EFFECTS OF THE 2017 TAX CUTS AND JOBS ACT ON PRIVATE NONCORPORATE FOREST LANDOWNERS' INCOME IN THE US SOUTH

by

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(Under the Direction of Yanshu Li)

ABSTRACT

The 2017 Tax Cuts and Jobs Act is one of the most expansive federal tax legislations of the US. Effects of recently passed tax bill and other proposals on non-corporate private forest landowners have not been evaluated or understood yet. Using the Faustmann approach, this study evaluated and compared net financial benefit of managing timberland under various tax scenarios to show the effects of the current law and other proposals on timber income from investment and business in the US South. Results from economic analysis showed minimal impacts of current law on investors and material participants. Current law decreased after-tax LEV for both types of landowners by less than 7.5%. Among the proposals, expensing reforestation costs had the least effect while 50% exclusion of capital gain had the greatest positive impact. Therefore, management of timberland becomes less beneficial for median income investors and material participants under the current law.

INDEX WORDS: Federal income tax; Financial analysis; Private forest owners; Timberland investment; Timber tax policy; US South

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B.S. Forestry, Tribhuvan University, Nepal, 2016

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

ATHENS, GEORGIA

2019

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May 2019

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my major advisor, Dr. Yanshu Li, for her invaluable guidance and assistance throughout my master's program. I would also like to thank my advisory committee members, Dr. Richard Bin Mei and Dr. Benjamin Campbell, for their suggestions and support. The appreciation goes to the United States Department of Agriculture, Forest Service for supporting this study financially.

I would like to thank my parents who have done so much to further my education than anyone else. I am always grateful to my parents-in-law for their love and support. Special thanks goes to my husband, Anil Koirala, whose sacrifices and moral and intellectual help was more than I could have asked for anything. There are many other people who have encouraged and supported me along this journey. Thanks to Rahil and all my friends for always being there.

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CHAPTER ONE

INTRODUCTION

Private forests cover more than half (58%) of the forestland in the United States and the proportion is even higher in the Southern region. In the US South, 86.7% of the total forestland is comprised of private forests, out of which 69.3% is accounted by private non-corporate forests that offer array of environmental, social, and economic services (Oswalt et al. 2014). Such services include, but are not limited to, supply of fiber and solid wood, valuable goods and services to the society including water quality, wildlife habitat, and recreation. In fact, a major share of nation's wood products are provided by these forests (Oswalt et al. 2014). However, continuous expenditures on management of timberland and production of these benefits without regular income and imposition of several taxes can make sustainable forestland management less appealing for non-corporate forest owners. That being said, arguments regarding sustainable management of private forests generally revolve around taxation policy issues.

Non-corporate family forest owners are responsible to pay various taxes for managing, protecting, and generating income from timberlands in the form of property tax, state and federal income tax, and severance tax. These taxes are regarded as one of the largest expenditures in managing timberland. Because of this, woodland owners in the United States have identified taxes as the top family forest issue (Argow 2017). Some prominent effects of state and federal timber taxation include changes in forest ownership dynamics, forest parcelization, and disruptions in forest management (Hibbard et al. 2003; Polyakov and Zhang 2008). Among different taxes on private forests, federal income tax is especially important for financially motivated family forest

landowners as it can significantly reduce net returns to forestland investments (Butler et al. 2012, Smith et al. 2008).

Federal income tax is the most debatable and complicated tax system of the United States (Roach 2010). It was initiated during the Civil War with a goal to support war expenses but it was later abolished in 1872. In 1913, the 16th Amendment to the Constitution of the United States once again supported federal taxation system. As stated in the Amendment, *"Congress shall have the power to lay and collect taxes on incomes, from whatever source derived without apportionment among the several states, and without regard to any census or enumeration*." Following the Amendment, Congress passed the 1913 Revenue Act which imposed federal income tax on wages, salaries, interest, dividends, rents, entrepreneurial incomes, and capital gains (Pechman 1987).

In order to promote sustainable forestry investment that will be able to protect and preserve forest resources while reducing federal income tax burden on landowners, a number of federal income tax provisions dealing with timber activities have been established over the years in the internal revenue code. More specifically, these tax provisions are intended to compensate landowners for ecosystem services provided to the public, encourage timber investment that increase cash flow and timber supply, and provide an equitable basis for investment in forest (Ellefson et al. 2005). Among many tax provisions pertaining to taxpayers, capital gain treatment of timber, reforestation deduction and amortization, and operating expenses and carrying charge deductions are particularly designed to address forestry practices. In addition, other incentive programs are also available as an assistance to the landowners. However, federal tax provisions can be more favorable than subsidy programs as they can provide more equitable participation of private forest landowners (Society of American Foresters 2016).

Although federal income tax provisions play a key role in reducing tax burden on private non-corporate landowners, these provisions are not utilized to their full potential. Complexity, lack of knowledge, and inconsistent treatment of forest management compared to other capital ventures are some reasons behind low rates of usage. In addition, frequently changing nature of federal tax provisions applicable to timberland creates an unpredictable tax environment for landowners (Arbogast 2015). A series of tax bills are introduced or revised in response to the expiration of existing tax structure, in order to minimize distorting effects on economic decisions, and to promote economic growth (Tax Foundation 1959). This trend usually gains its highest peak during the change of administration from one political ideology to another. In fact, around 6500 changes to the federal tax code were observed between 1986 to 1998 (Cushing 2006). As a result, it can be confusing and challenging for landowners to stay up-to-dated with reformed tax codes applicable to their timber activities. This suggests that landowners seek stability in the federal tax system because timberland investment is a long-term asset that entails a considerable risk due to lack of liquidity of the investment (Stier 1997).

With the periodic shift in forestry-related federal income tax policies, several publications have provided updates about current changes in law, studied their impacts on private timber income, and the extent to which favorable tax provisions are utilized. To keep landowners informed and updated, some studies focus on general description, rules under current laws, and the methods of filing tax returns. Guides and tips on federal income timber tax are provided periodically and annually by the USDA Forest Service publications (Wang and Siegel 2011; Greene et al. 2013; Wang 2018). In addition, National Woodlands magazine published by National Woodland Owners Association discusses current timber taxation issues and policies quarterly in the chapter “Timber and Taxes”. The National Timber Tax website is another information portal

which provides more detailed information on tax treatment of timber related activities. In response to changes in income tax laws, many studies utilized financial analysis approach to evaluate their economic impacts on non-corporate landowner's timber income (Greene and Kluender 1989; Dangerfield and Gunter 1991; Greene 1996; Bailey 1999; Smith 2004; Cushing 2006; Straka and Greene 2007). Some of these studies have reported decreases in land expectation value as a result of changes in federal tax provisions, imposition of combination of several taxes, and low rates of utilization, while others have reported improvement in land expectation value from proposed tax laws or changes in reforestation provision. To understand forest landowners use and awareness of tax provisions, several studies surveyed national and regional forest owners (Greene et al. 2004; Smith 2004; Butler et al. 2012; Greene et al. 2014; Hatcher et al. 2016). Some of these studies suggested to encourage and assist landowners with preparation of management plans and involvement in a forest owner organization (Greene et al. 2004), while others reported that tax policies alone cannot address forest loss issue (Butler et al. 2012). Need for educational and outreach program are highlighted by these studies to keep landowners aware of federal income tax provisions.

Previous studies have analyzed impacts of different tax bills and proposals on non-corporate private landowners in the past. The potential impacts of the "2017 Tax Cuts and Jobs Act"- enacted in December 2017- on private forest owners' income and profitability has never been studied before. Thus, it is imperative to understand how they are impacted by the new law. Prior to its enactment, several proposals of the bill were also released that could have potential impact on taxpayers, therefore, understanding impacts of such proposals are equally important as the passed law. While the passed federal income tax laws and proposals are different in details than the laws of previous years, there are some common elements. Tax reformations made in the

past, or proposed for the future, are one of many representative changes. Timberland is a long-term investment with annual expenses and periodic revenues. A tract of timberland is likely to witness several changes in tax laws for the purpose of federal income tax returns over the course of a typical rotation length of 25-30 years in the US South. Thus, it would be interesting to learn more about the potential impacts of such timber-related tax laws on returns from private timberland investments. This analysis is expected to assist non-corporate forest landowners in understanding effects of the current law and potential effects of proposed laws given the changes in federal income tax laws occur in future. The results will also be of interest to regulatory policymakers, extension specialists, general public, and other associated stakeholders in identifying issues associated with the current and potential future federal tax laws pertaining to forest landowners.

1.1 Objectives

The overall goal of this study is to improve our understanding of the financial effects of current and proposed changes in federal income tax treatment of timber income and timberland managed by non-corporate private forest landowners.

The specific objectives are (i) to identify changes made by (Tax Cuts and Jobs Act of 2017) and proposals related to timber activities and (ii) to evaluate and compare net financial benefit of owning and managing timberland under various tax scenarios to show effects of the current law and other proposals on timber income of non-corporate private forest landowners in the US South.

CHAPTER TWO

LITERATURE REVIEW

2.1 Federal income tax provisions affecting private forest landowners

In the IRC, different federal tax incentive provisions have been established to encourage nonindustrial private forest landowners towards forest management activities. The first among them was Section 117(k) of 1943, which allowed taxpayers to treat their cut timber as a sale or exchange. Later, this provision was recodify into Section 631(a) and Section 631(b) as a part of the IRC of 1954 (Bailey 1999; National Timber Tax 2019). In the 1970s and 1980s, cost-share payments for reforestation, and the reforestation and investment credits were introduced. Since then, a number of forest-related tax provisions are established that treat timber revenues and expenses favorably and help family forest owners reduce the taxes they owe.

For the purpose of federal income tax returns, the tax classification of woodland properties should be determined for each tax year. Ownership of woodland property can be classified as personal use, investment, and active or passive business/trade based on the objective of ownership, its use, and intensity of management activities on the property. Personal use property is primarily owned for recreation and residence purpose rather than income generation purpose for profit. Owners who hold timber as an investment manage timberland for profit, however, their involvement in timber management activities does not rise to the level of a business. Owning and managing timberland mainly for profit with frequent and regular participation in management activities are classified as trade or business. As this study focuses on financial returns of investment

and business, seven major federal tax provisions influencing the profitability of such forest properties are briefly summarized in the succeeding sections of this chapter.

1. Capital gain treatment of qualifying income from timber sales
2. Reforestation cost deduction
3. Timber basis and depletion deduction
4. Deduction of forest management and protection expenses
5. Depreciation and Section 179 deduction
6. Casualty loss deduction
7. Ordinary income

1. Capital gain treatment of qualifying income from timber sales

Long term capital gains are taxed at a lower rate than ordinary income. However, to qualify for capital gain treatment, forest property should meet some requirements about holding time period and ways of timber disposal. The net capital gain is obtained by deducting timber depletion and sale expenses from timber proceeds. For investment, standing timber is considered as capital asset and the gain obtained from timber sale using any method is treated as a long-term capital gain if such timberland is held for at least one year. Timber held for use in a trade or business is not considered as a capital asset. Income from such property is not eligible for capital gain treatment unless there is an election of Section 631(b) and Section 631(a). Under the IRC Section 631(b), net gain from both outright sale and pay-as-cut contract are eligible for capital gain although timber sale occurs in the ordinary course of business. Similarly, under the IRC Section 631(a), net gain from sale and cut procedure is taxed as a capital gain. However, proceeds from conversion of standing timber to sale products are treated as ordinary income. Additionally, capital gains are not subjected to self-employment taxes (except for passive business gains), and not

counted in the calculation for determining social security of the retired timber owners. Capital losses can also be used to offset unlimited capital gains.

2. Reforestation cost deduction and amortization

Expenses incurred on the establishment of timber stands such as site preparation, planting, and seedling costs can be deducted per qualified timber property (QTP). Outright deduction and amortization of reforestation expenses are provided by IRC Section 194(b) and Section 194 (a) respectively. Qualified timber property is a woodlot located in the United States that has at least 1-acre land size and is used for the planting, cultivating, caring for, and cutting trees for sale or use of commercial timber production.

Although the general rule is to capitalize all reforestation expenses and recover them during timber sale, it is more advantageous for timber owners to utilize reforestation cost deduction law passed by American Jobs Creation Act of 2004. Taxpayers can take outright deduction up to $10,000 (married filing jointly) of qualifying reforestation expenses and the amount exceeding this threshold can be amortized over 8 years using the half year convention rule. The amortization schedule of reforestation costs can be summarized as:

Year 1: $\frac{1}{14}$ of the expenses exceeding $10,000

Year 2 to 7: $\frac{1}{7}$ of the expenses exceeding $10,000

Year 8: $\frac{1}{14}$ of the expenses exceeding $10,000

3. Timber basis and depletion deduction

Initial timber basis is determined based on whether the property is purchased, inherited, gifted, exchanged, or obtained with bargain. Timber basis is best to be established during the acquisition

of property or during timber establishment on previously owned land. The original basis increases with capital improvements and decreases with amortization, depletion, and depreciation. Details on proper allocation of basis for property acquired from various ways is discussed in USDA Agriculture Handbook No. 731 (Greene et al 2013).

Total or a part of timber basis can be recovered at the time of timber sale using the cost depletion approach. If only a part of timber from the total tract is sold, it is necessary to calculate the depletion unit. Depletion unit is the fixed proportion of timber basis deducted for every unit of timber harvested (Smith 2004). It can be calculated by dividing adjusted timber basis by total timber volume at the time of timber sale. Then, depletion unit is multiplied with number of timber units sold to obtain deductible timber basis or depletion deduction. Net gain obtained after deducting the basis and sales cost is treated as taxable gain or loss from timber sale. On the other hand, if total tract of timber is cut then the depletion deduction is the total adjusted timber basis.

4. Deduction of forest management and protection expenses

Operating and carrying charges such as expenses on prescribed burning, pest management, property taxes, interest on bank loans, insurance etc. are annual expenses incurred for the management and protection of woodlands. Such expenses that are considered to be “ordinary and necessary” may be deducted by forest landowners holding timber for profit. For business, all the ordinary and necessary forest management expenses and carrying charges can be deducted fully against income from any source. However, management expenses for investment should be capitalized to be recovered from timber sale under the current law. Miscellaneous itemized deduction for annual management expenses is repealed by the TCJA 2017. While property taxes of business property can be deducted against income from any source, timber investors have to choose itemized deduction to claim the deduction.

5. Depreciation and Section 179 deduction

Costs on capital assets used in a business or investment that undergo wear and tear can be recovered annually by depreciation deduction over its useful life. Depreciation deduction is one of the federal income tax provisions under which the eligible property owners can depreciate assets such as temporary roads, fences, bridges, harvesting equipment, buildings etc. Land is not depreciable under this provision. Modified Accelerated Cost Recovery System (MACRS) established by Tax Reform Act 1986, IRC Section 168 should be used for asset depreciation.

If the property is held for use in an active trade or business, costs on certain qualifying depreciable property can be recovered currently under Section 179. Small businesses with limited cash flow can benefit from this provision by recovering the costs immediately. Cost incurred for Section 179 property can be currently deducted to a maximum limit permitted by the IRC. Qualifying property includes- but not limited to- tangible personal property, certain agricultural or horticultural structures and other types of tangible property. However, property acquired by means other than purchasing and investment expenses do not qualify for upfront deduction.

6. Casualty loss deduction

Timber damaged by identifiable events such as hurricanes, wildfire, earthquake, ice storms etc. that are sudden, unexpected, and unusual in nature is defined as timber casualty loss for federal income tax purposes. Qualified property owners can take loss deduction on their ordinary income in the year casualty occurs (IRC Section 165(b)). For timber held as an investment or business, allowable loss deduction is the lesser of adjusted timber basis and decrease in Fair Market Value of the single identifiable property due to the event. Timber adjusted basis may become very low (even zero) if the entire reforestation cost is recovered. Therefore, this limitation could result into little or no deduction at all on their federal income tax returns. If the timber is partially damaged,

taxpayers should conduct salvage operation. However, casualty loss deduction and timber salvage sale are treated separately for tax purpose as they are two separate events. If salvage sale exceeds adjusted basis, gain is recognized and should be reported as taxable income, or it can be deferred by purchasing qualifying replacement property (Li 2019).

7. Ordinary income

Noncapital nature of income composed mainly of salaries, royalties, and commissions are considered ordinary income. Based on various income levels, different tax rates are determined for ordinary income. For tax year 2018 through 2025, tax rates for ordinary income ranges from 10% to 37%.

2.2 Peer-reviewed publications and outreach documents on federal tax laws affecting timber owners

Based on their scope and objectives, previous studies on federal income tax laws affecting timber owners can be classified into three categories. This include informational publications on forest-related federal income taxation, scientific articles on financial impacts of federal income tax on forest landowners, and landowner's awareness and usage of federal income tax incentives.

2.2.1 Informational publications on forest-related federal income tax provisions

For educational and extension purpose, agriculture handbook called *Forest Landowners' Guide to the Federal Income Tax* is published by the US Department of Agriculture. As tax laws are expected to change or phase out after a certain time, this guide provides updated information about federal timber tax provisions to stay within the law. Since 1986, four guides on federal income tax for forest landowners are published that not only provide details about federal tax law and how can one qualify for that but also explains relevant IRS forms for filing tax returns (Hoover

et al. 1989; Siegel et al. 1995; Haney et al. 2000; Greene et al. 2013). These guides focus on tax planning strategies, ownership structures, and record keeping systems or account management. In addition, tax considerations for non-timber forest products and Christmas tree production are also included. The current 2013 guide with 15 chapters comprises of taxation policies practiced as of 2013. As this guide is published periodically, the U.S. Forest Service produces an annual extension material on current federal tax laws that provide tax tips to forest landowners, though it is not a comprehensive material as the guide.

The Siegel timber tax chronicles published by national woodland owner's association in national woodlands magazine provided timber tax updates every 3 months. Quarterly published issues from 1999 to 2010 mostly discussed on timberland ownership structures, federal tax laws associated to them, common timber tax related questions and answers, and informed current changes in federal income tax provisions. Additionally, they also emphasized the importance of usage of preferential tax provisions on private forest ownerships.

William and Kent (2001) discussed about capital gain treatment of timber and identified its opportunities and challenges. They mentioned that electing IRC 631(a) allows qualifying tax payers to treat timber sold in an ordinary course of business as a capital gain. However, they pointed out two negative consequences of electing IRC 631(a): (i) it converts transaction loss from ordinary loss into capital loss which is treated less favorably; (ii) it accelerates recognition of income even though the timber is not actually sold. To prevent taxation during sale year, basis of cut timber is increased to fair market value of timber at the time of cutting. Difference between actual sale price and the fair market value will result in a gain or loss in future sales. Therefore, it is important for timber owners to understand federal taxation of timber disposition before timber harvest.

Grebner and Busby (2004) revealed interesting facts about federal taxes on short-rotation woody crops (SRWC). SRWC are an alternative source of producing forest products that are subjected to federal taxes based on where the property is located. Although rotation length of SRWC are similar to Christmas trees, the IRS considers such crops as a timber resource for taxation purpose. In the US South, SRWC are subjected to federal and state timber tax rules as they are regarded as forest land use.

Similarly, Witter and Hoover (2005) discussed minimization of federal income taxes for forest landowners with a focus on changes made by American Jobs Creation Act of 2004. They explained about capital gain treatment of timber, cost recovery of timber management for landowners with different objectives, depreciation deduction, reforestation incentives, and forms to report. Their suggestion to a landowner managing timber as an investment or business was to have good record keeping of activities and cost as landowners had difficulty to take deduction on their federal income tax returns after several changes made by the TRA 1986.

2.2.2 Financial effects of federal income taxes on private timber income

With the reformation of federal tax codes by the TRA 1986, many studies analyzed its impact on timberland investment returns (Greene and Kluender 1989; Bettinger et al. 1991; Dangerfield and Gunter 1991). Some other studies were also conducted to evaluate financial effects of periodic changes in federal income tax law on non-corporate private forest owners (Smith 2004; Cushing 2006; Straka and Greene 2007).

Gunter and Milliken (1987) studied impacts of the TRA 1986 on landowners managing timberland as an investment and business. They reported smallest reduction in LEV for landowners managing timberland as a trade or business; the greatest reduction in LEV was reported for investors. In the study, the changes in LEV ranged between 60% and 94%. It was concluded that

eligibility of business owners to deduct management expenses reduced LEV by small percentage than investors who lost the eligibility of deducting management expenses in the TRA 1986.

In Greene and Kluender (1989), overall impacts of the TRA 1986 on timber income and average forest value was analyzed by taking an example of Arkansas. They modeled impacts on different ownership classes: forest industry, and three categories of non-industrial woodlands (owners in high tax bracket with low and high management investments and owners in low bracket with low investments). Net after tax harvest was estimated under previous and current rule (passed by TRA 1986) and found that the net income for private owners and forest industry decreased by 10.6% and 7.1% respectively. Among different private forest ownership classes, private owners in high tax bracket with high investment experienced the greatest income loss. Due to timber income loss, LEV in Arkansas was estimated to fall by $28.70 per acre given the changes of TRA 1986. They noted greater reduction in LEV for private owners than forest industry. They concluded that such loss could reduce competitiveness of timber investments followed by sale of forestland and changes in land use patterns and ownership. Therefore, overall impact on the economy was expected in the long run.

Rapera (1990) studied the effects of three capital gain tax structures on forest investment decision making. After-tax present values were measured for Douglas-fir and white pine managed in one-acre land. Moreover, sensitivity of present values to capital gain tax rates, interest rates, inflation rates, payoff periods, and tax treatment of fertilization costs was determined. Results from this study showed increase in net present value when basis indexing was done compared to no basis indexing at higher interest rates. Increase in rotation age by 3 years was observed for Douglas fir when the capital gain tax rate was increased to 46%. Deduction of management costs in the year it is incurred, rather than capitalization, resulted to higher net present value. Based on

combination of certain factors, they also reported that the after-tax present values of forest investment can be zero or negative (Rapera 1990; Cushing 2006). However, tax deferral was considered to be a substantial benefit to timber owners compared to other assets realizing annual income.

Another study analyzing impacts of the TRA 1986 differed from former study in that they explored long-run effects from the elimination of 60% capital gain exclusion and additional taxes due to change in passive loss rules. These changes by TRA of 1986 tended to have impact on profitability of non-corporate forest owners in the US South. Using south-wide 6 months' average stumpage prices and timber revenue at different soil productivity areas, Dangerfield and Gunter (1991) created three tax scenarios: before TRA 1986, after TRA 1986 without capital gain exclusion as an active business, after TRA 1986 without capital gain exclusion as a passive business. Their findings showed decrease in Equal Annual Equivalent for all tax scenarios examined. Under the passive loss rules, income for passive business was lower than active business. Small percentage decrease in EAE under long rotation length after TRA 1986 indicated that producers will tend towards it over short rotation length. Therefore, changes in capital gain taxation rule and adoption of passive loss rule caused negative impact on non-industrial owner's income.

Bettinger et al (1989) and (1991) also analyzed impacts of federal and state income taxes on Southern and Western timber income respectively following the 1986 TRA. Two landowner scenarios, medium and high income, were created to demonstrate combined effect of federal and state taxes. From investment analysis for 9 western states, greater tax saving was realized by landowners with medium income than landowners with high income when the installment sales method was elected. They also emphasized that impact of state taxes has received less attention as

it is complex and varies across the states. State income taxes comprised of around 10-20% of the total tax liability for non-industrial private owners. Similar results were reported for southern states landowners. Authors also recommended use of installment sales and good record keeping to take full benefits of federal tax laws.

To analyze effects of federal income tax proposals on returns of forest management, eight proposed laws related to capital gain, reforestation expenses, income averaging and flat tax, and green accounts were considered by Greene (1996). Using financial analysis, LEVs were estimated under proposed laws and compared with those under current law. Among all incentives available to landowners, excluding 5% capital gain per year of ownership to a maximum of 50% was the most beneficial whereas deducting all reforestation cost immediately in the year it is incurred was the least beneficial. In comparison to the current law, net present value of cash flow improved by 35% resulting to LEV of $559.37 per acre in the former situation. However, in the latter condition, net present value improved only by 1% resulting to LEV of $421.22 per acre. Therefore, it is vital to understand impact of potential changes in income tax provisions as well.

Smith (2004) studied effects of 2003 federal income taxes on financial return of private owner using the discounted cash flow model. A number of assumptions were made about private owners who utilizes available timber tax provisions for the purpose of federal income tax returns. Landownership scenarios were created with a combination of different income levels and forest management regimes for the estimation of per acre after-tax LEV. Negative impact on LEV was reported for all scenarios when the tax incentive provisions were not utilized. While on one hand, use of tax provisions improved LEV more for high income landowners; it was priciest for them when the provisions were not utilized. This study also surveyed members of American Tree Farm

System in Southern, Northern, Western region to determine their awareness level and use of favorable federal tax provisions which is discussed in the next category of this section.

Bailey (1999) also looked into impacts of federal and state taxes on landowners in four regions (South, Midwest, Northeast, and West) of the United States. Tax costs of timber sale were analyzed and tax planning scenarios were created to determine effects of tax provisions on LEV in accordance with the taxation rule of 1998. For Southern forest owners, this study reported decrease in LEV when the expenses were capitalized instead of deducting currently and when none of these provisions were utilized. Not taking advantage of capital gain treatment of timber income and other incentives were considered to be a great loss to the landowners. Their results corroborated with the results from Smith (2004). Similar results were obtained under various tax planning scenarios in other regions as well. Bailey (1999) concluded: (1) overlooking the utilization of capital gain can cause significant revenue loss to forest owners, (2) timberland investment becomes less attractive for landowners if they realize negative LEV as a result of multiple tax mistakes, (3) encouragement for reforestation can be possible if the credit for reforestation had been increased or indexed to inflation.

In Cushing (2006), tax burden on various types of private forest landowners was estimated by calculating percentage change in LEV when various taxes (federal income tax, property tax, severance tax, and state tax) were imposed. Region wide analysis was conducted by dividing the states into five regions viz. South, Northeast, central Appalachia, North central, and Northwest region. Data on reforestation expenses, stumpage prices, property taxes, severance taxes etc. were collected from various sources for different states in each region. The LEVs without any taxes were estimated and considered as a base case to compare with other scenarios at which each level of taxes was imposed. In addition, Analysis of Variance was run to determine if differences in

average value exist between the regions. Sensitivity analysis was also performed by, taking an example of Alabama, to determine sensitivity of LEV to various economic variables used in the model. Results showed no significant difference between before-tax LEV for all regions. After the imposition of federal income taxes, reduction in LEV was lower for states with low before-tax LEV. A greater amount of federal income tax was paid by landowners in the states with high productivity and LEVs. Among all states, Idaho had the highest reduction in LEV. Overall, the average percentage reduction in LEV for 22 states after imposition of federal income taxes was 18.9%. Results from ANOVA showed no difference of percentage reduction in LEV for some regions. From the sensitivity analysis, calculation of after-tax LEV was found most sensitive to the discount rate. Cushing (2006) concluded that landowners have no control over taxes compared to other variables although taxes are not the only variable impacting LEV.

Using the Faustmann (1995) approach, Straka and Greene (2007) analyzed financial effects of reforestation tax incentives under previous law (as of 2003) and current law (passed by Jobs Act 2004). Effects on non-industrial private landowners with different non-timber income levels and forest size were measured. Initially, after-tax LEV was calculated without reforestation incentives for all ownership types. Then, increase in LEV under previous law was estimated at which owners could take 10% tax credit and amortize up to $10,000 of reforestation expenses over 8 years. They also estimated net financial benefit under current law and concluded that current law was beneficial over previous law for both owners with large and small land holdings. However, the previous law was more favorable for small woodland owners only. In addition, they also compared current law with reforestation cost share program by calculating its cost share equivalent. Results indicated greatest benefit to the owners with high income and high forest holdings.

Cushing and Newman (2018) examined impacts of property, severance, state, and federal taxes on the profitability of non-industrial private forestland for 10 Southern States by estimating reduction in LEV. However, reforestation cost deduction is not utilized in this study considering it to be one of the federal income tax incentives that is not often used by forest landowners. Tax burden was estimated by calculating LEV with each of the taxes imposed on landowners and comparing it with LEV without any taxes. Then, the increase in LEV was estimated by removing individual taxes. Since Georgia, Louisiana, and Mississippi had all four taxes, they concluded that these four states had the highest site burden from taxes. Federal income taxes were reported to have greatest site burden in Alabama, Arkansas, Louisiana, North Carolina, South Carolina, Texas, and Virginia. They consider this to be one of the reasons for change in ownership to TIMOs and REITs where income taxes are passed on to shareholders and not imposed at the entity level.

2.2.3 Landowner's awareness and usage of federal income tax incentives

While there are number of studies concentrated on evaluating financial impacts of federal income taxes, there are other studies that analyzed usefulness of timber tax provisions from landowners' standpoint.

Reforestation tax credit and amortization of reforestation expenses together with cost-sharing program were provided as an incentive to landowners in 1980's. Expecting the inefficiency from joint availability of these incentives, Royer (1987) surveyed 155 landowners in North Carolina to explore their use and understanding of reforestation incentives. This study reported high awareness level of North Carolina owners about public forestry incentives. From logistic regression analysis, landowner's income, contact with professional foresters, and awareness about cost-sharing program were found to be the determining factor for reforestation. However, probability of reforestation was unaffected by the knowledge of reforestation tax incentives. While a good

proportion of landowners utilized reforestation tax incentives, more than 90% of those owners utilized cost-sharing program as well. Therefore, availability of programs together when only one may be needed were considered to be inefficient as the impact of tax incentive was limited. Authors suggested better coordination of forestry incentives from policy makers during its establishment.

In Smith (2004), tree farmers from different regions were asked about 9 tax provisions: capital gain, deduction of management costs, depreciation deductions, Section 179 deduction, depletion, reforestation tax credit, amortization of reforestation costs, exclusion of cost-share payments, and casualty loss deduction. Similar study was conducted by Greene et al (2004) with actively involved non-industrial private owners from South Carolina. All tax provisions but depletion deduction were similar to Smith (2004). Higher percentage of landowners were aware of tax provisions and their use than tree farmers. Smith (2004) reported that tree farmers were most aware (60%) about deduction of management cost and least aware (29%) about amortization of reforestation cost. However, findings from Greene et al (2004) showed majority (78%) of South Carolina landowners aware about preferential treatment of capital gain and annual deduction of management expenses and less than half aware about cost-share program. Among those who were aware, around 75% of tree farmers used deduction of management cost whereas roughly 85% of South Carolina owners used capital gain and annual deduction of management expenses. Out of all provisions, very less percentage of owners utilized casualty loss deduction in both studies although a reasonable percentage of owners were aware about it. Although less than half of tree farmers knew about reforestation incentives for timber growers (reforestation tax credit, amortization, and exclusion of cost-share program), more than 50% of them actually utilized it. All in all, both studies pointed out importance of informing landowners about beneficial federal tax provisions and emphasized a need for stable and simple tax policy that would yield positive returns.

Using data from South Carolina Survey (Greene et al 2004), another study was conducted to evaluate socioeconomic predictors governing the use of tax incentives under IRC of 2001 (Hatcher et al. 2016). While several studies investigated landowner's awareness and use of federal tax provisions, and qualitatively discussed reasons behind using such provisions; only a handful of studies deal with understanding of use behavior conditional on awareness level. Hatcher et al (2016) used logistic regression analysis with two-stage sample selection process which involved development of landowner awareness model followed by model that determines factors affecting usage of seven federal tax provisions. Initial findings of this study suggested that landowners involved in forest organizations and holding large lands are more likely to be aware of federal tax provisions. Although awareness level was considered to be influenced by ownership objectives and educational efforts, use of provisions was not influenced by these factors. Instead, size of forest holding was the major factor influencing their usage.

Butler et al (2012) explored existing tax policies and their impacts on ownership and forest management decisions by using a mixed-method approach. Review of tax policies was followed by survey of tax administrators, family forest owners, and forestry professionals. Email-survey about preferential property tax programs was conducted with tax administrators that concluded such programs to be an effective policy step. However, they consider that tax policy would not be enough in itself to address all forestry issues. Similar results were reported from a nationwide survey of management assistance foresters by Greene et al (2005).

Focus group discussion by Butler et al (2012) with family forest owners concluded few family owners having knowledge of federal tax provisions. Such group of owners were not interested in utilizing it as they believed that the tax savings were not commensurate to the requirements of federal income tax provisions. Stakeholder forum also considered lower knowledge and

complexity as major factors hindering their usage. Similarly, Greene et al (2005) also concluded lower knowledge among family owners about many existing incentive programs and criticized those programs for becoming too slow and governmental.

Focus group discussion among family forest owners was also conducted by Greene et al (2014) to understand the effects of federal, state and local tax policies on timberland management decision making. Results regarding knowledge of tax provisions were different from above mentioned studies in that the landowners enrolled in preferential property tax programs had more information about federal taxes than those who were not enrolled. However, only two federal income tax provisions (treatment of capital gain and timber depletion) were brought up by most of the groups during group discussion but they had faint knowledge about it. Some participants believed that timber income is not taxed at all while other thought that it is taxed as an ordinary income. Besides, tax uncertainty due to changes in tax provisions, unstable market condition for forest products, and risk of casualties were creating negative perception among private owners. Therefore, authors suggested development of extension education programs and simplification of requirements to qualify for the usage of tax provisions.

CHAPTER THREE

CURRENT CHANGES IN FEDERAL INCOME TAX LAWS

The Tax Cuts and Jobs Act 2017 [Public law 115-97] is considered to be the most sweeping tax legislation, after the TRA 1986, signed into law by President Trump on December 22, 2017. Most of the changes affecting individual taxpayers will expire by the end of 2025. Identification of current federal income tax laws is crucial as it is expected to influence timber investment decision making of various types of landowners. While a number of federal income taxes were revised by the TCJA, only those pertaining to non-industrial timber owner managing timber as a business or investment are discussed in this section.

The act reduced overall ordinary income tax rates, increased standard deduction, repealed personal exemption and miscellaneous itemized deduction, and modified depreciation deduction and Section 179 deduction. In addition, a new Section 199A (qualified business income deduction) has been introduced. While it allows deduction up to 20% of qualified business income for pass-through businesses, capital gain from timber is not considered as a qualified business income (IRS 2018a). Most of the provisions affecting timber growers remain intact under this act.

3.1 Capital gain treatment of timber income

While the new act did not make specific change to the long term capital gain tax rates, the way thresholds of taxable income are determined have changed slightly causing an indirect effect on timber taxes. Under the previous law, capital gain tax rates corresponded to the thresholds of ordinary income tax brackets. However, in the current law, capital gains income thresholds do not match up with the tax brackets. Capital gain from timber for married taxpayers filing jointly is

taxed at 0% if taxable income is below $77,200; at 15% if it is between $77,200 and $479,000; and at 20% if it is over $479,000. Similar rule exists for other type of tax payers as well.

3.2 Miscellaneous itemized deduction

Miscellaneous itemized deduction is repealed, thereby eliminating the deduction of forest management expenses for taxpayers holding timber as an investment. Such expenses should be capitalized for recovery during timber sale or other disposal. Property taxes on the other hand can be itemized. For taxpayers materially participating in a timber trade or business, the management expenses can still be deducted fully (Wang 2018).

3.3 Depreciation and Section 179 deduction

Bonus depreciation has been increased temporarily (from 50%) which equals to 100% of cost of qualifying property. The property should be acquired and placed in service after September 27, 2017 and before January 1, 2023. The TCJA expands Section 179 deduction that subjects to annual taxable income from business or trade. Taxpayers can now deduct up to $1 million which was $500,000 under previous rule. The phase-out limit for deduction is also increased form $2 million to $2,5 million indexed to inflation (Wang 2018; IRS 2018b).

3.4 Ordinary income tax brackets and standard deduction

The ordinary income tax brackets for individual tax payers were decreased ranging from 10% to 37%. However, taxable income thresholds for all types of tax payers were indexed to inflation, meaning the threshold income changes annually. For example, ordinary income of $78,000 would be taxed at 24% for tax year 2018 but it would be taxed at 22% for tax year 2019.

Table 1: 2018 federal income tax brackets and rates for single tax payer

Marginal tax rate	Taxable income range	Tax
10%	$0 - $9,525	10% of amount over $0
12%	$9,526 - $38,700	$952.5 + 12% of amount over $9,525
22%	$38,701 - $82,500	$4,453.50 + 22% of the amount over $38,700
24%	$82,501 - $157,500	$14,089.50 + 24% of the amount over $82,500
32%	$157,501 - $200,000	$32,089.50 + 32% of the amount over $157,500
35%	$200,001 - $500,000	$45,689.50 + 35% of the amount over $200,000
37%	Over $500,000	$150,689.50 + 37% of the amount over $500,000

(Tax Foundation 2018)

Table 2: 2018 federal income tax brackets and rates for married filing jointly

Marginal tax rate	Taxable income range	Tax
10%	$0 - $19,050	10% of amount over $0
12%	$19,051 - $77,400	$1,905 + 12% of amount over $19,050
22%	$77,401 - $165,000	$8,907 + 22% of the amount over $77,400
24%	$165,001 - $315,000	$28,179 + 24% of the amount over $165,000
32%	$315,001 - $400,000	$64,179 + 32% of the amount over $315,000
35%	$400,001 - $600,000	$91,379 + 35% of the amount over $400,000
37%	Over $600,000	$161,379 + 37% of the amount over $600,000

(Tax Foundation 2018)

Table 3: 2018 federal income tax brackets and rates for married filing separately

Marginal tax rate	Taxable income range	Tax
10%	$0 - $9,525	10% of amount over $0
12%	$9,526 - $38,700	$952.5 + 12% of amount over $9,525
22%	$38,701 - $82,500	$4,453.50 + 22% of the amount over $38,700
24%	$82,501 - $157,500	$14,089.50 + 24% of the amount over $82,500
32%	$157,501 - $200,000	$32,089.50 + 32% of the amount over $157,500
35%	$200,001 - $300,000	$45,689.50 + 35% of the amount over $200,000
37%	Over $300,000	$80,689.50 + 37% of the amount over $300,000

(Tax Foundation 2018)

Table 4: 2018 federal income tax brackets and rates for head of household

Marginal tax rate	Taxable income range	Tax
10%	$0 - $13,600	10% of amount over $0
12%	$13,601 - $51,800	$1,360 + 12% of amount over $13,600
22%	$51,801 - $82,500	$5,944 + 22% of the amount over $$51,800
24%	$82,501 - $157,500	$12,698 + 24% of the amount over $82,500
32%	$157,501 - $200,000	$30,698 + 32% of the amount over $157,500
35%	$200,001 - $500,000	$44,298 + 35% of the amount over $200,000
37%	Over $500,000	$149,298 + 37% of the amount over $500,000

(Tax Foundation 2018)

Standard deduction is increased nearly by double and also adjusted for inflation resulting to higher standard deduction in forth coming years.

Table 5: 2017 and 2018 standard deduction for different tax payers

Tax filing status	Standard deduction 2017	Standard deduction 2018
Single or married filing separately	$6,350	$12,000
Married filing jointly	$12,700	$24,000
Head of household	$9,350	$18,000

(Tax Foundation 2018)

Table 6: 2019 standard deduction for different tax payers

Tax filing status	Standard deduction 2018	Standard deduction 2019
Single or married filing separately	$12,000	$12,200
Married filing jointly	$24,000	$24,400
Head of household	$18,000	$18,350

(Tax Foundation 2018)

Proposed federal tax codes potentially affecting timber owners

During the presidential campaigns, several proposals were introduced that could have potentially impacted family forest landowners. The plan included current expense of new capital investment such as reforestation cost. Entire reforestation expenses can be recovered in the year it takes place to reduce taxable ordinary income. In addition, gains from qualified timber sales were proposed to be taxed at 50% less than favorable long-term capital gain tax rates as of 2017 (Burman

et al. 2017). This way the highest tax rate for long-term capital gain would be no more than 10%. Tax payers with an ordinary income between $77,200 and $479,000 would be taxed at 7.5% and tax those exceeding $479,000 would be taxed at 10%. In other words, half of the capital gain from timber would be tax-free if this proposed change was enacted. Although above mentioned changes are not included in the TCJA, it would be interesting to learn potential impacts of these proposed elements as it is still of interest to many stakeholders. Therefore, impacts of current changes of federal income taxes and proposals on non-corporate private timber income are analyzed in this study.

CHATER FOUR

METHODOLOGY AND DATA

Because of expected influence from the reformation of federal income tax codes, this study assesses their effects on stream of timber revenue generated by various types of non-corporate private forest landowners in the US South. Identified changes for tax years 2018-2025 were considered as a typical change of federal tax codes. Along with that, suggested changes from tax reform proposals were also identified although the proposals are just one of many proposed ones. Then, net financial benefit of managing and protecting timberland by private forest landowners were estimated under different tax scenarios.

4.1 Ownership scenarios

Forest landowner's timberland holding can be classified as personal use, investment or as a business for the federal income tax purposes. Tax treatment of income and expenses associated with timberland varies considerably across the ownership classifications. Because of this, current changes in federal income tax laws are also expected to influence such ownership classifications differently. Taking that into consideration, this study focused on two types of property, timber owners who hold timber as an investment and timber owners as a material participant who hold timber for use in a trade or business, both of which treat and manage timberland with a profit motive.

4.2 Assumptions about forest management regime and landowners' profiles

Several assumptions were made regarding forest management regime and profile of private landowners in the South. A married couple –without a child- who earns an average annual non-

timber income of $50,000 and files jointly for federal income tax returns was assumed. This estimation is based on the average median household income reported by the United States Census Bureau for 14 Southern states (Guzman 2017). Under current law, both investors and material participants are in 12% ordinary income tax bracket whereas under previous law they are in 15% tax bracket. In addition, it was assumed that investors and material participants will be holding 75 acres of land.

Effects of federal income taxes were examined in a typical forest setting. It was assumed that both types of landowners manage timberland under the same forest management regime. It was further assumed that loblolly pine will be the species of focus in this study. For timberland establishment, landowner uses chemical site preparation method and reforest with bare root loblolly seedlings. Seedling density is 600 trees per acre and no other intermediate treatments, except thinning, are applied to the plantation. Two different thinning regimes were assumed: no thinning and two thinning with final harvest occurring at year 25. In two thinning case, stand is thinned twice at year 12 and year 20 in a row at an intensity of 25%.

4.3 Data

Data were collected from numerous sources to run economic model for a typical type of private landowner managing timberland as a trade or business and as an investment. As loblolly is considered to be a major commercial species of Lower Coastal Plain, growth and yield model for loblolly pine plantation stand was used. Site Index (SI) 60 and planting density of 600 trees per acre were used in the growth and yield model. Pulpwood, chip-n-saw, and saw timber were the major timber products obtained from thinning or final harvest of timber.

Average South-wide stumpage prices were obtained from Timber-Mart South. Ten-year (2007-2016) average prices of $9.15/ton for pulpwood, $16.78/ton for chip-n-saw, and $27.10/ton for saw timber was used in the analysis (Timber Mart South 2017).

Reforestation and forest management costs were collected from costs and trends for Southern forestry practices (Maggard and Barlow 2017). Average overall hand planting and site preparation costs was estimated at $134.56 per acre and the seedlings cost was estimated at $0.08 per acre. In addition, $1.36 per acre was estimated as annual forest management costs. Average annual inflation of 1.24% was estimated by averaging the annual producer price index values from 2007 to 2016 (U.S. Bureau of Labor Statistics 2019). Therefore, the nominal discount rate of 5.3% was used in the analysis that includes an inflation rate of 1.24%.

Property taxes for each state differs from one another. In this study, a South-wide average rate of $3 per acre per year property tax was levied on timberland. To estimate federal income taxes on timber revenue from both business and investment, marginal capital gain tax rate in effect for the tax year 2018 was used. State timber income tax was estimated to be 25% of federal taxes.

4.4 Discounted cash flow model

Taking tax changes that were either proposed or passed as a reference, this study modeled potential impacts of those changes on various types of landowners. Faustmann (1995) approach was employed to value timberland over a perpetual number of identical forest rotations. This valuation of timberland is known as Land Expectation Value (LEV) which estimates the net present benefit of managing and protecting timberland in perpetuity under particular forest management regimes. It is based on standard Discounted Cash Flow calculation with assumptions of having same management regime in perpetuity, regeneration cost in the beginning, exclusion of

land value in the calculation and so on (Bullard and Straka 2011). After-tax LEV was determined using equation (1):

$$LEV = \frac{NPV(1+r)^n}{(1+r)^n-1} \quad (1)$$

Where NPV is after-tax present value of the net benefit of owning and managing timberland that can determined using equation (2):

$$NPV = \sum_{n=0}^{N} \frac{(P*Q_n-C_n)-FT_n-0.25*FT_n+FTS_n+0.25*FTS_n}{(1+r)^n} \quad (2)$$

$$where, \qquad FTS_n = TNTI_{nfo} - TNTI_{fo}$$

The first term in equation (2) is net timber income before taxes at year n; the second term is federal timber taxes computed using capital gain tax rate on timber income obtained from timber sale during thinning and final harvest years; the third term is state taxes on timber income at thinning and harvest years; the fourth term is federal tax savings on non-timber income at year n which represents difference between taxes on non-timber income of non-forest owner ($TNTI_{nfo}$) and forest owner ($TNTI_{fo}$); and the last term is state tax savings on non-timber income at year n. The rotation age is N; discount rate is r; p is the stumpage prices for pulpwood, chip-n-saw, and saw timber; Q_n is the expected yield of pulpwood, chip-n-saw, and saw timber; and C_n includes reforestation, annual forest management, and sales costs in n year.

Although property tax was included in LEV calculation, it is not shown in the formula (equation 2).

4.5 Tax scenarios

Four tax scenarios were evaluated to estimate net benefit under previous law, current law, and two proposed tax rules. Table 7 and 8 shows the summary of different tax situations analyzed for each ownership types. A total of eight cases from all four tax scenarios were examined that

differed from each other based on federal tax treatment rules applicable to investors and material participants. It was assumed that a typical type of landowner would take advantage of all preferential timber tax provisions available to them. LEV was calculated by developing spreadsheets for each tax scenarios. Then, percentage change in land expected values between tax scenarios were calculated by comparing respective LEV's.

Table 7: Tax situations for forest landowners holding timber held as an investment

Tax situations	Federal tax codes									
	Personal exemption		Standard deduction		Itemized deduction		Capitalized cost deduction		Deduct and amortize reforestation cost	Lower capital gain tax rates
	$4,050	$0	$12,700	$24,000	Property tax	Annual cost	Property tax	Annual cost		
Pre-TCJA	✓		✓				✓	✓	✓	✓
Post-TCJA		✓		✓			✓	✓	✓	✓
Pre-TCJA, if ID > SD	✓				✓	✓			✓	✓
Post-TCJA, if ID > SD		✓			✓			✓	✓	✓

ID indicates Itemized Deduction
SD indicates Standard Deduction

Table 8: Tax situations for forest landowners holding timber held as a trade or business

Tax situations	Federal tax codes							
	Personal exemption		Standard deduction		Reforestation cost deduction		Capital gain	
	$4,050	$0	$12,700	$24,000	Deduct and amortize	Currently expensed	Lower rates	50% exclusion
Pre-TCJA	✓		✓		✓		✓	
Post-TCJA		✓		✓	✓		✓	
Post-TCJA alternative scenario 1		✓		✓		✓	✓	
Post-TCJA alternative scenario 2		✓		✓	✓			✓

4.5.1 Pre-Tax Cuts and Jobs Act

In the first tax scenario, net benefit under federal tax laws that were in effect prior to the passage of TCJA were estimated for both investors and material participants. Three tax situations (two for investment and one for business) were analyzed under this tax scenario that differed from each

other based on various tax circumstances and varying federal tax treatment for different types of properties.

For investors: Two cases were analyzed for timber owners managing timberland as an investment. First, the net benefit of owning and managing timberland was modeled with an assumption of standard deduction exceeding itemized deduction. When standard deduction was greater than itemized deduction, investors capitalized both property tax and management costs and claimed standard deduction. Those capitalized costs can be recovered as a basis during timber sale. Personal exemption was claimed, part of reforestation expenses were deducted immediately, a half-year convention rule was applied to amortize remaining expenses, and the timber income was treated as a capital gain. In another case, when itemized deduction was assumed to be greater than standard deduction, investors deducted property tax and management expenses in the year they occur. All of these expenses were deducted as total itemized costs (including other expenses) was considered to exceed 2% of Adjusted Gross Income (AGI). Net benefit was estimated by keeping all other variables unchanged.

For material participants: Federal tax treatment of timber held as a trade or business can be different than investment. The net benefit of managing timberland for a business was modeled by deducting reforestation expenses of $10,000 in the year reforestation takes place and amortizing remaining expenses over 8 years. In addition, annual property taxes and timber management expenses were fully deducted in the year they occur and the timber revenue was treated as a capital gain. Standard deduction and personal exemption were also claimed by the tax payer. This analysis is similar to investors whose itemized deduction is more than standard deduction.

4.5.2 Post-Tax Cuts and Jobs Act

In the second tax scenario, net benefit from federal tax codes in effect after TCJA are demonstrated for investors and material participants. Similar to the pre-TCJA tax scenario, three tax situations applicable to investors and material participants were analyzed.

For investors: As shown in table 8, two cases were analyzed under current law for timber use in an investment. Identical to the first case for investors under the previous tax scenario, both property tax and annual management expenses were capitalized in the post-TCJA tax scenario. However, due to the repeal of miscellaneous itemized deduction by the current law, investors capitalized annual management costs and itemized property taxes when itemized deduction was considered higher than standard deduction. Capitalized management expenses were recovered as a basis during the timber sale and property taxes were deducted currently from ordinary income. All other variables but personal exemption were treated in the similar way as in the previous scenario. Investors can no longer claim personal exemption under the current law.

For material participants: When forest landowners materially participate in timber management, property taxes and management costs can be fully deducted in the year they incur. In addition, part of reforestation expenses was immediately deducted and remaining expenses were amortized using half-year convention rule. While the owners can claim higher standard deduction ($24,000), personal exemption is no longer available. Marginal ordinary income tax rates were not used to determine capital gain tax rates under the current law. New set of thresholds were used to determine capital gain tax for business. All other variables were analyzed in the same manner as for material participants under previous law tax scenario.

Results obtained from this tax scenario were compared with the previous law tax scenario to estimate impacts of current federal tax laws on investors and material participants.

Two alternative tax scenarios were analyzed for material participants to understand the impacts of proposals on financial returns from timberland management.

4.5.3 Current deduction of reforestation cost

Immediate deduction of all reforestation expenses was one of the suggested changes included in tax proposals. In this tax scenario, net benefit was estimated by deducting all management expenses in the year timber establishment takes place. Other federal tax laws in effect under current law were applied and same model parameters from previous scenarios were utilized. Then, the estimated LEV was compared to the estimates obtained under the previous law and current law.

4.5.4 50% exclusion of capital gain

Preferential treatment for capital gain is one of the most utilized incentives among forest landowners. Although making half of the capital gain tax-free was proposed, it was not materialized in the final bill. An analysis was performed to estimate its impact on landowners managing timber as a trade or business. Under this scenario, all other variables remained same as current rule except for capital gain tax rates. Based on the proposal, half of the capital gain was made tax free. In other words, an analysis was conducted by taking half of the existing capital gain tax rates i.e. 7.5% for 15% and 10% for 20%. Then the estimated LEV was compared with the results obtained from the previous tax law and current tax law.

CHAPTER FIVE

RESULTS

Results obtained from the analysis are reported first for timberland managed as an investment followed by a trade or business.

5.1 Impacts on investors

Impacts of federal income tax laws on investors were estimated for four tax situations in two tax scenarios managed under two different thinning regimes (no thinning and two thinning with final harvest at year 25). Net benefit of managing timberland varied between two tax scenarios due to the variation in federal income tax structures between the tax laws. Intermediate income from thinning resulted into higher after-tax LEV under two thinning regime than no thinning regime.

5.1.1 After-tax Land Expectation Values under Pre-TCJA scenario

Table 9 illustrates after-tax LEVs for investors under two tax situations in the previous law. When annual management expenses and property taxes were capitalized, after-tax LEV ranged from $151.08/acre in the no thinning regime to $219.44/acre in the two thinning regime. Alternatively, when investors itemized both annual management expenses and property taxes (currently deducted in the year incurred), after-tax LEV ranged from $159.33/acre in the no thinning regime to $229.97/acre in the two thinning regime. In this scenario, net benefit from capitalizing annual expenses were lower than itemizing the expenses. Although, all other elements were same in both tax situations, capitalization of annual expenses into the basis of timber account

in today's dollar value and deduction of the basis from timber revenue generated in future diminished the tax benefit.

Table 9: After-tax LEV ($/acre) for investors under two tax situations and thinning regimes in Pre-TCJA scenario

Tax situations	Thinning regimes	
	No thinning	**Two thinning**
Capitalization of expenses	$151.08	$219.44
Current deduction	$159.33	$229.97

5.1.2 After-tax Land Expectation Values for Post-TCJA scenario

Figure 1 shows after-tax LEVs for investors under two tax situations in the current and previous law and percentage change compared to the previous law. Similar to the pre-TCJA scenario, capitalization of both annual expenses lowered after-tax LEV. However, removal of miscellaneous itemized deduction in the current law diminished tax benefit as investors can no longer itemize forest management expenses. Because of this, after-tax LEV from itemizing property taxes and capitalizing management expenses was nearly the same as LEV from capitalization of all expenses.

The current law decreased after-tax LEVs minimally over the previous law in all tax situations under both thinning regimes. The greatest decrease occurred when investors itemized property taxes and capitalized management expenses. Even if itemized deduction of property taxes along with other eligible deductions was greater than standard deduction, elimination of miscellaneous itemized deduction under the current law reduced after-tax LEVs by 7.1% and 5.1% in no thinning and two thinning regimes respectively. The LEV under no thinning regime decreased to $148.8/acre whereas it reduced to $218.7/acre under two thinning regime. The current law reduced LEV negligibly by 4% to $145.3/acre for investors managing timberland less

intensively and electing to capitalize all annual expenses. Similarly, not much change (only by -2.7%) was found for those involved in more intensive management. Thus, the combined effect of removal of personal exemption, higher standard deduction and capital gain thresholds in the current law reduced net benefit for investors.

This indicates that regardless of thinning regimes and several tax situations, the current law decreased net benefit for investors in comparison to the previous law. Percentage change in net benefit was fairly similar in both thinning regimes (Figure 1, both tax situations). Capitalization of forest management expenses is necessary under the current law that otherwise would have been itemized under the previous law. Due to this, investors net benefit was lower than previous law even if they elect to take itemized deduction over capitalization. Therefore, from an economic standpoint, the current law might not be favorable and beneficial for median income landowners holding timberland as an investment.

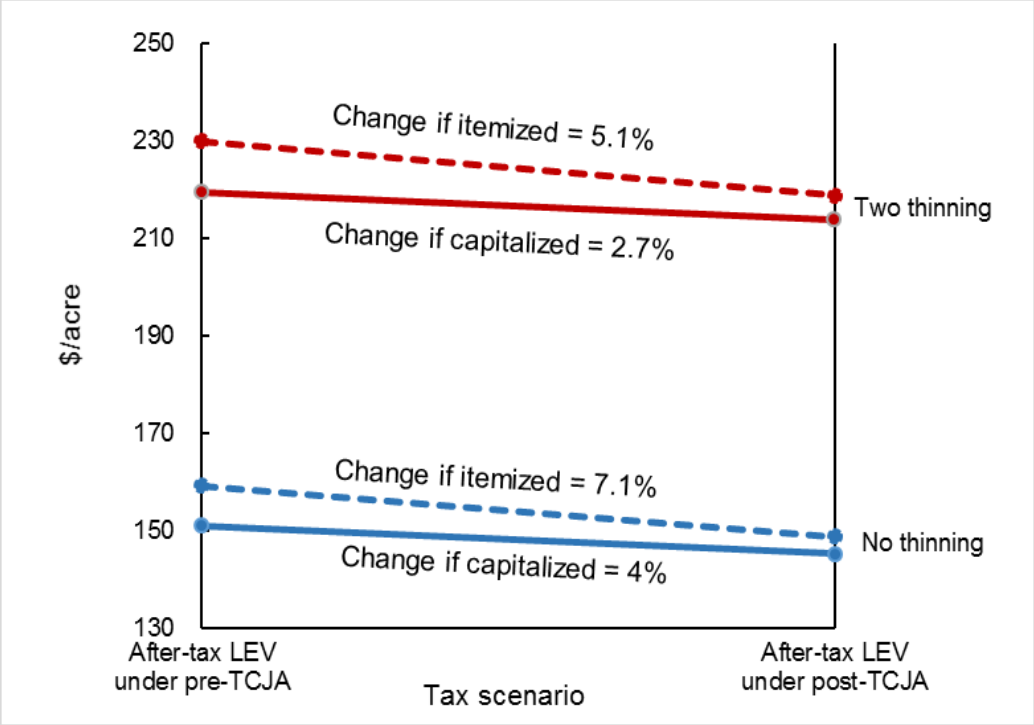

Figure 1: After-tax land expectation value for investors by thinning regimes under the current and previous law and percentage change in LEV compared to the previous law

5.2 Impacts on material participants

Impacts of federal income taxes on timberland managed as a trade or business are described for four tax scenarios- pre-TCJA, post-TCJA, and two alternative scenarios- managed under two different thinning regimes. Like investors, tax treatment of timber varied under various laws providing dissimilar cash flows and net revenues.

5.2.1 After-tax Land Expectation Value under Pre-TCJA scenario

Based on tax structures under the previous law, table 10 illustrates after-tax LEVs in two thinning regimes for business oriented timberland. In this scenario, LEV varied with thinning regime, from $159.33/acre in the no thinning regime to $229.97/acre in the two thinning regime. Thinning twice increased after-tax LEV by $70.64/acre due to immediate returns at years 12 and 20. Therefore, landowners engaged in intensive forest management regime would receive higher net benefit than those engaged in less intensive management regime under the previous law. Conditional on discount rate and tax rate, a timberland buyer would be willing to pay $229.97/acre for bare land in the South.

Table 10: After-tax LEV ($/acre) for material participants under two different thinning regimes in Pre-TCJA scenario

Tax scenario	**Thinning regimes**	
	No thinning	**Two thinning**
Pre-TCJA scenario	$159.33	$229.97

As operating timberland as material participants give landowners the most tax benefit, after-tax LEV under previous law was higher for such private landowners than investors. However, the LEV was same in both ownership types when investors itemized all annual expenses. The advantage to the investors of currently deducting all annual expenses on timber along with other miscellaneous expenses increased after-tax LEV to equalize net benefit of material participants.

For this, investors miscellaneous itemized deduction has to be greater than standard deduction and everything else should be same for both ownership types. This limits the number of investors who elect to itemize.

5.2.2 After-tax Land Expectation Values for Post-TCJA scenario

Impacts of current federal income tax law on business owners was analyzed by estimating percentage change in net benefit from the previous law. Figure 2 shows after-tax LEVs for material participants under the current and previous law and percentage change in LEV. The current law reduced after-tax LEVs in both thinning regimes by less than 6%, showing minimal impact on material participants. When landowners were assumed to be engaged in no thinning regime, LEV decreased by 5.9% to $150.38/acre in comparison to LEV in the previous law. Under two thinning regime, it was downsized to $221.03/acre by 4%. This decline has been attributed to be a combined effects of removal of personal exemption, increase of standard deduction and taxable income thresholds for capital gain. It should be noted that regardless of utilizing preferential federal income tax provisions (reforestation cost deduction, current deduction of forest management and protection costs, and long-term capital gain taxed at lower rate) as in the previous law, financial returns from timberland for median income material participants were lower in the current law tax scenario.

For the federal income tax purpose, timberland in a business use is characterized as a woodland property that experiences highest tax benefit. However, the current federal income tax law reduced net return from such property. This indicates that other woodland properties, such as investments, that generally receive lower tax benefit than business can be worsen off by the current law. For instance, the previous law enabled investors to deduct annual expenses currently and maximize their net benefit that equalizes material participants. This is not attainable under the

current law as it removed such incentive. All these outcomes suggest that both business and investment are negatively impacted by the current federal income tax law, with greater impact on timber managed as an investment.

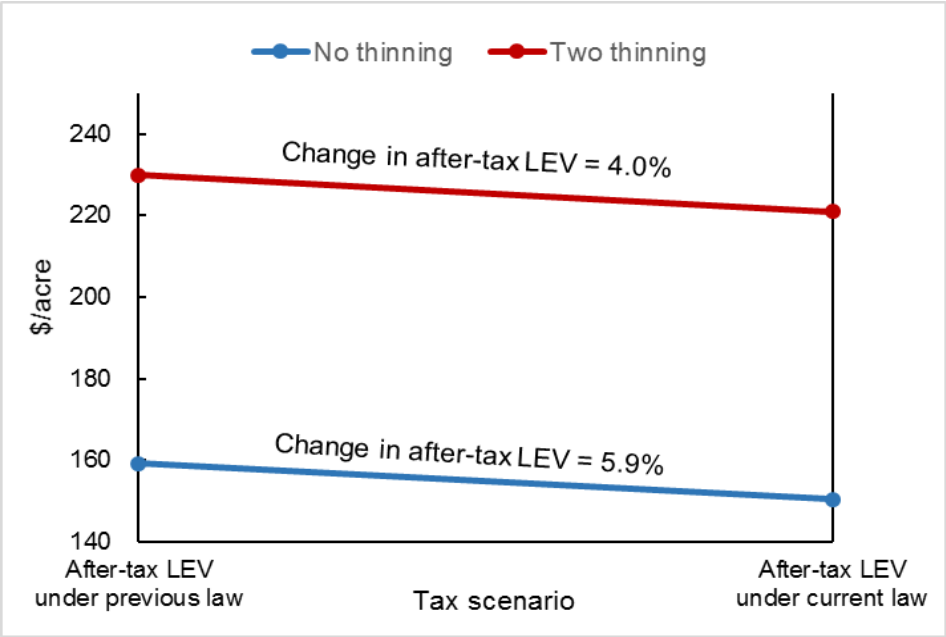

Figure 2: After-tax land expectation value for business owners by thinning regimes under the current and previous law and percentage change in LEV compared to the previous law

5.3 Impacts of alternative scenario: exclusion of 50% of capital gains

In this alternative scenario, pattern of cash flow differed from the current law only during the years of timber sale whereas it differed from the previous law in all years of rotation. As total taxable income was greater than upper threshold for 0% tax rate, timber capital gains from business was taxed at a marginal rate of 7.5% rather than 15% as passed in the current law.

Percentage increase in after-tax LEV from 50% exclusion of capital gain tax is illustrated in Table 11. The comparative analysis showed a varying rate of increase in LEV between two thinning regimes for material participants. Compared to the previous law and current law, increase in after-tax LEV in no thinning regime was more than twice as high as two thinning regime. In less intensively managed timberland, LEV increased by 11.3% from the current law and by 6%

from the previous law to $169.55/acre. Similar pattern was observed in more intensively managed timberland. After-tax LEV improved by 5.4% from the current law and by 1.5% from the previous law to $233.56/acre. Treatment of timber income at lower capital gain tax rate would increase net benefit considerably. If the proposal of making half of capital gain tax free was enacted under the current law, material participants would have benefitted most from managing timberland without thinning. As qualified income from investments are also treated as long term capital gains, it would have been beneficial for investors as well.

Table 11: After-tax land expectation value ($/acre) under post-TCJA with 50% exclusion of capital gain and percentage change in LEV compared to the previous law and current law

Thinning regimes	**After-tax LEV ($/acre)**	**% change compared to previous law**	**% change compared to current law**
No thinning	$169.55	6.0%	11.3%
Two thinning	$233.56	1.5%	5.4%

5.4 Impacts of alternative scenario: current deduction of reforestation costs

Table 12 shows after-tax LEV from the current deduction of reforestation costs and percentage change in LEV from the previous and current law with deduction and amortization rule. This alternative scenario had minimal effect on material participants under both thinning regimes with the maximum change in after-tax LEV up to 5.9%. Under no thinning and two thinning regimes, LEV decreased by 5.9% to $150.44/acre and 4% to $221.09/acre respectively from the previous law. After-tax LEVs from this proposal was nearly equal to LEVs under the current law. If the proposal of current deduction of reforestation expenses was included under the current law, it would not make difference on net benefit for median income business owners. Unlike the current law, this proposal reduced negative cash flow to a greater extent in the year of timber

establishment. However, removal of amortization of expenses increased negative cash flow from the second year of rotation through the 8th year.

Table 12: After-tax land expectation value ($/acre) and percentage change in LEV compared to the previous law and current law by thinning regimes

Thinning regimes	**After-tax LEV ($/acre)**	**% change compared to previous law**	**% change compared to current law**
No thinning	$150.44	-5.9%	0.04%
Two thinning	$221.09	-4.0%	0.03%

CHAPTER SIX

DISCUSSION

Understanding the effects of federal income taxes on the profitability from forest property is crucial as it is regarded as one of the driving factors of forest investment, its management, and protection (Arbogast 2015). Given the changes of taxation policy conducive to forest management, a number of studies have analyzed effects of individual taxes and combination of different taxes on forest owners (Smith 2004; Straka and Greene 2007; Cushing and Newman 2018). A major overhaul of tax code, since 1986, occurred in 2017 with the passage of Tax Cuts and Jobs Act. However, several proposals of the bill potentially affecting forest activities were not included in the final bill. This tax bill and the proposals have been of a great concern among timber owners as they view taxation as an impediment to achieving management objectives. Moreover, not many studies so far have explored the effects of proposed income taxation policies on returns to forest management (Greene 1996; Sedjo and Sohngen 2015). Therefore, this study analyzed and compared net financial benefit of managing and protecting timberland as an investment and business under several tax scenarios to show effects of the new tax bill and potential effects of proposals on timber income.

To analyze impacts of federal income taxes on non-corporate forest landowner's income, majority of previous studies have used Land Expectation Value method that estimates after-tax value of bare land for growing timber (Greene 1996, Bailey et al 1999, Straka and Greene 2007). Several assumptions about landowner's profile and non-timber income were made in these studies for data analysis and have acknowledged their effects on the estimation of net benefit. In this study,

an effort was made to develop reasonable assumptions for a typical type of southern non-corporate private forestland owners. However, as with many economic analysis, change in any one element could lead to changes in the specific conclusions and landowner's behavior (Greene 1996, Bailey 1999). Assuming higher level of non-timber income (>$50,000/year) and forestland holding would reduce net benefit of owning timberland for both investors and material participants under both laws. Additionally, other factors such as Alternative Minimum Tax that were not included in this study could have affected high income level landowner's investment decision. However, high income landowners would have potentially benefitted from the proposals in comparison to the previous law. Assuming average region wide state timber taxes (25% of federal timber taxes) can also be influential as some of the states in the Southern US, such as Florida and Texas, do not have state income taxes and thus have no state income tax liability (Bailey 1999). Given that, the net benefit of owning timberland, if analyzed state wise, may have been higher for those states. Although conclusions derived from this study is not robust for non-corporate landowners with different income levels, land holdings, and tax structures in different states of the south, it provides concepts on how the current federal income tax laws can affect profitability from forest managed as an investment and business.

The results of our analysis showed minimal impacts of Tax Cuts and Jobs Act on net returns of investment and business. It was found that the current law is less favorable than the previous law especially for investors when it comes to the deduction of annual management expenses. Lower timber taxes and lower tax savings in the current law reduced financial performance of investment. In the capitalization case, changes in standard deduction and personal exemption contributed to lower net cash flow in the first eight years of rotation. Alternatively, the results showed lower net cash flow in all years of rotation for investors utilizing itemized deduction

reflecting the effects of capitalization of forest management expenses. Within the previous tax law, after-tax LEV of investment from capitalization of annual expenses was lower than the return from current deduction. This was primarily because the capitalization of expenses reduced annual tax savings on ordinary income. Even though timber taxes were higher when investors deducted their expenses currently, realization of annual tax savings provided higher net cash flow in all years of rotation except for the year of timber disposal. Within the current law, removal of miscellaneous itemized deduction provision was only able to provide slightly higher tax savings (on non-timber timber) than capitalization. This implies that relatively lower tax savings in the current law did not improve after-tax LEV significantly as observed in the previous law. Therefore, it can be argued that the current law worsens off investors returns from timberland. This could reduce the attractiveness of timberland investment and encourage land use changes and movement to more favorable entities.

While the new tax bill is considered as an expansive federal tax legislation after 1986, timber tax provisions applicable directly to timber business owners did not undergo any significant changes. That being said, our analysis did not expect considerable impacts of current federal law on trade or business. The results indicated minimal impacts of the current law on median income material participants as after-tax LEVs did not change much from the previous law. This can be explained by dissimilarities in the cash flow between two tax scenarios. In the current law, both timber taxes and tax savings were lower than the previous law. Although higher standard deduction reduced taxable income regardless of the removal of personal exemption, small tax savings on non-timber income were not enough to improve after-tax LEV.

Comparing investors' net returns to that of material participants under the previous law, this study pointed out that investors can receive highest possible returns, to the level of material

participants, on their investment if they elect to itemize annual expenses. However, such tax advantage is no longer available for this ownership types in the current law, thereby providing lower after-tax LEV. Thus, in lieu of electing current deduction of management expenses, investors have to capitalize it for recovery during the timber sale. Hence, the current law can be unfavorable for both ownership types, especially for investors as they are subjected to limited deductions.

In addition to studying the impacts of current law, effects of immediate expensing of reforestation costs and exclusion of 50% of capital gain from taxation were also analyzed for material participants. While these proposals were not incorporated in the final bill, they can be representative choices for future tax reform proposals which could easily get slipped into the future bills (Hite 2014). All else equal to the current law, net benefit of material participants from immediate expensing of reforestation costs against non-timber income was slightly higher than the current law. Similar study by Greene (1996) reported a small increase in LEV than the current law. Because of lower tax savings from immediate expensing, after-tax LEV decreased compared to the previous law. The results imply that immediate expensing of reforestation cost, if included in the final bill, could have improved financial performance of timberland investment. Although this proposal can decrease negative cash flow in the first year of rotation, it can increase timber taxes by reducing timber adjusted basis that can be recovered during the sale of timber. Moreover, in case of timber casualty loss, reduction in timber basis might lead to small or no casualty loss deduction at all.

Proceeds from timber sales treated at a lower capital gain tax rates reduce timber tax, which in turn increase positive cash flow of qualified timber property. Results from this study showed greatest positive impact on after-tax LEV from making half of capital gain tax free. Under this

scenario, taxes on timber income were found to be half of that in the previous law contributing to the improvement of net benefit for both business and investment properties. Our result corroborates with the findings of Greene (1996) which reported increase in LEV resulting from the decrease in timber taxes at 50% exclusion of capital gain. Many other studies have also explained the significance of treating qualifying timber income at lower tax rates (Dangerfield and Gunter 1991; Bailey et al. 1999; Straka and Greene 2007; Smith et al. 2008). It is regarded as one of the most commonly used provisions by landowners that maximizes their land expectation value (Butler et al. 2010). However, one study reported that taxing capital gain at lower rate can make the federal income tax structure biased or in favor of capital gain (Rapera 1990). Furthermore, not considering timber as a capital asset, Representative Camp proposed elimination of treating timber income as capital gain. However, Sedjo and Sohngen (2015) reported that such proposal would have greatest negative impact on 200 million acres of family ownerships in the U.S. Thus, all this explains importance of capital gain treatment of timber sales.

As forest-related tax codes did not undergo major changes in the current law, it is not surprising to see minimal decrease in after-tax land expectation value in majority of the cases analyzed for investment and business. However, greater negative impacts on investment from the current law and positive impacts on business from proposals is something that need to be taken into consideration by policy makers. Thus, landowners holding timber with a profit motive should either have a good knowledge of federal tax provisions or should seek professional service for the purpose of federal income tax returns. This study may be extended in future to look into the effects of current law and other proposals state wise in the Southern US or other regions of the United States.

CHAPTER SEVEN

CONCLUSIONS

Over the years, volatility and complexity of federal income tax legislation affecting timer activities have made it difficult for timber owners to keep their land forested. Staying on current taxation policy and understanding several rules for its utilization have become challenging and expensive for timber owners. Although federal timber tax provisions provide opportunities for tax savings, they are sometimes not persistent over time, not easy to comply with or limited in their effectiveness. These factors have contributed to several environmental and economic issues such as land use change (deforestation, land fragmentation, and urban sprawl) and lower net returns. The Tax Cuts and Jobs Act passed in 2017 made some changes in taxation rules that could be applicable to timber owners, but our understanding about its impacts on private timber income are yet to be explored. Understanding utility of current and potential favorable tax provisions by landowners is key for ensuring continuous and long-term forest management and ownerships. Therefore, this study identified major changes in the current tax bill and evaluated its financial effects on non-corporate private landowner's income in the US South.

Results from economic analysis under both thinning regimes indicated minimal impacts of current law on investors and material participants. For investors, the after-tax LEV from current deduction of annual expenses was higher than capitalization of such expenses under the previous law. Additionally, after-tax LEV was equal to the material participants in this tax situation. However, removal of current deduction of management expenses in the current law reduced tax benefits for investors, resulting to lower after-tax LEV than material participants. Although all

available tax provisions were utilized in an optimal fashion by business, the current law was not beneficial to them. Among the proposals, while current expensing of reforestation costs slightly reduced after-tax LEV from previous law, reduction of capital gain tax rate improved financial performance of timberland. Owning timberland has become less beneficial for both ownership types from the current law and most beneficial for material participants from the proposals. Based on various tax circumstances, this comparative study suggest that the current law has worsen off net returns of timberland managed as an investment. Nevertheless, results could assist policy makers in improving federal tax policies and inform its implications to associated authorities interested in sustainable management of forest resources. This study can also deliver better understanding of potential impacts of changes in federal income tax laws pertaining to various types of private forest landowners in the US South.

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