AGRICULTURAL ECONOMICS

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Cornhusker Economics

Capital Budgeting by Cooperatives

Market Report	Year Ago	4 Wks Ago	2-14-17
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	119.36	119.00	*
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	162.03	185.07	192.36
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	133.83	158.94	152.48
Choice Boxed Beef, 600-750 lb. Carcass.	189.39	207.99	208.46
Western Corn Belt Base Hog Price Carcass, Negotiated	72.52	66.01	69.04
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	87.74	77.58	75.83
Slaughter Lambs, wooled and shorn, 135-165 lb. National.	140.06	127.92	131.14
National Carcass Lamb Cutout FOB.	339.86	369.87	372.34
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	3.30	3.45	4.14
Corn, No. 2, Yellow **Columbus**, bu.	3.32	3.00	3.42
Soybeans, No. 1, Yellow **Columbus,** bu.	9.57	8.81	9.21
Grain Sorghum, No.2, Yellow Dorchester, cwt.	5.19	5.99	5.63
Oats, No. 2, Heavy Minneapolis, Mn, bu.	2.95	2.83	3.03
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	NA	*	166.25
Alfalfa, Large Rounds, Good Platte Valley, ton.	65.00	90.00	90.00
Grass Hay, Large Rounds, Good Nebraska, ton.	65.00	82.50	82.50
Dried Distillers Grains, 10% Moisture Nebraska Average.	103.50	145.50	147.00
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	43.75	45.25	48.25

*** No Market**

In capital budgeting, a firm must decide whether or not to invest in a project, such as a new machine, plant, or product. Typically, the firm will invest in the project if the present value of the stream of cash flows the project is expected to generate exceeds the project's cost. The discount rate used in the present value calculation usually is the weighted average cost of capital for the firm, i.e., the weighted average of the firm's costs of equity and debt. For publicly traded firms, the capital asset pricing model (CAPM) is the most commonly used means for estimating the cost of equity for use in capital budgeting decisions.

Cooperatives and privately held companies are unable to use the CAPM approach because the equity of a firm must be publicly traded for the firm to have the information it needs to estimate its cost of equity. The modified capital asset pricing model (MCAPM) provides an alternative to cooperatives and other firms that are not publicly traded.[1] In applying the CAPM approach to capital budgeting decisions, the cost of equity is the rate of return shareholders expect to receive on their investment in the firm. In the MCAPM approach, the expected rate of return is

$$E(r) = r_f + \beta \times \left(r_m - r_f\right) + SRP + FSRP$$

[1] James R. Hitchner, *Financial Valuation: Applications and Models*, 4th ed. (Hoboken, N.J.: John Wiley and Sons, 2017),

where r_f is the rate of return available on a risk-free security (typically a 20-year U.S. Treasury bond), β is the firm's *beta*, r_m is the rate of return on the average share of stock in the market, *SRP* is a size risk premium, and *FSRP* is a firm-specific risk premium. The beta is a measure of the sensitivity of the firm's returns to market fluctuations, and $r_m - r_f$ represents the equity risk premium for the market, which is the additional return investors require to invest in the market instead of the risk-free security.

The beta can be estimated for a firm with publicly traded stock. Under the MCAPM approach, companies that are not publicly traded use proxy betas. There are various ways to develop a proxy beta. The beta can be assumed to equal one, and separate risk factors can be developed for inclusion in the calculation of the expected rate of return. A company can also use the average beta estimated for public firms from the industry or a benchmark group after it is adjusted for the difference in the company's capital structure. *SRP*, the size risk premium in the MCAPM approach, is used to account for the greater risk associated with a firm that is smaller than the large public companies from which the equity risk premium is calculated. *FSRP*, the firm-specific risk premium, accounts for the additional risk associated with investing in the firm instead of a diversified portfolio of stocks. It accounts for risk factors related to both the firm and the industry in which it operates.

Accountants have described how rural electric and telephone cooperatives can use the MCAPM approach to estimate the cost of equity for capital budgeting applications. Johnson, Smythe, and Fulmer (2000) argue that the use of proxy betas based on industry data can overstate the market risk for those cooperatives, which may face only limited competition.[2] They suggest that a cooperative should instead use a beta based on the estimated correlation between its return on assets and the returns of the S&P 500 or a group of publicly traded electric or telephone companies. As an alternative, they propose calculating the cooperative's yield on long-term debt and adding a risk premium to reflect the increased risk associated with equity. Halligan and Whitehead (20176 contend that the firm-specific risk premium used in M MCAPM analyses should include a component that reflects differences in financial performance due to operational characteristics related to the cooperative business form.[3]

Cooperatives should examine these techniques thoroughly before adopting them. Development of a proxy beta may present numerous challenges. Although the value assigned the firm-specific risk premium can have a major effect on the cost of equity estimate, there may be little in terms of empirical evidence or studies to guide an analyst. Consequently, that assignment may be highly subjective and largely dependent on the analyst's professional judgment.

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[2] J. Frederick Johnson, Thomas I. Smythe, Jr., and John G. Fulmer, Jr., "Using Net Present Value Analysis in Cooperatives," *Cooperative Accountant* 53, 3 (2000): 46–47 and 55–62.

3Stephen P. Halligan and Terry G. Whitehead, "Consideration for Developing a Cost of Equity Capital for Electric Cooperatives," *Insights*, Summer 2016, 28–34 Download available at *http://www.willamette.com/insights_journal/16/summer_2016_3.pdf.*

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