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Determining a Cooperative's Least-Cost Equity Position

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Market Report	Year Ago	4 Wks Ago	8/7/15
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	159.61	153.30	151.96
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	287.50	287.00	255.68
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	235.73	*	226.25
Choice Boxed Beef, 600-750 lb. Carcass.	262.26	252.09	234.84
Western Corn Belt Base Hog Price Carcass, Negotiated.	113.55	75.51	74.11
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	124.29	80.87	88.33
Slaughter Lambs, wooled and shorn, 135-165 lb. National.	154.38	NA	158.63
National Carcass Lamb Cutout FOB.	358.97	360.80	353.81
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	5.51	5.42	436
Corn, No. 2, Yellow Nebraska City, bu.	3.40	3.98	3.55
Soybeans, No. 1, Yellow Nebraska City, bu.	11.83	10.18	9.93
Grain Sorghum, No.2, Yellow Dorchester, cwt.	5.93	7.93	6.21
Oats, No. 2, Heavy Minneapolis, Mn, bu.	4.02	2.85	2.71
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	190.00	*	178.00
Alfalfa, Large Rounds, Good Platte Valley, ton.	100.00	72.50	85.00
Grass Hay, Large Rounds, Good Nebraska, ton.	100.00	90.00	95.00
Dried Distillers Grains, 10% Moisture Nebraska Average.	105.00	126.75	135.50
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	37.75	42.50	42.00

*** No Market**

A simple measure of interest coverage can serve as the basis for a valuable equity management and planning tool for both agricultural cooperatives and rural electric cooperatives (RECs). The times-interest-earned ratio (TIER) can be used by a cooperative to determine the least-cost mix of debt and equity capital that satisfies a particular interest coverage requirement given the cooperative's rate of return on equity and average interest rate. Identifying the least-cost mix of debt and equity is important because if the cooperative uses too much debt in its capitalization, it may be unable to cover its interest expenses; if it uses too much equity, its capital costs may be greater than necessary.

The interest coverage ratio, or TIER, is generally calculated by dividing earnings before interest and taxes (EBIT) by annual interest expense. For agricultural cooperatives that distribute net earnings to members as patronage refunds or RECs, which are exempt from income taxation, the interest coverage ratio (R) can be expressed in this form:

$$R = \frac{r_e \cdot p + i(1-p)}{i(1-p)}$$

where r_e represents the rate of return on equity, i represents the average interest rate, and p represents the equity position, which is defined as the proportion of total capital composed of equity. Total capital is usually considered to consist of equity and long-term debt, and annual interest expense consists of the interest on long-term debt.

Taking this expression for R and solving it for r_e, we can determine the rate of return on equity necessary for the cooperative to meet a particular value for the interest coverage ratio $\overline{R}$ given its equity position and average interest rate:

$$r_e = \frac{i(1-p)(\overline{R}-1)}{p} \text{ for } \overline{R} > 1.$$

The value of $\overline{R}$ may be dictated by loan agreements, or the cooperative may set $\overline{R}$ in an effort to ensure its net earnings and cash flow are sufficient for meeting its interest obligations and achieving its financial goals.

Alternatively, we can use this relationship to determine the equity position at which the interest coverage requirement $\overline{R}$ is met given the cooperative's rate of return on equity and the interest rate. Let p^* stand for this value, which represents the least-cost equity position, i.e., the value of p that satisfies the interest coverage requirement at the lowest total cost of capital. At an equity position less than p^*, the interest coverage ratio would be lower than the required value; at an equity position greater than p*, the total cost of capital would be unnecessarily high. To solve for p^*, we must take into account the relationship between the rate of return on equity and the equity position. Simply put, the rate of return on equity will decline as the equity position is increased and the return on capital decreases relative to the stock of equity.[1]

Determination of the least-cost equity position is demonstrated graphically in Figure 1. Each of the curves R_1, R_2, and R_3 represents the combinations of r_e and p corresponding to a particular value of R (1.5, 2.0, and 3.0) as calculated from the first equation. For any value of R, the least-cost equity position p^* is determined by the intersection of the respective R curve and the curve representing the rate of return r_e. The shape of the curve for r_e reflects that the rate of return on equity declines as the equity position is increased. As the figure shows, the least-cost equity position increases and the rate of return on equity decreases as the interest coverage requirement is raised.

Total capital costs can be calculated from the weighted average cost of capital k, which is

$$k = r_e \cdot p + i(1-p)$$

where r_e, the rate of return on equity, is used to represent the cost of equity capital. Because the rate of return on equity determines which choices of cash patronage refunds, equity growth, and equity retirement are feasible, it represents the opportunity cost of equity for the cooperative's members. Thus use of the rate of return on equity as the cost of equity capital ensures that alternative uses for equity are appropriately considered in financing decisions. A cooperative's failure to take the opportunity cost of equity into account can result in an undervaluation of the cost of equity, thereby contributing to an overreliance on equity capital and an overinvestment in assets.

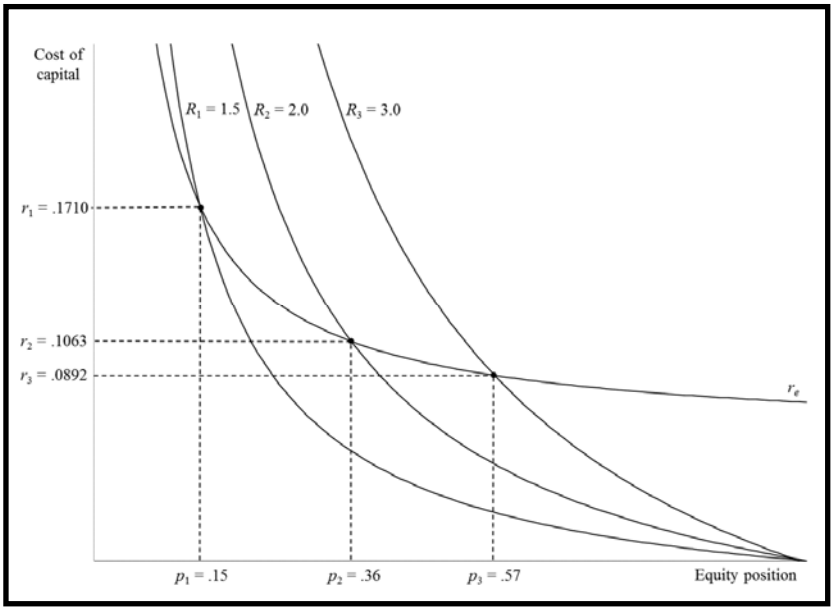

Figure 1. Least-Cost Equity Position and Cost of Equity Capital for Selected Values of Interest Coverage Ratio

[1] For more on this point and this topic in general, see Jeffrey Royer, "An Equity Management and Planning Tool for Cooperatives," *Agricultural Finance Review* 75, 2 (2015): 267–81.

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