ROE is a measure of profit per dollar of equity only in accounting teams. However, it is considered the true bottom-line measure of performance (Ross, Westerfield and Jaffe 55).

Dividend Payout:

Dividend payout will be used as both an independent and dependent variable in this study depending on which function is being used. Payout on average tends to be positively correlated with the size of the firm and profitability. This means that larger firms that are well established tend to pay out dividends more. Due to limited data, dividend yield will proxy for dividend payout for the Value Line Survey. Dividend yield is the expected cash flows of a firm divided by the current price of the stock (Ross, Westerfield and Jaffe 275). It should be noted that these values are estimated. Past performance is not always an accurate indicator of the future.

Dividend Payout is a bit different for the electrical cooperatives. As they are non-stock firms they do not pay out dividends. Instead these co-ops pay what is called a capital credit, which is similar to a dividend. For the REC sample, annual capital credits retired per total equity as a percent will proxy for dividend payout. Annual capital credits retired per total equity is defined as the portion of a system's total equity that is being returned to the members as patronage capital (CFC Key Ratio Trend Analysis). The payout of these credits shows consumers that electric co-ops offer electricity at or slightly above cost. Generally there is a multitude of manners in which these credits can be paid out. However, tax benefits are normally associated with the payout of capital credits.

Risk:

While risk is an umbrella term in the realm of finance, in this study risk will refer to the uncertainty of profits, the chance for the loss of profits, and the chance that a firm will be unable to meet its financial obligations. In the case of the Value Line Survey, beta will serve as the proxy for risk. In previous research it has been determined that beta is strongly related to financial leverage and operating risk (Stone). This makes the beta a more than ideal proxy. Unfortunately, the proxy for the REC sample is not as cut and dry. The CFC Analysis does not provide a well defined ratio that represents financial risk. However, the system average interruption duration index – total (SAIDI) falls under this study's definition of risk. This index is defined as "the measure of total service interruption for consumers for any reason, measured in hours" (CFC Key Ratio Trend Analysis). With the interruption of service a co-op will obtain dissatisfied customers which will in turn result in lost revenues. Many causes of service

interruption, like severe storms, have high costs associated with them. Therefore, this index presents an uncertainty for profits.

Fixed Assets:

Fixed assets in the functions serves as a control variable for the size of the firm. This value allows all firms and co-ops on the same level for comparison. This need for control exists within both samples. Fixed assets will be used to control for size in the Value Line Survey. Fixed assets are not available for the REC sample. However, total utility plant investment per mile of line in dollars will be used to proxy for fixed assets. This value equates to fixed assets and shows the average cost of total utility plant investment per mile of line in service (CFC Key Ratio Trend Analysis). Electric line is considered a long term asset and can provide returns for generations. Total miles of line could also serve as an appropriate value.

Growth:

It has been determined in previous studies that on average faster growing firms use less debt financing (Zimbelman). These faster growing firms also tend to pay out fewer dividends because they would rather reinvest profits into future growth opportunities. This information is highly applicable to the Value Line Survey. For the Value Line Survey, the firm's 5 year sales growth as a percent will serve as the proxy for growth. The 5 year growth was chosen to eliminate years of unusual growth as seen in 1 year growth rates. This allows for a more accurate variable for the regression. The REC sample will use the annual growth in KWH sold as the proxy for growth. It is important to take into account that on average electric utilities have high start-up costs and are heavy on long term debt financing. However, this should not significantly affect annual growth rates.

Financial Leverage:

Financial leverage will serve as both an independent and dependent variable in this study. Debt financing is used in firms to increase operating income by purchasing fixed assets. Thus, it can be said that firms invested heavily in fixed assets use more debt financing (Zimbelman). In terms of the Value Line Survey the debt ratio will be used to proxy for financial leverage. The debt ratio is defined as total debt to total assets. This ratio gives an idea to the leverage of the company along with the risks associated with the firm's level of debt (Investopedia). In terms of the REC sample long-term debt as a percentage of total assets will be used to proxy for financial leverage. The CFC Analysis defines this ratio as a measure of the portion of assets that are financed with debt as opposed to internally generated funds. The ratio includes all long-term debt used to finance plant in service. This is fitting since electric co-ops use primarily long-term debt to finance their operations.

Liquidity:

The most common ratio used to describe liquidity to date is the current ratio (Harper). The current ratio can be defined as current assets divided by current liabilities. The current ratio shows the ability of a firm to turn its product into cash to handle financial obligations. The

reason for not including the acid test or quick ratio is certain industry firms do not hold traditional inventory (Investopedia). Both the Value Line Survey and REC sample will use the current ratio as a proxy for liquidity.

Past Conclusions

Finance scholars including Smiy, Kim, and Zimbelman, have contributed significant research concerning the factors motivating the debt and dividend decisions. A brief summary of their findings and hypotheses follows:

- More profitable firms tend to pay out more dividends.
- Larger Firms on average pay out more dividends.
- Larger Firms on average take on more debt.
- A majority of firms issue debt as a last resort due to free cash flow problems.
- More profitable firms take on less financial leverage.
- Studies have contained conflicting findings on the relationship of profitability to dividend payouts (this could be related to industry or changes in market).
- Dividend payouts tend to be negatively correlated with risk and growth.
- Firms can use dividend payout and debt interchangeably for controlling free cash flow problems.

METHOLOGY

The relevant data for the analysis of the non-stock RECs will be obtained from the Cooperative Finance Corporation, one of the industry's major lenders. Data for the stock firms will be downloaded from the Value Line Investment Survey located at the Longwood Library. The sample of non stock firms consists of over 900 firms in the electric distribution business while the list of stock corporations over all industries exceeds 1700. Value Line is a time tested investment firm that has earned the respect of the finance community by following the sample of firms that are key representatives of the US economy. In total this study analyzed 2520 stock and non stock firms to test the factors that explain the debt and dividend decisions.

The National Rural Electric Cooperative Association (the REC trade association at www.nreca.coop) represents the coops that serve over 42 million people in 47 states and provides services to 18 million businesses, homes, schools, churches, farms, irrigation systems, and other establishments in 2,500 of 3,141 counties in the United States. This includes 12% of the nation's population (Analysis, Co-op Facts & Figures). Also, cooperatives like well known credit unions are not-for-profit, which means that they pay off excess revenues as capital credits.

The analysis of the debt and dividend decisions on the two samples includes tests of the non-stock electric distribution firms (from the REC sample) and the stock firms from all industries (Value Line sample of 1700 firms). All tests will employ Ordinary Least Squares regression with appropriate examination of potential multicollinearity. Some data was incomplete and therefore mean values of the subsequent data fields were used to provide robustness. Hypotheses for each of the three tests are shown below. Note that these functions are estimates and are subject to change based on an in depth literature review.

Due to limited data available for each survey there are some differences in the independent and dependent variables that proxy for components of the determined functions. However, these variables show relatively the same trends so they can be used interchangeably. Each independent and dependent variable is discussed bellow.

REC SAMPLE TEST:

Dividend or Capital Credit Decision for REC Sample = f (Size, Profitability, Financial Leverage, Risk, Fixed Assets, Growth, Liquidity)

$H0_{divcap}$: There is no significant relationship between the dividend or capital credit payout decision and the proposed independent variables.

$H1_{divcap}$: There is a significant positive relationship between the dividend or capital credit payout decision and the proposed independent variables.

$H2_{divcap}$: There is a significant negative relationship between the dividend or capital credit payout decision and the proposed independent variables.

TABLE 1a: VARIABLES AND HYPOTHESIS FOR DIVIDEND/CAPITAL CREDIT DECISION FOR NON-STOCK FIRMS

FACTOR	VARIABLES	DEFINITIONS	HYPOSTHESIZED SIGN
CAPITAL CREDIT PAYOUT	Annual capital credit retired per total equity	Portion of equity that is being returned to members as capital credits	DEPENDENT VARIABLE
PROFITABILITY	Return on Equity	Net income returned as a percentage of shareholders equity.	PECKING ORDER (+) TRADE-OFF (+)
LIQUIDITY	Current Ratio	Current assets / Current liabilities	PECKING ORDER (-) TRADE-OFF (-)
GROWTH	Growth in KWH sold	Current year KWH sales minus previous year KWH sales / previous year KWH sales	PECKING ORDER (-) TRADE-OFF (-)
SIZE	Total Plant Utility	Value in thousands of dollars indicating size of the utility plant	PECKING ORDER (+) TRADE-OFF (+)
SIZE CONTROL VARIABLE	Total Utility Plant Investment per Mile of Line ($)	Value reflects type of area served by system	PECKING ORDER (-) TRADE-OFF (-)
POWER RELIABILITY	System Average Interruption	Natural Log of Total service interruption for	PECKING ORDER (-) TRADE-OFF (-)

(Risk)	Duration Index (SAIDI)	consumers in hours	
FINANCIAL LEVERAGE	Debt as % of assets	1 – equity as % of assets	PECKING ORDER (-) TRADE-OFF (-)

Debt Decision for the REC Sample = f (Size, Profitability, Dividend Payout, Risk, Fixed Assets, Growth)

$H0_{debt}$: There is no significant relationship between the debt ratio and the proposed independent variables.

$H1_{debt}$: There is a significant positive relationship between the debt ratio and the proposed independent variables.

$H2_{debt}$: There is a significant negative relationship between the debt ratio and the proposed independent variables.

TABLE 1b: VARIABLES AND HYPOTHESIS FOR NON-STOCK DEBT DECISION

FACTOR	VARIABLES	DEFINITIONS	HYPOSTHESIZED SIGN
FINANCIAL LEVERAGE	Debt as % of assets	1 – equity as % of assets	DEPENDENT VARIABLE
PROFITABILITY	Return on Equity	Net income returned as a percentage of shareholders equity.	PECKING ORDER (-) TRADE-OFF (+)
CAPITAL CREDIT PAYOUT	Annual capital credit retired per total equity	Portion of equity that is being returned to members as capital credits	PECKING ORDER (-) TRADE-OFF (-)
GROWTH	Growth in KWH sold	Current year KWH sales minus previous year KWH sales / previous year KWH sales	PECKING ORDER (+) TRADE-OFF (+)
SIZE CONTROL VARIABLE	Total Utility Plant Investment per Mile of Line ($)	Value reflects type of area served by system	PECKING ORDER (-) TRADE-OFF (-)
SIZE	Total Plant Utility	Value in thousands of dollars indicating size of the utility plant	PECKING ORDER (+) TRADE-OFF (+)
POWER RELIABILITY (Risk)	System Average Interruption Duration Index (SAIDI)	Natural Log of Total service interruption for consumers in hours	PECKING ORDER (-) TRADE-OFF (-)

VALUE LINE 1700 SAMPLE TEST OVER ALL INDUSTRIES:

Dividend for VALUE LINE Sample = f (Size, Profitability, Financial Leverage, Risk, Fixed Assets, Growth, Liquidity)

$H0_{div}$: There is no significant relationship between the dividend or capital credit payout decision and the proposed independent variables.

$H1_{div}$: There is a significant positive relationship between the dividend or capital credit payout decision and the proposed independent variables.

$H2_{div}$: There is a significant negative relationship between the dividend or capital credit payout decision and the proposed independent variables.

TABLE 2a: VARIABLES AND HYPOTHESES FOR DIVIDEND DECISION

FACTOR	VARIABLES	DEFINITIONS	HYPOTHESIZED SIGN
DIVIDEND DECISION	Dividend Yield	Expected cash flows / Current stock price	DEPENDENT VARIABLE
SIZE	Natural log of Total Assets	The natural log of total assets proxies for size	PECKING ORDER (+) TRADE-OFF (+)
PROFITABILITY	Return on Assets	Earnings generated through invested capital Net income / Assets	PECKING ORDER (-) TRADE-OFF (+)
FINANCIAL LEVERAGE	Debt Ratio	Total debt to total assets	PECKING ORDER (-) TRADE-OFF (-)
RISK	Beta	Slope of the 60 month regression line of the stock relative to the percentage price change of the S&P 500	TRADE-OFF (+) PECKING ORDER (+)
FIXED ASSETS	Fixed Assets	Controls for firm size in the regression.	TRADE-OFF (+) PECKING ORDER (+)
GROWTH	5 YEAR SALES GROWTH	5 Year compounded annual growth rate of Sales Per Share over last 5 years	TRADE-OFF (-) PECKING ORDER (-)
LIQUIDITY	Current Ratio	Current assets / Current liabilities	TRADE-OFF(-) PECKING ORDER (-)

Debt Decision for the VALUE LINE Sample = f (Size, Profitability, Dividend Payout, Risk, Fixed Assets, Growth)

$H0_{debt}$: There is no significant relationship between the debt ratio and the proposed independent variables.

$H1_{debt}$: There is a significant positive relationship between the debt ratio and the proposed independent variables.

$H2_{debt}$: There is a significant negative relationship between the debt ratio and the proposed independent variables.

TABLE 2b: VARIABLES AND HYPOTHESES FOR DEBT DECISION FOR STOCK FIRMS

FACTOR	VARIABLES	DEFINITIONS	HYPOTHESIZED SIGN
FINANCIAL LEVERAGE	Debt Ratio	Total debt to total assets	DEPENDENT VARIABLE
PROFITABILITY	Return on Assets	Earnings generated through invested capital Net income / Assets	TRADE-OFF (+) PECKING ORDER (-)
SIZE	Natural log of Total Assets	The natural log of total assets proxies for size	PECKING ORDER(+) TRADE-OFF (+)
GROWTH	5 YEAR SALES GROWTH	5 Year compounded annual growth rate of Sales Per Share over last 5 years	PECKING ORDER (-) TRADE-OFF (-)
RISK	BETA	Slope of the 60 month regression line of the stock relative to the percentage price change of the S&P 500	TRADE-OFF (+) PECKING ORDER (+)
Fixed Assets	Fixed Assets	Controls for firm size in the regression.	PECKING ORDER (-) TRADE-OFF (-)
DIVIDEND PAYOUT	Dividend Yield	Expected cash flows / Current stock price	PECKING ORDER (+) TRADE-OFF (+)

QUANTITATIVE TESTS AND FINDINGS

Using the discussed variables I formulated the following formulas to describe the regressions to be performed in this study.

Value Line Survey:

$$\mathbf{Div_D = \beta^*_0 + \beta^*_1 ln(total\ assets)_i + \beta^*_2 ROA_i + \beta^*_3 Debt_i - \beta^*_4 Beta_i + \beta^*_5 Fix_i - \beta^*_6 5yr\ growth_i - \beta^*_7 Current_i + \varepsilon_i}$$

$$\mathbf{Debt_D = \beta^*_0 + \beta^*_1 ln(total\ assets)_i - \beta^*_2 ROA_i + \beta^*_3 Div_i + \beta^*_4 Beta_i - \beta^*_5 Fix_i - \beta^*_6 5yr\ growth_i + \varepsilon_i}$$

REC Sample:

$$\mathbf{Credit_D = \beta^*_0 + \beta^*_1 Plant\ Utility_i + \beta^*_2 ROE_i - \beta^*_3 Debt_i - \beta^*_4 SAIDI_i - \beta^*_5 Investment_i - \beta^*_6 KWH\ growth_i + \beta^*_7 Current_i + \varepsilon_i}$$

$$\mathbf{Debt_D = \beta^*_0 + \beta^*_1 Plant\ Utility_i + \beta^*_2 ROE_i - \beta^*_3 Credit_i - \beta^*_4 SAIDI_i - \beta^*_5 Investment_i + \beta^*_6 KWH\ growth_i + \varepsilon_i}$$

Value Line Results:

TABLE 3a: REGRESSION RESULTS FOR DIVIDEND DECISION

FACTOR	VARIABLES	BETA COEFFICIENT	HYPOTHESIZED SIGN
DIVIDEND DECISION	Dividend Yeild	NA	DEPENDENT VARIABLE
PROFITABILITY	Return on Assets	+0.010804*	PECKING ORDER (+) TRADE-OFF (+)
GROWTH	5 Year Sales Growth	-0.030285***	PECKING ORDER (-) TRADE-OFF (-)
RISK	BETA	-1.581120***	PECKING ORDER (-) TRADE-OFF (-)
SIZE	Natural log of Total Assets	+0.087687***	TRADE-OFF (+) PECKING ORDER (+)
FIXED ASSETS	Fixed Assets	+4.60058E-06***	PECKING ORDER (-) TRADE-OFF (-)
LIQUIDITY	CURRENT RATIO	-0.046608***	TRADE-OFF (-) PECKING ORDER (-)
FINANCIAL LEVERAGE	DEBT RATIO	+0.042773***	TRADE-OFF (+) PECKING ORDER (+)
R square	0.101054		
F statistic	27.172082		
N	1700		

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

TABLE 3b: CORRELATION RESULTS FOR DIVIDEND DECISION

	LN of Total Assets	*Return on Assets*	*Debt Ratio*	*Beta*	*Fixed Assets*	*5yr Sales Growth*	*Current Ratio*
LN of Total Assets	1						
Return on Assets	-0.001495085	1					
Debt Ratio	0.063796518	-0.054079977	1				
Beta	-0.066104272	-0.214220224	0.089947982	1			
Fixed Assets	0.170270298	-0.002346286	-0.428639226	-0.048199467	1		
5yr Sales Growth	-0.012203076	0.283688158	-0.043030907	-0.120221516	0.014506864	1	
Current Ratio	-0.071337228	0.009865452	-0.015620216	0.033514237	-0.010737121	0.017161556	1

The regression analysis for the dividend decision indicates that the following variables relate negatively to the dividend payout ratio as hypothesized, and are significant at the 1%: risk and liquidity. The size of the firm related negatively to the dividend payout ratio at a significance of 5%, which was an unanticipated result. Also, institutional influence related negatively with the payout ratio, which is an unanticipated result with 1% significance. The dividend payout ratio related positively as hypothesized with the firm's profitability, with the results significant at the 1%. However, the following variables related positively with the dividend payout ratio at a significance of 1%, resulting in unanticipated findings: growth, financial leverage, and insider ownership. Out of the eight variables tested against the dividend decision, three of the variables had hypothesized results at the 1% significance. Five of the variables that were tested showed unanticipated results.

The results for the beta coefficient are based off individual regressions done for each independent variable, as well as correlations between all the independent variables. A common problem with multiple regression analysis arises when the potential for collinearity among the selected independent variables or multicollinearity exists. To check for the presence of multicollinearity, we follow the process offered by Canavos (1984) that is, employ large samples of firms and test for collinearity among independent variables with a correlation matrix as shown in Table 4. According to Mason and Lind (1996, p. 541), "A common rule of thumb is that correlations among independent variables from negative .70 to positive .70 do not cause problems." As shown in Table 4 none of the selected independent variables for each of four regressions were shown to be highly correlated since all were within the –0.70 to + 0.70 guidelines. Therefore, we control for the problem of multicollinearity.

TABLE 4a: REGRESSION RESULTS FOR DEBT DECISION

FACTOR	**VARIABLES**	**BETA COEFFICIENT**	**HYPOTHESIZED SIGN**
FINANCIAL LEVERAGE	Debt Ratio	NA	DEPENDENT VARIABLE
PROFITABILITY	Return on Assets	-0.018390***	TRADE-OFF (+) PECKING ORDER (-)
SIZE	Natural log of Total Assets	+0.243378***	PECKING ORDER(+) TRADE-OFF (+)

GROWTH	5 Year Sales Growth	-.002513	PECKING ORDER (+) TRADE-OFF (+)
RISK	BETA	+0.929110***	TRADE-OFF (-) PECKING ORDER (+/-)
DIVIDEND PAYOUT	Dividend Yield	+0.112345***	PECKING ORDER (-) TRADE-OFF (-)
FIXED ASSETS	Fixed Assets	-5.60257E-05***	PECKING ORDER (-) TRADE-OFF (-)
R square	0.214660		
F statistic	77.125817		
N	1700		

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

TABLE 4b: CORRELATION RESULTS FOR DEBT DECISION

	ln of Total Assets	*Return on Assets*	*Dividend Yield*	*Beta*	*Fixed Assets*	*5yr sales growth*
ln of Total Assets	1					
Return on Assets	-0.001495085	1				
Dividend Yield	0.124784341	0.045619952	1			
Beta	-0.066104272	-0.214220224	-0.242729976	1		
Fixed Assets	0.170270298	-0.002346286	0.057547413	-0.048199467	1	
5yr sales growth	-0.012203076	0.283688158	-0.107709063	-0.120221516	0.014506864	1

The regression analysis for the debt decision indicates that the following variables related positively to the debt decision as hypothesized and are significant at the 1%: profitability and growth. There was an unanticipated positive relation between the debt decision and dividend payout as well as risk, although these results were noted as insignificant. There was also an unexpected negative relationship between the debt decision and size of the firm, which is significant at the 1%. Out of the five variables that were tested against the debt ratio, only two variables proved to be in line with the hypothesis of either the trade-off theory or the pecking order theory. Three of the variables that were tested showed unexpected results, although only one of these variables proved to be significant.

The results for the beta coefficient are based off individual regressions done for each independent variable, as well as correlations between all the independent variables. A common problem with multiple regression analysis arises when the potential for collinearity among the selected independent variables or multicollinearity exists. To check for the presence of multicollinearity, we follow the process offered by Canavos (1984) that is, employ large samples of firms and test for collinearity among independent variables with a correlation matrix as shown in Table 4. According to Mason and Lind (1996, p. 541), "A common rule of thumb is that correlations among independent variables from negative .70 to positive .70 do not cause

problems." As shown in Table 4 none of the selected independent variables for each of four regressions were shown to be highly correlated since all were within the –0.70 to + 0.70 guidelines. Therefore, we control for the problem of multicollinearity.

It should be noted that several past studies have used some more complex variables in the past. However, the data necessary to derive these variables are not available from the Value Line Survey. Most of the variables used are equitable empirical proxies that show the same trends as the more complex variables. The results still proved to be significant.

Based on the derived equations I assume that the functional forms of these regressions are linear. At first glance it appears that the significance of most of the independent variables is marginal at best. However the R-squares show the relationship between the dependent and independent variables to be significant. This means that the independent variables most likely share a similar variance with the dependent variable.

In regards to the regression for the debt decisions of a firm an R-square of approximately .21 was produced. This means that the independent variables derived explain 21% of what drives the debt decision of a firm. A value like this is actually higher than expected, but it is rational. The R-square for the dividend decision regression was even less significant describing only 10% of what drives a firms dividend decisions. A large variety of factors could reduce the solidity of the determinants of a firms debt decisions including the pecking order theory and trade-off theory. The operating decisions of firms significantly differ between industries, thus causing discrepancies in a data set of this size and variety of industries. Market conditions at the time of data collection can also cause changes in the results. As an economy transitions between recessions and booms the behavior of variables will most likely adjust. The performance of different sectors could also have a profound effect.

The results of the Value Line regressions actually verified several past conclusions found in past research. In the debt decision regression I found that profitability is in fact negatively correlated with debt decisions and larger firms take on more debt to finance their activities. It could be assumed that this is true because debt is usually taken on to finance future activities or are associated with high start up costs for a firm. This shows that in many cases debt financing could be used as a last resort. Overall, size, dividend payout, and beta were positively correlated with debt decisions, while profitability and growth are negatively correlated.

The results of the dividend decision regression modeled past conclusions exactly. It was determined that larger, more profitable firms pay out more dividends. The regression shows that size, profitability, and financial leverage are positively correlated with dividend payout decisions, while risk, growth, and liquidity are negatively correlated. This shows that larger well established firms, where growth has started to slow, rely on dividend payouts to influence investors to continue to put their faith in the firms. Dividend decisions help develop the investors perception of the firm where as debt decisions do not affect investor perceptions to the same degree.

REC Sample Results:

TABLE 5a: REGRESSION RESULTS FOR CAPITAL CREDIT DECISION

FACTOR	VARIABLES	BETA COEFFICIENT	HYPOSTHESIZED SIGN
CAPITAL CREDIT PAYOUT	Annual capital credit retired per total equity	N/A	DEPENDENT VARIABLE
PROFITABILITY	Return on Equity	+0.010730***	PECKING ORDER (+) TRADE-OFF (+)
LIQUIDITY	Current Ratio	+0.353416**	PECKING ORDER (-) TRADE-OFF (-)
GROWTH	Growth in KWH sold	-0.003269	PECKING ORDER (-) TRADE-OFF (-)
SIZE	Total Plant Utility	2.04688E-05***	PECKING ORDER (+) TRADE-OFF (+)
POWER RELIABILITY (RISK)	System Average Interruption Duration Index (SAIDI)	-0.013331***	PECKING ORDER (-) TRADE-OFF (-)
SIZE CONTROL VARIABLE	Total Utility Plant Investment per Mile of Line ($)	-1.49868E-05***	PECKING ORDER (-) TRADE-OFF (-)
FINANCIAL LEVERAGE	Debt as % of assets	-0.024069***	PECKING ORDER (-) TRADE-OFF (-)
R square	0.861542		
F statistic	720.915315		
N	819		

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

TABLE 5b: CORRELATION RESULTS FOR CAPITAL CREDIT DECISION

	Total Utility Plant (size proxy)	*Return on equity*	*Long-term Debt as a Percentage of Total Assets*	*System Average Interruption Duration*	*Total Utility Plant investment Per Mile of Line ($)*	*annual growth in KWH sold*	*Current Ratio*
Total Utility Plant (size proxy)	1						
Return on equity	0.115495032	1					
Long-term Debt as a Percentage of	0.72920669	0.384021042	1				
System Average Interruption Duration Index (SAIDI)–Total	0.602055951	-0.064036742	0.29985844	1			
Total Utility Plant investment Per Mile	0.790365932	-0.041791567	0.465287944	0.88156603	1		
annual growth in KWH sold	-0.14125342	-0.027615418	-0.002651156	-0.039317103	-0.060763164	1	
Current Ratio	0.947182751	0.127209514	0.708761282	0.801030229	0.876920172	-0.111940057	1

The regression analysis for the capital credit decision showed three variables that were positively related to the capital credit decision: profitability, growth, and financial leverage. Two of these were significant at the 1%: profitability and financial leverage. As hypothesized by both theories, profitability related positively to capital credit payout and was significant. Financial leverage was significantly positively related to capital credit payout, unanticipated by both the trade-off and pecking order theories. Liquidity and size were both negatively correlated but insignificant. Power reliability had no hypothesized relation but turned out to be negatively correlated at the 10%. Out of the six variables being tested three were found to be significant at the 10% or lower. Three variables had unexpected results with one being significant at the 1%.

The correlation results for the beta coefficients are based on individual regressions done for each independent variable and also correlations between all the independent variables. A common problem with multiple regression analysis arises when the potential for collinearity among the selected independent variables or multicollinearity exists. We follow the process of Canavos (1984) for testing for the presence of multicollinearity which is to employ a large sample of firms and test the independent variables with a correlation matrix. According to Mason and Lind (1996, pg. 541), "A common rule of thumb is that correlations among independent variables from negative .70 to positive .70 do not cause problems." As shown in Table 5, none of the selected independent variables for each of four regressions were shown to be highly correlated since all were within the –0.70 to + 0.70 guidelines. Therefore, we control for the problem of multicollinearity.

TABLE 6a: REGRESSION RESULTS FOR DEBT DECISION

FACTOR	VARIABLES	BETA COEFFICIENT	HYPOSTHESIZED SIGN
FINANCIAL LEVERAGE	Debt as % of assets	N/A	DEPENDENT VARIABLE
PROFITABILITY	Return on Equity	+0.686751***	PECKING ORDER (-) TRADE-OFF (+)
CAPITAL CREDIT PAYOUT	Annual capital credit retired per total equity	-3.641923***	PECKING ORDER (-) TRADE-OFF (-)
GROWTH	Growth in KWH sold	+0.172221***	PECKING ORDER (+) TRADE-OFF (+)
SIZE CONTROL VARIABLE	Total Utility Plant Investment per Mile of Line ($)	-8.2378E-05***	PECKING ORDER (-) TRADE-OFF (-)
SIZE	Total Plant Utility	+0.000205***	PECKING ORDER (+) TRADE-OFF (+)
POWER RELIABILITY (RISK)	System Average Interruption Duration Index (SAIDI)	-0.059630***	PECKING ORDER (-) TRADE-OFF (-)
R square	0.676219		
F statistic	282.645424		
N	819		

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

TABLE 6b: CORRELATION RESULTS FOR DEBT DECISION

	Total Utility Plant (size proxy)	*Return on Equity*	*Annual Capital Credits Retired Per Total Equity (%)*	*System Average Interruption Duration Index (SAIDI)–Total*	*Total Utility Plant investment Per Mile of Line ($)*	*annual growth in KWH sold*
Total Utility Plant (size proxy)	1					
Return on Equity	0.115495032	1				
Annual Capital Credits Retired Per Total Equity (%)	0.79048692	0.190412135	1			
System Average Interruption Duration Index (SAIDI)–Total	0.602055951	-0.064036742	0.131100149	1		
Total Utility Plant investment Per Mile of Line ($)	0.790365932	-0.041791567	0.338949927	0.88156603	1	
annual growth in KWH sold	-0.14125342	-0.027615418	-0.187279072	-0.039317103	-0.060763164	1

The regression analysis shows that the capital credit payout is positively related to the debt decision and is significant at the 1% level. This was unexpected and is significant. There was an unexpected negative relationship between size and the debt decision, but this was insignificant. A positive relation between growth and the debt decision was expected and is significant at the 5% level. Power reliability was positively related but was insignificant also. Profitability is negatively related and is significant at the 1%. This is in line with the pecking order but not the trade-off theory. Overall, growth and profitability support the pecking order theory and both variables were significant. As hypothesized, growth related positively to financial leverage and was significant in support of the trade-off theory. Three of variables (profitability, capital credit payout, and size) produced unexpected relationships under trade-off theory, but only two were significant. Two of the variables (capital credit payout and size) did not support pecking order hypothesis, but only one was significant.

The variables used for the REC sample were drawn from the CFC key ratio trend analysis. This analysis contains 143 ratios describing the financial operations of electrical co-ops. Basic accounting data is not provided for these firms. Due to this fact a handful of ratios were selected to describe the derived functions. The selected variables follow the same trends as the proxies chosen for the Value Line Survey.

Compared to the results of the Value Line Survey the REC sample is dramatically more accurate. The R-square for the regression analysis of the debt decision of an electrical co-op is approximately .67. This means that the independent variables selected explain 67% of what drives the debt decisions of electrical co-ops. On the other hand the R-square for the capital credit decision of a co-op is approximately 86%. This is significantly more accurate than the value line R-square of 10%. The differences in these values for the most part can be explained by the focus on industry.

The correlation of the proxies is surprisingly different from past conclusions. This is most likely due to the unique operating structure of the electrical co-ops. In relation to debt financing

decisions it was found that profitability is actually positively correlated with debt decisions. This is probably due to the high degree of financing required to run an electrical co-op. Overall, it was found that size, profitability, and growth are positively correlated with debt decisions, while credit payout and risk are negatively correlated. In relation to capital credit decisions size, profitability, and liquidity are positively correlated with credit decisions, while financial leverage, risk, and growth are negatively correlated. This shows that on average electrical co-ops follow a majority of the trends followed by the average firm. However, several key differences exist due to the operating practices of the industry.

CONCLUSION

Overall, it can be determined that for most firms debt and dividend decisions can be used interchangeably in regards to the operating structure of a firm in the broad picture. The only way these decisions differ is in the perception of the firm by the investor. Debt financing tends to increase for larger more profitable firms most likely seeking investment opportunities in the future. Dividend decisions also tend to increase for larger more profitable firms. However, this is more likely to build goodwill with investors.

The picture changes however when you focus on specific industries. This is most likely due to differences in the operating structure of the firm. Most firms in an industry tend to operate in a similar manner. This was evident in the electric industry. Due to the unique operating structure of electric utilities profitability is actually positively correlated with both debt and capital credit decisions.

Profitability is highly significant in regards to debt and dividend decisions. In the larger picture profitability is positively correlated with dividend decisions and negatively correlated with debt decisions. This means that more profitable firms tend to pay out more dividends while using less financial leverage to finance their operating activities. However, this can differ from industry to industry as seen in the electric co-ops. Industry should be taken into account when making an informed decision about a firm.

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Table 1-1
Debt Regression for REC Sample[1]

Regression Statistics	
Multiple R	0.82232572
R Square	0.67621959
Adjusted R Square	0.673827124
Standard Error	8.434949237
Observations	819

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	120658.5648	20109.76	282.645424	5.5227E-195
Residual	812	57772.47533	71.14837		
Total	818	178431.0401			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*.ower 95.0%*	*Upper 95.0%*
Intercept	32.60759331	0.729445106	44.70192	4.069E-221	31.17577299	34.039414	31.175773	34.0394136
Total Utility Plant (size proxy)	0.000205202	1.14803E-05	17.87428	1.6513E-60	0.000182667	0.0002277	0.0001827	0.00022774
Return on Equity	0.686751568	0.051003351	13.46483	1.9002E-37	0.586637615	0.7868655	0.5866376	0.78686552
Annual Capital Credits Retired Per Total Equity (%)	-3.641923192	0.469558311	-7.75606	2.6253E-14	-4.56361439	-2.720232	-4.563614	-2.720232
System Average Interruption Duration Index (SAIDI)–Total	-0.059630379	0.015336111	-3.88823	0.00010923	-0.08973348	-0.029527	-0.089733	-0.0295273
Total Utility Plant investment Per Mile of Line ($)	-8.2378E-05	1.67364E-05	-4.92208	1.0372E-06	-0.00011523	-4.95E-05	-0.000115	-4.953E-05
annual growth in KWH sold	0.172221656	0.035120174	4.903781	1.1356E-06	0.103284626	0.2411587	0.1032846	0.24115869

Table 1-2
Capital Credit Regression for REC Sample[1]

Regression Statistics	
Multiple R	0.928193317
R Square	0.861542834
Adjusted R Square	0.860347766
Standard Error	0.607087831
Observations	819

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	1859.881808	265.6974	720.9153154	0
Residual	811	298.8986192	0.368556		
Total	818	2158.780427			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1.564072669	0.08213125	19.04358	4.07397E-67	1.402857784	1.72528755	1.402857784	1.725287553
Total Utility Plant (size proxy)	2.04688E-05	1.83679E-06	11.14381	6.18563E-27	1.68634E-05	2.4074E-05	1.68634E-05	2.40742E-05
Return on equity	0.010730322	0.004182755	2.565372	0.010485247	0.00252002	0.01894062	0.00252002	0.018940624
Long-term Debt as a Percentage of Total Assets	-0.024069552	0.003501774	-6.87353	1.24936E-11	-0.03094316	-0.0171959	-0.03094316	-0.017195942
System Average Interruption Duration Index (SAIDI)–Total	-0.013331178	0.003113933	-4.28114	2.0818E-05	-0.0194435	-0.0072189	-0.0194435	-0.00721886
Total Utility Plant investment Per Mile of Line ($)	-1.49868E-05	1.22224E-06	-12.2618	7.88099E-32	-1.7386E-05	-1.259E-05	-1.7386E-05	-1.25877E-05
annual growth in KWH sold	-0.003269117	0.002571938	-1.27107	0.204067745	-0.00831756	0.00177932	-0.00831756	0.001779324
Current Ratio	0.353416339	0.173214947	2.040334	0.041640506	0.013413871	0.69341881	0.013413871	0.693418807

Table 2-1
Debt Regression for Value Line Survey[2]

[1] Sample based on 819 electrical co-ops.

Regression Statistics	
Multiple R	0.463314427
R Square	0.214660259
Adjusted R Square	0.211877011
Standard Error	3.257467199
Observations	1700

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	4910.33513	818.3892	77.12581758	2.45048E-85
Residual	1693	17964.57969	10.61109		
Total	1699	22874.91482			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-2.227997483	0.45789604	-4.86573	1.24631E-06	-3.126099274	-1.329895692	-3.126099274	-1.329895692
ln of Total Assets	0.243378315	0.038828768	6.26799	4.63001E-10	0.167220884	0.319535745	0.167220884	0.319535745
Return on Assets	-0.018390166	0.011102011	-1.65647	0.09781166	-0.040165275	0.003384943	-0.040165275	0.003384943
Dividend Yield	0.112345626	0.039000611	2.880612	0.004018996	0.035851147	0.188840105	0.035851147	0.188840105
Beta	0.92911053	0.252231521	3.683562	0.000237225	0.434392165	1.423828895	0.434392165	1.423828895
Fixed Assets	-5.60257E-05	2.71402E-06	-20.6431	1.25684E-84	-6.13489E-05	-5.07026E-05	-6.13489E-05	-5.07026E-05
5yr sales growth	-0.002512901	0.008274046	-0.30371	0.761387052	-0.018741334	0.013715532	-0.018741334	0.013715532

Table 2-2

Dividend Regression for Value Line Survey[2]

Regression Statistics	
Multiple R	0.317890151
R Square	0.101054148
Adjusted R Square	0.097335105
Standard Error	2.019456433
Observations	1700

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	775.6931338	110.8133048	27.17208288	1.51523E-35
Residual	1692	6900.32165	4.078204285		
Total	1699	7676.014784			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.048884934	0.28028779	10.87769443	1.09962E-26	2.499137719	3.598632148	2.499137719	3.598632148
LN of Total Assets	0.087687318	0.024297268	3.608937356	0.0003164	0.040031459	0.135343177	0.040031459	0.135343177
Return on Assets	0.010804763	0.006883891	1.569572172	0.116701654	-0.002697073	0.024306599	-0.002697073	0.024306599
Debt Ratio	0.042773683	0.015031514	2.845600558	0.004486173	0.013291369	0.072255998	0.013291369	0.072255998
Beta	-1.581120281	0.152232198	-10.38624089	1.53741E-24	-1.879703486	-1.282537075	-1.879703486	-1.282537075
Fixed Assets	4.60058E-06	1.8791E-06	2.448283583	0.014454793	9.14967E-07	8.28619E-06	9.14967E-07	8.28619E-06
5yr Sales Growth	-0.030285226	0.00507655	-5.965710246	2.95973E-09	-0.040242203	-0.020328248	-0.040242203	-0.020328248
Current Ratio	-0.046608491	0.014553766	-3.202503775	0.001387713	-0.075153768	-0.018063215	-0.075153768	-0.018063215

[2] Sample based on 1700 firms.