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The capital structures of Iowa’s grain and agriculture supply firms: are cooperatives different than their investor-owned counterparts?

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In the world of agricultural cooperatives, a significant amount of board room and executive time is spent on capital and equity management. At the

core of many board decisions is an attempt to strike a balance between the use of debt capital and equity capital. There is no reason to expect two otherwise identical firms, one organized as a cooperative and the other as a non-cooperative corporation, to have different capital needs. Cooperatives operate in the same markets as investor-oriented firms (IOFs) and are subject to the same market forces; however, the way in which their activities are financed is inherently different. This difference derives from a defining characteristic of the cooperative business model: the “user-owner” principle. The cooperative is capitalized by those who use it and not by passive investors. Just as profitability in a traditional corporation accrues to its investors by way of stock appreciation or dividends, a portion of the cooperative’s profits are allocated to its investors, the members who use the cooperative. By retaining profits in the cooperative and allocating them in

the users’ names, the firm builds equity that will be redeemed to the member-owners at some point in the future¹.

There are a number of interesting implications that arise from cooperatives’ accumulation and subsequent redemption of equity; one is an implication for capital structure: a firm’s proportional use of debt and equity to finance assets and investment activities. The conventional thought is that since a portion of the cooperative’s

¹ This describes the usual allocation of qualified patronage, a portion of which the cooperative is legally obligated to pay in cash, the remainder of which is retained at the cooperative level until it is redeemed at some point in the future. The redemption strategies differ, but most agricultural cooperatives use either an age-of-equity program or revolving equity program.

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Handbook updates

For those of you subscribing to the handbook, the following new updates are included.

Cost of Storing Grain – A2-33 (2 pages)

Grain Storage Alternatives: An Economic Comparison – A2-35 (7 pages)

Cash Rental Rates for Iowa 2015 Survey – C2-10 (12 pages)

Computing a Pasture Rental Rate – C2-23 (3 pages)

Adapting Crop Share Agreements for Sustainable and Organic Agriculture – C2-31 (4 pages)

Please add these files to your handbook and remove the out-of-date material.

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equity will be redeemed in the future, lenders may not view this as a source of leverage for borrowing. Therefore, all else equal, the cooperative firm may face constraints in borrowing compared with their non-cooperative corporate counterparts. But can we observe that cooperatives are constrained in their usage of debt capital? If so, can the difference in their capital structure be correlated with financial and operating measures?

Li, Jacobs, and Artz examine this issue in a recent research study². They compare the relative use of debt and equity financing by cooperatives and IOFs using financial data from approximately 150 agricultural grain marketing and supply firms in Iowa from 1992 to 1995. Approximately 2/3 of the firms are cooperatives. They compare the variation in firms' debt-to-asset ratios (capital structure) and common financial constructs using a variation of the standard DuPont Decomposition of a firm's return on equity. The financial constructs are measures of asset use efficiency, operating efficiency, interest on debt, liquidity, and the relative use of short- and long-term borrowing. The authors identify whether a firm's "type" – cooperative or IOF – has an effect on its capital structure on average, all else equal. Second, they investigate whether the key financial and operating measures have different effects on capital structure for the two firm types.

Table 1 contains the financial variables used in the study and provides the averages of each for cooperatives and IOFs. The cooperatives in this sample are significantly larger than the IOFs, and a sense of the differences in terms of size, profitability, and balance sheet structure are evident. The absolute values in Table 1, however, are not very useful because it is difficult to compare firms of different sizes. The financial ratios used in the analysis are provided in Table 2. These are relative performance and financial measures – they are normalized, for example, by measures such as asset values, dollars of revenue, and earnings. Though the cooperatives in this study are larger, their operating efficiency (profit

margin) and interest coverage ratios are comparable to their IOF counterparts, they use relatively less debt to finance their assets, have a substantially lower asset utilization efficiency (asset turnover), and a substantially smaller portion of their overall liabilities is long term.

Given what was learned about how cooperatives and IOFs in Iowa compare in financial and performance terms, the authors then measure the impact of each on capital structure. The results suggest that not only do cooperatives and IOFs have different capital structures (debt-to-asset ratios), but also the impacts on the relative use of debt from performance and financial outcomes differs. The analysis shows:

- Cooperatives that increase their operating efficiency (profit margin) have higher debt-to-asset ratios, but when IOFs increase their profit margin they reduce their use of debt. Cooperatives use the improved operating efficiency and the cash reserves it generates to reduce debt usage.
- Improvements in asset utilization efficiency (asset turnover ratio) lead to higher debt-to-asset ratios in cooperatives but the same connection is not found in IOFs.
- Firms with larger inventory values relative to total current assets are more leveraged; this holds for cooperatives and IOFs.

Table 1. Summary of data, Iowa grain and farm supply firms, 1992 - 1995

Financial Measures	Average for Cooperatives (\$m)	Average for Investor-Owned Firms (\$m)
Current assets	\$4.86	\$1.10
Inventory	\$2.94	\$0.55
Fixed assets	\$2.15	\$0.57
Total assets†	\$8.50	\$1.77
Current liabilities	\$3.62	\$0.73
Long-term liabilities	\$0.62	\$0.24
Total liabilities	\$4.25	\$0.96
Pre-tax profit	\$0.34	\$0.05
Total revenue	\$21.11	\$6.83
Sales (revenue – non-operating income)	\$20.10	\$6.69
Earnings before interest and tax (ebit)	\$0.49	\$0.09
Annual interest expense	\$0.16	\$0.05

² Li, Z., K. Jacobs, and G. Artz. "The Cooperative Capital Constraint Revisited," forthcoming in *Agricultural Finance Review*.

† Total assets include investments in regional cooperatives and leases.

The capital structures of Iowa's grain and agriculture supply firms, continued from page 2

Table 2. Comparison of cooperatives and investor-owned firms on financial and performance outcomes

Performance and Operational Ratios	How it's Calculated	What it Means	Average for Cooperative	Average for IOFs	Are Co-ops and IOFs Different?
Debt to Asset	The \$ value of total debt divided by the \$ value of total assets.	The larger this ratio, the more debt financing the firm is using to support assets and investment activities. A ratio of 0.5 indicates that 50% of the total assets are financed through debt.	0.468	0.519	The difference between cooperatives and IOFs is small but statistically significant. On average, the IOFs in this study are more leveraged than cooperatives, financing approximately 51% of their assets with debt.
Operating Profit Margin	A firm's pre-tax profits divided by its revenue.	This is a profitability measure; it identifies the proportion of revenue that is left after deducting all operating costs and costs of goods sold. A value of 0.14 means that for every \$1 of revenue generated, \$0.14 was left as pre-tax profits	0.1387	0.1474	This difference is not statistically significant. Both firm types have positive operating margins of about \$.14 per \$1 of revenue generated.
Asset Turnover	The \$ value of sales divided by the \$ value of total assets.	This is an operational efficiency measure: it identifies how efficiently a firm uses its assets to generate sales. Higher values indicate better asset use efficiency. An asset turnover ratio of 2.5 means that each dollar of assets generates \$2.50 of sales for the firm.	2.467	5.115	Cooperatives in this study had significantly lower asset turnover ratios indicating a less efficient use of assets in generating sales relative to the IOFs.
Liquidity	The \$ value of inventory divided by the \$ value of all current assets.	This is not a common financial or operational measure; however, a higher value may indicate relative small cash positions and the need for short-term financing of grain, fertilizer, chemicals, fuel and other inventory items. A liquidity ratio of 0.61 implies that for each dollar of current assets, \$0.61 is tied up in inventory (non-cash).	0.605	0.434	This liquidity measure indicates that cooperatives and IOFs differ in the proportion of their current assets that are inventory goods. Cooperatives held 60% of current assets in inventory while IOFs held 43%.
Inverse Interest Coverage	Total interest expense divided by earnings before interest and taxes (EBIT).	This measures is the relative burden of interest expense from debt and the extent to which the company is generating sufficient earnings to pay the expense. Higher values indicate the company is spending more of its earnings on interest. An inverse interest coverage ratio of 0.3 means that each \$1 of pre-tax and pre-interest earnings will be used to pay \$0.30 of interest.	0.318	0.0689	Though the inverse interest coverage ratio was larger for the cooperatives, the difference was not significant.
Debt Structure	Long-term liabilities divided by short-term liabilities.	A firm's debt structure identifies whether the firm primarily depends on long-term or short-term borrowing for its needs. A value less than 1.0 means the firm has more short-term borrowing than long-term. The higher the number, the greater the firm's reliance on long-term borrowing.	0.157	0.477	IOFs in this study had a significantly larger proportion of their total liabilities as long-term liabilities compared with cooperatives, yet both firm types rely primarily on short-term borrowing.

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The capital structures of Iowa's grain and agriculture supply firms, continued from page 3

Key findings:

- On average, grain and supply cooperatives in our study have lower debt-to-asset ratios than do investor-owned firms in the same industry. Cooperatives do tend to use more equity than debt to finance their activities.
- Cooperatives that achieve higher operating efficiency, better asset utilization (more sales per dollar value of assets), and more current assets as inventory tend to be more leveraged than other cooperatives.
- Meanwhile, investor-owned firms with a higher proportion of inventory to current assets tend to be more leveraged, but in contrast to the cooperatives in the sample, when IOFs increase their profit margin they reduce their use of debt to finance assets.

- There is no clear effect on capital structure from a change in interest rate expenses for cooperatives and IOFs.

Overall, the study suggests that cooperative firms, on average, rely more heavily on equity financing than debt financing. Further, improvements in profitability are associated with increased use of debt financing in cooperatives and deleveraging activities in IOFs. Do these results imply that cooperatives do indeed face borrowing constraints? Unfortunately, that cannot be determined from these data. Further, there are other explanations for why cooperatives may rely more heavily on equity than debt financing relative to IOFs: cooperative managers may view equity viewed as a costless source of capital, and equity financing is perceived to be a more conservative investment approach.

A snapshot of today

This study was based on data from the 1990s. Is it still true that cooperatives in Iowa rely more heavily on equity financing than debt, and do they use less debt relative to their IOF counterparts? Do the relationships between capital structure and performance measures still hold? Without updated data, the analysis cannot be replicated. However, there have been significant changes in the economic environment of agricultural grain and supply companies since the 1990s that impact debt usage, capital structure and equity, including:

- An overall increase in grain price volatility and recent historical highs in grain prices means that marketing firms must have more working capital to withstand the crop price movements, fluctuations in inventory values, and margin account requirements.
- Cooperatives have significantly higher liquidity today than ever before.

- Recent profitable years have contributed to strong balance sheets and even excess working capital, reducing the need for short-term and long-term borrowing and increasing cooperatives' ability to fund investments.
- Cooperatives in the Midwest have engaged in unprecedented investments in technologies and assets to increase efficiency and services they can provide.
- The use of Section 199 deductions has accelerated the growth of cooperatives' equity, particularly the unallocated earnings.
- Cooperative mergers and acquisitions over the last 20 years have reduced the total number of cooperatives but not necessarily the number of locations they operate. Much of the consolidation of agricultural cooperatives resulted in a reduction of the number of IOFs and private firms, either by attrition or acquisition.

Tables 3 and 4 provide, for cooperatives only, an updated look at the comparable key financial and performance measures used in the study. These are based on fourth quarter (2014) financial data from 32 local grain and farm supply cooperatives (primarily in Iowa) that participate in CoopMetrics³. Whereas the average cooperative in the 1995 study had assets of \$8.5 million, the average of cooperatives today is nearly \$128 million. It is difficult to draw comparisons between the two groups of cooperatives without knowing more about the sample data

³ Cooperatives participating in CoopMetrics upload quarterly operating statements and trial balance sheet values. The 4th quarter data is "rolling," representing the outcome of the previous four quarters in calendar year 2014. Not all cooperatives have year-ends that coincide with the calendar year-end; to the extent that this influences borrowing and financing outcomes, the data in Tables 3 and 4 are also affected.

The capital structures of Iowa's grain and agriculture supply firms, continued from page 4

Table 3. Balance sheet averages for grain and farm supply cooperatives

Assets		Liabilities	
Current Assets	\$ 77,771,152	Current Liabilities	\$ 59,536,418
Inventory	\$ 51,555,984	Long-term Liabilities	\$ 18,559,774
Fixed Assets	\$ 33,737,770	Total Liabilities	\$ 78,096,191
Other Assets	\$ 16,444,849		
Investments in Cooperatives	\$ 15,881,608		
		Equity	
		Unallocated Equity	\$ 29,249,239
		Allocated Equity	\$ 20,608,341
Total Assets	\$ 127,953,771	Total Equity	\$ 49,857,580

Source: CoopMetrics, 4th Quarter 2014

from 1990s and how firms select to participate in CoopMetrics; however, it is safe to say that cooperatives are significantly larger now than they were in the 1990s, an artifact of years of mergers in the industry. The data from the 4th quarter of 2014 provide the following snapshot of these Midwest cooperatives:

- A debt-to-asset ratio of 0.61 indicates for every \$1 of assets, \$0.61 is financed by either long-term or short-term borrowing. These cooperatives are using more debt than equity to finance the value of their assets.⁴
- The asset turnover ratio of 2.066 is slightly lower than that observed in the 1990s, indicating that each \$1 dollar of assets generates \$2.07 of sales.
- The average proportion of cooperatives' current assets that are inventory is 0.663. This means that 66 percent of the value of current assets is in inventory, an asset that is less liquid than other current assets.
- An inverse interest coverage ratio of 0.178 implies that each \$1 of earnings before interest and taxes will be used to pay \$0.18 in interest. A smaller portion of EBIT is needed to service the debt today versus in the 1990s.
- These cooperatives' average debt structure – the ratio of long-term debt to short-term debt – is 0.312. Approximately 87 percent of the total debt is in short-term borrowings.

Besides being an indicator of the solvency of a firm, a cooperative's capital structure gives insight into how it has chosen to fund its activities and its appetite for

Table 4. Average financial and performance measures for grain and farm supply cooperatives

Selected Financial and Performance Measures, Averages for 32 Cooperatives	
Local Equity	\$ 36,170,802
Sales	\$ 264,292,546
Operating Profit Margin	\$ 2,204,525
EBIT	\$ 6,596,265
Interest Expense	\$ 1,175,749
Debt to Asset	0.610
Asset Turnover	2.066
Liquidity	0.663
Inverse Interest Coverage	0.178
Debt Structure	0.312

Source: CoopMetrics, 4th Quarter 2014

utilizing members' risk capital. It appears to be the case that, on average, cooperatives have increased their use of debt financing relative to equity since 1995. This is likely a reflection of the low costs of servicing debt that firms have enjoyed in recent years. The research by Li, Jacobs, and Artz (2014) find there are correlations between capital structure and financial and operational outcomes, and these are different for cooperative and non-cooperative grain and farm supply firms in Iowa. There is little reason to expect that the relationships between capital structure and other key financial data no longer exist; however, they may have changed with changes in the industry. Cooperatives may find value in examining their own capital structures over time to identify correlations between it and key financial and operational measures.

⁴The average quarterly debt-to-asset ratios for cooperatives in 2014 varied between 0.51 and 0.61, and during the 4th quarter 2014, individual cooperative values ranged from 0.27 to 0.77.

Research briefs from the ISU Department of Economics

Iowa State University part of grant to improve ag policy in Ghana

Iowa State University has joined a partnership to improve agricultural policy making, policy analysis and implementation in the African country of Ghana. The work is funded by the U.S. Agency for International Development (USAID) through its Feed the Future Agriculture Policy Support Project. Iowa State joins Chemonics, an international development company; the Centre for Policy Analysis, a non-governmental think tank in Ghana; and the Ghana Institute of Management and Public Administration on the four-year, \$15 million grant.

The ISU component of the project is led by John Beghin, professor of economics and a researcher in the Center for Agricultural and Rural Development, and Manjit Misra, director of the Seed Science Center who leads the Global Food Security Consortium. Iowa State's subcontract in the grant is worth \$1.145 million.

This project is called the *Ghana Feed the Future Agricultural Policy Support Project*. It is a capacity building project that will focus on policies affecting

seeds and fertilizer use, and smallholder subsistence farming.

Ghana's agriculture sector represents 30 percent of its gross domestic product and 50 percent of its employment, but is not growing at a pace needed to eliminate food insecurity. This project is designed to complement other USAID efforts by supporting measures where the political will for reform connects with the constraints facing agribusinesses.

ScoutPro named rural entrepreneur of the year

Michael Koenig ('12 agriculture and life sciences education) Holden Nyhus ('13 agriculture and life sciences education) and Stuart McCulloh ('13 agriculture and life sciences education) created ScoutPro as a class project in a CALS agricultural entrepreneurship course in 2011. The group was named Entrepreneur of the Year as part of the first-ever Rural Entrepreneurship Challenge, receiving \$30,000 in prize money to implement the business idea, which is software to assist farmers with crop maintenance. The Rural Entrepreneurship Initiative is a joint program of the American Farm Bureau Federation and Georgetown University's McDonough School of Business.

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Internet Updates

The following Information Files and Decision Tools have been updated on www.extension.iastate.edu/agdm.

Estimated Cost of Establishment and Production of 'Liberty' Switchgrass – A1-29 (7 pages)

Estimated Cost of Establishment and Production of 'Liberty' Switchgrass – A1-29 (Decision Tool)

Monthly Cost of Storing Grain – A2-33 (Decision Tool)

Estimating Farm Machinery Costs – A3-29 (11 pages)

Grain Transportation Cost Calculator – A3-29 (Decision Tool)

Calculating Pasture and Hay Land Cash Rents – C2-23 (Decision Tool)

Conversions Between English and Metric Units – C6-80 (Decision Tool)

Current Profitability

The following tools have been updated on www.extension.iastate.edu/agdm/info/outlook.html.

Corn Profitability – A1-85

Season Average Price Calculator – A2-15

Soybean Profitability – A1-86

Ethanol Profitability – D1-10

Iowa Cash Corn and Soybean Prices – A2-11

Biodiesel Profitability – D1-15

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