Valuing the Cooperative Firm

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The cooperative business model is unique in that it distributes profits to its users in proportion to the volume of business conducted with the firm. This distribution is referred to as a patronage refund or patronage distribution and is a fundamental cooperative principle. This structure is in contrast to that of investor-owned firms where profits are distributed in proportion to ownership. Many agricultural cooperatives operate under the "traditional" or open membership cooperative model. These cooperatives create or accumulate the majority of their profits by retaining profits as both revolving allocated equity and unallocated equity (retained earnings). These structures for profit distribution and equity create a number of unique features. These structures also create challenges in determining the value of the cooperative firm. In this paper, we address these challenges by proposing two methods to value the cooperative firm. We illustrate these methods using financial data from 10 case study cooperatives.

Purposes of Business Valuation

Business valuations are performed for a number of different reasons which can include financing, liquidations, mergers, acquisitions, spin offs and bankruptcies. Individual owners may be concerned with valuation in order to vote on corporate reorganization decisions or for personal reasons such as divorces or estate settlement and taxes. A firm stockholder or cooperative member might also be interested in valuation to access the firm's performance. In the case of publicly traded companies, the market capitalization (stock price multiplied by number of shares outstanding) provides one constantly available measure of value. Analyst can also use publically available financial data to develop more complex valuations. While it has numerous weaknesses as a measure of value, the book value (total equity value) of a publicly traded corporation is also readily available as a measure of the firm's value. An individual owner can also easily determine the book value per share. In the case of traditional open membership cooperatives, the equity shares are not bought or sold so there is no observable stock price. In terms of the individual owner's perspective, identification of the appropriate book value is also not straightforward. In order to highlight these issues, a quick review of the financial structure of an open membership cooperative is helpful.

Background on Cooperative Finance

While there are minor variations in structure, the traditional open membership is used by over 2,000

agricultural supply and grain marketing cooperatives across the U.S. as well as most dairy and cotton cooperatives (Chaddad and Cook, 2004). These cooperatives are commonly described as open membership cooperatives because producers can join at any time. To become a voting member and receive patronage from the cooperative, a producer has to purchase a membership share which is often a nominal investment of $50 to $100. Traditional open membership cooperatives create or accumulate the majority of their equity by retaining profits. This is accomplished by retaining a portion of patronage refunds and issuing equity shares to members instead of cash patronage. These equity shares are eventually redeemed by the cooperative, and are therefore referred to as allocated revolving equity. The cooperative may also retain profits from nonmember business and a portion of the profits from member business as unallocated equity which are ordinarily never redeemed. From an accounting standpoint unallocated equity is analogous to the "retained earnings" equity category on the balance sheet of an investor-owned firm. Because of the unique property rights issues to this class of equity in cooperative firms the term "unallocated equity" is more descriptive.

A cooperative's allocated revolving equity is not tradable but is instead redeemed by the cooperative at its original book value at some later period in time. The descriptor "allocated" refers to the fact that the ownership amounts are designated to specific members. The present value of allocated equity is less than the face value because of the delay until redemption. The decision to redeem equity is made by the cooperative board of directors and can be dependent on the financial condition of the cooperative. However, most cooperative redeem equity under a predetermined system. The system may be based on the year the stock was issued, the age of the patron, a percentage of all of the equity and other criteria. According to a USDA study 44% of local agricultural cooperatives redeemed equity based on the age of the equity with an average revolving period of 17 years and 43% redeemed allocated equity based on the patron's age with an average age of 69 years (Eversull, 2010). Cooperatives also hold unallocated equity. Unallocated equity does not revolve and the members do not ordinarily receive the profits which are retained as unallocated equity. The unallocated equity is part of the members' collective claim on the firm's assets if the cooperative merges with another cooperative or is dissolved or sold. In that case it is typically distributed on the basis of use during some defined "look back period." Cook and Iliopoulos (2000) discuss these issues in the context of what they describe as ill-defined property rights in U.S. cooperatives.

There are alternative cooperatives structures with different equity systems. These include the closed cooperative structure, often referred to as "New Generation Cooperatives" and non-stock cooperatives that accumulate capital through a system of per-unit retains (Cook and Chaddad, 2004). The issues we discuss with regard to cooperative valuation are not as prevalent in those cooperative structures. For the sake of simplicity we use the term "cooperative" to refer to open membership cooperatives with revolving equity, in the remainder of this paper.

In contrast to a publically traded firm, there is no observable stock which can be used to infer the value of a cooperative. The ownership of the stock does not create property rights to future profit distributions. Those distributions are made on the basis of

future business volume. The allocated equity in a cooperative is redeemed at book value in some future period. The payment that the member receives reflects the profit distribution from a previous year and is not impacted by the growth of the firm or the current value of the firm. The members' present value of their allocated equity depends on the timing and the system of equity redemption. That timing can be impacted by the future profitability and cash flow needs of the cooperative. In the case of a cooperative redeeming stock based on the year of issue, the various shares of a member's allocated equity would have different present values. In the case of a cooperative using an age of patron plan, the present value of the allocated equity would vary with the age of the member. In terms of the cooperative, the present value of the stock to the membership can be estimated but the value to a particular member is case specific.

The other component of the book value of the cooperative is unallocated equity. Under normal operation the unallocated equity in the cooperative is never redeemed and the value is never realized by the members. If the cooperative is liquidated the claims of all debtors are satisfied first followed by the claims of allocated equity holders. The residual value is typically distributed in proportion to business volume over some sort of a look back period with six years commonly considered as being a minimum but boards have great latitude in choosing the appropriate time period. Under this structure an inactive member loses their claim on the residual value related to the unallocated equity when the time period of their inactivity exceeds the look back period. While the book value of the cooperative firm is obvious the share attributable to a particular member is more ambiguous. For that reason it is logical to compare alternative valuation measures to both the value of the allocated equity and value of the total equity.

Principles of Firm Valuation

There is no single valuation method that is unanimously applicable in all valuation purposes (Pratt, Reilly, and Schweihs 2000). According to the American Institute of Certified Public Accountants, business valuation methodology is based on two principles: "the principle of substitution" and the "principle of future benefits" (Trugman 2013). The principle of substitution states that the value of property tends to be determined by the cost of acquiring an equally desirable substitute. In other words, a person will not purchase a particular asset if such a substitute can be purchased at a lower price. The principle of future benefits states that the economic value of an investment reflects anticipated future benefits.

IRS Revenue Ruling 59-60 discusses general approaches, methods and factors to be considered in valuing shares of the capital stock of closely held corporations for estate tax and gift tax purposes. While the revenue ruling is focused on valuation for tax purposes, the guidelines recommended by Revenue Ruling 59-60 are generally acknowledged as appropriate for more general purposes (Kremer, Jarvis, and Wallach 2011). The ruling suggests that a theoretically sound valuation shall be based upon all the relevant facts, but common sense, informed judgment and reasonableness should also be considered in the process of evaluating those facts and determining their combined importance. The ruling lists a number of potential factors to consider in the valuation of a closely held business including: the book value of the stock and the financial condition of the business, the earnings capacity

of the company, the dividend paying capacity, the market price of stocks of corporations engaged in a similar line of business, the price of any recently sold block of stock, and other factors.

Methods and Procedures

These valuation guidelines suggest two measures that can be applied to the cooperative firm, in addition to book value. The first valuation method is one that we created and denoted as "member value" (MV). Member Value is the present value of projected future cash patronage payments and equity redemption payments. Consistent with the Revenue Ruling 59-60 guidelines, MV would reflect the dividend paying ability of the cooperative firm.

MV was calculated by projecting annual cash patronage and equity retirement payments and discounting the member payments back to the present value.

$$MV = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \frac{CF_4}{(1+k)^4} + \cdots . + \frac{CF_{10}}{(1+k)^{10}}$$

Where:

CF= cash patronage and equity redemption payment

K=discount rate

Our calculated MV is a conservative estimate of the member's projected benefit from the cooperative because we only consider future member payments for a ten year period. The valuation technique could easily be expanded to a longer time period. We selected the ten year period because the accuracy of financial projections tends to decrease as the time frame increases. In addition, because the cash flows were discounted to present value, including more distant cash flows has a decreasing impact on the total valuation.

One disadvantage of MV as a means of valued the cooperative firm is the need for assumptions of future cash patronage rates and the equity redemption schedule. While many cooperatives have consistent patronage levels and systematic equity revolving periods, decisions on profit distribution and equity retirement are made by the board of directors on an annual basis. Changes in those decisions would impact MV. As an extreme case, a cooperative that is currently retaining all profits to grow the firm would have a MV of zero (if current patronage and equity management was assumed to continue) even though the cooperative was generating cash flows and investing in infrastructure. Presumable, the board would eventually modify their decisions on patronage and equity management as the cooperative's asset investment needs were satisfied.

Another income-based valuation approach which is appropriate for the cooperative firm is the free cash flow to equity (FCFE) valuation. The FCFE approach is often used to value privately held firms but has rarely been applied to the cooperative

business model. FCFE is the cash flow available to the firm's owners once operating expenses (including taxes), expenditures needed to sustain the firm's productive capacity, and payments to (and receipts from) debt holders are accounted for. In simple terms, FCFE represents the cash that could be potentially available to pay to equity shareholders. Like the MV measure, the FCFE approach is focused on the dividend capacity of the firm which is highlighted in Revenue Ruling 59-60. The FCFE differs from the MV approach in that it measures the cash potentially available for distribution. FCFE therefore requires no assumptions of actual profit distribution choices (cash patronage rates and revolving equity schedules, in the case of the cooperative firm.) FCFE also differs from MV in that it considers the residual value of the firm in the final year of the projections.

In calculating FCFE a valuator forecasts operations for a 5 to 10 year period of time and estimates the cash flows in excess of all expenses, loan repayment and additional infrastructure investment needed to maintain the assumed growth rate for each of those years. The valuator also estimates the terminal value for the business in the final year of the forecast. The annual cash flows and the terminal value are then discounted back to the date of the valuation to determine the current firm value. FCFE was calculated as:

$$FCFE = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots \frac{CF_{10}}{(1+k)^{10}} + \frac{TV_{10}}{(1+k)^{10}}$$

Where: CF = cash flows in excess of all expenses, loan payments, additional infrastructure investment and changes in working capital

k=discount rate

TV = terminal value of the firm in the last year of the projections

In FCFE valuation, the terminal value is commonly calculated using a perpetual growth valuation which assumes that cash flows past the terminal period will grow at a constant rate forever. It essence, the terminal value is represented by the value of an annuity yielding the cash flow in the year following the last year of the projected cash flows. Because the cash flows are assumed to grow at a constant rate, the discount rate in the annuity value is the difference between the firm's discount rate and the assumed growth rate of the cash flows. Specifically:

$$TV = \frac{\text{CF10 x } (1+\text{g})}{\text{k} - \text{g}}$$

Where:

CF10 = the cash flow to equity projected in the last year of projection

g = growth rate of the firm

k=discount rate

As explained above, the resulting terminal value is then discounted back to present value using the firm's discount rate. Due to the effect of this discounting, FCFE valuations are typically not overly sensitive to the terminal value calculation. In our analysis of the case study cooperatives, which is discussed in the subsequent section, the terminal value represented, on average, 40% of the total FCFE.

Data

Data from ten Oklahoma grain marketing and farm supply cooperatives in Oklahoma were used to investigate how MV and FCFE valuations compared with book value measures. The case study cooperatives were quite diverse with annual sales ranging from $9M to $219M and total assets ranging from $2.5M to $40M. The degree of financial leverage (debt/equity) varied across the cooperatives with the average debt to equity ratio of 93.9%. Because grain marketing and farm supply cooperatives make extensive use of seasonal financing, the ratios of long term debt to equity were much lower. The ratio of unallocated equity to total equity ranged from 41.5% to76.7 with an average of 59.9%.

Table 1: Summary of Historical Financial Data for Case Study Cooperatives

(average of previous 6 years)

Cooperative	Sales	Net Income	Total Assets	Debt/Equity	Long term Debt/Equity	Unallocated Equity/Total
A	$ 28,647,226	$1,65,398	$11,824,271	109.6%	39.7%	74.3%
B	$ 11,103,162	$1,109,621	$ 7,477,233	25.4%	0.7%	76.7%
C	$ 20,650,277	$1,682.687	$12,529,314	38.6%	2.2%	67.5%
D	$ 12,497,720	$ 213,213	$ 9,452,601	56.7%	19.8%	51.2%
E	$ 9,452,601	$ 166,016	$218,772,791	27.5%	5.1%	43.1%
F	$218,772,791	$7,848,099	$ 31,468,566	27.3%	2.6%	62.5%
G	$ 31,142,224	$ 772,426	$ 31,142,224	285.1%	34.4%	41.5%
H	$ 31,142,224	$ 651,586	$ 19,247,674	103.7%	43.5%	65.2%
I	$ 19,247,674	$ 905,601	$ 19,247,674	226.4%	17.0%	62.9%
J	$ 23,787,599	$1,146,559	$ 23,787,599	38.9%	12.8%	54.1%
Average	$ 40,685,984	$1,614,121	$12,710,311	93.9%	17.8%	59.9%

Profit distribution and equity management systems also varied across the case study cooperatives (Table 2). The majority of the cooperatives distributed patronage as 50% cash and 50% nonqualified allocated equity. However the cash patronage rate varied from 21% to 70%. One cooperative distributed patronage as 15% cash and 85% nonqualified allocated equity. Because of the different tax implications, the after-tax impact of the 15% cash/85% nonqualified distribution to the member was similar to the 50% cash/50% qualified distributions. The cooperatives were evenly split across age of member and age of stock equity redemption systems. The arithmetic average of the trigger ages was 70 years and average of the revolving period triggers was 22 years.

Table 2: Profit Distribution and Equity Management Systems in Case Study Cooperatives

Cooperative	Cash Patronage	Retained Allocated Equity Patronage	Equity Redemption System
A	50%	50% qualified equity	Age of Patron-Age 70
B	50%	50% qualified equity	Age of Stock-15 Years
C	50%	50% qualified equity	Age of Patron-Age 65
D	50%	50% qualified equity	Age of Stock-30 Years
E	50%	50% qualified equity	Age of Patron-Age 68
F	50%	50% qualified equity	Age of Patron-Age 68
G	21%	79% qualified equity	Age of stock-25 Years
H	15%	85% nonqualified equity	Age of Stock-20 Years
I	50%	50% qualified equity	Age of Stock-20 Years
J	70%	30% qualified equity	Age of Patron-Age 78

A cooperative financial simulation program developed at Oklahoma State University was used to develop 10 year projections for the case study cooperatives (Kenkel, 2013 and Kenkel and Holcomb, 2005). The simulations modeled the sales, expenses, profits and profit distributions of the firm and considered the cash flow required for infrastructure reinvestment and equity retirement. Sales volumes and margins for grain, fertilizer, petroleum and miscellaneous farm supplies were based on the historical averages. Patronage refunds from regional cooperatives (cash and equity) were based on the historical relationship with farm supply sales. The cash portion of regional patronage was included in the projected profits and cash flows. Fixed expenses such as depreciation, maintenance and repairs, insurance and property tax were based on their historic relationship with fixed asset levels. Personnel expense was based on the most recent fiscal year. Inventory and accounts receivable levels were based on historic relationships with farm supply sales.

Annual re-investment in fixed assets was assumed to be 5% of total asset value. This level was lower than the average re-investment levels in the historical data (18.6%). The firm specific growth rates are not used because all of the case study cooperatives have recently replaced major assets such as grain bins or fertilizer warehouses during the previous six years. It therefore seemed likely that their long term asset growth will be lower than their recent historical average. The five percent fixed asset investment was roughly equivalent to the depreciation expense for most of the case study firms.

A profile of the allocated equity by member age, or year of issue was obtained for each cooperative and used in the simulation program to forecast equity retirement payments. The equity profile by member age and stock year included the additional equity retained during the simulation period. Annual distribution and retention of profit as cash patronage, retained allocated equity and retained unallocated equity were calculated based on the projected profits and the existing profit distribution system. The additions to unallocated equity came from the after-tax portion of profits on

nonmember business. The percentage of non-member business was obtained for each cooperative and applied to farm supply based profits. In cases where the cash patronage rate was not consistent over the period of the historical data, phone interviews with the CEOs were conducted to determine the most typical profit distribution. The cooperatives' after tax income was calculated consistent with Sub-chapter T provisions using the Oklahoma and federal corporate tax rates.

Both the MV and FCFE approaches required the selection of the discount rate. Conceptually the discount rate should reflect the risk free rate of return with appropriate adjustments for risk, lack of marketability and lack of control. Schall, Sundem and Geijsbeek (1978) investigated capital budgeting practices at 424 U.S. corporations. They reported an average (before tax) discount rate of 14.3%. Researchers have tended to apply lower discount rates in evaluating agricultural projects, perhaps reflecting an assumption that agricultural producers have lower opportunity cost for alternative investments. For example, Richardson et. al. (2007) used a 7.5% discount rate in evaluating ethanol projects. Reid and Bradford (1983) examined rates between 3% and 9% in determining the optimal replacement of farm tractors. Boyer et. al. (2008) used a discount rate of 6.125% in evaluating irrigation projects in South Texas. Leuer, Hyde and Richard (2008) used an 8% discount rate in analyzing the profitability of methane digesters on Pennsylvania dairy farms. . A baseline discount rate of 10 percent was used in our validation models. . We examine lower and higher discount rates in our sensitivity analysis.

Results

The ratio of MV to allocated equity (Table 3) ranged from 0.86 to 3.98 with an average of 2.12. That implied that members, on average, received future payments from their cooperative worth over twice the value of their allocated equity. The MV valuation had two components, the present value of the cash patronage and the present value of the equity redemptions. On average, future equity redemptions made up 17% of the MV. Equity redemptions were a larger portion of MV for the cooperatives using an age of stock system (21%) relative to those on an age of patron system (12%) reflecting the fact that the cooperatives with age of stock systems tended to revolve equity more rapidly.. There was however, an example of a cooperative that redeemed equity slowly under each system. The lowest MV/allocated equity ratio was for cooperative G which had the lowest cash patronage rate of 21%. Cooperative D had the next lowest ratio. While Cooperative D did have an age of stock equity management system, it had the longest revolving period of the age of stock subset at 30 years. The ratio of MV to total equity was lower, averaging 0.79, reflecting the fact that unallocated equity accounted for more than half of total equity for most of the case study cooperatives.

The ratios of FCFE to allocated equity were more than twice as high as the corresponding MV ratios, averaging 5.57. FCFE represents all of the cash that the cooperative could potentially distribute to members and also considers the value of the firm in the last year of the projections. It is therefore not surprisingly that FCFE values were higher than the MV which projected actual member payments with no consideration of terminal value. Another interpretation of FCFE is the amount that a firm or financial instrument yielding the projected cash flows is worth in the present period. The second interpretation would

suggest that a "fair" outside offer for the cooperatives would range from 2.68 to 9.72 times the value of the members' allocated equity, averaging 5.57 times. The lowest FCFE to allocated equity ratio (cooperative H at 2.68) was somewhat misleading. Because the cooperative had just transitioned from qualified retained patronage to nonqualified retained patronage, it could not deduct the equity patronage for tax purposes which reduced its available cash. The cooperative will realize a tax deduction on that equity when it is redeemed. However, since the redemption of the nonqualified equity was beyond the projection period, the cash flow benefits of that deduction were not reflected. Like the MV ratios, the FCFE to total equity ratios were lower that the corresponding allocated equity ratios.

Table 3: Valuation Results

Cooperative	MV/ Allocated Equity	MV/ Total Equity	FCFE/ Allocated Equity	FCFE/ Total Equity	ROA	ROE
A	3.49	0.90	8.30	2.14	13.1%	21.5%
B	2.08	0.49	5.34	1.25	11.8%	13.2%
C	2.11	0.68	5.53	1.80	12.8%	17.1%
D	1.09	0.53	3.14	1.53	11.0%	17.8%
E	1.34	0.76	3.38	1.92	14.2%	16.6%
F	2.11	0.79	5.83	2.18	16.6%	19.4%
G	0.86	0.50	3.59	2.10	7.4%	18.0%
H	1.10	0.38	2.68	0.93	12.5%	18.5%
I	3.98	1.48	9.72	3.61	10.7%	27.9%
J	3.08	1.41	8.16	3.75	17.9%	22.6%
Average	2.12	0.79	5.57	2.12	12.8%	19.3%

The patterns in the MV and FCFE ratios reflect the many moving parts of the cooperative business model. The FCFE to total equity values generally followed the pattern of the return on equity. That is not surprising since the more profitable cooperatives (as measured by ROE) would be expected to generate higher cash flows potentially available for distribution. Cooperative H was again somewhat of an outlier due to the specialized tax issues associated with the transition to nonqualified stock. The MV to total equity ratios also tended to follow the pattern of the ROEs but were impacted by the cooperative profit distribution and equity management strategies. For example, Cooperative C had a slightly lower ROE relative to Cooperative D. The two cooperatives had identical cash patronage percentages but Cooperative C which revolved equity at age 65 has a slightly higher MV relative to cooperative D which used a 30 year age of stock system. The MV and FCFE ratios using allocated equity were impacted by the proportion of unallocated equity in the cooperative's equity structure.

Sensitivity Analysis

` The effects of the discount rate on the MV and FCFE valuations are provided in Table 4. The FCFE/ allocated equity ratios were more sensitive to the discount rate since larger cash flows were involved. At the lower 7% discount rate the MV was on average 2.5 times the value of the

members allocated equity while the FCFE valuation was almost ten times the allocate equity value. At the higher discount rate the ratios of MV and FCFE to allocated equity were 1.86 and 4.10 respectively.

Table 4: Ratio of MV and FCFE to Allocated Equity at 13%, 10% and 7% Discount Rate

Cooperative	MV/AE-13%	MV/AE-10%	MV/AE-7%	FCFE/AE-13%	FCFE/AE-10%	FCFE/AE-7%
A	3.05	3.49	4.02	6.04	8.30	13.96
B	1.83	2.08	2.40	4.00	5.34	8.69
C	1.84	2.11	2.43	4.03	5.53	9.30
D	0.96	1.09	1.25	2.14	3.14	7.16
E	1.17	1.34	1.54	2.51	3.38	5.55
F	1.85	2.11	2.42	4.51	5.83	9.11
G	0.75	0.86	0.99	2.77	3.59	6.86
H	0.96	1.10	1.27	1.85	2.68	4.78
I	3.49	3.98	5.14	7.00	9.72	17.52
J	2.69	3.08	3.56	6.11	8.16	13.31
Average	1.86	2.12	2.50	4.10	5.57	9.63

Implications

Acquisitions of cooperatives by investor owned firms are relatively rare but do occur. These valuation measures could be used by members in evaluating an acquisition offer. The MV valuation provides a conservative lower bound for an acceptable outside because it reflects the present value of the payments that members are projected to receive over the next ten years and does not consider the value of the residual value of the firm at the end of that period. It seems reasonable to postulate that no cooperative membership should accept an acquisition offer that is lower than MV. On average the MV based valuation were over twice the value of the allocated equity. The FCFE valuation provides a higher benchmark for an acceptable offer. The FCFE valuation reflects the value of an asset with a similar earning stream as the cooperative. Unlike the MV it also considers the residual value at the end of the projection period. On average, that value is over five and half times the value of the allocated equity.

A merger between two cooperatives is the most common form of cooperative reorganization. When voting on a possible merger the members of both cooperatives have to evaluate whether the merger would improve their benefit stream from the cooperative. There may also be negotiations over the ratio of equity in the acquired cooperative is exchanged for equity in the acquiring firm. In cases where the acquiring cooperative has higher profitability, lower leverage, a shorter equity revolving period or a lower ratio of unallocated equity, the membership may perceive that the allocated equity from the acquired cooperative should be exchanged at a ratio lower than one to one. In terms of the cooperative financial model, this common approach to determining a "fair" equity exchange is flawed. Members of a cooperative have two streams of future benefits: cash patronage and expected equity redemption. It is logical to adjust the ratio at which equity is exchanged to account for differences in the equity revolving period so that the present value of the equity redemption stream

is held constant. Adjusting the equity exchange ratio is not a logical approach to account for profitability differences since the patronage distributions of the merged cooperative will be made based on future use and is not influenced by equity ownership.

The MV valuations and its components could be very useful for cooperative members who are evaluating a merger decision. Members would be expected to benefit from a merger when it was forecasted to improve their MV. Ideally, the merger analysis could include a MV valuation for the merged firm, reflecting projected cost savings and synergies. In that case the members of each cooperative could determine if the merger was projected to improve MV. Even without a MV projection for the merged firm, the MV valuations of the existing cooperative would be useful. The valuation would help members of a lower MV cooperative quantify the potential benefits of a merger with a higher MV cooperative. Similarly, it would help the members of the higher MV cooperative understand the magnitude of synergies or performance improvement that would need to be obtained for the merger to be beneficial from their perspective. A subcomponent of the MV, the present value of projected equity redemption payments, would provide a benchmark for a fair equity exchange ratio.

As an example, consider Cooperative A proposing a merger offer to members of Cooperative B. Cooperative B's member value is only 57% that of Cooperative A. That would suggest a clear benefit to Cooperative B members from merging. It also highlight the fact that Cooperative A members must expect a substantial performance gain from the former Cooperative B operations to prevent the merger from diluting their MV. Based on the relative value of the allocated equity Cooperative B members would receive 0.96 shares of cooperative A stock for their stock in Cooperative B. If total equity or "book value" was considered then Cooperative B members would receive 1.06 shares of Cooperative A stock for each of their existing shares, a difference reflecting the slightly higher percentage of unallocated equity in Cooperative's B equity structure. However, if the present value of projected equity redemptions were considered, Cooperative B members would receive 1.4 shares of Cooperative A stock for their allocated equity. That ratio reflects the fact that Cooperative B is on a 15 year age of stock equity revolving system which is projected to revolve equity more rapidly than Cooperative's A age of patron-age 70 system.

Perhaps the most useful implication of the MV and FCFE valuation is the potential in membership communication. The highest performing cash study cooperative had a MV of almost four times that of the value of the allocated equity and a FCFE valuation of almost ten times allocated equity value. Cooperative leaders could use that information in membership communications to help cooperative members understand the value and benefit of their cooperative. As discussed previously, MV information would be useful in communicating the benefits of a proposed merger and to communicate a logical and easily understood basis for the equity exchange ratio. In the less common circumstance of an outside offer for the cooperative, a cooperative board could use FCFE valuation information to justify why they choose not to communicate an outside acquisition offer to the membership and/or to communicate the lower bounds of a "fair" offer.

Summary

The unique financial structure of the cooperative business model creates challenges in valuing cooperative firms. Because it is the only measure available, cooperative members often reference the value of their allocated equity as a measure of the value of their share in the cooperative. The valuation measures that we discuss, which focus on the future earning capacity and future distributions of the cooperative, provide a much more accurate picture of a cooperative's value. Our valuation measures could help boards and CEOs to communicate the cooperative value to the membership. They would also provide essential information when the cooperative membership is evaluating a reorganization alternative such as a merger with another cooperative or sale of the cooperative business.

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