IMPLICATIONS OF BOOK VERSUS TAX BASED PATROANGE IN AGRICULTURAL COOPERATIVES

By

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Abstract: Cooperative businesses are taxed under Sub-Chapter T of the IRS tax code. Under that provision, cooperative businesses are allowed to deduct profits distributed to their member-owners (termed patronage dividends). Any income remaining after patronage distributions is taxed at the regular corporate rate. Patronage calculations can be based on either "book" net income following the accrual method of Generally Accepted Accounting Principles (GAAP) or on a tax basis reflecting a cooperative's IRS calculations. The difference between the two income calculations are referred to as "Book Tax Differences (BTD). The two alternative methods for income calculation can lead to both permanent and temporary BTD. Permeant BTD are created when an income or expense is recorded on a book basis which will never be recognized on a tax basis or vice versa. A common permanent BTD in an agricultural cooperative would be the Section 199A deduction. Temporary BTDs occur when timing of income or expense recognition varies between book and tax methods. Common temporary BTD in agricultural cooperatives include accelerated or bonus depreciation and the receipt of nonqualified equity patronage from regional cooperatives. BTDs are particularly important for cooperative businesses because profits are shifted over time. The members doing business and receiving patronage in future years may be different from those patronizing the cooperative in the year the BTD was created. Because of that potential effect there is a clear need for research on the implications of book and tax based patronage on agricultural cooperatives and their members.

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CHAPTER I

Introduction

Agricultural marketing and farm supply cooperatives are special types of entities that allow producers, the owners, to benefit on the farm level by price discovery and availability of services (Kenkel et al., 2019). Cooperatives are legally classified as corporations but can obtain pass through taxation if they distribute profits to their patron members in proportion to business volume. Those distributions are termed patronage dividends or patronage refunds and are distributed to members in some ratio of cash and equity. Annual patronage distribution decisions are made by each cooperative's elected board of directors. When deciding patronage distribution, the board must consider the fiscal year income. However, the calculation of net income for a cooperative varies, based on the accounting method and other various procedures elected by that cooperative. The selection of the accounting method for patronage is just one of numerous financial decisions that the cooperative board of directors must make each year. Many boards lack an understanding of the implications of that decision and how it effects both the cooperatives and the members. There is a need for research based information on the implications of book and tax based patronage that can be communicated to cooperative boards of directors.

The recent global pandemic and other disruptive market forces are challenging the cooperative business model (Zuckerberg, 2020). That makes it essential for cooperatives to operate in accordance with cooperative principles, provide a financial return to the members and

grow the cooperative to meet the needs of future members. All of those factors are impacted by the decision whether to base income and patronage on a book or tax basis. It is also essential for agricultural cooperatives to encourage younger producers to join and patronize cooperatives. The decisions around patronage calculation, like other decisions in a cooperative, can have differential impacts on younger versus older members. That makes it important for the cooperative board of directors to not only understand the overall impacts of boor or tax based patronage but to also understand how that decision impacts younger members. This research explores cooperatives' decision to base patronage on either book or taxable income and the subsequent impacts that decision has on the valuation of cooperative membership.

To maintain records, cooperatives may be required or can choose to follow Generally Accepted Accounting Practices (GAAP) guidelines. The main goal of GAAP, also known as book accounting, is to produce financial statements that are uniform across industries that accurately reflect the current financial state of the firm. The defining characteristic of GAAP is the matching principal and subsequent accrual method. The matching principal requires entities to match expenses to the associated revenue. The accrual method used in GAAP upholds the matching principal by recording both expenses and revenues in the period that revenue is earned rather than when cash is received. The accrual method and matching principle are critical to GAAP because they accurately depict core-operating earnings and result in more accurate forecasts for investment decisions than other accounting methods (Zimmerman and Bloom, 2016).

While there are many advantages to keeping records on a GAAP basis, many firms elect to not follow GAAP accounting and instead keep their records on a tax basis. Tax basis accounting is more concerned with the amount of value spent and received in a given period. This differs from the book method where the timing of cash is less important than when revenue is technically earned. When a company follows GAAP accounting, they are required to adjust and reconcile their financials every year in order to file taxes in accordance with U.S. tax code. The

adjustment and reconciliation process is time consuming and costly for firms. For firms that aren't required to have book financial statements, like cooperatives, the adjustments and reconciliations might not be worth the cost and instead choose tax basis record keeping for its practical application.

For pass through entities like cooperatives, the distinction between book income and taxable income is critical. Cooperative businesses are taxed under Sub-Chapter T of the IRS tax code. One of the major provisions of cooperative taxation is that cooperative businesses are allowed to deduct profits distributed to their member-owners. As mentioned, those distributions are termed "patronage dividends" and can be in a combination of cash and stock. Stock patronage is redeemed into cash by the cooperative at a future date, in accordance with the cooperative's equity management program. Any income remaining after patronage distributions is taxed at the regular corporate rate. A cooperative can, therefore, avoid corporate-level taxation by making patronage distributions equal to its pre-patronage taxable income.

In recent years, grain marketing and supply cooperatives have experienced increased use of accounting items that have resulted in greater divergence between book and taxable income values. For example, regional cooperatives have increased their use of non-qualified equity distributions which creates a timing issue of the recognition of that income depending on the accounting basis of net income. The divergence of tax and book income leads to the question of which value should cooperative patronage decisions be based on. Book income may more accurately reflect the true profitability of the firm, and thus book-based patronage calculations may more fairly distribute earnings to the members in proportion to their use of the cooperative. Whereas, taxable income is more closely related to the cooperative's net cash flow and potential tax liability. Tax based income is often lower relative to tax based income which results in lower patronage payments and higher cash flow to the cooperative. That increased cash flow could potentially be used to finance the growth of the firm. Book based patronage could create cash flow challenges in either the year of the patronage distribution or the year in which the equity

patronage is redeemed into cash. The effects of using a tax based accounting system versus the book method on matching member benefits to use and on a cooperative's cash flow and equity retirement are unknown.

To consider the differences between book and tax income and how they affect the cooperative, it is important to understand how the two income metrics differ on a technical level. As mentioned above, the book method records revenue in the period it is earned while the tax method records the cash value gained in a period whether it is "earned" or not. The difference in recorded value by the two methods is known as a book tax difference (BTD). When accounting items occur that create BTDs, GAAP accounting results in a book income while a tax method accounting system generates taxable income. BTDs can lead to temporary and permeant differences depending on the accounting issue.

Cooperatives are based on the principal of distributing profits in proportion to the members' use of the cooperative. Managers and the board have a responsibility to match member benefit to the proportion of member use. For example, if a member accounts for 20% of the cooperative business they will receive 20% of the available member benefits. Since temporal BTDs shift income and member benefits into other periods there is a chance that once the member benefit is realized certain members will not receive the same portion of that benefit, as they would have in the period of creation. This research considered three accounting issues prevalent, and unique in some cases, to agricultural cooperatives that create the BTD described above. The simulation and case study consider depreciation issues, non-qualified regional equity and Section 199A tax deductions and their effects on book and taxable income.

To quantify the effects of the BTDs on agricultural grain marketing and farm supply cooperatives this research will use a variety of methods. First, the potential effects are illustrated using a simplified cash and equity patronage stream. Next, the research utilizes an established cooperative simulation developed at Oklahoma State University (Kenkel 2015; Boland and Barton 2013). The simulations used in this research represents an example Midwestern corn and

soybean marketing and farm supply cooperative and a Southern Plains wheat marketing and farm supply cooperative. The simulations of the example cooperatives are used to analyze how BTDs individually and cumulatively effect typical agricultural cooperatives.

Problem Statement

Cooperative boards and managers are responsible for a wide array of financial decisions that impact the distribution of patronage to cooperative members. Ultimately, they are responsible for the proportional distribution of annual patronage to the cooperative members. Currently, there is a lack of researched based information on whether to base cooperative income and patronage on a book or tax basis impacts the cooperative and the members. Cooperative boards of directors need that information so that they can make patronage decisions on an informed basis. The decision as to book or tax based patronage is an important and timely issue since it has implications as to whether profits are distributed equitably, the growth of the cooperative and the impacts on younger and older cooperative members. By understanding how using either book or taxable income changes distribution of patronage, patronage allocations could be altered to increase the overall benefits of cooperative membership.

Objectives

The overarching objective of this research is to determine how using book versus tax accounting methods effects matching member benefits and the growth potential of the cooperative. Specific objectives include: Identify book versus tax accounting differences relative to cooperative entities. Model the effects of BTDs on member patronage and the cooperative's potential growth rate through use of a cooperative financial simulator and example cooperative firms. Decompose the effect of BTDs on member benefit by patron age group using a typical pattern of lifetime patronage derived from USDA Ag Census data. The objectives listed are concerns of farm supply and marketing cooperative managers, boards, and members across the region. The effects of using a tax based accounting system versus the book method on matching

member benefits to use and on a cooperative's cash flow and equity retirement are unknown. This project aims to answer those questions faced by cooperative governance and members.

CHAPTER II

REVIEW OF LITERATURE

Description of the Cooperative Financial Model

Agricultural cooperatives were founded on the principle that the patron users should supply the equity to fund the cooperative and should receive benefits in proportion to their use of the cooperative. Cooperative boards are responsible for making financial decisions on behalf of the farmers who hold ownership, through member business, in the cooperative. As a representative of the entire cooperative membership, the cooperative board has an ethical duty to operate in the best interest of its stakeholders. Modern agricultural marketing cooperatives can trace their history to the Rochdale Society of 1844, a collection of tradesmen working together cooperatively (USDA, 2011). The Rochdale society collected the best businesses practices of the time and created guiding principles that developed into the modern iteration of core cooperative principles (USDA, 2011). The USDA defines three core principles of contemporary cooperatives; the user-owner principle, the user-control principle and the user-benefit principal. The user-owner principle describes the cooperative as those who use the cooperative, own the cooperative. Conversely, the user-control principal says that those who use the cooperative should control the cooperative. Finally, the user-benefit principle says, “the cooperative’s sole purpose is to provide and distribute benefits to users on the basis of their use” (USDA, 2011).

Despite their unique structure and belief in the user-benefit principle, agricultural cooperatives still operate in a highly competitive market economy (Boland, 2012). Due to their core principles and structure, cooperatives hold a unique position in the marketplace. Producers benefit from the cooperative structures via increased bargaining power resulting from economies of scale (Boland, 2012). Cooperatives also serve as a "competitive yardstick role" by providing a fair and observable market price. This helps producers offset the market power exercised by some large firms (Boland and Barton, 2012). In order for the cooperative to survive, it must act competitively in the interest of both the cooperative and the member. In competitive markets, a cooperative's goal is to maximize profit in order to distribute earnings back to its members. Ideally, cooperatives should distribute earnings in a way that maximizes long-run benefits to its members (Boland, 2012). Additionally, to comply with the user-benefit principal cooperatives must return maximized long-run benefits to members in proportion to their use. Remaining competitive while adhering to the core cooperative principles is challenging but should be a priority for every cooperative.

Most open membership cooperatives, which include agricultural marketing and farm supply cooperatives, achieve the principle of member ownership by distributing a portion of patronage in the form of revolving equity. As the name implies, the equity is eventually redeeming into cash at face value. The process of distributing patronage to cooperative members and managing equity is complex and cooperatives have flexibility with those choices. Since 1951, over 100 dissertations covered topics within cooperative finance (Boland and Barton, 2013). Even though cooperative finance literature is extensive, changes in policy over time represent new opportunities for revisiting and renovating previous research in the area.

Once net income for the fiscal year has been determined, the first step in the profit distribution process for a cooperative is separating member and nonmember sourced profits. Most cooperatives then retain nonmember sourced profits as unallocated equity (Boland, 2012). Unallocated equity can also be referred to as retained earnings. Next, the cooperative has to

decide how much of the member sourced profits will be allocated, creating cash and equity patronage that is distributed to the members (Boland, 2012). It is important to note that cooperatives can deduct patronage distributions from their taxable income. That implies that any profits from both member and nonmember sources retained as unallocated equity profits will be taxed at a normal corporate rate. In the context of the current research, positive BTDs reduce tax-based income and patronage and result in additional funds being retained as unallocated reserves.

The next choice for the cooperative is the determination of what portion of the member's allocated earnings will be issued as cash or equity. Cash distribution decreases both the cooperative's book earnings and taxable income. On the member level cash distributions increases the tax liability in the current year. Equity distributions made to members can be qualified or non-qualified. Qualified equity distributions are taxable at the member level in the year of the distribution and decreases the cooperative's book and taxable income. There is no taxable event when the cooperative redeems the qualified equity for cash because the members incur the tax liability up front. One caveat of choosing to distribute qualified equity is that cooperatives are also required to distribute 20% of the allocation as cash patronage (Boland, 2012). Unlike qualified equity, non-qualified equity is included in the cooperative's taxable income in the year of distribution while the distribution is recognized on the book side. When non-qualified equity is redeemed for cash, members benefit from an increase of taxable income and the cooperative receives a tax deduction (Boland, 2012). All of these tax effects are reflected in the cooperative financial simulator used in this research.

Historically, cooperatives have chosen to retain equity by distributing qualified rather than non-qualified equity. However, some research finds that the issuance of non-qualified rather than qualified equity leads to higher member returns and higher member internal rate of return (IRR). Kenkel (2015) used 6 years of financial statements to estimate 30 years of pro forma financial statements using a number of assumptions. This study considers the after tax effect of issuing qualified, non-qualified and unallocated equity. The results show that non-qualified equity

distribution strategy result in the highest member IRR. Russel and Briggeman, (2014) reached similar conclusions. For the purpose of this research the example cooperatives were modeled distributing a combination of cash and non-qualified equity patronage.

Once a cooperative has distributed redeemable patronage equity, it must decide the type of equity redemption program it will implement or if it will employ a defined program at all. The most common equity redemption programs can be classified as: (1) revolving fund, (2) patron's estate, (3) patron's age, (4) percent of all equities, and (5) base capital plan (Eversull, 2010). The simulations in this research assumed a revolving fund equity program with a 15 year revolving period. The choice of the equity redemption program effects the timing of the member cash flows from equity patronage.

Another component of the financial model of local cooperatives is the receipt of patronage from regional cooperatives. Most local farm supply and marketing cooperatives are themselves patron users of larger, regional cooperatives. Regional cooperatives provide local cooperatives with economies of scale in a number of functions such as; marketing commodities, supplying fertilizer and petroleum, providing insurance, and a variety of other services. The local cooperative receives profit distributions from the regional cooperative, regional patronage, in combination of cash and qualified patronage or non-qualified patronage. The local cooperative is required to pass on the taxable components of regional patronage to the local member within 8.5 months of its own fiscal year end if it wishes to exclude the regional patronage from its taxable income (Kenkel, 2019). Just like local cooperatives, regional cooperatives redeem previously issued equity under a selected equity management program. In recent years, some regional cooperatives have elected to distribute equity patronage in the form of non-qualified revolving equity. This creates another potential BTD for the local cooperative. If the local cooperative calculates patronage on a book basis the regional non-qualified patronage would become part of the local cooperatives income in the year the equity patronage was issued. Local cooperatives

calculating patronage on a tax basis would include the regional non-qualified equity as patronage in the year the equity is redeemed by the regional.

Book versus Tax Differences

Accounting items that result in a variation between book and tax income create either a permanent or a temporary BTD in income values. A permanent BTD is created when an accounting item occurs that is only recognized on either a book or tax basis but not both. Since the difference is only ever recognized on one basis, it does not reverse itself and the BTD will continue into perpetuity. A temporary BTD is created when an accounting item is recognized in both book and tax income just at different times, thus reversing itself after a given period. Both permanent and temporary BTDs are important considerations for the cooperative's equity management decisions. A favorable BTD is a transaction that increases the amount of a deductible expense or decreases the amount of taxable income. If a favorable BTD is temporary, the tax benefit is realized in the current year and periodically will reverse itself through a deferred tax liability until it is fully reversed. On the reverse side, an unfavorable BTD decreases the amount of a deductible expense or increases the amount of taxable income. Temporary unfavorable BTDs are realized in the current period and reverse themselves out periodically through a deferred tax asset.

The first accounting issue prevalent in agricultural cooperatives that creates a BTD is depreciation. Depreciation on a book basis is typically recognized on a straight line basis. A straight line basis means that the asset base is depreciated an equal amount every period until the asset is full depreciated. On a tax basis depreciation is recognized on a modified accelerated cost recovery system (MACRS) basis. The MACRS accelerates the rate of the depreciate schedule by shifting the largest portion of the depreciation to the earliest years in the asset life. The difference recorded on the book and tax basis between straight-line and MACRS is considered a favorable temporary BTD at the cooperative entity level. The temporary BTD results in more depreciation being recognized on a tax basis, leaving the taxable income to be less than the book income in

years where MACRS depreciation is higher than straight-line depreciation. At the owner level the lower taxable income could be considered unfavorable if the taxable income is the value that is used to determine patronage distributions. On a tax basis, decreased taxable income results in a lower amounts of both cash and equity patronage distributions to the members.

Another BTD which is considered in this research is the effects of regional non-qualified patronage distributions made to the local cooperative. As discussed previously, non-qualified equity distributions are not taxable income to the cooperative until the year of redemption by the regional cooperative but are still recognized on a book basis in the year of issuance. This creates a temporary favorable BTD that reverses upon redemption. Like the depreciation issue above, the timing difference of recognition of the income shifts the timing that the member will receive its benefits further into the future if patronage is based on taxable income.

In 2017 TCJA was enacted and with it, widespread tax reform. A key provision of TCJA that affects cooperatives is Section 199A. Section 199A allows the cooperative to deduct the lessor of 9% of qualified business income or 50% of the cooperatives w-2 wages from their taxable income value before patronage distributions (KPMG, 2019). While Section 199A reduces taxable income, it is not recognized by GAAP and has no effect on book income. The difference resulting from a Section 199A deduction is favorable and permanent. Due to Section 199A being an item of tax law that has no recognition in GAAP, the difference in the two income values will never be reversed. On a tax basis the income deducted from Section 199A would not be distributed to members and would be retained at the cooperative level, increasing the cooperatives unallocated equity.

The non-comparability between book income and taxable income values has been extensively researched and debated in relation to investor owned firms in the U.S. (Atwood et al. 2010). The author notes that the United States is considered to have a low book-tax conformity meaning these two income values differ significantly. It is widely thought that the BTD a firm carries can reveal information about current earnings. Taxable income is stricter on income

recognition while accruals can be adjusted on a book basis. Some researchers and analyst claim that a large BTDs should be seen as a red flag and earnings manipulation (Hanlon, 2005). Others suggest that BTDs are a proxy for the unobservable level of tax planning within a firm (Wahab and Holland, 2015). Much of the research to date focuses on corporation's BTD balance and their future earnings performance.

One paper found empirical evidence that large positive BTDs (taxable income lower than book income) are indicative of less persistent future earnings (Hanlon, 2005). This result was consistent even after controlling for one time special accounting items (Hanlon, 2005). Persistence is defined as the temporal BTD correlation to accounting earnings where higher correlation is related to higher quality of earnings (Wahab and Holland 2015). Less persistent earnings mean that the accruals taken in order create the large BTD balance are overestimated and underperform in realization. Hanlon (2005), also found that large negative BTDs lead investors to overestimate the future performance of the firm's earnings.

Wahab and Holland (2015) take the previous research a step forward. Rather than considering the correlation between BTDs and earnings persistence, Wahab and Holland (2015) examine the persistence of BTDs themselves. To do this, they categorized BTDs into two categories, permanent and temporal, and analyzed them individually. They find that 51.5% of firms had positive permanent differences which suggests aggressive financial reporting. Additionally, they found low persistence of temporal differences. The low persistence suggest that temporal BTDs are occurring as others are being offset in a mechanical cycle rather than aggressive earnings management (Wahab and Holland, 2015).

BTDs have also been studied in conjunction with auditor-provided tax services. Luo (2019) questions how auditor-provided tax services relate to the level of BTD that a firm has and their future earnings performance. The results of the research suggest that the use of auditor-provided tax services are related to low levels of temporal BTDs. As Hanlon (2005) found in her research, large BTDs lead to less persistent future earnings leading investors to misprice firms.

This research was important by showing that auditor-provided tax services can lower the use of temporal BTDs which results in less mispricing by investors.

Current research in BTDs for corporations are done using the schedule M-3. Schedule M-3 requires a firm to reconcile taxable income to book income which in result extracts BTD information from firms. One study used time-series M-3 data from 2004 to 2013 to study the sources and trends of BTD usage in corporations (Gaertner, et al., 2016). Their major findings showed an increase in the net values of BTD balances over the time period of the study which suggest less book and taxable income conformity. The study did find that a large portion of BTDs resulted from normal operational and financing activities (Gaertner, et al., 2016).

While there has been extensive research on the persistence of BTDs and their correlation within corporations, there is significantly less research in regards to pass through entities like cooperatives. To our knowledge, no research has considered the effects of book-tax differences in relation to agricultural marketing and farm supply cooperative. This research aims to understand the effects of using a book income versus taxable income value in cooperative financial cycles and their effectiveness in distributing member benefits in proportion to their use.

CHAPTER III

METHODOLOGY AND DATA

Cooperatives have a notability complex financial model. Every year the cooperative managers and board are required to make a number of accounting and economic decisions for the cooperative as a whole. Included in those decisions are the choice of calculating patronage on a tax or book basis, profit distribution choices which include the portion of cash and equity patronage, and the form of the equity patronage and its revolving cycle. Among these decisions, the choice of book or tax based patronage is the subject of this research. The cooperative's calculated net income and patronage is effected by the accounting method used by the cooperative. Cooperatives using book method (GAAP) accounting will end up with both a book income value and a taxable income value after their taxes are completed. Cooperatives keeping their books on a tax basis will only produce a taxable income value.

Book income is representative of a cooperative's yearly economic profit and is required to follow GAAP. Taxable income however is more representative of a cooperative's fiscal year cash flow and is subject to the IRS tax code. Because most BTDs involving cooperatives are favorable, calculating patronage on a tax basis results in lower patronage payments to members and increases the cooperative's current year cash flow. That result is predicated on a cooperative maintaining the same portion of cash patronage. In practice, cooperative boards do not tend to adjust the cash patronage when cooperatives obtain the tax deductions leading to BTDs.

Cooperative members are sensitive to the cash patronage percentage but rarely understand the cooperative's pre-deduction income. For that reason, cooperative boards often see the cash flow resulting from BTDs as a means of reinvesting in assets and grow the cooperative. . The goal of this research is to understand how the non-conformity of book and taxable income values effect cooperative member returns from the cooperative and the distribution of these effects on members of various ages. A second, inter-related goal is the impact of tax patronage and favorable BTDs on the potential growth of the cooperative. This research hypothesizes cooperatives basing patronage on a book income benchmark will have a higher member return relative than if they had calculated patronage on tax based income. Additionally, we hypothesize that tax based patronage will result in a higher growth rate for the cooperative.

These objectives are achieved through the of a cooperative financial simulation program and financial data from two example cooperatives. Prior to exploring the simulation results a simplified patronage stream is used to illustrate the expected effects of the BTDs The simulation approach models two example cooperatives over a 30-year period. The simulation uses an established model that was modified to incorporate book and tax accounting methods specific to this research. The example cooperatives created in the simulation model were based on a time-series of financial data from two case study cooperatives. The simulation output included a 30-year time series of pro-forma financial statements which included patronage, and equity retirement payments. The financial simulator also calculated the annual cash flow of the cooperative and net cash flow after all expenses, patronage, loan payments, taxes and equity retirement payments was assumed to be re-invested in assets. Through that process the simulation modeled the differential growth rates from book and tax based income calculations could be reflected.

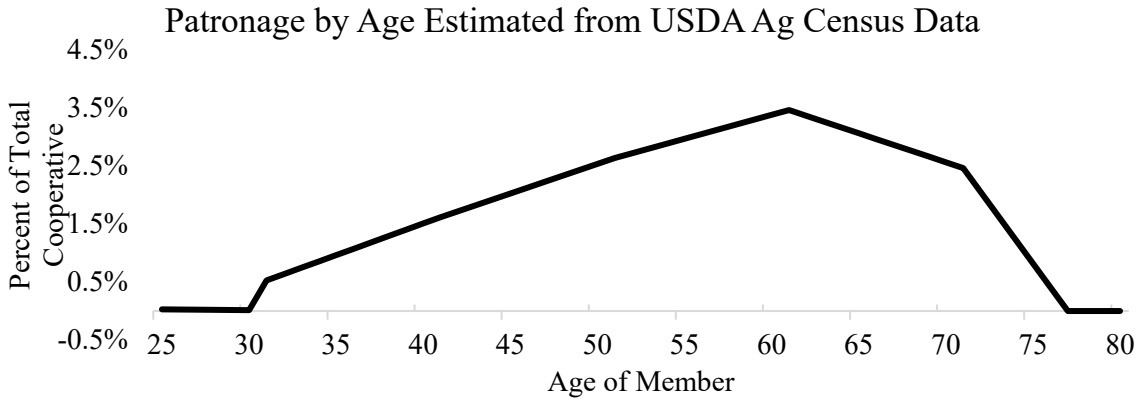
The growth rate of the cooperatives and the net present value of member benefit are direct output from the simulator. The time series of member benefit (cash patronage and equity redemption payments) was further analyzed to determine the impact on members of different

ages. The NPV of returns will vary for members based on their age for two reason. Younger members have a longer time horizon of business volume with the cooperative. They are therefore more likely to capture the effect of the reversal of temporal BTDs and to benefit from growth of the cooperative which leads to higher patronage. Cooperative members also typically follow a pattern of lifetime patronage which reflects the changes in their farming activities. Farming activity and cooperative patronage increases over the lifespan of the producer and peaks at approximately age 60. That patronage pattern also creates a potential for BTDs to impact younger and older producers differently. Tax based income and patronage calculations could move income to a future period due to temporal BTDs. That could benefit a younger patron because they have a relatively small share of the total patronage in the current year but will have a higher share in future years.

In order to model business volume by age, data on the market value of agricultural products sold by age category were obtained from the USDA 2010 Census of Agriculture (USDA, 2012). This data was used to model the portion of cooperative, business volume and patronage that was attributable to every year of age (Figure 1). The final age category in the Ag Census table lists sales for ages 65 and older. Our analysis assumed that patrons retired and ceased patronage with the cooperative at age 70.

Figure 1

Estimation of Cooperative Use by Patronage Age



While the census data is a snap shot of current farm sales by age, we assume it provides a reasonable approximation of the pattern of farming activity over the lifespan of a typical cooperative member. Furthermore, our estimates of business volume reflect similar productivity patterns found by Tauer (2019). By carrying this profile of business volume by age through every year of the 30-year simulation, a profile of member benefit of patronage and equity retirement payments over the member lifetime was created for each member age. That allowed us to measure both the NPV of overall member benefit over the 30 year simulation as well as the NPV for each member age. For the purpose of our analysis a discount rate of 3% was assumed. Our selection of a low discount rate reflects the fact that most members consider their revolving equity a low risk investment.

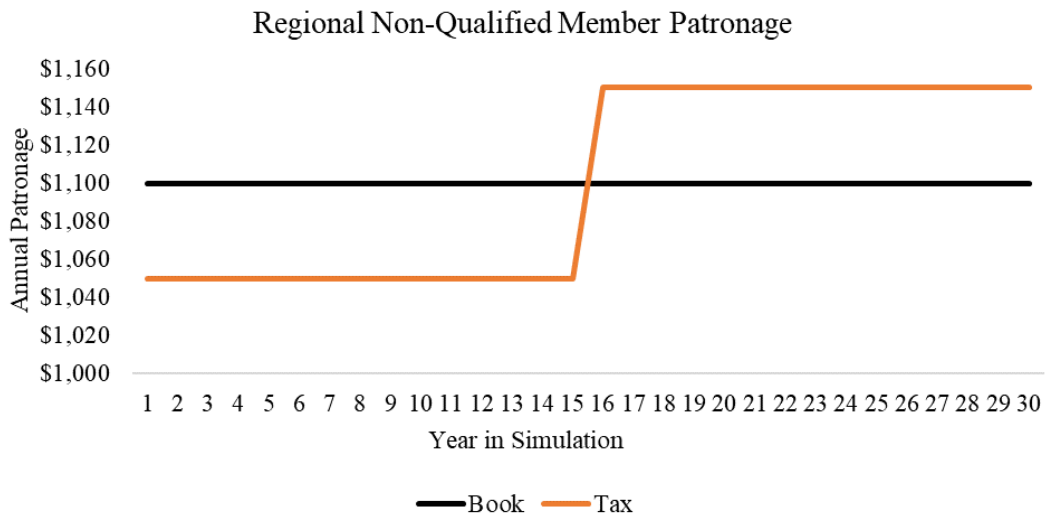
Simplified Patronage Stream

The simplified stream of patronage reflects a cooperative earning a constant profit stream $1000 per year over a 30-year period. That net profit reflected $600 of depreciation expense. Two identical patronage streams were created which were then systematically modified so that one stream reflected book based patronage and one modeled tax based patronage. The patronage streams reflected profit distribution of 50% cash patronage and 50% retained patronage and a 15 year equity revolving cycle. The patronage streams were modified to reflect BTDs

The first effect version modeled with the patronage streams was the receipt of regional $50 in non-qualified patronage by the local cooperative each year with the regional equity revolving into cash on a 15 year cycle. On a book basis non-qualified regional equity patronage is recognized as income in the year the patronage is issued which results in higher patronage for distribution to the local cooperative's patrons. On a tax basis regional non-qualified equity is not recognized as income until the equity is redeemed. This creates a simple temporal difference in patronage as illustrated in Figure 2.

Figure 2

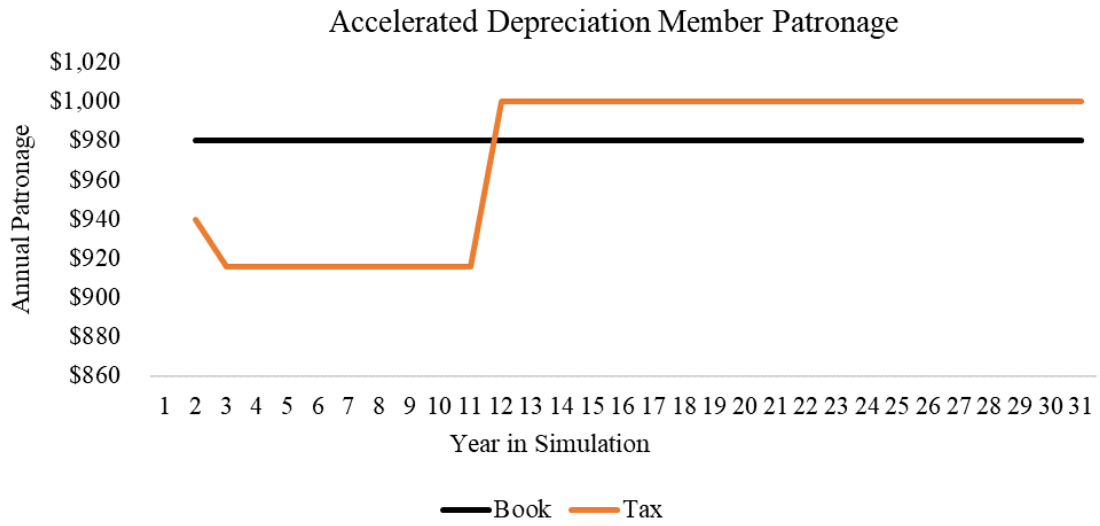
Simplified Patronage Stream – Regional Non-Qualified Effect



The second effect modeled with the patronage stream was accelerated depreciation. The cooperative creating the patronage stream was assumed to depreciate $600 worth of assets. Book basis depreciation was found using the straight-line method assuming a 30 year asset life. To examine accelerated depreciation, the tax basis depreciation used a MACRS rate schedule. That also created a simple temporal difference in patronage as illustrated in Figure 3.

Figure 3

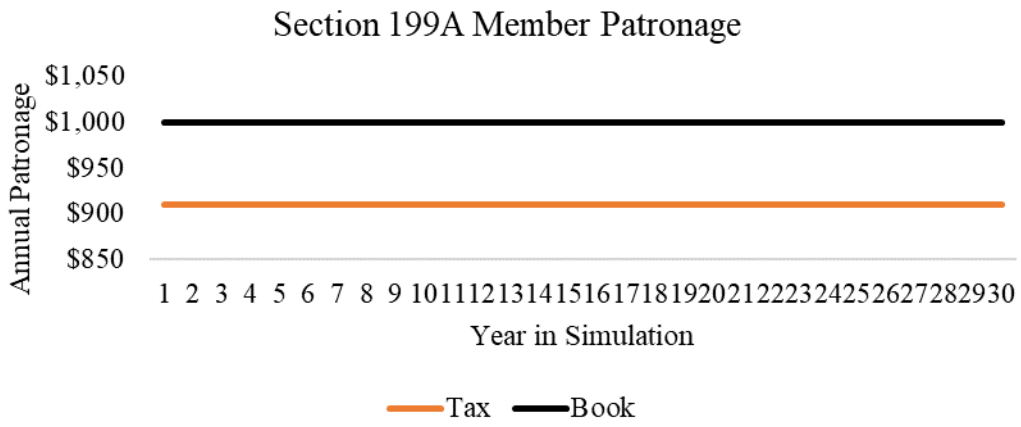
Simplified Patronage Stream – Accelerated Depreciation Effect



The final effect illustrated with the simplified patronage streams was the effect of Section 199A deductions. That deduction is never recognized on a book basis, therefore, only effect is a reduction in tax basis patronage. The Section 199A is a complex calculation that requires many considerations and is subject to various limitations. For our purposes of illustrating the hypothetical shifts in patronage we assumed that Section 199A deduction was simply 9% of qualified income. The Section 199A deduction creates a permanent difference in tax and book based patronage as illustrated in Figure 4.

Figure 4

Simplified Patronage Stream – Section 199A Deductions Effect



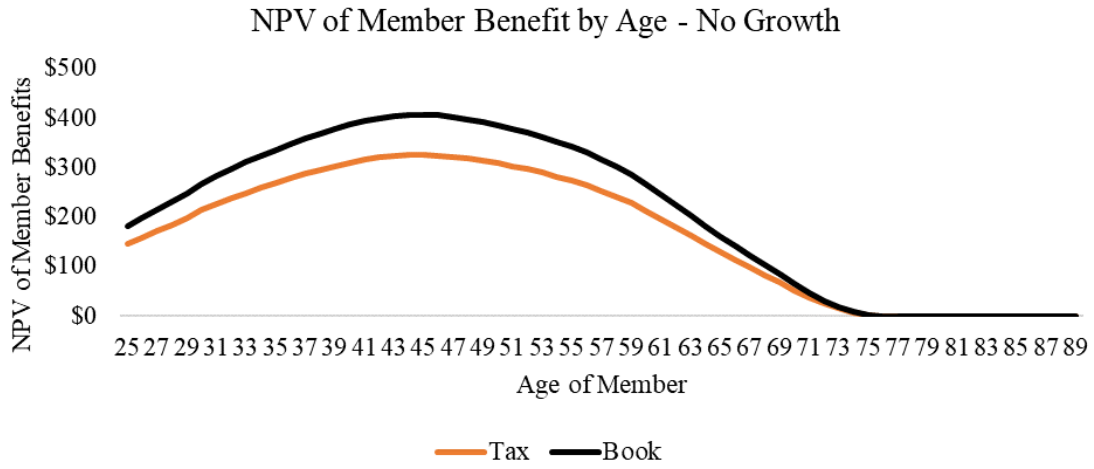
The combined effects of those BTDs on patronage and equity retirement payments can be converted into net present value (NPV) and further separated into NPV by member age using the previously described profile of patronage by age (Figure 1). A discount rate of 3% was used in our NPV calculations. This choice of a low discount rate reflects the fact that most members consider the cooperative as being a relatively safe investment. The discount rate was roughly equivalent to the Wall Street Journal Prime Interest Rate which was 3.25% as of November 2020 (WSJ, 2020). Sensitivity analysis on the discount rate did not reveal any major impacts on the shapes of the member benefit profiles.

The aforementioned profile illustrates different levels of NPV of member benefit based on member age. Members of approximately 45 years old would expect the highest NPV since they are beginning at higher level of patronage and their assumed retirement comes close to the end of the simulated period. The age 25 members have a lower NPV because they will not reach their peak patronage period during the 30 simulation and a portion of their equity redemption payments occur past that period. The profile of member NPV reflected in Figure 5 (which does not reflect any growth in the cooperative) suggest that cooperative members would receive a higher NPV of member benefit from book based patronage. The 30 year simulation period results

in higher NPVs for members in the middle age groups and the advantage of book based patronage expands in that age range.

Figure 5

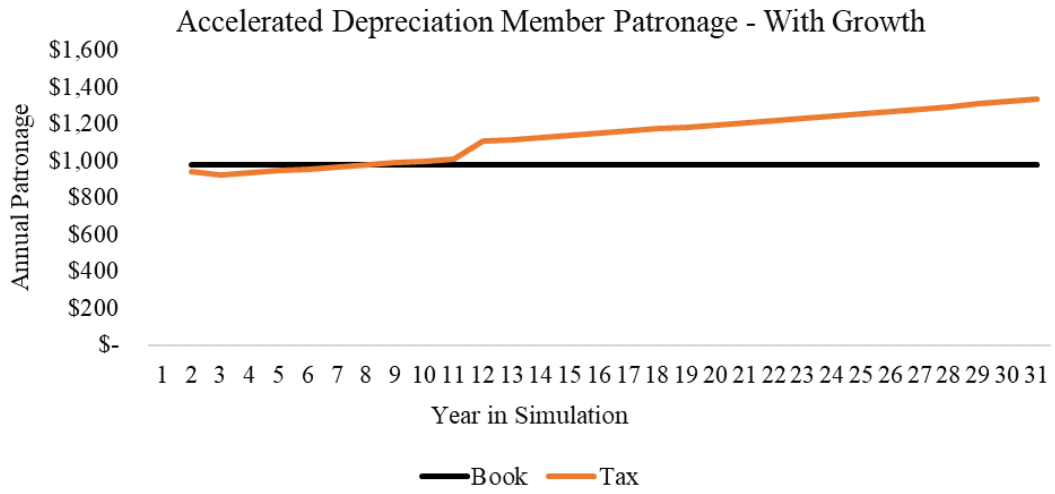
Simplified Patronage Stream - Net Present Value of Member Benefit by Age No Growth Scenario



A final but important illustration with the simplified patronage stream is to consider differential rates of growth for the cooperative under book and tax based patronage. In order to illustrate that effect the tax based patronage stream was assumed to growth at 1% per year while the book based patronage stream was constant. That resulted in a more complex profile of patronage stream as illustrated in Figure 6.

Figure 6

Simplified Patronage Stream - Accelerated Depreciation Effect with Growth Scenario



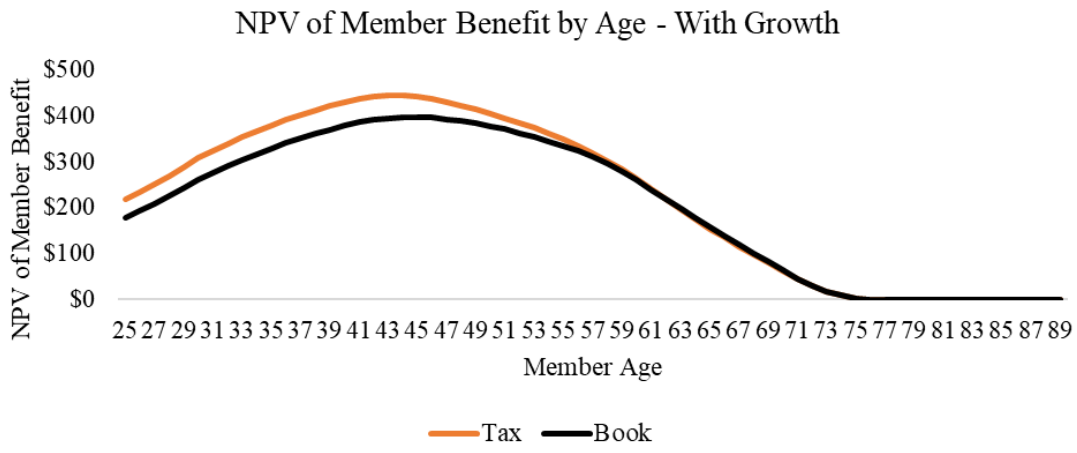
When the cooperative is assumed to growth faster using tax based patronage, the patronage stream in later years increases under the tax patronage scenario. That raises the possibility that the membership as a whole could achieve a higher patronage NPV under tax based patronage if the higher patronage in later years offset the temporal effects of delayed patronage and the permanent effects of the Section 199A deduction. The assumption of higher cooperative growth under tax based patronage could also change the profile of patronage by age because younger patrons would have more to gain from the growth associated with tax based patronage.

The profile of patronage NPV by age with a 1% growth for tax based patronage is shown in Figure 7. At 1% growth the patronage NPV for the entire membership is almost identical for book based and tax based patronage. At higher growth rates an overall advantage to tax based patronage develops. At 1% growth younger members receive a higher NPV under tax based patronage while older members receive the highest benefit with book based calculations. This provides an important insight for cooperative leaders. To the extent to which the increased cash

flows from tax based patronage calculations are used to grow the cooperative, preferences for book or tax based patronage might vary with the age of the member.

Figure 7

Simplified Patronage Stream - Net Present Value of Member Benefit by Age with Growth Scenario



The simplified patronage streams illustrated the possible impacts of tax and book based patronage calculations using arbitrary levels of regional patronage and depreciation expense and a very simplified representation of the Section 199A deduction. It illustrates the effect of each BTDs on the patronage stream. It also illustrates how the possibility of higher growth with tax based patronage could offset the short term effects of lower patronage. The next procedures examine those effects using typical cooperative firms.

Cooperative Simulation

A cooperative simulation model developed by Oklahoma State University Kenkel (2015) was used to model the effects at the cooperative level. The simulation program uses a time series of financial and operational information and models sales volumes, margins and expenses based on historical averages and relationships with asset values. Regional patronage is based on the historical relationship with farm supply sales and the cash and stock portion of the regional patronage is similarly modeled. The simulator models the cooperative's equity management plan

as either an age of patron equity plan or an age of stock plan with imputed trigger age or revolving period. The revolvement of regional equity is modeled on an age of stock plan subject to the imputed revolving period. Profit distribution alternatives including cash patronage, qualified equity patronage, non-qualified equity patronage and retention as unallocated retained earnings are input variables. Profit distribution can be set to match the cooperative's historical practice or changed to examine alternative structures. Regional equity patronage can be set to any combination of qualified and non-qualified allowing it to be based on either historical or anticipated patterns. The Section 199A deduction was modeled as the lessor of 50% of W-2 wage expense or 9% of qualified business income. Qualified business income was modeled as the gross margins from farm supply sales and grain handling, less the non-member business percentage which is an input variable, typically set from the historical average. The resulting income tax effects at both the cooperative level and the member level are also modeled.

The simulation program creates a 30-year time series of pro-forma financial statements. The long period for projections is necessary to reflect the impacts of revolving equity and the member's long-term return from the cooperative. In addition to pro-forma profit and cash flow projections, the members' internal rate of return (IRR) is calculated using the total allocated equity as the initial investment and the after tax portion of cash patronage and equity revolving payments as the annual future net cash flow. The calculated member IRR can be used to analyze the impact of alternative profit distribution, equity management structures, choices of book or tax based patronage, or other firm level decisions.

The original simulation method used by Kenkel (2015) was modified to reflect both book and tax based income and patronage calculations. Three categories of BTDs were modeled. Depreciation expense varies based on the accounting basis. For book basis, depreciation was calculated as a fixed percentage of fixed assets based on the historical ratio. That basically modeled straight line depreciation with the period set by the cooperative's historic depreciation. Tax basis depreciation was based on MACRS depreciation. The initial fixed asset balance was

depreciated on the MACRS rate schedule. Because MACRS is not a constant rate, annual net additions must be modeled individually. Every year net additions to fixed assets are added to a MACRS rate matrix where the total annual depreciation expense was calculated.

The Section 199A calculations were already modeled by the simulator. That deduction was considered for tax based income and patronage and ignored for book basis. Because the purpose was to examine BTDs, regional equity was assumed to be non-qualified with the amount based on historic relationship between regional equity patronage and farm supply sales. A 15 year revolving period was assumed for both the cooperative's revolving equity and the regional equity. The regional equity patronage was included in tax based income in the year issued and in book based income in the year it was redeemed.

The final modification to the simulator to account for BTDs was to link the cooperative's growth rate to available cash flows. The baseline version of the simulation template reinvests an amount equal to annual depreciation into fixed assets each year. That process maintains a steady state cooperative while modeling the tax implications of depreciation. In order to consider the possible growth implications of tax based patronage, a portion of available annual cash flows (after all payments and the assumed depreciation based fixed asset reinvestment) was assumed to be channeled to additional fixed asset purchases. Sales volumes and variable expenses were assumed to inflate at the same rate as fixed assets. Fixed expenses were already calculated as a percent of fixed assets and thus automatically adjusted.

Case Study Cooperatives

The first example cooperative was based on a Midwestern farm supply and marketing cooperative with approximately $58M in annual sales and $99M in total assets. In terms of physical units, the cooperative marketed approximately 35M bushels of grain and supplied 57,000 tons of fertilizer and 8M gallons of petroleum products. The cooperative had approximately $44M of fixed assets, net of accumulated depreciation. The cooperative had a debt to asset ratio of 53% and the allocated equity represented 47% of total equity. Personnel expense represented

37% of the cooperative's gross margin. Regional patronage represented approximately 20% of farm supply margins.

The second example cooperative was based on a Southern Plains wheat marketing and farm supply cooperative with approximately $42M in sales and $46M in total assets. The cooperative marketed approximately 28M bushels of grain (primarily wheat) and supplied 38,000 tons of fertilizer and 10M gallons of petroleum products. The cooperative had 17M in net fixed assets, a debt to asset ratio of 37% and allocated equity represented 43% of total equity. Personnel expense represented 28% of gross margin while regional patronage represented 40% of farm supply margins.

Profit distribution choices were standardized across the example cooperatives at 35% cash and 65% nonqualified equity patronage. Nonqualified equity patronage is not tax deductible in the year issues and therefore creates the greatest advantage for the Section 199A tax deduction. A 15 year revolving period was used for both the example cooperatives and the regional equity patronage. For simplicity, 100% member business was assumed for both cooperatives. Two growth scenarios were considered, a no growth scenario where none of the excess cash flows were applied to additional fixed asset purchases, and a growth scenario where 40% of the available cash flows were applied to additional fixed asset purchases. The 40% assumption was admittedly ad-hoc but reflected the fact that a cooperative would be unlikely to invest all available cash flows since a growing cooperative would also need additional investment in current assets.

While these cooperatives were typical for their regions and also fairly similar to each other they provide some reasonable variation in key BTDs variables. The Midwestern cooperative had a higher ratio of fixed assets to total assets creating a greater effect from accelerated depreciation. On the other hand, the Midwestern cooperative had a lower historical ratio of regional patronage to farm supply margins creating a smaller impact from regional equity.

The Southern Plains cooperative had a lower ratio of personnel expenses to gross margin which implied a relatively smaller Section 199A deduction and less impact from that effect.

CHAPTER IV

RESULTS

In the 0% growth scenario both the Midwestern corn and soybean and Southern plains wheat cooperatives showed an aggregate preference for book based patronage as shown in Table 1. As the growth constraint was relaxed, both aggregate cooperatives switched their preference to tax based patronage as displayed in Table 1. These findings are consistent with the simplified patronage stream. Members tend to prefer book based patronage when the growth of the cooperative is low or constrained. Their preferences change as the growth of the cooperative is increased. Tax based patronage provides additional capital left at the cooperative level for the growth of each cooperative. Higher growth rates of the cooperatives increase patronage in later years, which results in higher levels of total member benefits over the course of the simulation.

When comparing the margin of preference for tax or book in the growth scenario the cooperatives diverge. The Midwestern cooperative strongly prefers tax based patronage due to the additional $46M of total member benefits (Table 1). The additional $46M received on a tax basis increases total member returns by over 30%. The members of the Southern Plains cooperative prefer tax based patronage but only slightly relative to the Midwestern cooperative. Tax based patronage only results in an additional $2M of member benefits for the Southern Plains cooperative (Table 1). The additional $2M received on a tax basis only increased total returns by around 2%. Differences in the strength of preferences could be due to the variation in fixed asset

structure, annual revenue and relative size between the cooperatives.

Table 1

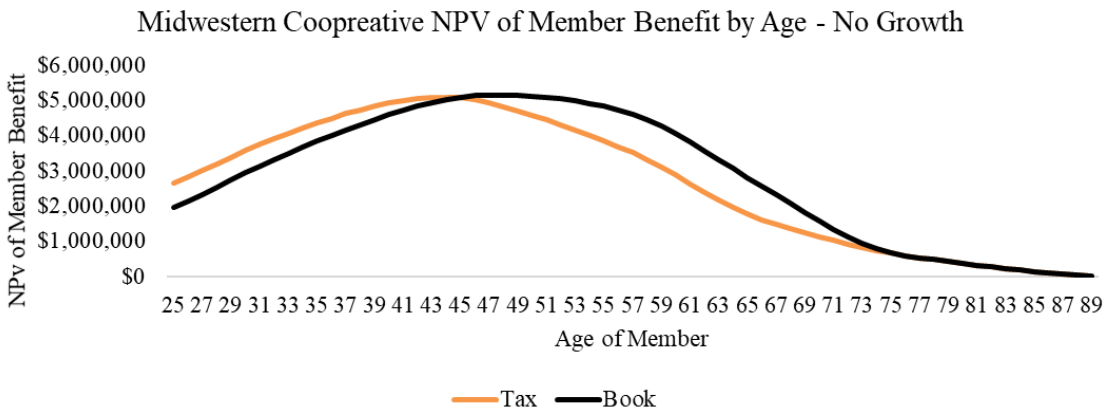
Net Present Value of Member Benefits across Case Study Scenarios

Growth Scenario	Accounting Basis	
	Book	**Tax**
Midwestern Cooperative		
No Growth	$ 136,932,076	$ 117,783,255
Growth from Available Cash Flows	$ 145,378,998	$ 191,694,565
Southern Plains Cooperative		
No Growth	$ 102,737,505	$ 87,419,953
Growth from Available Cash Flows	$ 108,228,075	$ 110,383,085

Book or tax based patronage preferences are more complex when you consider the preference on an individual member level. While under the 0% growth scenario the aggregate cooperatives both preferred book based patronage, however, not every member would. As shown in Figure 8, members of the Midwestern cooperative have a mixed preference. Members under the age of 45 prefer tax based patronage, while members over 45 prefer book based patronage.

Figure 8

Midwestern Cooperative - Net Present Value of Member Benefit by Age No Growth Scenario

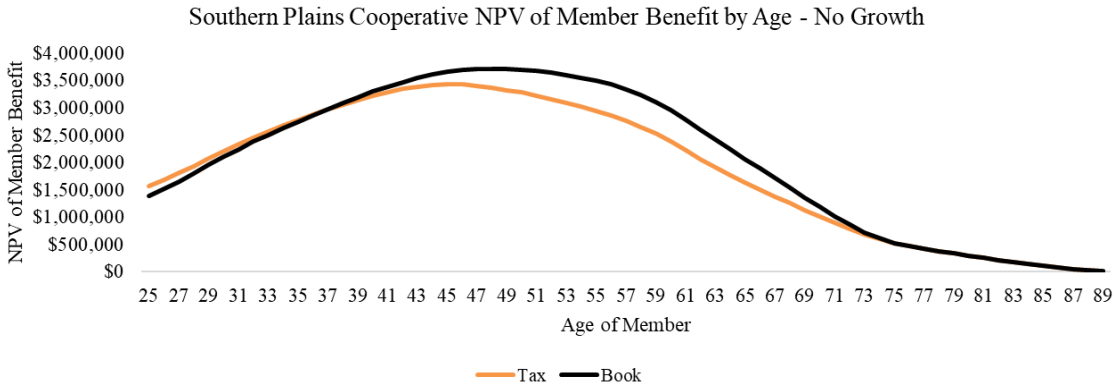


The Southern Plains cooperative on the other hand had a large majority of members preferring book based patronage on a low growth scenario. Figure 9 shows that only the youngest

of members, those below the age of 36 might prefer tax based patronage, while the rest of the members prefer book based patronage.

Figure 9

Southern Plains Cooperative - Net Present Value of Member Benefit by Age No Growth Scenario



As you allow the growth of the cooperative to increase the preference for tax based patronage also increases on the aggregate level, as shown in Table 1. The increase in aggregate preferences suggests that a larger range of individuals could prefer tax based patronage. Those results can be seen in Figure 10 and Figure 11.

Figure 10

Midwestern Plains Cooperative - Net Present Value of Member Benefit by Age Growth Scenario

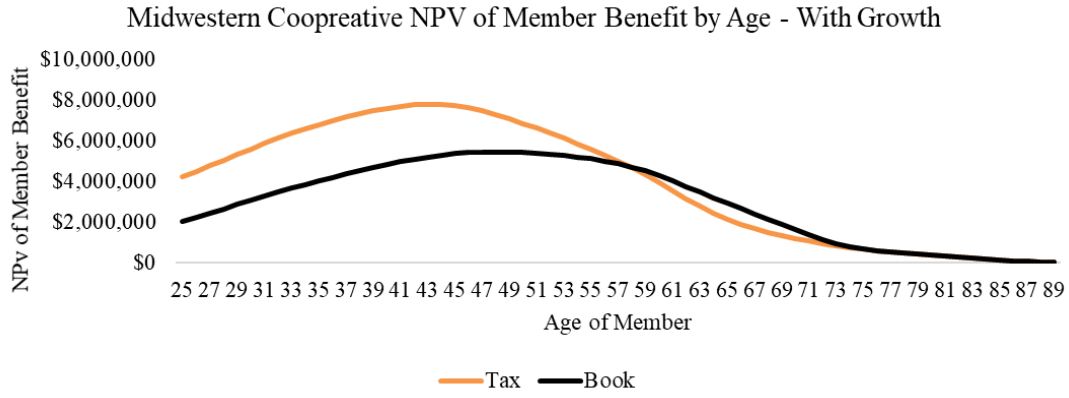
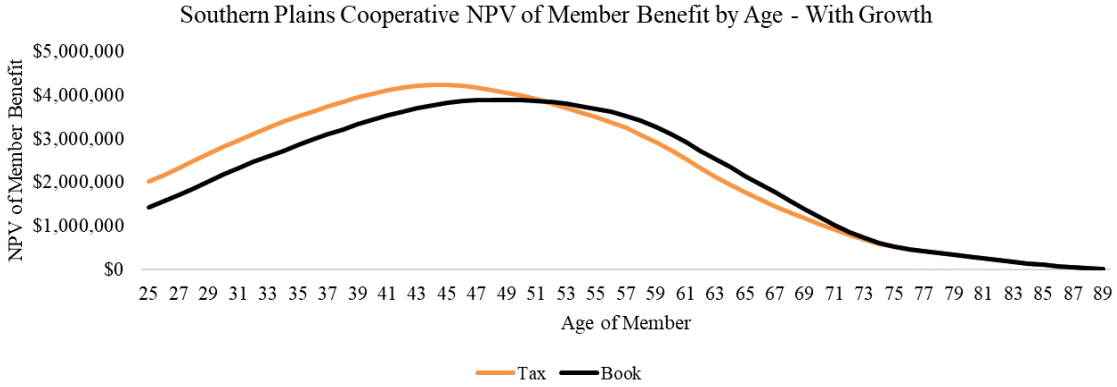


Figure 11

Southern Plains Cooperative - Net Present Value of Member Benefit by Age Growth Scenario



The age of preference for tax based patronage was increased for both the Midwestern and Southern Plains cooperative. In the Midwestern members under the age of 58 might prefer tax based patronage while Southern Plains members under the age of 51 could prefer tax based patronage (Figure 10 and 11). Additionally, Figure 10 shows those who preferred tax based patronage under the no growth scenario now might even more strongly prefer tax based patronage.

CHAPTER V

CONCULSION AND IMPLICATIONS

Cooperatives have a unique structure in the marketplace that result in a complex financial cycle. The complexity of the financial cycle is dealt with on a firm-by-firm basis in conjunction with cooperative managers, boards of directors, auditors and other trusted advisors. Their choices influence the financial health of both the cooperative and the cooperative members. Specifically, their choice of using either book or tax based patronage can affect the cooperative and the cooperative members' bottom line. This research attempts to qualitatively and quantitatively show how the difference between book and tax based patronage could affect cooperatives and their members.

Through our simplified patronage stream we qualitatively showed how both temporary and permanent initially favorable BTDs shift income recognition into the future on a tax basis. The income recognition delay on a tax basis leaves extra capital at the cooperative level. In theory, cooperatives would reinvest that additional capital to grow faster which would give tax basis a relative growth advantage compared to book basis. The growth advantage associated with tax disproportionately increases younger member total returns. Older cooperative members have a shorter horizon to benefit from growth than compared to younger members. This is especially true for the oldest members whose cooperative use will terminate in the short term.

Not only do younger members have a longer horizon to benefit from growth, their proportional use of the cooperative is increasingly growing. This results in income being recognized in periods when younger members are doing more business with the cooperative than when the income was originated. On the other hand, older members' business with the cooperative is decreasing. For older members delayed income will be recognized when they are doing less business with the cooperative than if it had been recognized in the period it had on a book basis. These effects have the potential to distort member's benefits in proportion to their use, which is one of the fundamental principles of cooperatives.

The case study coops show results similar to what we would expect from the results of the simplified patronage streams. They give us a more accurate picture of how BTDs interplay and impact the performance and growth of the cooperative. Results from each cooperative and scenario show a mixture of member preferences by age distribution. In general, younger members might prefer tax based patronage due to their longer time horizons and increasing cooperative use. However, older members might prefer book based patronage due to their shorter time horizons and decreasing cooperative use.

The results of the case study simulations are sensitive to numerous factors. The proportion of fixed assets to total assets for example changes the impacts of BTDs due to the relationship between depreciation and fixed assets. Additionally changes in parameters like, the debt to asset ratio, personnel expense, and sales growth relative to asset growth can change the performance of a cooperative in the simulation. This research is limited in that it only considers the impacts of three BTDs that are all initially favorable. There are a wide scope of BTDs that can occur in a cooperative's financial cycle and each BTD should be evaluated individually. Future research could expand on other accounting procedures that result in BTDs. While this research highlighted the impacts of BTDs on different age groups in two cooperatives, additional research could consider how BTDs impact cooperatives with varying performance.

Cooperative managers, board of directors and advisors should use the findings of this research to weigh options when making accounting treatment decisions for their cooperative. The magnitude of BTDs varies by cooperative due to the ratio of fixed assets to total assets, the amount and structure of regional patronage and other factors. The potential return on the investment in additional fixed assets, which can be funded by favorable BTDs also varies across cooperatives. In order to make appropriate decisions cooperative leaders need to understand the current basis of their patronage calculations, the magnitude of potential BTDs and the growth potential of the firm. Additionally, cooperative leaders should consider the demographic mix of their members. Tax based income calculation tends to reduce income recognition and patronage and shift it into the future. The cash flow savings of tax based patronage can facilitate a higher growth rate for the cooperative. Cooperative leaders should consider the impact of their patronage decisions on both the cooperative as a whole and on members of different ages. In general, if the board perceives the cooperative with limited growth potential and they place a high value on matching benefit to use, and impacts on older members, they may be best served with book based patronage. Conversely, boards who perceive substantial opportunities to grow the cooperative and who are interested in maximizing the benefits to younger members may see benefit in tax based patronage.

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APPENDICES

APPENDIX A

Financial Characteristics of Case Study Cooperatives

Financial Chararcteristic	Case Study Cooperative	
	Midwestern	Southern Plains
Total Assets	$ 99,003,671	$ 46,303,715
Fixed Assets, net of depreciation	$ 44,248,742	$ 17,067,252
Porportion of Fixed Assets to Total Assets	45%	37%
Average Annual Sales	$ 58,177,353	$ 42,494,801
Average Annual Grain Volume (bu)	35,236,876	28,510,839
Average Annual Fertilizer Volume (ton)	56,041	38,757
Average Annual Petroleum Volume (gal)	7,942,416	10,381,976
Debt to Asset Ratio	53%	37%
Ratio of Allocated Equity to Total Equity	47%	43%
Ratio of Personnel Expense of Gross Margin	37%	28%
Ratio of Regional Patronage of Gross Margin	20%	40%

APPENDIX B

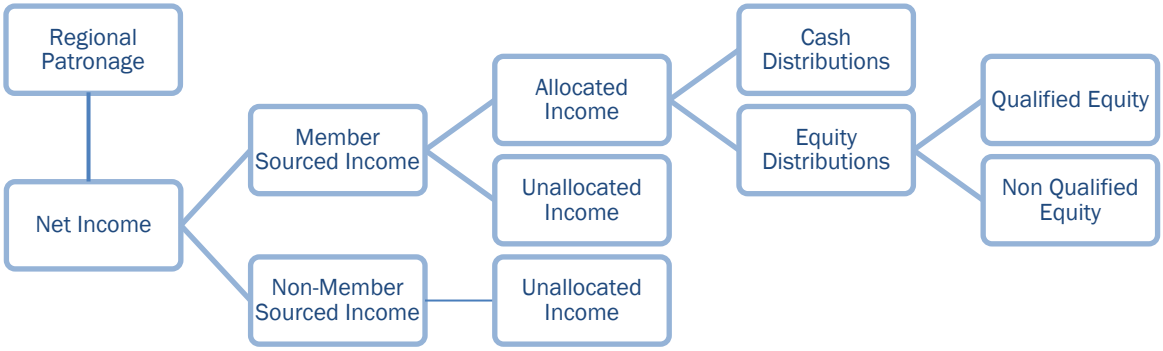
MACRS Rate Schedules

	Depreciation Rate for Recovery Period					
Year	3 Year	5 Year	7 Year	10 Year	15 Year	20 Year
1	33.33%	20.00%	14.29%	10.00%	5.00%	3.750%
2	44.45%	32.00%	24.49%	18.00%	9.50%	7.219%
3	14.81%	19.20%	17.49%	14.40%	8.55%	6.677%
4	7.41%	11.52%	12.49%	11.52%	7.70%	6.177%
5		11.52%	8.93%	9.22%	6.93%	5.713%
6		5.76%	8.92%	7.37%	6.23%	5.285%
7			8.93%	6.55%	5.90%	4.888%
8			4.46%	6.55%	5.90%	4.522%
9				6.56%	5.91%	4.462%
10				6.55%	5.90%	4.461%
11				3.28%	5.91%	4.462%
12					5.90%	4.461%
13					5.91%	4.462%
14					5.90%	4.461%
15					5.91%	4.462%
16					2.95%	4.461%
17						4.462%
18						4.461%
19						4.462%
20						4.461%
21						2.231%

Source: (IRS, 2019)

APPENDIX C

Chart of Cooperative Financial Cycle



Source: (Boland, 2012)

APPENDIX D

Common Book Tax Differences

Common Permanent Differences
Life insurance proceeds
Tax-exempt interest income
Nondeductible tax penalties and fines
Tax credits
Political contributions
Disallowed buiness-related meals
Disallowed premiums on officers' life insurance
Dividends-received deduction
The windfafll tax benefit from exercise of nonqualified stock options
Entertainment expenses

Source: (McGraw-Hill, 2020)

Common Temporary Differences
Depreciation
Accrued vacation pay
Prepayments of income
Installment sale income
Pension plan deductions
Accrued contingency losses
Business interest expense
Reserves for bad debts
Inventory costs capitalized under IRC 263A
Warranty reserves
Stock option expense
Accrued bonuses and other compensation
Net operating loss and net captial loss carryovers

Source: (McGraw-Hill, 2020)

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