Examining Cooperative Sustainable Growth Rates: Who Is Growing Broke?

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Abstract

Many cooperatives are growing at an exceptional rate. Cooperative growth has been fueled by producer consolidation, a highly competitive marketplace and new opportunities through rising global demand. However, growth at an exceptional rate may be unsustainable and could potentially cause significant financial stress. Cooperatives could get so caught up in growing that they could create problems, or "grow broke." The sustainable growth rate (SGR) is a financial metric used by many businesses to address this potential growth problem and can be used by cooperatives to ensure their long-run success. Thus, the objective of this research is to better understand the SGRs of cooperatives, provide baseline SGRs, determine key attributes of higher growth rate cooperatives and key indicators of SGR changes.

The SGR relates to the retained earnings growth of a cooperative. Boosting a cooperative's retained earnings can be done by manipulating the four levers of growth to attain higher retained earnings. These financial decisions will also boost a firm's SGR. Increased retained earnings lends more flexibility to expand through organic growth or acquisitions.

The SGR provides little information if not compared to actual growth results across time and across industry standards. Actual growth rates are measured by the year-over-year change in sales as Higgins (1977) details. By determining the difference between actual sales and the SGR, the sustainable growth challenge (SGC) is found. The SGC is a straightforward way to see how far a firm is straying from the SGR and, over time, see where the correction was made to converge to the SGR. If a business has a negative SGC, then actual growth rates exceeded SGR, which means outside financing is necessary to fund growth. If SGC is positive, then the firm is not meeting their growth target and potentially not capturing their full value for their owners. (Higgins, 1977)

A seemingly unrelated regression approach is used to analyze the interrelationships of the four levers of growth using panel data from the CoBank Risk Analyst database of Midwest cooperatives' financial and operating information. Breaking cooperatives into "large" and "small" designated groups will aids determining factors of boosted retained earnings. The cooperatives are also grouped based on regional location as well as the percentage that farm supply sales make up total sales. The drivers of SGR in today's cooperatives will be examined—higher profit margin, or lower patronage—to determine which factors are more practical for specific cooperative size and type. In addition, the size of cooperative that faces the largest SGC and whether that sector also has a higher or lower SGR is of interest to this research. ("CoBank Risk Analyst Database," 2017)

Econometric results identify the most useful levers to boost the SGR, change the SGC or both. Profit margin is the key driver of sustainable growth; however, operating efficiency and leverage are key factors as well. When a growth challenge is present, leverage is most often used and the biggest contributor to changes in the SGC. Cooperatives of each size, location and region grow and are affected by growth challenges. This study will help cooperative directors understand the financial decision repercussions on growth and growth challenges.

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Chapter 1 - Introduction

Since the 1922 Capper-Volstead Act was passed into law, cooperatives have been helping producers and rural communities thrive. From this point forward, management decisions have led hundreds of cooperatives to regional or national success and led more yet to disastrous ruins. In 2015, the USDA reports that over 2,200 agriculturally focused cooperatives generated revenue in excess of $222 billion. With such an impact on rural America, ensuring long-term success of these cooperatives helps safeguard success of U.S. producers. Given the role that cooperative decision-making plays, education focused on planning, business management and outreach has proven crucial for cooperative success.

Grain and farm supply cooperatives' impact, through direct contributions as well as wages, on rural communities is tremendous. These cooperatives held $40.5 billion equity in an $88.2 billion asset base and employed over 187,000 people, largely in rural communities, to meet the needs of their members. Given cooperatives represent such large revenues and employment opportunities in agricultural and rural communities, understanding growth is key to longevity of such a vital business in rural America. Cooperative management is oftentimes credited with the successes or failures of a cooperative. Using sustainable growth rates and challenges in business plans aide management in decision making for long term success through matching of actual and sustainable growth rates. (USDA, 2015)

This study focuses on methods used by cooperatives for growth and how growth affects the financial underpinnings of a cooperative. When a cooperative idolizes growth, the financials suffer due, in part, to growth swing induced leverage and operating efficiency changes. Likewise, when growth and the financials are thought of as having equal weight, the cooperative can more accurately predict how a purchase or expansion decision will affect short and long-term

health of the cooperative. Accommodating members' speed and efficiency needs could be a reason for expansion, upgrade or growth. Cooperative growth and expansion may not be necessary if a cooperative is serving members' needs and best interests with a healthy balance sheet.

Monitoring growth via the sustainable growth rate (SGR) model is done through examining four key financial ratios – earnings retention, leverage, profit margin, and operating efficiency. Each of these ratios positively impacts the SGR, and if examined carefully, can show opportunities for improvement and challenges. Cooperative directors and management can view these four ratios as "levers" that can be adjusted to drive growth.

Cooperative growth can be a method for them to stay competitive in the fast-changing marketplace on the local, regional or national scale. This study determines which growth levers best boost sustainable growth or best change the sustainable growth challenge (SGC). Profit margin looks to be the key driver of sustainable growth; however, operating efficiency and leverage are key factors as well. When a growth challenge is present, leverage is most often used and the biggest contributor to changes in the SGC.

Due to the tremendous data available for the study, cooperative growth is tracked from 1996 to 2014. This study period spans double digit growth and decline of cooperatives. The Farmland Industries bankruptcy of the early 2000s as well as the ethanol fueled commodity boom late in the same decade were major contributors to this varied growth. Given the wide array of production and profitability results, the study provides robust findings that are immediately applicable to cooperative growth decision making.

The data used for calculating the SGR and SGC of cooperatives is from the CoBank Risk Analyst database. The 19 years of data provides a look at cooperatives in all stages of growth. All cooperatives in the dataset persist throughout the study period. With cooperatives in the dataset representing 23 states, localized or regionalized events will not affect the study. Each cooperative's panel data provides 19 years of observations for 155 variables.

Due to the robust dataset, studying the aggregate methods of overcoming growth challenges may not be applicable to all cooperatives. This study breaks the dataset into subsets for comparison and applicability of the results. The categorization is done based on size, regional location, and whether a cooperative specializes in farm supply sales. An analysis of the aggregate dataset allows for comparing subsets to the aggregate.

Chapter 2 - Literature Review

Cooperatives exist as a vehicle for members to compete on a larger scale by pooling assets and production capacities. Likewise, growth, expansion and acquisition by a cooperative is generally thought of as accomplishing the noted reasons for existence. Determining the speed of growth and optimal size to compete in a given market is difficult. Higgins (1977) realized that firms were putting growth and profits above all other measures of a healthy company. The sustainable growth rate (SGR) was developed as a method for analyzing optimal growth using a firm's financial policies or measures. The sustainable growth rate is the annual change in year over year sales that a company can achieve without disrupting the given capital structure. If growth in sales occurs at a different rate, then the financial ratios and over-arching capital structure will also have to be adjusted. (Higgins, 1977)

Identifying growth is important, possibly more important is comparing actual and sustainable growth rates to determine the needed course of action. To do so, Higgins (2011) developed the sustainable growth challenge (SGC). It can be found by differencing the SGR from the actual growth a cooperative realizes. Management knowing their SGC is described as the kingpin of using the SGR model to make financial decisions. (Higgins, 2011)

Once the firm's SGR is known, steps should be taken to reach the sustainable rate. A firm that is temporarily growing faster than the SGR would have a positive challenge and would likely increase leverage to fund this growth. Similarly, firms temporarily growing slower than the given SGR would be experiencing a negative challenge while accumulating more capital than needed and be able to decrease leverage or increase dividend payout ratio. Higgins (1977) offers a number of adjustments that firms can make when their actual growth exceeds sustainable over the long term. Selling new equity is foremost on the list which carries high transaction and

indirect costs for firms that can do so and is not feasible for traditional cooperatives. Other possibilities include reducing dividend payout (patronage payout), increasing leverage, increasing profit margin, or revise market growth strategies. Balancing a competitive marketplace's downward pressure on profit margins with owners' desire for additional dividends paid makes any adjustment difficult. (Higgins, 1977)

Key methods used by cooperatives to grow are through acquisition of existing facilities and territories or building new facilities. Olson and Pagano (2005) examined long run SGR of banking institutions post-acquisition. Their findings suggest the biggest driver of a firm's SGR post-acquisition are the changes that occur to the SGR and payout ratio once an acquisition has taken place as well as the acquiring firm's SGR prior to the purchase. Regardless of a firm's SGR, the actual rate of growth that a firm can achieve is directly dependent on the rate of growth in the business sectors a firm operates in as well as the competitors' reactions to acquisition. Likewise, it can be expected that cooperatives' growth is highly dependent on the industries in which business is conducted as well as the extent of competition in the marketplace. (Olson & Pagano, 2005)

Healy et. al (1990) performed similar analyses but instead using the 50 largest mergers between 1979 and 1984. The operating performance for the combined or acquiring firm was analyzed relative to industry benchmarks. Their findings indicate a decrease in total revenue for the combined firm when compared to the individual firms pre-merger. Furthermore, their findings indicate that firms who did not participate in a merger experienced considerably more revenue declines. The findings highlight that operating efficiency increased across the merged firms' dataset. Thus, supporting efforts and reasoning behind cooperative efforts to improve efficiencies through growth and acquisition. (Healy, Palepu, & Rubak, 1990)

Using row crop and livestock farm data from Illinois, Escalante et. al (2009) study the SGR of these farms as well as which of the four factors of SGR is most commonly used to overcome a challenge. Using a seemingly unrelated regression, the study finds that leverage and earnings retention were the two most common levers used to push SGC and SGR to convergence. Referencing the fact that farmers must submit their business plans to their lenders prior to engaging in farming activities for the year, Escalante finds that financial decisions are made prior to production and any corrections or convergences must therefore take place post-production and could be a multi-year balancing endeavor.

This study also explicitly details the drastic effects of multiple growth levers changing at a time. Heading into the 1980's farm crisis, farmers across the United States were allowed to borrow based on the premise that land values were increasing greatly thus decoupling the production capacity of land from its loan value. Correction of this occurred as commodity prices declined, interest rates rose, and land values plummeted. When multiple growth levers adjust at once, the SGR, as a multiple of each change, exacerbates the adjustment.

Escalante et. al highlights the value of using the SGR model in agriculture. Using the SGR to make financial decisions can be viewed as more than merely a practical approach. From the business side of operating, knowing a firm's SGR can help understand both current and future leverage needs as well as the expectations of working capital demands. Public policy decision making can also be aided if the SGR is considered. If policy-makers are cognizant of the current SGR and SGC of a particular ag sector, policies and programs can be designed to help ease correction of a challenge or be designed with the SGR implications in mind at a minimum.

Replicating the SUR model presented by Escalante et. al using grain and farm supply cooperative data will aid in describing the decision-making process as well as the acute value of each growth lever for U.S. grain and farm supply cooperatives. Additionally, much like their study of Illinois farms, the cooperative study will separate data based on cooperative size, location, and type of sales. Using subsets of the data to help explain results on a small scale will make the information more applicable and able to be quickly circulated in extension publications. (Escalante et al., 2009)

Cooperative Structure

In the United States, public elections are held on the basis of one vote per person. In corporate America, one vote per share is the way votes are counted when making business decisions. Thus, it is easy to envision shareholders with the most money invested running the company's vote and lesser shareholders going unheard.

Cook (1995) defines five stages for which to classify cooperatives' genesis, growth and demise. The first stage outlines the reasons for formation among the diverse types of cooperatives. Two main drivers existed in the formation of cooperatives. Individual producers needed a mechanism to balance over-supply induced price swings as well as counter act opportunistic or hold up type scenarios that were particularly common prior to the 1900s. With both major reasons being outside a producer's control, forming a cooperative is seen as a defensive move, whereby, had the prompts not occurred, the cooperative may not have formed.

In the second stage, it is observed that cooperatives formed to counteract over-supply are usually short-lived and have overall negligible impacts on their owners' profitability or livelihood. GEAPS (2002) identifies a potential pattern in supply-side cooperatives experiencing extreme hardship in the early 2000s. This is due to the over-supply being producer fueled, not

consumer fueled among reasons with rooting in the loss of focus on the membership. Had the cooperative introduced a new use or increased demand through another method, both cooperative and producer may have enjoyed net positive results. Cooperatives that were formed to correct market failures, which generally deliver better pricing than the existing IOF firm endure infancy. Thus, these cooperatives continue gaining the business of patrons and non-patrons alike. Once cooperatives correct a market failure, prices among cooperatives and local IOFs are roughly equal, thus entering stage three. (GEAPS, 2002)

As prices roughly equalize, property rights and rent extraction start to become member issues. Stage four involves the escalation and recognition of property right problems in cooperatives by the management or directors. Finally, stage five de-escalates the property rights pressures by either continuing operations, exiting the business or transitioning to a different business structure.

Examining property rights struggles within cooperatives serves to indicate that revolving capitalization can limit a cooperative's growth projections and targets. And, if property rights are muddled to those not familiar with the subject, a grassroots push for quicker capital turnover may exacerbate these problems. Growth of a cooperative may be the highest priority for a board, however, amelioration of property right misunderstandings should occur prior to growing the issue and the cooperative simultaneously.

The examination of property rights struggles is key to understanding the undercapitalization of cooperatives and "new-style" cooperatives alike. Firstly, the free rider problem occurs when property rights are untradeable, insecure or unassigned. This occurs when current members or non-members use a resource to their benefit that was not directly or adequately invested in to realize the true cost of the usage. Similarly, long-time members, and

non-members oftentimes become invested to the point which they have paid for or invested much more resources than needed, if they were to purchase their needed resources separately or individually. An example of a free rider problem would be a cooperative that markets grapes. If a producer refuses to join the marketing cooperative, they could receive all the benefits of the marketing cooperative without having to abide by the investment or production quota requirements. A more complex form of free rider or internal free rider is when cooperatives value new and old members' business equally through patronage or residual benefit distributions. Due to the reduction in rate of return as investment of a member increases, it incentivizes under investment or low levels of investment to fund their cooperative.

Further property rights problems exist. The situation of a member's residual claims to an asset last longer than the asset itself is deemed the horizon problem. The problem is caused by lack of a secondary market to transfer claimant rights which would lend liquidity to the members and cooperative alike. The horizon problem disincentives investment by members into new opportunities, given their investment period will last longer than the asset itself. Moving from tangible to intangible assets such as research and development or advertising tremendously increases the rate at which this problem occurs. Directors will be pressured to resolve this problem by paying cash out quicker than originally planned through both equity redemption and member payments relative to investment. The accelerated cash payments decrease retained earnings, thus causing additional need for member investment in future endeavors and continuing the cycle that the horizon problem creates.

Decreased investments by the cooperative members leads to a lower SGR. And, increased equity retirements or cash patronage payments also reduce capital held by the cooperative and reduce the SGR.

As size and complexity of a cooperative increases, directors are representing a larger number of members. Divergence of director and member interests can occur when a small number of members actively lobby a director to alter the direction of the cooperative. In private firms, the external pressures exerted through stock trading and public information work to aid directors' decision making; whereas in cooperatives that have no market for equity and a low level of information available, uninformed decision making by members and directors alike occurs. This divergence of member and director interests is known as a control problem. Similarly, influence costs can be problematic when a large, diverse membership exists. The limits imposed by a cooperative's charter as well as the procedures that govern decision making determine the speed and amount that a cooperative begins operating in a space not originally formed to do. Influence costs exist when a membership faction pursues selfish cooperative endeavors affecting the wealth distribution among members or constituents of a cooperative or director. (Cook, 1995)

Once the cooperative's stage is determined, the SGR model can be applied to determine the potential growth that a cooperative can achieve in the coming years. With growth prospects known, the cooperative management and board can more accurately project operation and financial requirements of the cooperative. And, the decisions to continue, change or cease operations can then be more easily decided.

In accordance with the risk-balancing hypothesis, Escalante and Barry (2001) detail that producers who abide by the hypothesis avoid incurring additional financial obligations when business risks are too high. Conversely, increasing debt levels could be warranted when business risk level is low or increasing debt levels will lower business risk. Producer equity investment in cooperatives is largely out of producer control once the investment has been made or the

allocation of patronage has taken place. The portfolio problem highlights that equity is generally locked for a period and could force producers to violate the risk-balancing hypothesis, thus creating the portfolio problem. (Escalante & Barry, 2001)

Cook (1995) posits linked patronage and investment decision making in a cooperative causes the portfolio problem. When members are unable to transfer equity privately or through a separate market, the risk aptitude of an individual is not accounted for. With the inability for individuals to adjust their cooperative holdings to reflect their optimal investment portfolio, it is likely that directors will be pressured to alter cooperative plans to better suit members' desired risk portfolio. (Cook, 1995)

As property right problems are determined and exposed, directors must determine the direction of business. Three options exist for cooperatives in stage five; they are exit, continue or transition. Each choice is dependent on the individual cooperative's ability to best serve current and future member needs. Within the exit strategy exist general options. Liquidating all assets or restructuring as an investor-oriented firm are the form these options generally assume. Shrader (1989) details that low performing cooperatives move toward liquidation, merging or acquisitions while high performing cooperatives oftentimes restructure as investor-oriented firms.

Correcting the undercapitalization of the cooperative through the continuance plan can be accomplished through seeking outside equity capital or a proportionality strategy within the cooperative. The outside equity capital infusion, while maintaining cooperative status, would be accomplished through a joint venture or publicly listed subsidiary of the cooperative. Whereas the proportionality strategy structures the cooperative to pursue proportionally shared economic responsibility across the membership. The resulting strategies and policies generally narrow the

scope and refocus business units to enable internal capital levels to be maintained. Finally, transitioning cooperative type exists as the final option in stage five. The new generation cooperative attempts to solve or lessen the property rights problems by developing membership policies that do not allow for external free riders, develops asset appreciation policies, creates base equity capital plans and increases liquidity of shares through an external delivery rights clearinghouse. (Schrader, 1989)

Since the mid-1990s, the formation of new generation cooperatives, which are formed to ameliorate property rights concerns, has been explosive. The new cooperatives require closed membership. Once the stock offering is over, someone new cannot come in without purchasing a member's stock. The new cooperative, unlike older entities, requires significant up-front investment and a pooling arrangement in which members share equitably on a per-unit basis in the revenue stream that has been created. Farmers are required to deliver according to plan regardless of the open market. A St. Paul, MN banker emphasizes that formation of new generation cooperatives is an offensive move. "They are not simply trying to keep input prices and basic commodities fair. They are trying to share in more of the food system revenue stream..." (“Industry Activities - Colloquium Speakers See Corn Sweetener Imbalance into Future,” 1997)

New generation cooperatives are built on set amounts of capital, oftentimes the stock is tradeable, but membership is closed. Given the fixed capitalization structure, management is better able to plan for future expansion. Future capital payments are strictly based on per unit volume and paid yearly in cash. Without retained equity, a cooperative can use leverage and equity more efficiently; no surprise equity redemption scenario is able to occur.

Cooperative Constraints to Accessing Capital

Earnings for a given company are limited by the asset base and operating efficiency. Hailu and Goddard (2009) link gross revenues and equity capital using the SGR model. With high commodity prices, an increase in revenues may translate to an increase in SGR, given sufficient economies of scale exist and allow for increased profit margin. Similarly, during low commodity prices, revenues and profit margins could be pushed lower which in turn would pressure the SGR lower. With adequate economies of scale enjoyed by a firm, operating efficiency will increase—surging the SGR—through better management of assets. If a firm is constrained by its capital sourcing and unable to reach adequate economies of scale, reduced levels of operating efficiency and a reduced SGR will be realized by the firm.

Cooperatives that tie equity redemption to age of a producer or an otherwise extended period are prone to having the core owners not be the biggest benefactors. Issues arise when a member or members with vast holdings are due for their equity to be redeemed at the same time as other cash needs within a cooperative. Given patrons begin business with the cooperative at differing ages, equity redemption tied to age can be sporadic and unpredictable. Lilydale cooperative's ability to generate cash flow to sufficiently meet equity redemption as well as debt taken on for expansion purposes is not unlike many other cooperatives. Recurrent reliance on leverage for growth and expansion lead equity redemption payments more difficult with respect to cashflow. The growth that Lilydale achieved was consistently above their SGR by 0.3% for the 27 years studied by Hailu and Goddard (2009).

The longer a firm operates beyond their SGR, the more difficulty they experience when the convergence of actual and sustainable growth occurs. The study details that equity retirement needs directly contributed to Lilydale Cooperative converting to an investor owned

firm. Lilydale was 35% owned by 60+ year old members, the directors needed additional cash in the coming years to expand operations and maintain economies of scale in an increasingly competitive market which conflicted with the equity redemption plans in place. Due to the conflicting needs of cash and limited sourcing of equity capital, it was found that a corporate structure would provide a more permanent equity base while allowing for its members to manage their portfolios better and provide a vehicle to further invest in the company for future expansion purposes. A corporate structure was also found to allow for employee and outside investor buy-in to further growth potential. (Hailu & Goddard, 2009)

In Fulton and Girard's 2015 textbook, the key reasons that cooperatives demutualize include poor financial performance, access to capital constraints, personal benefit of a select group, a focus on realizing full value of the firm for owners and member engagement declines. Cooperatives can improve their performance and longevity expectations by maintaining focus on producers as well as maintaining producer to cooperative lines of communication. Additionally, board oversight of management could prove key in steering a cooperative to or away from a demutualization. Many of these factors are member or management driven, however, given its external hand in cooperative decision making, access to capital continues to cycle through the reasons given for a number of demutualized cooperatives. (M. Fulton & Girard, 2015)

Cooperative's ability to access sufficient capital is one of the most discussed and researched issues in the cooperative literature. Fulton and Hueth (2009) studied cooperative failures, conversions and restructurings and how access to capital played a role in each instance. In the study, three groupings were established: 1) conversions or bankruptcy due to poor financial performance; 2) conversion to access capital or realize value for the members; and 3) cooperatives that were re-engaging in a market or initially forming.

As an example of the first group, Rice Growers Association was used to highlight management and performance dependencies. As tight markets gripped the rice cooperative, rather than refocus and retrench in the core of the business, the management pitched investments in new opportunities as the way forward and promoted diverse business operations. While poor decision making by the management is not isolated to cooperative forms of business, it is more likely in cooperatives lacking effective board oversight. In this instance, a sister cooperative in the region that refocused operations into the core business were able to continue operations throughout and after a market lull.

In the second grouping of cooperatives, those that converted to realize full value for members and access capital for operations, Fulton and Hueth questioned long-term value to the producers. Measurement of long-term producer welfare was measured through factors like lower market competition, how producers were treated, and continuation of operations across the region instead of centralized. In the case of FC Stone conversion, changing structures allowed members to benefit through huge financial gains as well as additional access to capital for the firm. Risk management, in this study, was found to be a competitive market, thus whether cooperatively owned or investor owned, members, patrons and non-members alike would receive equal services before and after the conversion. In a differing conversion, Diamond Walnut Growers, similar reasons were given in favor of conversion by the board, however, member outcomes differed. While redemption of older equity to members was a key reason for converting, walnut producers faced a monopsonistic buyer after the conversion.

In the third grouping, deficient board oversight, lack of significant buy-in by members, and operational performance were cited as reasons for failure. The free rider problem also persisted from the very beginnings in the failure cases studied. (M. E. Fulton & Hueth, 2009)

In these cases, using Collins' (1991) evaluation of three demutualization hypotheses—corporate acquisition, equity access by membership, and cost of equity—equity access is again highlighted. The study examines cooperatives that used corporate spinoff to publicly list an entity of the cooperative. Collins suggests members that received corporate stock in return for the initial holdings of cooperative stock were not always better off. Members wanting to realize their full equity investment value may or may not have realized the full value of their equity, which drove the spinoff. Thus, Collins found that corporate spinoff exacerbated equity liquidity issues in both the short and long term for two out of the five cooperatives in this study. (Collins, 1991)

In their study, Fulton and Hueth found that the first group were operating the business unsustainably. This group possesses a management team that found leverage as their method for growth. High leverage eventually lead the cooperative to convert. Post-conversion, these businesses' management remained, consequently, so did the poor operations and efficiency.

For producers, continued control is a legitimate reason to desire cooperative status in the firms they do business with. Fulton and Larson (2009) detail the Saskatchewan Wheat Pool's (SWP) ultimate conversion from cooperative status to investor owned. Lack of proper oversight was listed as a core reason for ultimate conversion due to their share structure. SWP found itself positioned similarly to Lilydale- it needed large amounts of capital to fund vast equity redemptions due in the near term. Ultimately only delaying the conversion, initially SWP opted for a dual share structure with traded, non-voting shares and non-trading, voting shares. The voting shares were held by farmers while the traded shares were available for any individual or entity to acquire. Given the board had to answer to both share classes, in conjunction with a lack of focus on producer welfare, the board began investing heavily in operations far and wide. As

focus left producers and instead centered on profit potential, SWP's market share on wheat halved. While cooperative success is needed for the viability of operations, producer success is ultimately the reason for cooperative's existence. The cooperatives that lost sight of producer success and welfare are the instances that were not viable long-term plans for producers to buy into. (M. E. Fulton & Larson, 2009)

For the cooperatives studied that survived investment drives pushing operations away from bulk handling and into further processing, competition is key. Instead of competing on one front or in one business unit, these cooperatives are now competing in multiple stages of production and found it more difficult to identify the key profit and loss activities for any given period. Additionally, as operations grow, accurate representation of a business unit and its benefit to the cooperative's members becomes more difficult.

Chapter 3 - Sustainable Growth Rate

The Sustainable Growth Model

Many cooperatives are growing at an exceptional rate. Cooperative growth has been driven by producer consolidation, a highly competitive marketplace and new opportunities through rising global demand. Agricultural producers have benefited from this growth through various investments such as grain storage and train loading facilities as well as enhanced access to technology. However, if this growth is unsustainable, the cooperative could experience significant financial stress, which could potentially harm the producer.

The sustainable growth rate can be used by a cooperative's management team and board of directors to monitor growth. The sustainable growth rate (SGR) is a financial metric used by many businesses to address potential growth problems. Monitoring growth via the SGR is done through examining four key financial ratios – earnings retention, leverage, profit margin, and operating efficiency. Each of these ratios positively impacts the SGR, and if examined carefully, can show opportunities for improvement and challenges.

The SGR equation is straightforward and shows how four key financial ratios affect cooperative growth. Cooperative directors and management can view these four ratios as "levers" that can be adjusted to drive growth. The intuition of the sustainable growth model is shown below

Sustainable Growth Rate = Earnings retention x *Leverage* x *Profit margin* x *Operating efficiency* (1)

The earnings retention lever is the first a board can pull to drive sustainable growth. If additional earnings are retained as patronage or retained earnings, that provides capital to fund

growth. Likewise, payment of the earnings to members in the form of cash patronage reduces available capital to fund growth.

Leverage reflects the capital structure of the cooperative and is controlled by the board of directors. Growth can be fueled by adding more debt capital or leverage. Adding debt to fund additional investments is a way to boost the SGR. However, reducing debt capital will pull down the SGR due to less capital available to the cooperative to fund growth.

Profit margin is key to any cooperative's performance and critical to calculating a SGR. It is fairly intuitive that growth is bolstered by higher profits. And, when profits are lower, growth is lower. However, a cooperative's ability to pull this "lever" to drive SGR is limited. For example, increasing margins requires either lifting revenues or lowering costs, and in a competitive business environment, it is difficult to do either item. Sales professionals must work diligently to maintain the cooperative's profit margins in the face of competitive price bidding and customer price shopping.

Operating efficiency is the final piece of the SGR equation. This particular "lever" shows how efficiently a cooperative's assets are being utilized to generate sales. So, if a cooperative decides to expand assets, then sales needs to rise significantly in order for there to be operating efficiencies gains and a higher SGR. Conversely, if assets are reduced or certain assets are culled, then sales need to remain at their current levels or drop only slightly to maintain higher operating efficiencies and SGRs.

Further simplifying the SGR model results in two focal points. Return on equity and earnings retention can be multiplied to determine the SGR. Return on equity is a measure of profit earned on equity invested, while the earnings retention quantifies retained earnings in relation to net income. These metrics measure how well a cooperative is at generating then

accumulating capital, which drives sustainable growth. A key takeaway of the SGR model for a board of directors is that growth of a firm is not an independent decision, but an interdependent decision based on acceptable financial and operating ratios.

When the SGR is compared to actual growth rates, the sustainable growth challenge (SGC) can be identified. Higgins (2011) states that the SGC is the difference between actual sales and SGR. The SGC is a straightforward way to observe how far a firm is straying from the SGR and, over time, see where the correction was made to converge to the SGR. If a business has a positive SGC, then actual growth rates exceeded SGR, which means outside financing is necessary to fund growth. A negative SGC indicates the firm is not meeting their growth target and potentially not capturing full value for their owners. (Higgins, 2011)

Calculating the Sustainable Growth Rate

The SGR and SGC equations are straightforward in showing how four key financial ratios affect growth. It is important to recognize that the growth levers influence each other. Equations (2) and (3) show the growth lever interdependency. Profit margin, operating efficiency and SGC use 'Total Sales' in their calculations. 'Net Income' appears in earnings retention and profit margin. Furthermore, 'Total Equity' increases if the board decides to retain more earnings within cooperative so earnings retention and leverage are connected.

$$SGR = \underbrace{\left(1 - \frac{Cash\ Patronage\ Paid}{Net\ Income}\right)}_{\text{Earnings Retention}} \underbrace{\left(1 + \frac{Total\ Debt}{Total\ Equity}\right)}_{\text{Leverage}} \underbrace{\left(\frac{Net\ Income}{Total\ Sales}\right)}_{\text{Profit Margin}} \underbrace{\left(\frac{Total\ Sales}{Total\ Assets}\right)}_{\text{Operating Efficiency}} \quad (2)$$

$$SGC = \ln(Total\ Sales_t - Total\ Sales_{t-1}) - SGR \quad (3)$$

SGC and actual growth rate convergence is caused by the need for a cooperative to weather economic downturns. Determining the timing of growth lever adjustment is crucial. Whether the adjustment occurs prior to a strategy implementation, as a result of the strategy outcomes, or a combination of the two is key to understanding the decision making of a cooperative. Likely, given the price, volume, and efficiency uncertainties that cooperatives face, the cooperative makes growth, credit needs, and sales projections in advance. Following harvest, with financial metrics known and uncertainties now certain, adjusting the growth levers is needed balance growth experienced in the operating year. For example, if a higher than anticipated operating efficiency leads to the SGR exceeding actual growth, then decisions could involve reducing debt, increasing patronage or increasing earnings retention. Decision making post-production year must dictate the purpose of the extra income – whether it is to be retained, paid to patrons, or reducing debt, it must be accounted for to properly close the year. Likewise, additional leverage may be called for to fund investments or bridge the gap between revenue and expenses in a lackluster year.

When the actual rate of growth exceeds the sustainable rate, a positive SGC exists. Positive growth challenges require outside capital to fund growth and maintain operations. An SGR that exceeds actual rates of growth contributes to an excess of capital in the firm. The firm must take steps to allocate the uses or purpose of the buildup. Actual and SGR convergence leads the SGC to go to zero.

A zero value SGC indicates that no additional financing is required, and no buildup of capital occurs. Furthermore, with an SGC value of zero, the firm exactly captures the value which its asset base and operating efficiency dictate. A zero value SGC promotes the Pecking Order Theory's rule number one which says the best way to avoid lender skepticism and default

is by using internal financing. Under a zero SGC scenario, excess capital would be put to use as it came available.

The management and directors must position a cooperative to weather the cyclical farm production and price swings. In order for a cooperative to weather a downturn, the growth levers must not be at their limits. Through the potential need for leverage increases, say, a cooperative's leverage at any given time must remain at or below tolerable levels. Once the leverage rises above tolerable, an unforeseen downturn calling for additional leverage could lead a cooperative to be unable to further leverage. And potentially need to reduce the asset base in order to provide needed liquidity. Due to the need for operating longevity, convergence of the SGR and SGC represents the safest position for a cooperative to locate.

Earnings retention is the first lever a board can pull to drive SGR. If additional earnings are retained within the cooperative, either as retained patronage or as retained earnings, this provides additional capital for growth. Similarly, if earnings are not retained, then they are distributed back to patrons in the form of cash patronage, which means the cooperative will have less capital to fund growth.

Leverage reflects the capital structure of the cooperative and is controlled by the board of directors. Using debt to fund additional investments is a way to boost the SGR. Elevated levels of leverage reduce the ability of a cooperative to weather unexpected events, thus making it more susceptible to failure or restructuring. Furthermore, lenders allow a finite extent of a business to be leveraged before the risk becomes in excess of tolerable limits. Reducing debt capital will

pull the SGR lower because the cooperative will not have as much capital available to fund growth.

Profit margin is key to any cooperative's performance and critical to calculating growth. It is fairly intuitive that growth is bolstered by higher profits; when profits are lower, growth is lower. However, a cooperative's ability to pull this "lever" to drive SGR is limited. For example, increasing margins requires either elevating prices or lowering costs, and in a competitive business environment, it is difficult to do either item.

Operating efficiency is the final metric used in the SGR equation. This lever measures how efficiently a cooperative's assets are being utilized to generate sales. When a cooperative decides to expand assets, then sales needs to rise significantly in order for there to be an operating efficiency gain and increased SGR. Conversely, if assets are reduced or certain assets are culled, then sales need to remain at their current levels or drop only slightly to maintain an increased operating efficiency and SGR.

Chapter 4 - Data Discussion

The CoBank Risk Analyst database provided the panel data of 162 cooperatives for analysis. Each cooperative has data for 19 years spanning from 1996 to 2014. Given the data used was generated by a financial institution, precise and accurate financials are available for analysis. Furthermore, the dataset contains years of extreme growth, as well as decline for individual and aggregate cooperatives. These growth variations help to better understand how a cooperative drives growth and overcomes a growth challenge. With a dataset as large and complete as this, empirical analyses of the cooperatives provide results that are applicable to a wide range of cooperatives. ("CoBank Risk Analyst Database," 2017)

With such an expansive dataset, the empirical analyses may not be directly applicable to specific cooperatives. To better allow for comparison and application at the individual cooperative level, the dataset is divided into subsets for analysis. Half of the dataset is made up of cooperatives with sales of less than $50 million annually. Given this makeup, the dataset is split at $50 million. Cooperatives with less than $50 million in annual sales comprise the low sales subset. And, the cooperatives with greater than $50 million in annual sales comprise the high sales subset.

Another subset split was made on the basis of farm supply sales. Cooperatives which engage primarily in farm supply sales likely do not have as much activity in grain handling. Farm supply sales requires large inventories and high competition to maintain sales, however the sales are near constant in boom and bust years. Grain handling requires large infrastructure investments that require upkeep in boom and bust years alike. These differences in capital requirements, inventory management strategies, and profit margins necessitated the separation

into subsets. A cooperative which generated the majority (50-100%) of total sales through farm supply sales is classified as a majority farm supply cooperative. The cooperatives with a minority (0-50%) of total sales generated through farm supply sales are classified as minority farm supply cooperatives.

Finally, due to the volume differences between cooperatives in the corn belt and those that are not, a regional subset detailing whether a cooperative is operating within or outside of the corn belt is used. The corn belt cooperatives enjoy a higher level of consistency in production and production requirements, thus enabling different financial decision making and requiring a subset split. Location information is available at the state level; states partially in the corn belt are not used given there is no way to distinguish specific location. Cooperatives in Iowa, Illinois or Indiana makeup the corn belt subset with corn belt parameters given by *The Corn Belt*. And, cooperatives not located in Iowa, Illinois, or Indiana makeup the non-corn belt states. (Jones & Duran, 1954)

A cooperative's classification, for example by total sales dollars or by type of sales, was made based on the final year of available data. For example, if a cooperative had sales of $25 million in 1996 and sales of $65 million in 2014, it would be classified by the 2014 sales number which puts it in the mid-sized category of $50-250 million in sales, along with 37% percent of the dataset. Once categorized, all years of a cooperative's data are tagged as being a "mid-sized" cooperative, even if only the final year generated the revenue needed to be located in the mid-sized class.

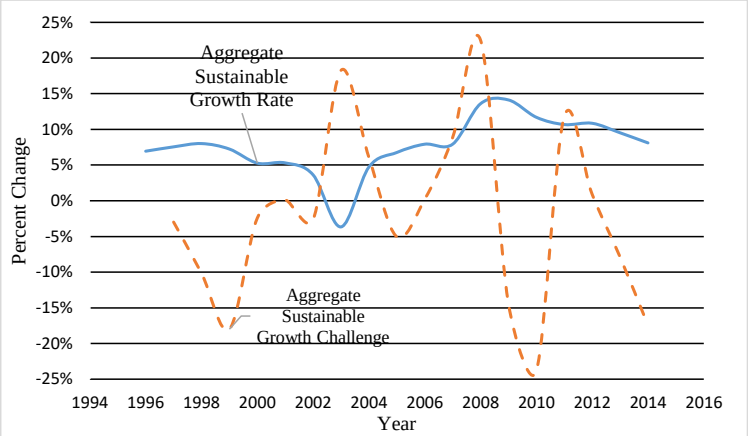
The states represented in the dataset include: Arkansas, California, Colorado, Florida, Iowa, Illinois, Indiana, Kansas, Louisiana, Michigan, Minnesota, Missouri, Mississippi, North Dakota, Nebraska, Ohio, Oklahoma, Pennsylvania, South Dakota, Tennessee, Texas, Virginia

and Wisconsin. Additionally, 82 of the cooperatives, or 50.6% are recognized in the less than $50 million in sales subset; 60 cooperatives or 37% are in the $50-$250 million category; and the remaining 20 cooperatives having sales greater than $250 million comprise 12.4% of the total number of cooperatives. The 52 cooperatives that make up the corn belt subset represent approximately a third of the dataset while cooperatives not in the corn belt make up the remaining 109 cooperatives and roughly two thirds of the data. Cooperatives that receive a majority of sales through farm supply sales makeup 31.5% of the dataset while those with a minority of sales generated by farm supply sales comprise 111 cooperatives or 68.5% of the dataset.

Descriptive Statistics

Ease of interpretation and usage are the key reasons for using the sustainable growth rate (SGR) model to compare year to year growth. Calculating the SGR is accomplished by multiplying the four growth levers. Figure 4-1 graphically shows year to year changes in the SGR and SGC. An SGR value above zero indicates that year-over-year revenue growth was positive, likewise, a negative SGR value indicates that year-over-year revenue growth was negative. A positive SGC value means that a cooperative has outstripped their resources and outside finances are needed to fund growth. Negative SGC values indicate that a firm is growing slower than sustainable which causes accumulation of capital, lowering of leverage or increased patronage payment as well as potentially not capturing the full value for the owners.

Figure 4-1 Sustainable Growth Rate and Sustainable Growth Challenge (percent) of Farmer Cooperatives from 1996 to 2014



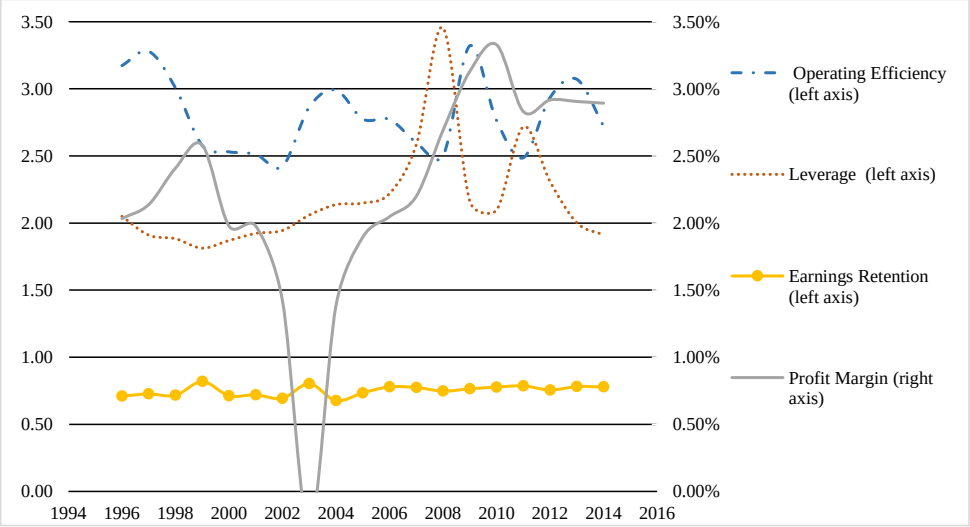
Source: CoBank Risk Analyst Data

A paradox of the SGR model is that, by its name, one would assume that the sustainable growth rate of one year can be continued into perpetuity, however, that is not necessarily true. The financial performance would have to continue as well. Due to the nature of the calculation, a firm's SGR is based on the current performance only. Thus, in figure 4-1, the SGR fluctuates from year to year but represents the highest rate of growth that the aggregate cooperatives could achieve in each year, given their financial metrics.

In the early 2000s, the multi-year decreasing sustainable growth rate demonstrates how the Farmland Industries collapse affected cooperatives across the nation. Likewise, SGC leapt upward as leverage was heavily used to continue operations in a time of negative profit margins. Contrary to the early 2000s, 2008 saw simultaneous increasing levels of SGC and SGR. This points to profitable years leading to large investments which were accomplished using leverage. The negative SGC in years centering on 2010 indicate that capital was used to decrease leverage, increase patronage, or be retained, which lowered the actual growth to balance with the SGR.

Examining the year to year changes to all cooperatives' financial metrics provides intuitive results. Looking to Figure 4-2, the farmer cooperatives financial metrics by year are graphed with leverage, operating efficiency and earnings retention on the left axis while profit margin corresponds with the right axis.

Figure 4-2 Growth Levers of the Sustainable Growth Rate for Farmer Cooperatives from 1996 to 2014



Source: CoBank Risk Analyst Data

Each growth lever equally represents a portion of the SGR equation. Given this information, growth lever variation would directly contribute to SGR variation. Looking at Figure 4-2, visualizing the variation of growth levers is possible. Leverage and operating efficiency vary greatly across the study period as well as in year to year comparison. Periods of decreasing leverage correspond with periods of decreasing SGC. Likewise, periods of increasing leverage correspond with increasing SGC periods. The operating efficiency mirrors the SGR's movements across the study period, highlighting the importance of efficiency for cooperatives.

These growth levers' movements being highly correlated with those of the SGR and SGC are due to the fact that profit margin and earnings retention are usually quite stable.

The profit margin's drastic effect on SGR, as seen in 2003, occurs as the profit margin dropped nearly 10 times lower than previous levels. For any lever, a 1000 percent move will greatly affect the SGR and greatly effect the business. Operating efficiency and earnings retention spiked as profit margin moved sharply lower, helping offset the decline. Moving towards the end of the study period, the commodity boom allowed for increased profit margins by 40 percent. Variations in the profit margin lead to large swings in the SGR due to the extreme importance of profitability for business longevity.

Cooperative's primary way to fund rapid sales growth is through debt capital or leverage. Given cooperatives have limited to no ability to raise outside equity capital, leveraging the balance sheet through additional debt capital is how cooperatives fund the additional growth. Leveraging the balance sheet during very rapid sales growth periods like 2008, has ramifications for the SGR. Figure 2 shows that the SGR rose from leverage going up.

The rapid growth experienced in 2008 and 2012 led to significant investments in infrastructure and a change in operational efficiency. A rise in operational efficiency occurred following the rapid rise in 2008 sales but it has tapered off recently. Incidentally, as operational efficiency has fallen, the SGR has fallen too. Cooperative directors and managers should be keenly focused on deploying capital in a way that will bolster operational efficiency for future growth.

SGR and growth lever analyses are enhanced when looking at each subset. Examining the data by subset allows for determination of the drivers of higher or lower growth cooperatives. Table 4-1 shows variation across subsets.

Table 4-1 Mean Cooperative Financial Metrics, by Farmer Cooperative Subset

	Number of Cooperatives	Operating Efficiency Ratio	Profit Margin (%)	Earnings Retention rate (%)	Leverage ratio	Total Sales (Million $)	Sustainable Growth Rate (%)	Sustainable Growth Challenge (%)
All	162	2.81	2.24%	75.05%	2.17	63.40	7.70%	-2.01%
Farm Supply Sales Generate 0-25% of Total Sales	46	2.53	2.13%	74.48%	2.28	92.90	8.05%	-0.82%
Farm Supply Sales Generate 25-50% of Total Sales	15	2.20	2.37%	78.44%	1.92	32.80	6.83%	-1.25%
Farm Supply Sales Generate 50-75% of Total Sales	36	2.26	3.40%	71.43%	1.80	22.20	7.25%	-3.32%
Farm Supply Sales Generate 75-100% of Total Sales	65	2.35	3.60%	74.55%	1.81	18.40	7.44%	-2.48%
Less than $50 million in Total Sales	82	2.45	2.47%	72.33%	1.82	15.40	6.35%	2.50%
Greater than $50 million in Total Sales	80	2.90	2.21%	75.40%	2.53	112.63	9.08%	-1.53%
Located in the Corn Belt	53	3.10	1.86%	78.15%	2.28	85.00	8.52%	-2.14%
Not Located in the Corn Belt	109	2.66	2.42%	73.54%	2.11	52.80	7.29%	-1.04%
Std. Dev.	41	0.29	0.55%	2.21%	0.24	33.68	0.79%	1.54%
Mean	72	2.58	2.52%	74.82%	2.08	55.06	7.61%	-1.34%

Source: CoBank Risk Analyst Data

Commented [A1]: Not really financial metrics. It is the breakdown of the SGR ratios

The category of cooperatives with annual sales greater than $50 million showed the highest levels of annual revenue growth as well as the highest levels of leverage. Lowest levels of annual growth were recognized by cooperatives with 75-100% of sales coming from farm supplies.

The subset with 0-25 percent of total sales from farm supply sales show marked financial metric differences when compared to the highest farm supply quartile, 75-100 percent. Profit margin for the low farm supply sales cooperatives is half that of the highest quartile for farm supply sales. And, earnings retention is 7 percent higher for the 0-25 percent farm supply sales cooperatives. Leverage for the lowest supply sales cooperatives has a mean value 30 percent above that of the highest supply sales cooperatives.

Corn belt cooperatives' high efficiency is likely due to the high volumes that those cooperatives manage. Proximity to end user and transportation availability allows these cooperatives to not only store vast quantities but cycle more yet through the cooperative throughout the year. Additionally, the corn belt cooperatives operate in a lower profit margin environment, but manage to retain more earnings, when compared to non-corn belt cooperatives. In total, all financial metrics of the corn belt cooperatives are higher than those of non-corn belt cooperatives, barring profit margin.

Cooperative statistics by size exhibit intuitive and applicable information. The lowest total sales category, with sales less than $50 million, makes up just over half the dataset and holds the lowest growth rate among size categories. The largest cooperatives with sales greater than $50 million annually, showed the highest revenue growth that was greater than twice that of the low sales category. These large cooperatives also operate the most efficiently and retain the most earnings when comparing to low sales cooperatives.

The low sales cooperatives realize the lowest SGR among all firms chiefly due to the lowest earnings retention rate of all subsets. Furthermore, the profit margin and operating efficiency are among the lowest for all subsets. This compares to cooperatives with greater than $50 million in sales which operate the most efficiently, retain among the most earnings, and also use the highest levels of leverage among all cooperative subsets.

The greatest SGR mean value of the subsets was realized by cooperatives with sales greater than $50 million. Interestingly, comparing these to the SGR of low sales cooperatives, less than $50 million in total sales, shows that cooperatives with sales over $50 million enjoy a 43 percent higher SGR. These cooperatives also have an SGR that is 17 percent higher than that of all cooperatives.

The lowest quartile of farm supply cooperatives, those with 0-25 percent of total sales generated through farm supply sales, experienced the greatest SGR, when comparing to all other quartiles of farm supply sales cooperatives. This style of cooperative is likely focused on grain and grain operations as opposed to farm supplies.

Tables 4-2 and 4-3 compare SGR and SGC within each subset to demonstrate variabilities. Comparing the smallest and largest cooperatives in the dataset show marked differences. Cooperatives with sales greater than $50 million generated a three percent higher mean SGR than cooperatives with sales less than $50 million. Furthermore, the SGC of the larger cooperatives had a higher median value, by a similar three percent, than smaller cooperatives. Cooperatives with sales greater than $50 million generated their highest mean sustainable growth in 2008, as the farm economy strengthened, and grain prices soared.

Table 4-2 Mean Sustainable Growth Rates (percent) of Farmer Cooperatives from 1996 to 2014, by Farmer Cooperative Subset

Year	All	Low Sales	High Sales	Minority Farm Supply Sales	Majority Farm Supply Sales	Corn Belt	Non-Corn Belt
1996	6.95%	5.79%	8.11%	7.15%	6.52%	6.91%	6.96%
1997	7.55%	6.09%	9.05%	7.47%	7.74%	8.20%	7.24%
1998	8.01%	6.94%	9.12%	7.99%	8.07%	7.68%	8.18%
1999	7.25%	6.57%	7.95%	7.47%	6.74%	6.83%	7.45%
2000	5.27%	4.99%	5.56%	5.42%	4.95%	4.79%	5.50%
2001	5.31%	4.56%	6.07%	5.31%	5.30%	4.84%	5.53%
2002	3.62%	2.21%	5.07%	5.12%	0.37%	5.86%	2.54%
2003	-3.66%	-6.59%	-0.66%	-2.68%	-5.80%	3.64%	-7.22%
2004	4.73%	4.40%	5.08%	4.27%	5.75%	4.91%	4.65%
2005	6.77%	6.00%	7.55%	6.59%	7.14%	6.99%	6.65%
2006	7.93%	5.53%	10.39%	7.55%	8.75%	9.61%	7.11%
2007	7.93%	6.05%	9.85%	8.40%	6.91%	9.64%	7.10%
2008	13.60%	12.47%	14.75%	13.35%	14.17%	13.16%	13.82%
2009	14.13%	12.55%	15.74%	15.76%	10.58%	17.15%	12.66%
2010	11.70%	10.28%	13.15%	12.90%	9.07%	13.99%	10.58%
2011	10.68%	8.56%	12.85%	11.41%	9.08%	10.79%	10.63%
2012	10.86%	9.00%	12.76%	11.24%	10.02%	10.80%	10.88%
2013	9.52%	8.15%	10.93%	8.81%	11.07%	8.26%	10.14%
2014	8.11%	7.12%	9.12%	7.67%	9.06%	7.88%	8.22%
Mean	7.70%	6.35%	9.08%	7.96%	7.13%	8.52%	7.30%
Median	7.93%	6.09%	9.12%	7.55%	7.74%	7.88%	7.24%
Std. dev.	0.039	0.040	0.038	0.039	0.041	0.034	0.044

Source: CoBank Risk Analyst Data

Table 4-3 Mean Sustainable Growth Challenge (percent) of Farmer Cooperatives from 1997 to 2014, by Farmer Cooperative Subset

Year	All	Low Sales	High Sales	Minority Farm Supply Sales	Majority Farm Supply Sales	Corn Belt	Non-Corn Belt
1997	-2.99%	16.71%	-33.80%	-3.39%	-14.34%	-5.77%	-31.80%
1998	-10.15%	10.82%	-27.58%	-11.71%	-34.52%	-15.46%	-26.66%
1999	-18.00%	-13.85%	-8.07%	-17.84%	-58.79%	-21.90%	-8.71%
2000	-2.42%	11.22%	2.79%	-2.66%	-4.43%	-0.70%	2.76%
2001	0.11%	18.94%	9.08%	-2.69%	12.86%	5.13%	9.05%
2002	-2.63%	-21.99%	-2.92%	-2.23%	-27.80%	-4.33%	-2.91%
2003	18.28%	6.53%	30.32%	19.72%	11.07%	18.60%	30.34%
2004	6.06%	2.49%	17.25%	7.68%	7.18%	1.71%	17.22%
2005	-5.05%	18.70%	-0.77%	-8.72%	9.36%	-4.59%	-0.71%
2006	0.21%	13.32%	33.89%	-1.79%	4.94%	-5.61%	33.84%
2007	8.87%	2.96%	7.34%	11.84%	5.99%	17.53%	7.33%
2008	22.50%	45.96%	15.55%	28.74%	11.07%	24.87%	28.71%
2009	-14.44%	-38.11%	-55.36%	-12.75%	10.01%	-6.67%	-56.48%
2010	-23.84%	-19.19%	-16.47%	-23.46%	-29.16%	-29.93%	-16.48%
2011	11.82%	3.91%	24.74%	12.84%	5.55%	15.05%	24.71%
2012	0.90%	0.37%	-11.89%	-0.03%	3.80%	2.83%	-11.82%
2013	-7.89%	-15.74%	-42.92%	-4.73%	-27.23%	-9.68%	-42.94%
2014	-17.45%	1.97%	25.86%	-19.14%	-23.06%	-19.55%	25.90%
Mean	-2.01%	2.50%	-1.83%	-1.69%	-7.64%	-2.14%	-1.04%
Median	-2.53%	3.43%	1.01%	-2.67%	4.37%	-4.46%	1.02%
Std. dev.	0.121	0.186	0.250	0.133	0.204	0.143	0.257

note: SGC=ln(Total Sales(t)- Total Sales(t-1)) - SGR)

Source: CoBank Risk Analyst Data

Comparing cooperatives based on region highlights that corn belt cooperatives were largely insulated from the Farmland Industries crash in the early 2000s. Corn belt cooperatives also achieved a higher level of SGR, by 16.7 percent, than non-corn belt cooperatives for the entire study period. Cooperatives located outside the corn belt experienced SGC mean values that were slightly negative across the period which possibly indicates they were not capturing full value for owners, however, the corn belt cooperatives maintained a lower SGC. The corn belt cooperatives' SGC was 105 percent lower than that of non-corn belt cooperatives. While the

SGC for both corn belt and non-corn belt cooperatives is negative, the corn belt cooperatives realized a lower SGC. This indicates that both are potentially not growing as fast as sustainable, however, the corn belt cooperatives are doing so to a greater extent.

Comparing growth in cooperatives based on farm supply sales exhibits that a key to growth is consistency. Cooperatives with a minority of their sales coming from farm supplies are generally engaging in more grain sales, on a percentage basis, than other cooperatives. Given this difference, large swings in the price and quantity of grain affected cooperatives with a minority of sales from farm supplies to a greater degree with both higher and lower SGC oscillations in the late 2000s than other cooperatives in the dataset. Majority farm supply sales cooperatives are dependent on consistent farm supply sales.

Comparing low and high sales cooperatives provides interesting information. Low sales cooperatives tie for the lowest SGR among all subsets. Furthermore, these cooperatives have a positive mean SGC, suggesting an outstripping of capital and potential to growth broke. Meanwhile, the high sales cooperatives realized a 43 percent higher SGR as well as a 236 percent lower SGC. The larger cooperatives may not be using their resources as effectively as possible – they could be growing faster, given their negative SGC.

A cooperative's performance and growth are highly dependent on the marketplace in which it operates. An expanding and growing market would allow for expansion and growth in the cooperative more readily. Consistently engaging resources and capital in farm supply sales proves to generate more variable SGC values than minority farm supply cooperatives. Likely, the higher dependency on one business unit, farm supply sales, causes majority farm supply sales cooperatives to be susceptible to changes in the marketplace to a greater degree than actual changes to their business decisions. Moreover, the cooperatives with majority of sales from farm

supplies generated nearly equal mean SGR values as minority farm supply sales cooperatives, with a full seven percent higher SGC median value across the study period.

Chapter 5 - Empirical Results

A growth challenge can occur due to strategic investment and planning or an unforeseen circumstance. Overcoming a growth challenge requires deliberate action on the cooperative's part. With longevity of a cooperative in mind, knowing the most efficient methods for changing the SGR or SGC is valuable. A cooperative which can more efficiently change or react to growth needs will likely persist longer. Efficiently using retained earnings, leverage, profit margin or operating efficiency to overcome a challenge can set the foundation for continued growth and expansion. To the contrary, poor use of the growth levers could stretch resources too thin without achieving balanced, sustainable growth.

The contributors of a growth challenge can be calculated to better understand how investment and operating activities may lead to a growth challenge. The year over year change in the growth levers is regressed on the SGC using a seemingly unrelated regression (SUR) to properly account for interrelated growth levers causing correlated error terms. The resulting coefficients represent unit changes in the SGC for each year over year change in growth lever.

Determining the highest growth cooperative type allows for cooperatives to strive for growth through business unit alignment. An OLS regression model is used to study the effects. The purpose of the OLS model is to explain the determinants SGR using the dummy variables of the cooperative type.

Commented [A2]: All of this SGR regression discussion needs to come before the SUR model.

The OLS model uses Equations 4-6. Where *Small* is the dummy variable equaling one if the cooperative has sales less than $50 million, otherwise zero. *Corn* is the dummy variable equaling one if the cooperative is located within a corn belt state. *Supply* is the dummy variable

equaling one if the cooperative receives greater than 50 percent of total sales from farm supply sales.

$$SGR = \beta 1 + \beta 2 Small + \varepsilon 1 \quad (4)$$

$$SGR = \beta 1 + \beta 2 Corn + \varepsilon 1 \quad (5)$$

$$SGR = \beta 1 + \beta 2 Supply + \varepsilon 1 \quad (6)$$

Commented [A3]: Make these equations look like a journal article.

Looking at table 5-1, the effect that a cooperative type has on SGR is shown. Low sales cooperatives, those with sales less than $50 million, have nearly a three percent lower SGR than cooperatives with sales greater than that threshold. The corn belt cooperatives enjoy a boosted SGR by 1.2 percent, compared to non-corn belt cooperatives. Finally, the majority farm supply cooperatives realize a slightly lower SGR, a decrease of 0.83 percent, compared to minority farm supply cooperatives.

Table 5-1 Regression Analysis of Sustainable Growth Rate Dependent variable and Independent Dummy Variables

Variable	Cooperative with Sales less than $50 million = 1, zero otherwise	Cooperative located in the Cornbelt = 1, zero otherwise	Marjority Farm Supply Cooperative = 1, zero otherwise
Intercept	0.0908	0.0729	0.0796
Dummy Variable Coefficient	-0.0273	0.0123	-0.0083
R^2	0.0254	0.0045	0.0020
note: each coefficient significant at the 5 percent level			

Source: CoBank Risk Analyst Data

Commented [A4]: Notes in tables goes below the table but above the sournce

Growth levers and the Sustainable Growth Challenge

Higgins (1977) SGR model does little in explaining causality or signaling. Given a firm uses their SGR to make business decisions and a firm's business decisions are factors of the SGR, it is easy to miss which causes the other. The interrelated growth levers cause endogenous

regressors. Utilizing a SUR model helps explain the variables' contribution to the respective growth lever with the influences measured jointly. (Higgins, 1977)

Using an OLS regression requires zero correlation among error terms. Once the Breusch-Pagan test suggested correlation among error terms, use of a standard regression model proved futile. A SUR model was developed to properly allow for correlated error terms. The purpose of the SUR model is to explain the determinants of each growth lever and the SGC. In this study, the sureg procedure, available in Stata, is employed which uses the asymptotically efficient, feasible generalized least-squares algorithm developed in Greene (2003). (Greene, 2003)

The SUR model uses Equations 7-11. With one equation for each of the four growth levers as dependent and lagged dependent variables and using SGC as an independent variable then using a fifth equation with SGC as the dependent variable and the year over year change in each growth lever used as independent variables. Each of the four growth levers as dependent variables of a regression measures the determinants of those growth levers. The SGC regression measures which levers are used when a challenge exists. The SUR model used and that it allows for correlated error terms for a given variable across equations.

$$OE_t = \beta 01 + \beta 11 OE_{t-1} + \beta 21 SGC_t + \beta 31 dummy\_variable + \varepsilon 1 \quad (7)$$

$$PM_t = \beta 02 + \beta 12 PM_{t-1} + \beta 22 SGC_t + \beta 32 dummy\_variable + \varepsilon 2 \quad (8)$$

$$LEV_t = \beta 03 + \beta 13 LEV_{t-1} + \beta 23 SGC_t + \beta 33 dummy\_variable + \varepsilon 3 \quad (9)$$

$$ER_t = \beta 04 + \beta 14 ER_{t-1} + \beta 24 SGC_t + \beta 34 dummy\_variable + \varepsilon 4 \quad (10)$$

$$SGC_t = \beta 05 + \beta 15 ChgOE_{t-1tot} \beta 25 ChgPM_{t-1tot} + \beta 35 ChgLEV_{t-1tot} + \beta 45 ChgER_{t-1tot} + \beta 55 dummy\_variable + \varepsilon 5 \quad (11)$$

Where *OE* is the Operating efficiency ratio, *PM* is the Profit margin, *ER* is the Earnings retention rate, *Lev* is Leverage and the *dummy_variable* is equal to 1 to examine the particular

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data subset of interest, otherwise equal to 0. The prefix *Chg* denotes the year over year change for a given variable.

Table 5-2 shows the summary statistics of each variable used in the SUR model as well as the calculation methods of each variable to better familiarize the reader with the metrics and their usage. The earnings retention and profit margin are bound between zero and one, given their calculation method. Interestingly, the mean year over year change in leverage, operating efficiency and profit margin are positive while the mean year over year change in earnings retention is negative. This is interesting due to the contrast when comparing all 'change levers'. While each 'change lever' represented in table 5-2 is an average, the negative value for earnings retention rate represents a decrease in this lever during the study period.

Table 5-2 Seemingly Unrelated Regression Summary Statistics for Farmer Cooperatives from 1996-2014

Variable	Definition	Obs	Mean	Std. Dev.
SGR	(PM*OE*LEV*ER)	3,075	0.0770	0.0857
Dependent Variables				
Operating Efficiency	(Net_Sales/Total_Assets)	3,076	2.8056	1.5507
Leverage	1+(Total_Liabilities/Equity)	3,076	2.1682	0.9867
Earnings Retention	1-(PatDiv_Cash/Net_Income)	3,075	0.7505	0.6645
Profit Margin	Net_Income/Net_Sales)	3,076	0.0224	0.0242
SGC	ln(Net Salest - Net Salest-1) - SGR		-0.0201	0.2255
Independent Variables				
lagged Operating Efficiency	Levt-1	2,914	2.8103	1.5538
lagged Profit Margin	OEt-1	2,914	0.0220	0.0238
lagged Leverage	PMt-1	2,914	2.1825	1.0029
lagged Earnings Retention	ERt-1	2,913	0.7489	0.6794
Change in Leverage	Levt - Levt-1	2,913	0.0257	0.2468
Change in Operating Efficiency	OEt - OEt-1	2,913	0.0318	0.3321
Change in Profit Margin	PMt - PMt-1	2,912	1.5598	76.4130
Change in Earnings Retention	ERt - ERt-1	2,912	-0.0745	3.4073

Source: CoBank Risk Analyst Data

Comparing cooperatives based on total sales shows interesting differences in how these cooperatives overcome a growth challenge. These comparisons can be made by looking to table 5-3. Cooperatives with annual sales of less than $50 million are hereafter referred to as low sales cooperatives. There are 82 cooperatives that make up the low sales cooperative subset. Cooperatives which generate annual sales exceeding $50 million are hereafter referred to as high sales cooperatives; 80 such cooperatives exist in this subset. High and low sales cooperatives are individually compared to all cooperatives to determine how strategies differ. In table 5-3, a

dummy variable, *large*, is used and takes a value of one if annual sales are greater than $50 million, otherwise zero.

Table 5-3 Seemingly Unrelated Regression Model Results based on Gross Revenue for years 1996-2014

	All cooperatives in the data set (% of total)	Cooperatives with sales less than $50 million (50.6%)	Cooperatives with sales greater than $50 million (49.4%)
obs.	2911	1473	1078
Dependent Variable: Operating Efficiency			
lagged OE	0.9063**(0.0071)	0.9307**(0.0087)	0.9005**(0.0115)
SGC	1.7531**(0.0640)	1.9540**(0.0782)	1.7145**(0.1293)
large	0.0084(0.0286)		
intercept	0.2693**(0.0278)	0.2079**(0.0292)	0.2966**(0.0435)
r^2	0.7476	0.767	0.7628
Dependent Variable: Leverage			
lagged Lever	0.7793**(0.0102)	0.8427**(0.0123)	0.7739**(0.0170)
SGC	0.9071**(0.0558)	0.6127**(0.0563)	1.1603**(0.1101)
large	0.1287**(0.0263)		
intercept	0.4288**(0.0257)	0.3061**(0.0257)	0.5743**(0.0489)
r^2	0.5142	0.5129	0.4543
Dependent Variable: Earnings Retention			
lagged ER	0.0091(0.0184)	0.0017(0.0257)	0.0137(0.0304)
SGC	-0.0755(0.0556)	-0.0800(0.0884)	-0.1534(0.0926)
large	-0.0143(0.0251)		
intercept	0.7515**(0.0225)	0.7570**(0.0277)	0.7267**(0.0302)
r^2	0.0009	0.0003	0.0018
Dependent Variable: Profit Margin			
lagged PM	0.6053**(0.0143)	0.6215**(0.0198)	0.5508**(0.0244)
SGC	-0.0222**(0.0015)	-0.0289**(0.0025)	-0.0163**(0.0022)
large	-0.0018**(0.0007)		
intercept	0.0096**(0.0006)	0.0090**(0.0007)	0.0091**(0.0007)
r^2	0.4346	0.4635	0.3607
Dependent Variable: SGC			
Chg_Lev	0.7095**(0.0123)	0.7519**(0.0159)	0.6590**(0.0203)
Chg_OE	0.5975**(0.0092)	0.7349**(0.0125)	0.5158**(0.0147)
Chg_PM	0.0001(0.0043)	-0.0002(0.0003)	0.0001**(0.0033)
Chg_ER	-0.0003(0.0007)	-0.0001(0.0007)	-0.0050(0.0041)
large	-0.0055(0.0051)		
intercept	-0.0547**(0.0036)	-0.0585**(0.0031)	-0.0588**(0.0045)
r^2	0.6248	0.7219	0.5664
note: ** denotes significance at the 5% level			
note: standard error in parentheses			
note: large equals 1 if annual sales are greater than $50 million, otherwise zero			

Source: CoBank Risk Analyst Data

Running a seemingly unrelated regression (SUR) model on each growth lever and the sustainable growth challenge (SGC) was necessitated by correlated endogenous regressors. The growth lever determinants were analyzed to ensure the SUR properly accounted for all endogeneity related to a sustainable growth rate (SGR) or SGC calculation. However, the determinants of growth levers do not add new information to cooperative management or board members on how to best overcome a growth challenge. Thus, the focus of this analysis is on the SGC regression which indicates how a cooperative best overcomes a challenge.

In all cooperatives, the year over year change in leverage and operating efficiency are the only two regressors that are significant. The *leverage* coefficient indicates that a 0.71 change in SGC occurs following a change to *leverage*. Change in *operating efficiency* has a smaller coefficient at 0.5975, however, the interpretation is the same. *Profit margin* is an insignificant value, however, the coefficient of 0.0001 represents a tenth of a percent of the magnitude of the significant variables. This indicates that adjusting *profit margin* is not a method of cooperatives to overcome a growth challenge. The change in *earnings retention* variable is insignificant, however, its negative coefficient offers interesting implications to overcoming a growth challenge.

The dummy variable's coefficient of 0.84% indicates that high sales cooperatives may have an elevated growth challenge, as compared to the low sales cooperatives. The coefficient is insignificant but offers intimations, nonetheless. One such intimation would imply that reaching the high sales cooperative status will boost the SGR in and of itself.

Looking at low sales cooperatives, the significant variables in the SGC regression are larger than for all cooperatives. The change in *leverage* is 6 percent larger for low sales cooperatives. And, the change in *operating efficiency* is 23 percent larger for the low sales

cooperatives as well. Although insignificant interesting coefficients resulted from the *profit margin* and *earnings retention* variables. Change *in profit margin* represents a 300 percent decrease in coefficient magnitude, compared to all cooperatives. The year over year change in *earnings retention* has a coefficient that is 66 percent larger than all cooperatives. Albeit small and statistically insignificant, the magnitude differences between low sales cooperatives and all cooperatives are thought-provoking.

High sales cooperatives recognize a 7 percent lower change in *leverage* coefficient and a 14 percent lower change in *operating efficiency* coefficient, when comparing to all cooperatives. Lower change in *leverage* and *operating efficiency* coefficients suggests that high sales cooperatives use these growth levers to a lesser degree than all cooperatives to overcome growth. There is no difference in the change in *profit margin* coefficients of all cooperatives and high sales cooperatives. And, the change in *earnings retention* is greater than 1500 percent larger in magnitude for high sales cooperatives than it is for all cooperatives. A decreased dependency on *leverage* and *operating efficiency* and an increased dependency on *earnings retention* highlights that high sales cooperatives are operating with a different growth ideology.

Analyzing the cooperatives based on regional location was motivated by volume differences of cooperatives inside the corn belt. SUR model Given the corn belt partially encompasses some states and wholly encompasses others, along with the nature of the data segregated by state, cooperatives in Iowa, Illinois, or Indiana makeup the subset henceforth referred to as corn belt cooperatives. Those cooperatives that are not located in either of the three listed states are henceforth referred to as not in the corn belt cooperatives. Subset comparison to the aggregate dataset provides insights on how a subset uses their growth levers to

overcome a challenge. The dummy variable, *corn*, takes a value of one if the cooperative is located in the corn belt, otherwise, zero.

Looking to table 5-4, for all cooperatives the year over year change in *leverage* coefficient is 0.7088, which indicates that the SGC will change 0.7088 as much as *leverage* does. Decreasing *leverage* will lead to a decrease in the SGC; increasing *leverage* leads to an increase in the SGC. Change in *operating efficiency*, with a value of 0.6004, is the secondary positive and significant key variable contributing to the SGC. The change in *profit margin*'s coefficient is significant and positive, however at a low magnitude, given its 0.0001 value is 6,000 times smaller than the next smallest coefficient. And, the change in *earnings retention* coefficient is insignificant in all subsets shown in table 5-3 and negative and small in magnitude, -.0002, for all cooperatives.

Table 5-4 Seemingly Unrelated Regression Model Results based on Location for years 1996-2014

	All cooperatives in the data set (% of total)	Cooperatives not in the Corn Belt (67.26%)	Cooperatives in the Corn Belt (32.74%)
obs.	2911	1957	954
Dependent Variable: Operating Efficiency			
lagged_OE	0.9083**(0.0071)	0.9268**(0.0078)	0.8483**(0.0153)
SGC	1.7517**(0.0640)	1.7674**(0.0719)	1.6358**(0.1291)
Corn	0.0467(0.0306)		
intercept	0.2524**(0.0256)	0.2033**(0.0264)	0.4827**(0.0545)
r^2	0.7477	0.7945	0.6046
Dependent Variable: Leverage			
lagged Leverage	0.8073**(0.0096)	0.8449**(0.0105)	0.6843**(0.0196)
SGC	0.8872**(0.0564)	0.7572**(0.0610)	1.2936**(0.1157)
Corn	0.0185(0.0272)		
intercept	0.4248**(0.0256)	0.3423**(0.0263)	0.7348**(0.0517)
r^2	0.5039	0.616	0.2867
Dependent Variable: Earnings Retention			
lagged_ER	0.0083(0.0184)	-0.0029(0.0224)	0.3529**(0.0273)
SGC	-0.0815(0.0555)	-0.1406(0.0801)	0.0450(0.0270)
Corn	0.0483(0.0267)		
intercept	0.7291**(0.0204)	0.7361**(0.0247)	0.5108**(0.0221)
r^2	0.0019	0.0012	0.156
Dependent Variable: Profit Margin			
lagged_PM	0.6032**(0.0144)	0.6177**(0.0174)	0.4899**(0.0257)
SGC	-0.0221**(0.0015)	-0.0254**(0.0020)	-0.0153**(0.0019)
Corn	-0.0025**(0.0007)		
intercept	0.0096**(0.0005)	0.0092**(0.0006)	0.0093**(0.0006)
r^2	0.4355	0.4458	0.3383
Dependent Variable: SGC			
Chg_Lev	0.7088**(0.0123)	0.7837**(0.0147)	0.5965**(0.0207)
Chg_OE	0.6004**(0.0092)	0.6996**(0.0110)	0.4606**(0.0154)
Chg_PM	0.0001**(0.0011)	0.0000 (0.0003)	0.0001**(0.0030)
Chg_ER	-0.0002 (0.0007)	-0.0003 (0.0007)	0.0015 (0.0025)
Corn	-0.0237**(0.0054)		
intercept	-0.0497**(0.0031)	-0.0537**(0.0029)	-0.0631**(0.0050)
r^2	0.6271	0.7010	0.5230
note: ** denotes significance to the 5% level			
note: standard error in parenthese			
note: Corn is equal to 1 if the cooperative is located in the corn belt, otherwise zero			

Source: CoBank Risk Analyst Data

The dummy variable for corn belt cooperatives has a significant negative coefficient of -0.0237. This indicates that corn belt cooperatives achieve 2 percent lower SGC values than their counterpart non-corn belt cooperatives.

Comparing corn belt cooperatives to all cooperatives shows differences. The change in *leverage* coefficient is 10 percent higher for corn belt cooperatives. Also, the change in *operating efficiency* has a 16 percent higher coefficient magnitude than all cooperatives. Though insignificant, a 100 percent decrease in the change in *profit margin* coefficient from all cooperatives to corn belt cooperatives suggests that *profit margin* is not adjusted to overcome growth challenges. Change in *earnings retention* coefficient shows a marked decrease of 50 percent when comparing all cooperatives to corn belt cooperatives. This indicates that the *earnings retention* growth lever is not used to overcome growth challenges.

Looking to the cooperatives not located in the corn belt, the change in *leverage* coefficient is 16 percent smaller in magnitude than for all cooperatives. Change in *operating efficiency* for cooperatives not in the corn belt shows a large decrease, 23 percent, when comparing to all cooperatives. Cooperatives not located in the corn belt have a coefficient that is unchanged from that of all cooperatives for the year over year change in *profit margin*. Across all subsets, the largest difference from subset to aggregate cooperatives exists in the comparison of corn belt cooperatives and all cooperatives while examining year over year change in earnings retention. While insignificant, non-corn belt cooperatives have an increase in the coefficient of *earnings retention* by 850 percent when compared to all cooperatives. The increase in coefficient indicates that cooperatives not located in the corn belt may manipulate their *earnings retention* rate to overcome a growth challenge to a greater degree than all cooperatives.

Comparing cooperatives based on farm supply sales provides intuitive and interesting results. The cooperatives that generate a majority of sales through farm supply sales are hereafter referred to as majority farm supply cooperatives. And cooperatives which generate a minority of sales through farm supply sales will be hereafter referred to as minority farm supply cooperatives. Majority and minority farm supply cooperatives are individually compared to all cooperatives to distinguish differences. A majority farm supply cooperative dummy variable was inserted as Supply-coop. This dummy variable takes a value of one if the cooperative is majority farm supply, otherwise zero.

Looking to table 5-5, all cooperatives' year over year change in *leverage* has a positive significant coefficient. This indicates that a change in *leverage* leads to a 0.71 change in the SGC. The change in *operating efficiency* is another key growth lever that is significant and positively effects the SGC. The change in *profit margin* coefficient is a positive and significant coefficient, however, the magnitude reflects less than one percent of the *operating efficiency* or leverage magnitudes. Hence, *operating efficiency* and *leverage* represent the largest growth lever coefficients positively affecting the SGC. *Earnings retention* year over year changes negatively affect the SGC, this result for all cooperatives is insignificant, however, lends interesting implications nonetheless.

Table 5-5 Seemingly Unrelated Regression Model Results based on Farm Supply Sales for years 1996-2014

	All cooperatives in the data set (% of total)	Cooperatives with greater than 50% of sales from farm supply sales (31.5%)	Cooperatives with 0-50% of sales from farm supply sales (68.6%)
Obs.	2911	914	1997
Dependent Variable: Operating Efficiency			
lagged_OE	0.90199** (0.00726)	0.94542** (0.01109)	0.89664** (0.00888)
SGC	1.736911** (0.06404)	1.67630** (0.06350)	1.7454** (0.08753)
Supply	-0.05460 (0.03136)		
Intercept	0.30250** (0.02804)	0.14816** (0.02829)	0.31810** (0.03352)
R^2	0.7483	0.7564	0.7304
Dependent Variable: Leverage			
lagged Leverage	0.79643** (0.00979)	0.90507** (0.01170)	0.77567** (0.01225)
SGC	0.88504** (0.05619)	0.56404** (0.05374)	1.04514** (0.07644)
Supply	-0.08243** (0.02774)		
Intercept	0.48036** (0.02758)	0.18950** (0.02448)	0.53161** (0.03366)
R^2	0.5080	0.7155	0.4470
Dependent Variable: Earnings Retention			
lagged_ER	0.00901 (0.01839)	0.14148** (0.03245)	-0.02340 (0.02218)
SGC	-0.08058 (0.05557)	0.04847 (0.08135)	-0.12411* (0.07120)
Supply	-0.02757 (0.02698)		
Intercept	0.75303** (0.02055)	0.63144** (0.02966)	0.77676** (0.02344)
R^2	0.0011	0.0209	0.0025
Dependent Variable: Profit Margin			
lagged_PM	0.58347** (0.01453)	0.61849** (0.02428)	0.48915** (0.01848)
SGC	-0.02174** (0.00150)	-0.04427**(0.00370)	-0.01357** (0.00138)
Supply	0 .00573** (0.00075)		
Intercept	0.00739** (0.00049)	0.01146** (0.00944)	0.00926** (0.00046)
R^2	0.4441	0.5065	0.3019
Dependent Variable: SGC			
Chg_Lev	0.71017** (0.01235)	0.94362** (0.02353)	0.66152** (0.01406)
Chg_OE	0.60083** (0.00919)	0.89225** (0.01701)	0.54034** (0.01054)
Chg_PM	0.00006** (0.00003)	-0.00004 (0.00028)	0.00007** (0.00003)
Chg_ER	-0.00031 (0.00074)	-0.00289 (0.00156)	-0.00015(0.00083)
Supply	0.02089** (0.00552)		
Intercept	-0.06408** (0.00316)	-0.04952** (0.00355)	-0.06006 (0.00331)
R^2	0.6265	0.7571	0.6070
note: ** denotes significance to the 5% level			
note: standard error in parentheses			
note: Supply_coop is a dummy variable equalling 1 if the cooperative receives a majority of sales from farm supply sales			

Source: CoBank Risk Analyst Data

Interestingly, the *supply* dummy variable indicates a significant two percent increase in SGC if the cooperative is a majority farm supply cooperative. The dummy variable results designate that majority farm supply cooperatives are prone to elevated growth challenges. By definition, this indicates that majority farm supply cooperatives have actual sales that outpace the SGR.

Comparing majority farm supply cooperatives to all cooperatives indicates that, when significant, majority farm supply cooperatives' coefficients are larger than the aggregate cooperative dataset. The change in *leverage* coefficient is positive and significant for majority farm supply cooperatives and represents a 33 percent increase over all cooperatives. Likewise, the majority farm supply cooperative's change in *operating efficiency* coefficient is significant and positive and shows a 48.5 percent increase when comparing to all cooperatives.

Looking to the minority farm supply cooperatives, the change in *leverage*, *operating efficiency* and *profit margin* are each significant and positive coefficient. The change in *leverage's* coefficient is 6.8 percent lower than it is for all cooperatives. Similarly, change in *operating efficiency* coefficient is reduced by 10 percent when comparing to all cooperatives. For minority farm supply cooperatives, the year over year change in *profit margin* is a 16 percent larger driver of the SGC than it is for all cooperatives. While the change in *earnings retention* for minority farm supply cooperatives is not a significant variable, its coefficient is 51 percent larger than all cooperatives', though it is also a negative coefficient.

Chapter 6 - Conclusions

Using CoBank Risk Analyst panel data of 162 cooperatives across 19 years, the SGR and SGC was calculated for aggregate cooperatives as well as smaller subsets. The initial empirical study determined the affect that each growth lever had on the SGR—as a growth lever fluctuates, the SGR also fluctuates by a percentage of the initial change. Using the SUR model, it was deduced how growth lever adjustments affect the SGC and enables cooperative directors to efficiently pull levers to overcome a growth challenge.

Changes to the SGC could result from either an increased SGR or decreased annual sales. Holding inventory prices constant, decreased annual sales equates to decreased market share for a cooperative. Although decreasing sales may be needed for a strategic restructuring of the business, cooperatives under normal operations should not strive for reduced sales. Changing the SGR is needed to change the SGC, holding year over year annual revenue growth constant.

In the SUR model, low sales cooperatives depend most on *leverage* and *operating efficiency*. However, the low sales cooperative subset has a 23 percent higher coefficient for *operating efficiency*, compared to all cooperatives. Only a 6 percent higher coefficient exists for the change in *leverage* and its effect on SGC. Thus, compared to all farmer cooperatives, *operating efficiency* is much more important for low sales cooperatives when overcoming a growth challenge.

Econometric analysis results indicate for two out of three comparisons, the higher growth subset also achieves a lower growth challenge. Corn belt and high sales cooperatives attain both higher sustainable growth as well as a lower growth challenge for the study period. The corn belt cooperatives generated a 16.7 percent higher SGR and a 105 percent lower SGC, when compared to non-corn belt cooperatives during the study period. And, the high sales

cooperatives realized a 43 percent higher SGR and a 236 percent lower SGC when compared to low sales cooperatives. This indicates that the high growth cooperatives are not growing fast enough and potentially not capturing full value for their owners. And, the lower growth subsets, the non-corn belt and low sales cooperatives, achieve lower SGR and higher SGC during the study. Implying that the low sales cooperatives are growing faster than sustainable, requiring additional financing.

The sustainable growth rate (SGR) model provides a framework for cooperative directors and managers to discuss growth of the cooperative. If actual growth exceeds what is sustainable, then the discussion needs to focus on acquiring outside capital to fund the growth. Or, if actual growth is slower than what is sustainable, then the discussion should center around why is the co-op not growing fast enough.

In this study, the financials of 162 grain and farm supply cooperatives in 23 states were analyzed focusing on growth and methods of growth. Using the SGC as a measure for rate of growth relative to sustainable rate, those cooperatives with a positive SGC may be outstripping their resources, seeking outside capital, and growing unsustainably.

The term growing broke refers to a business that grows annual revenues faster than the capital base able to produce the sales. This could mean that the business is unable to purchase enough trucks to deliver the sold product in a timely fashion, if at all. In another example, a company that grows too quick may not have the cash on hand to meet the day to day needs of payroll and cost of goods sold while waiting on the customer base to remit payment in a timely manner.

Two pairs of subsets exhibited both higher SGR and lower SGC values for one of the two pairs. First, the corn belt and non-corn belt cooperative subset comparison showed that corn belt

cooperatives realized a 16.7 percent higher SGR as well as a 105 percent lower SGC, relative to non-corn belt cooperatives. Due to both cooperative regional subsets maintaining a negative SGC, neither would be classified as growing broke, however, the corn belt cooperatives are growing at a faster rate as well as accumulating more capital than non-corn belt cooperatives.

The next subset paring that exhibits this phenomenon, low and high sales cooperatives, do so in a slightly different manner. The high sales cooperatives, those with greater than $50 million in annual sales, experienced a 43 percent higher SGR and a 236 percent lower SGC, relative to low sales cooperatives. These low sales cooperatives, those with annual sales of less than $50 million, have a positive SGC that is near 40 percent of their SGR, which would suggest that these cooperatives are growing faster than sustainable. The high sales cooperatives maintained a negative SGC value indicating that their growth, although rapid, could be quicker. Due to the low sales cooperatives exhibiting a positive SGC and the lowest SGR of all subsets, these cooperatives are growing broke in the evolving and changing marketplace of today.

A deeper growth discussion is possible when examining the four levers of growth. These levers show how key financial ratios are connected and affect a cooperative's SGR. Using the empirical results most resembling their cooperative, directors can make growth and financial lever decisions. The subsets were created to better enable application of the results directly to cooperatives. Given the financial metrics table in chapter 4, a director can compare their cooperative's metrics with the subset or aggregate data to determine the cooperative's standing and differences from average.

Through time, cooperative directors and boards have the ability to react to economic challenges by increasing the operating efficiency and leverage. But during boom times, decreasing this leverage and increasing the profit margin are key focal points. While significant

competition limits directors and management's ability to lift profit margins to drive growth, profitability must occur, or else growth will turn negative.

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