An Econometric Analysis of Alabama Rural Land Values

by

Na Zhou

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Approved by

Rebecca J. Barlow, Chair, Assistant Professor of Forestry and Wildlife Sciences
James W. Prevatt, Professor of Agricultural Economics and Rural Sociology
Yaoqi Zhang, Associate Professor of Forestry and Wildlife Sciences

Abstract

Dramatic changes in rural land values played an important role in regional, social, economic, and environmental development. The ability to understand and predict these changes is necessary for the effective design of environmental, public finance, and urban growth management policies. Surveys of landowners and real estate professionals were used to determine changes in 2009 Alabama rural land value, and the major determinants that influence how small private nonindustrial landowners value timberland in Alabama. A hedonic price model and other statistical methods were used to evaluate the survey data set. Results from this study determined that there were declines in Alabama rural land values during 2008 but large increases in the last ten years. Additional results indicated that road frontage, bodies of water, tract size, distance to the nearest urban areas, and age of the stand had significant effects on timberland values per acre.

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List of Abbreviations

AFC	Alabama Forestry Commission
AFT	American Farmland Trust
BLS	Bureau of Labor Statistics
FIA	Forest Inventory and Analysis
GIS	Geographic Information System
NFLS	Northern Forest Lands Study
NIPF	Non-industrial Private Forest
USDA	United States Department of Agriculture

CHAPTER I

INTRODUCTION

In the recent past, rural land value and use has undergone dramatic change for various reasons including population expansion, economic conditions, technology changes, and government policies (USDA 1999, Prevatt 2000). Impacts of these changes have played an important role in regional, social and economic development and global environmental changes. To better manage this resource and maintain an economically and ecologically sustainable ecosystem is increasingly becoming an important issue to society.

About 90% of total land surface area in Alabama is considered rural land, which includes the categories of farmland, timberland and transition land. Farmland or farm real estate is described by United States Department of Agriculture (USDA) as the combination of land value and the additional value from any improvements to the land such as buildings, fences, wells, irrigation, and drainage. Farm real estate is the major asset on farm sector balance sheets, which accounts for greater than 84% of total U.S. farm assets (USDA 2010a). Therefore, the general economic health of the agricultural sector, and the underlying the financial stability of many farm businesses whose portfolio derives a large proportion of their value from real estate are closely linked with farmland values. Trends in United States and Alabama farm real estate values have been characterized by a substantial increase in the 1970s, a rapid decrease in the 1980s, and another upward trend in the 1990s. In general, Alabama farm real estate values have shown

approximately 6.4% annual real return during the period between 1970-2007 (Adrian and Prevatt 2007).

Approximately 70% of the total land area in Alabama was covered by forestland in 2008 (FIA 2008). During that period, over 95% of the forestland in Alabama was privately owned, and approximately 65% of that was owned by small-scale nonindustrial private forests (NIPF) landowners (FIA 2008). Alabama had the second largest forest industry in United States in 2007 (AFC 2007). Alabama's forest industry included more than 900 primary and secondary manufacturing facilities in 2007, generating 18.3% of the state's total manufacturing output, and employing nearly 54,000 people, or 3% of the state's 1.8 million jobs (AFC 2007). Due to landowners' multiple objectives, forests may be managed for reasons beyond timber production, such as recreational opportunities, wildlife habitat, biodiversity, water quality protection, and carbon sequestration (Newman and Wear 1993, Barlow and Grado 2002, Raunikar and Buogiorno 2006, Grado et al. 2009). In addition, forestland has the potential to be part of non-industrial private landowners' investment portfolio with the possibility for a high rate of return and lower risk, offering a hedge against inflation, and providing asset diversification opportunities (Conroy and Miles 1989; Binkley et al. 1996; Sun and Zhang 2001). Trends in timberland values showed that in the past bare timberland prices overall have increased steadily while timber prices in U.S. have shown a significant decline (Armstrong 1987, Sendack and McEnvoy 1989).

Transition land was defined as rural land that is likely to be changed to nonagricultural uses like residential, commercial, and industrial land. The variety of demands for converting rural land to nonagricultural uses has been continually increasing due to population growth and economic development. Approximately 29% (21 million acres) of U.S. rural land from 1997 to

2002 was converted for residential purposes (Lubowski et al. 2006b). Transition land which is favorable for development generally has a stronger demand and higher market value than agricultural land. However, choices of land use that may be desirable for an individual landowner may not be optimal for society (Lubowski et al. 2006a, Lewis and Plantinga 2007). A major concern in recent years was that land use change may produce negative environmental impact such as water pollution, erosion, lack of the sustainability of production, deterioration and fragmentation of land resources, carbon sinks, and loss of wildlife habitat (Lubowski et al. 2006a, Lewis and Plantinga 2007).

Farmers, natural resource managers, and investors continually strive to understand rural land markets as part of their land management and investment decision making. Rural land values have undergone dramatic change in recent years and the ability to understand and predict those changes in land values is necessary for the effective design of environmental, public finance, and urban growth management policies. As many local and state governments in U.S. grapple with increasing growth pressures, the need to understand the economic factors that influence individual choices concerning the value and the use of land has taken on added urgency in recent years. Therefore, future trends in rural land markets are very important to landowners, lenders, tax assessors, agricultural producers, and local governments.

In an effort to understand these trends, United States Department of Agriculture (USDA) has evaluated state average farm real estate values and cash rents for many years, and continues to provide this useful information. However, limited information about timberland, transition land, and the factors influencing the rural land values has been reported. In response to those needs, the 2000 Alabama Farmland Values and Cash Rent report was developed to provide average estimates of rural land values in six agricultural reporting districts delineated by the

Alabama Agricultural Statistical Service (Prevatt 2000) (Figure 1). Counties located within each of the six geographic locations are similar in climate and soil type and generally have similar agricultural activities. Therefore, rural land values were estimated for different land categories in each of the six geographic regions.

The determinants affecting Alabama timberland values are of particular interests due in part to rapid changes in ownership, holding size, and price of timberland. It is believed that land management strategies are also shifting. An update to the 2000 survey is needed to understand the current Alabama timberland market and help land managers and policy makers to form more informed resource allocation decisions.

To explore the determinants of the timberland values, it is necessary to understand why landowners buy the land or an individual landowner's objective. Many studies suggested that depending on an individual landowner's objectives, forests may be managed for a variety of reasons, including timber production and other goods and services such as aesthetics, recreational opportunities, wildlife habitat, biodiversity, water quality protection, and carbon sequestration (Newman and Wear 1993, Barlow and Grado 2002, Wear and Greis 2002, Raunikar and Buongiorno 2006, Stenger et al. 2009, Grado et al. 2009).

Indeed, timber production is often not the primary reason for owning forestland (Birch 1996). Northern Forest Lands Study (NFLS) (1990) proposed that primary factors influencing timberland prices are individual users and their objectives rather than timber production potential. Zhang et al. (2009) proposed that as emphasis on non-timber values increases, forestland is more likely to be owned by individuals to provide for their personal consumption of non-market amenity goods and services.

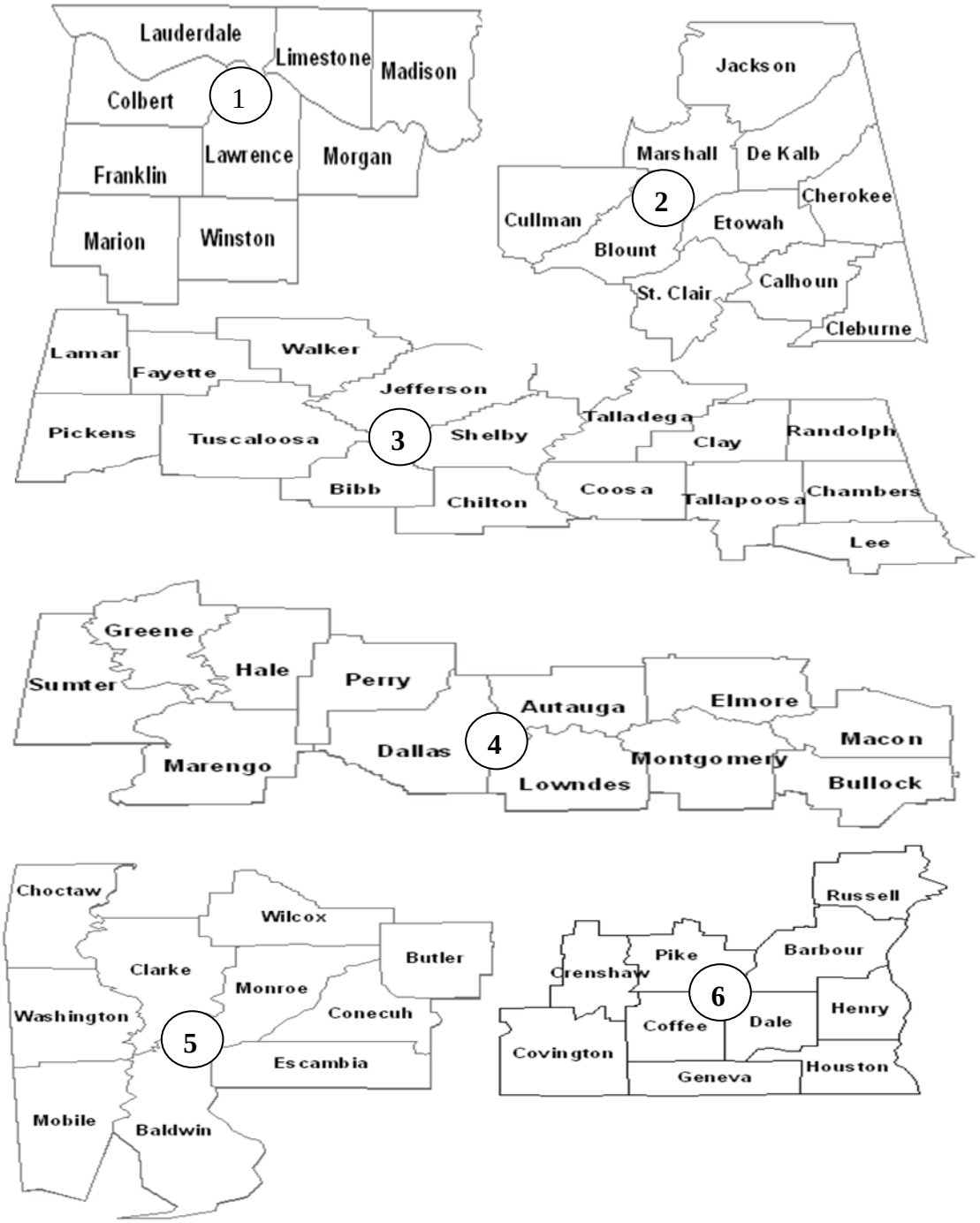

Figure 1 Alabama Six Agricultural Reporting Districts as delineated by the Alabama Agricultural Statistical Service.

Some surveys also presented that non-timber considerations were of higher importance than timber production. A survey of Wisconsin private forestland owners (Birch 1996) found that woodland ownership objectives such as recreation and esthetic enjoyment ranked higher than timber production. The results from the National Woodland Owner Survey (NWOS) reported that the most commonly cited reasons were beauty/scenery, to pass land on to heirs, privacy, nature protection, and part of home/cabin (Butler 2008).

The last 10 years have seen dramatic shifts in the ownership of U.S. rural lands as industrial landowners sold their lands while non-industrial landowners eagerly purchased land often for primarily recreational reasons (Mather 2001, Butler and Leatherberry 2004, Kendra and Hull 2005, Zhang et al. 2005, and Pan et al. 2007). Historically, timberland values have increased or remained stable, regardless of depressed timber markets (Armstrong 1987, Sendack and McEnvoy 1989). It is often unclear what factors caused this increase in land value, but the landowners' varied land management goals and objectives may be one of them. Indeed, Zhang et al. (2009) suggested that the increases in the number of small-scale family forest owners and the decreases in these owners' holding sizes in United States are due to the increasing importance of non-timber values to forest landowners. It is believed that actual timberland value can be affected by several factors other than the present value of expected future income from timber production.

The Faustmann formula is the commonly accepted theory used to estimate the value of forest land (Samuelson 1976, Hyde 1980). The concept of this method is that the value of forest land equals the present value of profits from all future timber sales. This means that the value of forest land depends on timber markets and expenses such as regeneration and taxes. This approach is often applied by timberland buyers and sellers whose major objective is profit

maximization (Healy and Bergquist 1994, Kennedy et al. 2002). Armstrong (1987) stated that this method of estimating land prices only from a timber productivity standpoint is not proper since non-timber values are often actually more important than timber values to the price of forestland for non-industrial private landowners (Widmann and Birch 1988, NFLS 1990, Scarpa et al. 2000).

In 1976, Hartman developed an extension of the Faustmann model, which included non-timber values. However, the use of this approach is limited in practice since the values of most non-timber outputs are difficult to measure, namely non-market goods such as aesthetics, wildlife habitat, and clean air (Hartman 1976, Dole 1999, Touza and Termansen 2002).

As increasing importance is placed on non-timber benefits, methods beyond the Faustmann and Hartmann models are needed to assess the value of non-timber amenities (Lockwood et al. 1993). One accepted method is that of the hedonic price model. Hedonic models assume that the observed price of a good is the sum of the unobserved prices of the bundle of attributes associated with that good (Rosen 1974, Epp and Al-Ani 1979, Miranowski and Hammes 1984, Herriges et al. 1992, Roos 1995, Irwin 2002). The advantage of this method is that non-timber values may be measured in a way which timber production models based on the theory of Faustmann formula cannot provide. Therefore, through the use of hedonic models, desirable methods for finding timber price determinants may be accomplished more efficiently. This study examines how hedonic models may be used to estimate land values in Alabama.

Current research information concerning what influences land pricing and landowner objectives in Alabama will be useful in policy formation. This study seeks to understand these current trends through the completion of the following objectives:

1) To provide the rural land value estimates, cash rents, and trends for various land uses and locations throughout Alabama, and factors influencing the rural land values;

2) To give insight into motivations for timberland ownership in Alabama;

3) To identify the major determinants of small private landowners on timberland values in Alabama by developing a hedonic price model on measuring tract characteristics, distance to nearest urban area, and income characteristics of landowners.

CHAPTER II

LITERATURE REVIEW

Rural land value

United States Department of Agriculture (USDA) has provided a well-documented data series on the value of land used in farming by region and state (Prevatt 2000). In summary, variation in U.S. farmland prices attracted widespread interest with the explosive appreciation of the 1970s, the rapid depreciation of the 1980s, and the slow upward trend in the 1990s (USDA 1997). Since 1987, average farmland values in the Nation have rebounded 48.6%, from $599 per acre to $890 (1982 dollars) in 1996. However, in real or inflation-adjusted terms, this amount gained only 10.8 percent (USDA 1997).

This time frame is divided into several important parts: a growth period (1970-81), the farm crisis period (1982-87), and the current period (1988-07) (Adrian and Prevatt 2007). Many reasons have been given to explain these large price movements following a relatively long-term period where farmland prices were stable. These reasons include changes in financial returns from farming (Alston 1986, Burt 1986, Herriges et al. 1992, Moss 1997, Barnard et al. 1997), credit market constraints and imperfections (Shalit and Schmitz 1982), urbanization impacts on farmland values (Reynolds and Tower 1978, Chicoine 1981, Dunford et al. 1985, Folland and Hough 1991, Shi et al. 1997), tax policy (1031 tax exchange) impacts on farmland values (Colwell and Dehring 2001, Bernick 2006), and nonfarmland financial returns to land (Livengood 1983, Irwin and Bockstael 2004, Bastian et al. 2002).

In Alabama, the Department of Agricultural Economics and Rural Sociology at Auburn University initiated the Alabama Farmland Values and Cash Rents Survey in 1991 and conducted it annually until 2000. The 2000 Alabama Farmland Values and Cash Rents Survey provided estimates of rural land values and cash rents in six agricultural reporting districts, which were delineated based on similar climate and soil types and found to have generally similar agricultural activities (Prevatt 2000). Results indicated that there were considerable differences in rural land values among land uses and locations. Overall, there were slight value increases in all types of land uses from November 1999 to May 2000.

Other than Alabama, the 2008 Florida Land Value Survey was conducted by the Food and Resource Economics Department at University of Florida in November 2008 (Clouser et al. 2008). Estimates of the value of different types of rural land for different regions of the state were provided. This study found that there was a drop in 2008 Florida rural land values when compared to 2007 due to a down U.S. and Florida economy, the slower rate of Florida's population growth, and depressed Florida housing construction industry (Clouser et al. 2008).

The most recent information on land values and cash rents for 2009 provided by USDA reported that the average farm real estate value per acre in the U.S. averaged $2,100 per acre on January 1, 2009, down 3.2 percent from 2008, which was the first decline in farm real estate value since 1987 (USDA 2009). Both cropland and pasture values declined; 4.0 percent for cropland and 1.8 percent for pasture. Cropland values averaged $2,650 per acre and pasture values averaged $ 1,070 per acre, compared with $2,760 and $1,090 per acre, respectively, a year earlier. In Alabama, the average real estate value per acre was $2,150 in 2009 and $2,300 in 2008, down 6.5 percent, which was about double when compared to decreases nationwide. Both cropland and pasture values also dropped in Alabama; 5.7 percent for cropland and 5.6 percent

for pasture. Cropland values averaged $2,500 per acre and pasture values averaged $1,700 per acre, compared with $2,650 and $1,800 per acre, respectively, in 2008.

Hedonic price method

As increasing importance is placed on non-timber benefits, the hedonic price method has provided a practical approach to assess the timberland values. Being a basis for econometrics techniques, this approach became widely used after Rosen (1974) published a theoretical model that hypothesized that the observed price of a good was the sum of the unobserved prices of the bundle of attributes associated with that good (Rosen 1974, Epp and Al-Ani 1979, Miranowsi and Hammes 1984, Bartik 1987, Herriges et al. 1992, Roos 1995, Irwin 2002). A number of authors used this approach to estimate the value of multiple uses of land, the value of recreational attributes (Lansford and Jones 1995, Mahan et al. 2000), the benefit of open space (Irwin 2002, Irwin and Bocksteael 2004), the merit of location (Reynolds and Tower 1978, Adrian and Cannon 1992), and benefits of wildlife amenities (Livengood 1983, Pope et al.1984, Bastian et al. 2002).

Turner et al. (1991) analyzed the forestland market in Vermont based on 139 sales of unimproved forest land, 100 to 500 acres in size, using a hedonic or implicit pricing model. Physical and location characteristics were used to estimate the real sales price per acre. From this study it was determined that parcel size had little effect on price per acre, however, the presence of road frontage, open land, increases in population, proximity to major roads and ski areas, and lower taxes contributed to higher per acre land prices.

Scarpa et al. (2000) estimated the non-timber value of maple-birch forests in Wisconsin using a hedonic model. The explanatory variables were location attributes, ecological stand

attributes, and socioeconomic conditions. Location variables included site quality, distance to roads, and distance to water, while stand variables were tree species diversity, tree size diversity, and tree color diversity. Socioeconomic variables included county population density, and average county household income. In this case, all of these variables were found to be significant predictors of timberland value.

Similarly, Kennedy et al. (2002) estimated the tract value relationship in the North Louisiana timberland market by using a hedonic model and geographic information system (GIS) mapping techniques to examine factors hypothesized to influence the price of timberland. Results indicated that location and tract development potential played an important role in determining timberland value.

Outside of the U.S., hedonic price models have also been used to determine land value. In Sweden, many factors were found to influence the price for forest land on combined forest estates, including physical characteristics and location (Roos 1995). Based on 198 sales in Sweden during 1992, population density, the percentage of productive forest land compared with the total forest area, site quality, and standing volume per hectare of productive forest land had a positive relationship on forest land value, while negative relationships were found with regard to the proportion of agricultural land of land holding.

As an extension to his earlier study, Roos (1996) also used 143 sales of forest land in 1992, which were primarily used for timber production, to analyze the factors affecting the forest land prices in Sweden. Population density in the county, the proportion of productive forest land in a parcel, the mean standing timber volume, and the mean site productivity on forest land were found to positively influence the prices for forest land. The results also indicated that tract size had negative relationship with price per unit area.

Aronsson and Carlen (2000) found that land related attributes and the characteristics of buyers and sellers influence timberland price. Of the land characteristics, timber volume, land size, and site productivity were found to have positive impacts on timberland price. They also described that buyer's income level and seller's income level, education, wealth, all had substantial effect on forestland price.

Landowner objectives

Many studies that have focused on NIPFs' ownership objectives found that ownership is not often related to timber production, but instead strongly associated with non-timber activities purposes (Haymond 1988, Hodge and Southard 1992, Jones et al. 1995, Birch 1996). Northern Forest Lands Study (NFLS) (1990) presented that timber production is often not the primary reason for owning forestland. Hodges and Cubbage (1990) found that NIPF owners were more interested in owning forestland for aesthetics, recreation, and wildlife than for timber management.

Various regional and state surveys of NIPF owners also have documented that non-timber considerations were higher than timber production. A survey of Wisconsin private forestland owners (Birch 1996) found recreation, and aesthetic enjoyment, ranked higher than timber production as reason for woodland ownership. The results from the National Woodland Owner Survey (NWOS) in 2003 reported that the most common reasons for owning land were to pass land on to heirs, to enjoy beauty and scenery, and for land appreciation (Butler and Leatherberry 2004). Additionally, Butler (2008) found that the most commonly cited reasons were beauty/scenery, to pass land on to heirs, privacy, nature protection, and part of home/cabin.

Hodge and Southard (1992) found that the top three reasons for the ownership were preserving nature, maintaining scenic beauty and viewing wildlife.

In addition, some studies also found that there were regional differences in forest landownership objectives due to personal beliefs and values, historical land use, local timber markets, and site productivity (Megalos 2000, Wicker 2002). Haymond (1988) found that pride of ownership, privacy, recreation, and family were the significant benefits of forest ownership. Moreover, there was a difference between farmer and non-farmer who do not live on the forest they own or whose primary occupations are not connected with forestry, where farmers were more interested in timber economics while non-farmers were more interested in non-timber benefits (Haymond 1988). William et al. (1996) revealed that NIPF owner groups of different regions in Arkansas had different management objectives. Delta and Southwest NIPF owners were more interested in growing and selling trees. Landowners in Ouachita and Ozark region preferred recreational activities and grazing on their lands. Similarly, Megalos (2000) found that mountain region landowners owning their forestlands were more interested in the green space and as a place of residence, while coastal plains landowners were more likely to focus on farm and timber production.

CHAPTER III

2009 ALABAMA RURAL LAND VALUES AND CASH RENTS

3.1 Introduction

About 90 percent of total land surface area in Alabama is considered rural land, which includes the categories of farmland, timberland and transition land. Farm real estate, is described by the United States Department of Agriculture (USDA) as the combination of land value and the additional value from any improvements to the land such as buildings, fences, wells, irrigation, and drainage. The U.S. farming system is important to the balance of trade and the employment of nearly 23 million people nationwide (AFT 2003). Farm real estate is the major asset on farm sector balance sheets, which accounts for greater than 84% of total U.S. farm assets (USDA 2010a), and greater than 80% of total Alabama farm assets (USDA 2004). Therefore, the general economic health of the agricultural sector and the underlying the financial stability of many farm businesses whose portfolio derives a large proportion of their value from real estate are closely linked with farmland values. Farm real estate is often the largest single investment item, and may be used to finance the purchase of additional farmland and equipment or to finance current operating expenses (Krupa and Barneard 2001).

Timberland in Alabama also has significant economic importance, as well as environmental and aesthetic benefits. United States forestland area in 2002 totaled 651 million acres (28.8% of the total land area) (Lubowski et al. 2006b). In contrast, approximately 70% of the total land area in Alabama was covered by forestland in 2008. During that period, over 95%

of the forestland in Alabama was privately owned, and approximately 65% of that was owned by small scale nonindustrial private forests (NIPF) landowners (FIA 2008). Due to landowners' multiple objectives, forests may be managed for reasons, beyond timber production, such as recreational opportunities, wildlife habitat, biodiversity, water quality protection, and carbon sequestration (Newman and Wear 1993, Barlow and Grado 2002, Wear and Greis 2002, Raunikar and Buongiorno 2006, Stenger et al. 2009, Grado et al. 2009).

As a vital component of the state's economy, Alabama had the second largest forest industry in United States in 2007 (AFC 2007). Alabama's forest industry included more than 900 primary and secondary manufacturing sectors in 2007, generating 18.3% of the state's total manufacturing output, and employing nearly 54,000 people, or 3% of the state's 1.8 million jobs (AFC 2007). Alabama forests produced an estimated $15.6 billion in 2005 and ranked second statewide in all agricultural commodities in 2007 (AFC 2005, AFC 2008).

Transition land was defined as rural land that is likely to be changed to nonagricultural uses like residential, commercial, and industrial land. Due to population growth and economic development pressures, rural land used for residential purposes increased nationwide by 29% (21 million acres) from 1997 to 2002, and by 30% (17 million acres) from 1980 to 1997 (Lubowski et al. 2006b). Driven by landowners' desire to maximize economic benefits, the use pattern of a rural land is most likely to convert to that with highest expected return. However, some landowners own rural land for recreational activities where they may enjoy fishing, hunting, or beautiful views. Choices of land use that may be desirable for an individual landowner may not be optimal for society, and may have considerable impact on both economic and environmental systems. A major concern in recent years was that land use change may produce negative environmental impacts such as water pollution, erosion, adversely affecting sustainable

production , deterioration and fragmentation of land resources, carbon sinks, and loss of wildlife habitat (Lubowski et al. 2006a, Lewis and Plantinga 2007, Polyakov and Zhang 2008).

Farmers, natural resource managers, and investors continually strive to understand rural land markets as part of their land management and investment decision making. Rural land values have undergone dramatic change in recent years, and the ability to understand and predict those changes in land value is necessary for the effective design of environmental, public finance, and urban growth management policies. As many local and state governments grapple with increasing growth pressures, understanding economic factors that influence individual choices concerning rural land value and use has taken on added urgency in recent years. Therefore, future trends in rural land markets are very important to landowners, lenders, tax assessors, agricultural producers, and local government (policy makers).

In an effort to understand these trends, the 2000 Alabama Farmland Values and Cash Rents report was developed to provide average estimates of rural land values in six agricultural reporting districts delineated by the Alabama Agricultural Statistical Service (Prevatt 2000) (Figure 1). Counties located within each of the six geographical locations are similar in climate and soil type and generally have similar agricultural activities. Therefore, rural land values were estimated for different land categories in each of the six geographic regions. Based on the 2009 Alabama Rural Land Value Survey, most recently conducted in August 2009 by the School of Forestry and Wildlife Science at Auburn University, the 2009 Alabama Rural Land Value and Cash Rents report was intended to provide 2009 rural land value and cash rent estimates of different land uses and locations throughout Alabama.

State average farm real estate values and cash rents have been evaluated by USDA for many years. The aim of this study is not to replace the USDA information, but to provide

detailed information about average Alabama rural land values and cash rents, and to identify the trend of land value based on different land uses and locations.

For the purposes of this report, Alabama rural land use was categorized as three major uses: farmland, timberland, and transition land. Farmland was classified as bare cropland, improved permanent pasture, and unimproved permanent pasture. Timberland included both bareland timberland and forested areas typically used in forest production and well classified as pine, hardwood or mixed woodland sites. Transition land included undeveloped single home sites, undeveloped residential subdivisions, and undeveloped commercial and industrial areas.

During August 2009, a total of 890 questionnaires were mailed to individuals across Alabama who might have experience with rural land sales. Members of this group included real estate professionals, appraisers, natural resource land managers, and land investors. In addition, public agency employees such as those who work with Cooperative Extension System, Farm Service Agency, Revenue Commission, Federal Land Bank, and the Natural Resource Conservation Service were also surveyed. Respondents were asked to estimate market value per acre for each land use category in February and August 2009 (Appendix A). These estimates provided an indication of how rural land values have changed over a 6 month period. Furthermore, changes in rural land values from May 2000 to August 2009 were also determined using results from the "2000 Alabama Farmland Values and Cash Rents" report (Prevatt 2000).

Of those mailed surveys, 70 were returned as undeliverable; and 88 responded for a response rate of 10.7%. The average estimates on rural land values and cash rents were based on the reports from 74 useable responses. Survey participants were asked to report values for all counties in which they were knowledgeable about land market value. The questionnaire

requested an estimate of the market value per acre for average quality rural land in the reported county.

This study intends to provide landowners, lenders, farmers, foresters, and policy makers, detailed information about average rural land values and cash rents in different regions of Alabama, and not for the estimate of any particular parcel. For this report, differences in Alabama rural land values during the six months from February 2009 to August 2009 are examined as well as changes between 2000 and 2009 values. Finally, factors that were likely to determine future rural land values were indentified.

3.2 Rural Land Values in 2009

The 2009 survey results for value of farmland were reported in Table 1. The State of Alabama average value for bare cropland was reported at $2,326 per acre. Improved and unimproved permanent pasture averaged $2,307 and $2,033 per acre, respectively.

Timberland values were described by the type of timber grown and whether the site included land and trees or land only. Timberland values that included land and trees or land only (clear-cut) varied widely due to the size of the tract, the quality of the parcel, the value of the trees, and non-timber value considerations.

The 2009 survey results for value of timberland were reported in Table 2. Average plantation pine (land only) value for the State of Alabama was $1,421 per acre, while average value of plantation pine land and trees was $2,119 per acre. Average state timberland values for hardwood and mixed woodland (land and trees) were $2,129 and $2,203 per acre, respectively or about $822 and $789 per acre greater than cutover hardwood and mixed woodland (land only, clear-cut).

The state average for transition land in residential subdivisions and single home sites were $9,296 and $7,506 per acre (Table 3). These were approximately 90 and 73 percent, respectively, of the value of transition land in commercial and industrial uses. Transition land used for commercial and industrial uses had a state average value of $10,322 per acre.

Land use and location have significant impacts on the average rural land market per acre values. In August 2009, the highest average rural land value reported was in District Six for transition land moving to undeveloped commercial and industrial use, and to undeveloped residential subdivision uses, at $17,000 per acre (Tables 1, 2, and 3). A wide range of transition land values were observed in District Five and District Six, likely due to the various characteristics of the parcels, like the distance to urban areas, size of the tract, site improvements, and accessibility.

A “relative value measurement” is commonly used to express the value of a given rural land use as a percentage of bare cropland value. For example, the value of improved permanent pasture was 99 percent of bare cropland value ($2,307/$2,326): unimproved permanent pasture, 87 percent; plantation pine (land only, clear-cut), 61 percent; hardwood (land only, clear-cut), 56 percent; and mixed woodland (land only, clear-cut), 61 percent.

Table 1 Average Alabama farmland values by location and land use as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	Dollars per Acre						
FARMLAND							
Bare Cropland							
Aug 2009	$2756 (1124)	$3600 (1084)	$1640 (483)	$1843 (489)	$1650 (293)	$2466 (602)	$2326
Improved Permanent Pasture							
Aug 2009	$2567 (1133)	$3740 (1019)	$1992 (566)	$1677 (326)	$1494 (363)	$2371 (685)	$2307
Unimproved Permanent Pasture							
Aug 2009	$2088 (803)	$3590 (1139)	$1450 (346)	$1461 (357)	$1350 (536)	$2258 (626)	$2033

Note: standard deviation is denoted in parenthesis below each estimate.

Table 2 Average Alabama timberland values by location and land use as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	----------Dollars per Acre----------						
TIMBERLAND							
Plantation Pine (land only)							
Aug 2009	$971	$2420	$1141	$1395	$1065	$1531	$1421
	(329)	(983)	(454)	(558)	(381)	(625)	
Hardwood (land only)							
Aug 2009	$1050	$2300	$1135	$1213	$921	$1221	$1307
	(274)	(985)	(561)	(426)	(458)	(670)	
Mixed woodland (land only)							
Aug 2009	$1042	$2580	$1190	$1325	$1000	$1344	$1414
	(282)	(1034)	(546)	(649)	(401)	(542)	
Plantation pine (land and trees)							
Aug 2009	$1440	$3625	$1431	$2143	$1400	$2675	$2119
	(238)	(850)	(611)	(601)	(200)	(538)	
Hardwood (land and trees)							
Aug 2009	$1383	$3640	$1607	$2129	$1213	$2800	$2129
	(317)	(879)	(1103)	(660)	(103)	(979)	
Mixed woodland (land and trees)							
Aug 2009	$1458	$3300	$1976	$2260	$1625	$2600	$2203
	(397)	(758)	(1816)	(800)	(386)	(839)	

Note: standard deviation is denoted in parenthesis below each estimate.

Table 3 Average Alabama transition land values by location and land use as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	----------Dollars per Acre----------						
TRANSITION LAND							
Undeveloped Single Home site							
Aug 2009	$7417 (3200)	$8300 (4353)	$6580 (3171)	$3911 (1326)	$6400 (4393)	$12429 (10783)	$7506
Undeveloped Residential Subdivision							
Aug 2009	$7900 (5878)	$14167 (6292)	$5794 (3166)	$4417 (1357)	$6500 (6689)	$17000 (19925)	$9296
Undeveloped Commercial And Industrial							
Aug 2009	$7000 (5354)	$12125 (5137)	$7486 (3521)	$8000 (2309)	N/A	$17000 (19925)	$10322

Note: standard deviation is denoted in parenthesis below each estimate.

3.3 Rural Land Values by Districts

3.3.1 Farmland

The average value of bare cropland was highest in District Two at $3,600 per acre (Table 1). This is consistent with results from the previous report in 2000, and is possibly due to the importance of urban influences in this region (Prevatt 2000). Counties in this region have average higher population and income per capita, such as St. Clair, Calhoun, Etowah and Marshall when compared to other regions of the State (US Census Bureau 2009). Lowest

average bare cropland values were reported for District Three and District Five at $1,640 and $1,650, respectively per acre (Table 1).

Average improved permanent pasture values were highest at $3,740 per acre in District Two and the lowest at $1,494 per acre in District Five. The average unimproved permanent pasture values ranged from $1,350 per acre in District Five to $3,590 per acre in District Two. Unimproved permanent pasture value for District Three and District Four were similar with a $11.00 difference ($1,450 and $1,461, respectively) per acre. The average improved permanent pasture and unimproved permanent pasture values were both highest in District Two and lowest in District Five. Urban influences in District Two may indeed be a factor. Counties in District Five such as Conecuh, Choctaw, Wilcox, and Washington have lower population and income per capita than in other districts (US Census Bureau 2009).

3.3.2 Timberland

Average plantation pine (land only) values ranged from $971 per acre in District One to $2,420 per acre in District Two (Table 2). Average Hardwood (land only, clear-cut) values were highest in District Two at $2,300 per acre, and lowest in District Five at $921 per acre. Average mixed woodland (land only, clear-cut) values ranged from $1,000 per acre in District Five to $2,580 per acre in District Two. Generally, District Five average timberland values (land only, clear-cut) were lower than other districts, while District Two average timberland values (land only, clear-cut) were consistently higher than other districts.

Average overall timberland (land and trees) values for the state ranged from a low of $1,213 per acre in District Five for hardwood to a high of $3,640 per acre in District Two for hardwood (Table 2). Average plantation pine (land and trees) values were similar for District

One ($1,440), and Three ($1,431), and District Five ($1,400). Plantation pine (land and trees) values were similar for District Four at $2,143 per acre, and District Six at $2,675 per acre. The highest value of plantation pine (land and trees) was $3,625 per acre in District Two.

Average hardwood (land and trees) values were similar for District One ($1,383), District Three ($1,607), and District Five ($1,213). The highest value of hardwood (land and trees) was $3,640 per acre in District Two.

Average mixed woodland (land and trees) values were similar for District One ($1,458), and District Five ($1,625). Mixed woodland (land and trees) values were similar for District Three at $1,976 per acre, and District Four at $2,260 per acre. The highest value of mixed woodland (land and trees) was $3,300 per acre in District Two.

Generally, average timberland values for District Two were higher than other districts probably due to recreational and urban influence. As a major forested area, stumpage revenue from sale of forest products in District Five accounted for approximately 33% of the state's total stumpage revenue in 2008 (AFC 2008). However, District Five average timberland prices were not higher than other districts, possibly as a result of depressed timber markets and rural nature of this region. Studies have shown that timberland owners in the mountain region of the State where District Two is located were more likely to enjoy non-timber amenities such as recreational opportunities, which landowners in the Coastal Plains (such as District Five) were found to be focused more on farm and timber-related objectives (Wicker 2002, Zhou 2010).

3.3.3 Transition Land

Average transition land values for undeveloped single home site were highest for District Six ($12,429) and lowest for District Four ($3,911) (Table 3). The average transition land values

for undeveloped residential subdivision uses were highest in District Six ($17,000) and lowest in District Four ($4,417). Similarly, undeveloped commercial and industrial uses were highest in District Six at $17,000 per acre; however they were lowest in District One at $7,000 per acre. In general, average transition land values were highest in District Six, which is possibly because of increasing urban growth and commercial and industrial development in this region.

In summary, there were considerable differences in rural land values under different land uses and locations. Average rural land values were generally higher in District Two and District Six (Tables 1, 2, and 3). The average bare cropland value per acre at $3,600 in District Two and $2,466 in District Six were higher than average state's bare cropland value ($2,326) by 55% and 6%, respectively. The average improved permanent pasture value per acre at $3,740 in District Two and $2,371 in District Six were higher than average state's improved permanent value ($2,307) by 62% and 3%, respectively. The average unimproved permanent pasture value at $3,590 in District Two and $2,258 in District Six were higher than average state's unimproved permanent pasture value ($2,033) by 77% and 11%, respectively (Table 1).

As far as the average values per acre of timberland were concerned, District Two had the highest values for all timberland categories when compared to other districts. Average land only values per acre of plantation pine, hardwood, and mixed woodland in District Two were at least 70% higher than average state value for each category. Average value of land and trees per acre for plantation pine, hardwood, and mixed woodland in District Two was approximately 50-70% higher than average state value (Table 2).

Transition lands used for undeveloped single home sites in District Two and in District Six were $794 (11%) and $4,923 (66%), respectively, higher than the average state value of $7,506. Average value per acre of undeveloped residential subdivisions in District Two and in

District Six was $4,871 (52%) and $7,704 (83%), respectively, higher than average state value of $9,296. Average value per acre of undeveloped commercial and industrial lands in District Two and in District Six was $1,803 (17%) and $6,678 (65%), respectively, higher than average state value of $10,322 (Table 3).

3.4 Changes in Land Values

3.4.1 Changes from February 2009 to August 2009

Nationwide declines in farmland values were reported according to the 2009 report provided by the United States Department of Agriculture (USDA 2009). On January 1, 2009, U.S. cropland values averaged $2,650 per acre, down from 2008 at $2,760 per acre, a decrease of approximately 4.0%. Pasture values in the U.S. averaged $1,070 per acre, falling 1.8% from 2008. In addition, U.S. farm real estate values have declined 3.2%. This was the first drop in U.S. farmland price since 1987 (Shane et al. 2009). This sudden change is primarily due to the overall economic recession and depressed financial condition of rural land markets. Also, the decline in value likely stems from lower livestock and crop products/commodities prices and high input costs (USDA 1999, Shane et al. 2009). Monthly average corn and soybean prices were unstable as shown in Figure 2 and Figure 3, and corn and soybean prices decreased sharply from 2008 to 2009 (USDA 2010b).

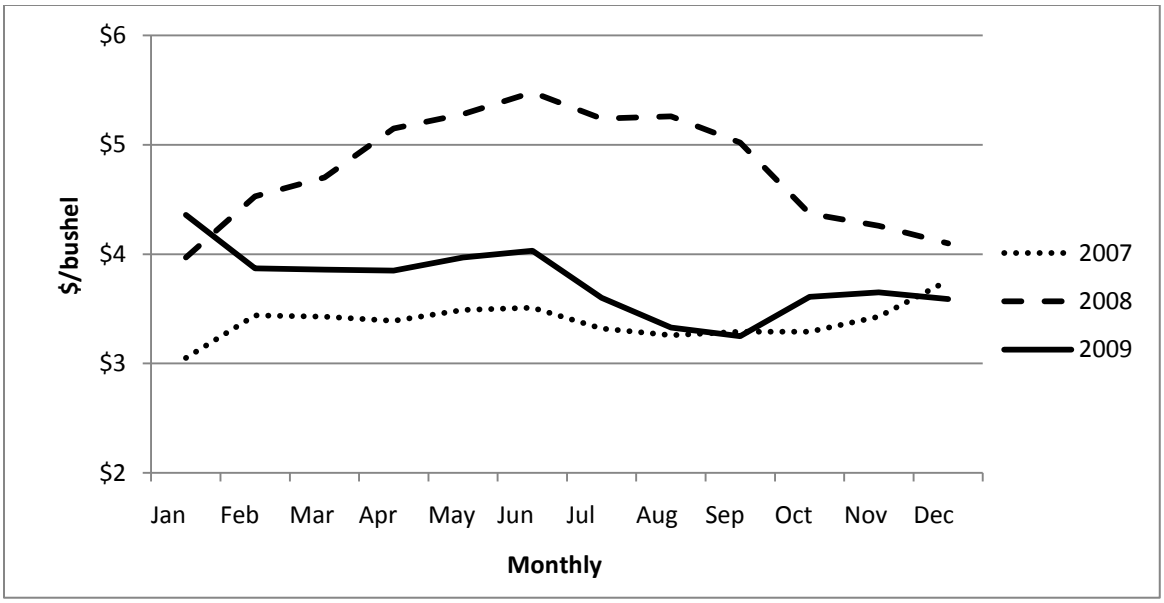

Figure 2 Monthly U.S. corn prices, 2007-2009.
Data source: US average farm price database. http://www.nass.usda.gov/index.asp. United States Department of Agriculture National Agricultural Statistics Services (USDA).

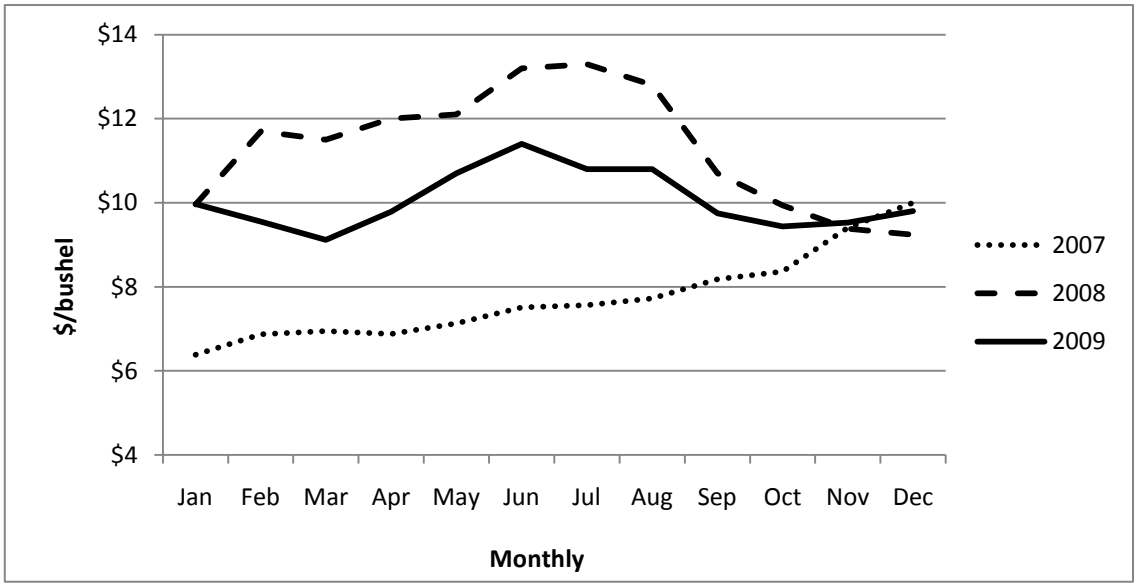

Figure 3 Monthly U.S. soybean prices, 2007-2009.
Data source: US average farm price database. http://www.nass.usda.gov/index.asp. United States Department of Agriculture National Agricultural Statistics Services (USDA).

Southeast region average cropland and pasture values as reported by the USDA also suffered considerable declines at 9.1% and at 13.7%, respectively, from January 1, 2008 to January 1, 2009 (USDA 2009). Alabama cropland and pasture values also decreased during that period, down 5.7% and 5.6%. This downward trend appeared to continue as illustrated by the results of 2009 Alabama Rural Land Value and Cash Rent Survey, where Alabama average cropland and pasture values were reported to have declined 4.5% and 5.8% from February 2009 to August 2009 (Table 4).

Based on our current study, statewide reported averages in rural land values declined for most land uses, including farmland, timberland, and transition land, from February 2009 to August 2009, as shown in Tables 4, 5, and 6.

The percentage changes for the farmland categories by district were negative, except no change for improved permanent pasture in District One. The average percentage change in farmland for the State of Alabama ranged between -6.9% to -4.5% (Table 4). The percentage decrease in the farmland category by district ranged from -22.9% to 0.0%.

The percentage changes in the value for the various land uses by districts in the timberland categories were negative for most uses by region (Table 5). However, there was no change for hardwood (land only), mixed woodland (land only), plantation pine (land and trees), and mixed woodland (land and trees) in District One, or for Mixed woodland (land only) in District Five. Positive changes for hardwood (land and trees) and mixed woodland (land and trees) were found in District Two.

The average percentage change in timberland for the State of Alabama ranged from -8.5% to -3.7% (Table 5). Change in timberland land-only categories ranged from -23.0% to 0.0%, while timberland categories with land and trees ranged from -23.4% to +2.2%. The

average percent change for timberland categories in District One were small and more stable when compared to other districts. Average timberland prices in District Two were generally higher than other districts. The average percent change for timberland categories in District Two indicated that there were some increases in values for hardwood (land and tree) and mixed woodland (land with trees). This may be the result of the increasing importance of non-timber values to many landowners. Indeed, those individuals from affluent urban areas may influence demand for and value of non-timber forest activities (Bockstael 1996, Scarpa et al. 2000). Hardwood (land with tree) and Mixed Woodland (land with trees) areas could be more desirable to these landowners, for their amenity values such as forest aesthetics and wildlife habitat (Bockstael 1996, Aronsson and Carlen 2000, Scarpa et al. 2000, Raunikar and Buongiorno 2006).

For the category of transition land, most value changes for the various land uses were negative also, except undeveloped residential subdivision lands in District One and District Five, and undeveloped commercial and industrial in District One. The average percentage change in transition land for the State of Alabama ranged between -9.6% to -3.8% (Table 6). The percentage change in the transition land category by district ranged from -26.9% to 8.2%.

Table 4 Average February and August 2009 Alabama farmland values by location and land use as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	----------**Dollars per Acre**----------						
FARMLAND							
Bare Cropland							
Aug 2009	$2756	$3600	$1640	$1843	$1650	$2466	$2326
Feb 2009	$2861	$3650	$1775	$1979	$1792	$2550	$2435
% Change	-3.7%	-1.4%	-7.6%	-6.9%	-7.9%	-3.3%	-4.5%
Improved Permanent Pasture							
Aug 2009	$2567	$3740	$1992	$1677	$1494	$2371	$2307
Feb 2009	$2567	$3750	$2140	$1747	$1886	$2436	$2421
% Change	0.0%	-0.3%	-6.9%	-4.0%	-20.8%	-2.7%	-4.7%
Unimproved Permanent Pasture							
Aug 2009	$2088	$3590	$1450	$1461	$1350	$2258	$2033
Feb 2009	$2113	$3700	$1625	$1511	$1750	$2400	$2183
% Change	-1.2%	-3.0%	-10.8%	-3.3%	-22.9%	-5.9%	-6.9%

Table 5 Average February and August 2009 Alabama timberland values by location and land use as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	----------**Dollars per Acre**----------						
TIMBERLAND							
Plantation Pine (land only)							
Aug 2009	$971	$2420	$1141	$1395	$1065	$1531	$1421
Feb 2009	$1007	$2540	$1370	$1463	$1133	$1600	$1519
% Change	-3.6%	-4.7%	-16.7%	-4.6%	-6.0%	-4.3%	-6.4%
Hardwood (land only)							
Aug 2009	$1050	$2300	$1135	$1213	$921	$1221	$1307
Feb 2009	$1050	$2400	$1239	$1279	$933	$1329	$1372
% Change	0.0%	-4.2%	-8.4%	-5.2%	-1.3%	-8.1%	-4.7%
Mixed woodland (land only)							
Aug 2009	$1042	$2580	$1190	$1325	$1000	$1344	$1414
Feb 2009	$1042	$2690	$1545	$1427	$1000	$1463	$1528
% Change	0.0%	-4.1%	-23.0%	-7.1%	0.0%	-8.1%	-7.5%
Plantation pine (land and trees)							
Aug 2009	$1440	$3425	$1431	$2143	$1400	$2675	$2119
Feb 2009	$1440	$3550	$1607	$2277	$1583	$2750	$2201
% Change	0.0%	-3.5%	-11.0%	-5.9%	-11.6%	-2.7%	-3.7%
Hardwood (land and trees)							
Aug 2009	$1383	$3640	$1607	$2129	$1213	$2800	$2129
Feb 2009	$1450	$3560	$1842	$2233	$1475	$3083	$2274
% Change	-4.6%	2.2%	-12.8%	-4.7%	-17.8%	-9.2%	-6.4%
Mixed woodland (land and trees)							
Aug 2009	$1458	$3300	$1976	$2260	$1625	$2600	$2203
Feb 2009	$1458	$3260	$2579	$2383	$2038	$2730	$2408
% Change	0.0%	1.2%	-23.4%	-5.2%	-20.3%	-4.8%	-8.5%

Table 6 Average February and August 2009 Alabama transition land values by location and land use as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	----------**Dollars per Acre**----------						
TRANSITION LAND							
Undeveloped Single Home site							
Aug 2009	$7417	$8300	$6580	$3911	$6400	$12429	$7506
Feb 2009	$7583	$8600	$7548	$4334	$8750	$13000	$8303
% Change	-2.2%	-3.5%	-12.8%	-9.8%	-26.9%	-4.4%	-9.6%
Undeveloped Residential Subdivision							
Aug 2009	$7900	$14167	$5794	$4417	$6500	$17000	$9296
Feb 2009	$7300	$15000	$6479	$5500	$6375	$17333	$9665
% Change	8.2%	-5.6%	-10.6%	-19.7%	2.0%	-1.9%	-3.8%
Undeveloped Commercial And Industrial							
Aug 2009	$7000	$12125	$7486	$8000	N/A	$17000	$10322
Feb 2009	$7000	$13375	$9180	$9625	N/A	$17333	$11303
% Change	0.0%	-9.3%	-18.5%	-16.9%	N/A	-1.9%	-8.7%

3.4.2 Changes from May 2000 to August 2009

All prices of rural land in 2009 were adjusted by consumer price index (CPI) and fixed to year 2000 as a base year (BLS 2010). August 2009 land values for all categories were compared with May 2000. State average values increased for all land uses, except the decrease in value per acre for undeveloped commercial and industrial uses, as shown in Table 7.

The highest average percentage change in Alabama farmland from May 2000 to August 2009 was +79% (in nominal value) or +44% (in real value) for unimproved permanent pasture. The percentage change ranged from +62% to +79% (in nominal value), or from +30% to +44% (in real value) (Table 7). In August, 2009, Alabama bare cropland values averaged $2,326 per acre (in nominal value) or $1,867 per acre (in real value), up from May, 2000 at $1,433 per acre,

an increase of approximately 62% (in nominal value) or 30% (in real value). Alabama average improved permanent and unimproved permanent pasture values during that period averaged $2,307 and $2,033 per acre (in nominal value), or $1,852 and $1,632 per acre (in real value), up from May, 2000 at $1,413 and $1,134 per acre, an increase of approximately 63% and 79% (in nominal value), or 31% and 44% (in real value), respectively.

The average percentage change in timberland categories for Alabama ranged from +46% to +91% (in nominal value), or from +17% to +53% (in real value). The highest percentage change in this category was for mixed woodland (land only) at +91% (in nominal value) and +53% (in real value), increasing to $1,414 (in nominal value) and $1,135 (in real value) in 2009 up from prior value of $740 in 2000 (Table 7). Timberland categories with land only ranged from +86% to +91% (in nominal value), and from +49% to +53% (in real value). Timberland categories with land and trees ranged from +46% to +55% (in nominal value), or from +17% to +24% (in real value).

The average percent changes for transition land were varied, and ranged from -1% to +69% (in nominal value), and from -21% to +36% (in real value) (Table 7). Values increased by +36% and +22% in real value (+69% and +52% in nominal value) for undeveloped single home site and undeveloped residential subdivision, respectively, from 2000 to 2009, while values of undeveloped commercial and industrial land suffered a 21% drop in real value (-1% in nominal value). This was perhaps a reflection of the current economic recession, resulting in the greatest decrease in the rural land industry to date (Shane et al. 2009).

Table 7 A comparisons of 2009 Alabama rural land values (nominal and real).

Land Use	State of Alabama				
	May-00	Aug-09	Real Aug-2009[1] (Index back to 2000)	% change in nominal value, 2000-2009	% change in real value, 2000-2009
	---------**Dollars per Acre**--------				
FARMLAND					
Bare Cropland	1433	2326	1867	+62	+30
Improved Permanent Pasture	1413	2307	1852	+63	+31
Unimproved Permanent Pasture	1134	2033	1632	+79	+44
TRANSITION LAND					
Undeveloped Single Home site	4442	7506	6025	+69	+36
Undeveloped Residential Subdivision	6122	9296	7462	+52	+22
Undeveloped Commercial And Industrial	10459	10322	8285	-1	-21
TIMBERLAND					
Plantation Pine (land only)	763	1421	1141	+86	+49
Hardwood (land only)	701	1307	1049	+86	+50
Mixed woodland (land only)	740	1414	1135	+91	+53
Plantation pine (land and trees)	1456	2119	1701	+46	+17
Hardwood (land and trees)	1381	2129	1709	+54	+24
Mixed woodland (land and trees)	1425	2203	1768	+55	+24

[1] Estimates the 2000 value of rural land based on the price in 2009 using Consumer Price Index (CPI).
2000 index=172.2; 2009 index=214.537;
Estimate the 2000 value of land from the 2009 price: 2000 index/2009 index *2009 value=estimated 2000 value.

3.5 Rural Land Transfer and Price Projection

Respondents were asked to report their observations regarding the number of farmland transfers during the past twelve months when compared to a year earlier, as well as their projection of where farmland prices may be a year from now based on current levels as presented in Table 8.

For Alabama, no respondents reported an increase in farmland transfers during the past twelve months. Approximately 32% of the respondents reported no change in the number of farmland transfers, while about 68% reported fewer. The average percentage change estimated for statewide farmland transfers during the past twelve months was 22% lower than last year ranging from -32% to -9%. The lowest (-32%) change in farmland transfer was reported in District Two.

About 45% of the survey respondents expected no change in farmland prices in 2009. Forty-two percent of the respondents expected lower farmland prices for 2009, while only 13% expected higher farmland price. The average percentage change estimated for statewide farmland prices during the past twelve months was 5% lower than last year and ranged from -11% to +0.6%.

Table 8 Respondents' opinions regarding Alabama recent volume of farmland transfers and projected direction of farmland values a year from August 2009 as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	----------**Percentage of Respondents**[1] ----------						
Farmland Transfers							
Higher	0	0	0	0	0	0	0
No Change	67	17	45	25	13	22	32
Lower	33	83	55	75	88	78	68
Projected Farmland Prices							
Higher	11	17	0	16	0	33	13
No Change	89	67	64	26	25	22	45
Lower	0	17	36	58	75	44	42
	----------**Percentage Change Projected**----------						
Farmland Transfers	-9	-32	-13	-30	-19	-23	-22
Projected Farmland Prices	0.6	0	-6	-8	-11	-1	-5

[1] Percentages may not sum to 100 due to rounding.

Respondents were also asked to give their opinions about the number of timberland transfers during the past twelve months compared with a year earlier as well as their projection of where timberland prices may be a year from now based on current levels (Table 9).

Twenty-six percent of the respondents reported no change in timberland transfers, while 68% reported lower and 6% reported higher timberland transfers during the past twelve months. The average percentage change estimated for statewide timberland transfers during the past twelve months was 21% lower than last year and ranged from -31% to -10%. The lowest (-31%) estimated change in timberland transfers was reported in District Two and District Four (Table 9).

Table 9 Respondents' opinions regarding Alabama recent volume of timberland transfers and projected direction of timberland values a year from August 2009 as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	----------Percentage of Respondents[1] ----------						
Timberland Transfers							
Higher	0	0	8	10	0	11	6
No Change	70	17	42	10	11	11	26
Lower	30	83	50	80	89	78	68
Projected Timberland Prices							
Higher	0	0	0	16	0	22	8
No Change	100	83	55	16	22	33	45
Lower	0	17	45	68	78	44	47
	----------Percentage Change Projected----------						
Timberland Transfers	-10	-31	-11	-31	-18	-22	-21
Projected Timberland Prices	0	0.8	-7	-9	-11	-2	-6

[1] Percentages may not sum to 100 due to rounding.

Similar to farmland price estimates, approximately 45% of the survey respondents expected no change in timberland prices in 2009. Forty-seven percent of the respondents expected lower statewide timberland prices for 2009, while only 8% respondents were more optimistic and expect higher prices for timberland. The average percentage change estimated for timberland prices during the past twelve months was 6% lower than last year and range from -11% to +0.8% (Table 9).

3.6 Farmland Cash Rents

The average cash rent per acre estimates by location and land use are illustrated in Table 10. Average cash rent per acre in Alabama is characterized by a number of factors. Location, land use, irrigation use, improvement, type of crop, and quota contributed to a wide variety of possible cash rents per acre.

The 2009 State of Alabama average rental rates for bare cropland with irrigation and without irrigation were $79 and $42 per acre, respectively (Table 10). Consistent to the finding of 2000 report, respondents in Districts One, Five, and Six also reported higher cropland cash rents per acre than other districts. The results may reflect that the bare cropland cash rent values were greatly affected by corn and cotton production in District One. Corn production in this district accounts for 55% of the State's total production, while cotton accounts for 36% of Alabama production (USDA 2008). Cotton and peanut production may have large impact on the bare cropland cash rent values in District Five, and District Six. Cotton production in District Five and Six represents about 21% and 29% of state's total production, and peanut production in two districts contributed 30% and 64% to the total production, respectively (USDA 2008). By district, the cash rent per acre for bare cropland ranged from $38 to $125 per acre with irrigation and $29 to $55 per acre without irrigation.

Alabama average rental rate for improved permanent pasture was $23 per acre (Table 10). The State of Alabama average rental rate for unimproved permanent pasture and woodland pasture were $17 and $9 per acre. Their values were approximately 74% and 39% of improved permanent pasture. Improved and unimproved permanent pasture cash rental rates were higher in District One, District Two, and District Six since the average improved and unimproved permanent pasture values were also higher in these districts. Pasture cash rent was affected more

by land value than by commodity prices (USDA 2009). The differences in improved permanent pasture cash rental rates probably reflected there were different quality of pastures, various types of pastures, and improvements such as fencing, road frontage, water, surrounding land use, open space, and distance to major markets.

The average cash rents expressed as a percent of August 2009 farmland values by location and land use are presented in Table 11. Average cash rents as a percent of land value fell in a narrow range for each land use category. District Five showed the highest average cash rent as a percent of bare cropland value at 3.3%. The highest average cash rent as a percent of improved permanent pasture value was 1.5% in District Five, and for unimproved permanent pasture was 1.1% in District Four. Generally, lower average cash rents as a percent of land value were observed in District Two.

Alabama average cash rent for bare cropland without irrigation averaged $42 per acre which was 1.8% of the estimated land value. Statewide average cash rent for improved permanent pasture and unimproved permanent pasture averaged $23 per acre and $17 per acre, which was about 1.0% and 0.8% of the estimated land value, respectively.

Table 10 Average 2009 Alabama cash rent per acre estimates by location and land use as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						State Of Alabama
	One	Two	Three	Four	Five	Six	
	----------**Cash Rent Per Acre** ----------						
Bare Cropland w/irrigation	$125 (0)	N/A	$38 (28)	$70 (0)	$72 (33)	$90 (37)	$75
Bare Cropland w/o irrigation	$54 (11)	$37 (3)	$29 (11)	$37 (7)	$55 (28)	$40 (6)	$41
Improved Permanent Pasture	$29 (3)	$25 (6)	$13 (6)	$19 (8)	$23 (3)	$26 (5)	$23
Unimproved Permanent Pasture	$19 (4)	$21 (5)	$15 (0)	$16 (3)	$15 (0)	$18 (5)	$17
Woodland Pasture	$7.5 (3)	$13 (4)	$9 (2)	$9 (2)	$5 (0)	$12 (6)	$9

Note: standard deviation is denoted in parenthesis below each estimate.

Table 11 Cash rents expressed as a percent of August 2009 farmland values by location and land uses as reported in the 2009 Alabama Rural Land Value Survey.

Land Use	USDA Agricultural Reporting Districts						Alabama
	One	Two	Three	Four	Five	Six	
	----------**%** ----------						
Bare Cropland w/o irrigation	1.96	1.03	1.77	2.01	3.33	1.62	1.81
Improved Permanent Pasture	1.13	0.67	0.65	1.13	1.54	1.10	1.00
Unimproved Permanent Pasture	0.91	0.58	1.03	1.10	1.01	0.80	0.84

3.7 Summary and Conclusions

In general, Alabama land values were down in 2009 based on this current survey when compared to prior years. There were various reasons provided by the survey respondents in order to explain this drop in U.S. rural land prices. Some professionals indicated “down economy” and “harder financial condition”. Some said that “low commodity price”, “high cost for input”, and “high tax” were factors. Other experts reported “slow sales”, and “depressed land market for development”. Based on information from the USDA report, “The 2008/2009 World Economic Crisis: What It Means for U.S. Agriculture” U.S. agriculture has been greatly affected by the 2008-2009 world economic crisis, which caused a sharp decrease in agricultural price, farm income, and employment compared to 2007 and 2008. As a result, 2009 rural land value also declined (Shane et al. 2009).

This study provided average estimates of rural land (including farmland, timberland, and transition land) values and cash rents in six agricultural reporting districts in Alabama tracking differences in Alabama rural land values during the 6 months from February 2009 to August 2009, and examining at the changes between 2000 and 2009. Without historical value data, the trend from 2000 to 2009 can’t be identified clearly year by year. It is important to remember that this report is not for the estimate of any particular parcel. The value of individual parcels may differ greatly from these estimates since each parcel has own characteristics, including land, location, and improvement characteristics. Different characteristics of the land could substantially affect the price. For example, the attributes like proximity to bodies of water, surrounding land use, distance to major roads, and urban areas will influence the value of a given parcel.

It should also be noted that in 2009 there was a lower response rate (10.7%) to this survey when compared to 175 respondents with 25% response rate in 2000. Also for 2009, there was an increased focus on timberland prices over prior surveys. Therefore, the pool of those surveyed was modified to include individuals who bought and sold timberland specifically, in addition to those who had participated in prior surveys. This provided an advantage over the study conducted in 2000 in that there was additional information collected on timberland values.

3.8 Rural Land Outlook

Variation in U.S. farm real estate prices attracted widespread interest over the last 40 years. This time frame is divided to several important parts: a growth period (1970-81), the farm crisis period (1982-87), and the current period (1988-07) (Adrian and Prevatt 2007).

From 1940 to 2006 (except mid-1980s), U.S. farm real estate values have increased consistently and substantially appreciating at 6.4% annual real returns, adjusted by the consumer price index (1982-84=100). Interesting, U.S. farm real estate values had an average annual increases of 4.4% during 1987-1997, 8.3% during 1997-2006, and 15.2% between 2005-2006 (Forster 2006).

The trend also existed in Alabama farm real estate values. Alabama farm real estate values have risen greatly at 6.4% annual real return during the 1970-2007, ranging from -6.2% in 1983 to 26.8% in 2005 (Adrian and Prevatt 2007). Therefore, purchasing farm real estate should be considered as an attractive investment against inflation in the long-term.

On the timberland side, bare timberland prices in the past overall have increased steadily while timber prices in the U.S. have shown a significant decline (Armstrong 1987, Sendack and McEnvoy 1989). In addition, there were dramatic shifts in the ownership of private lands as

industrial landowners sold their landholding and non-industrial landowners eagerly purchased land for primarily recreational and environmental reasons (Mather 2001, Butler and Leatherberry 2004, Kendra and Hull 2005, Zhang et al. 2005, and Pan et al. 2007).

Many studies have found that NIPF landowners own land for a variety of reasons; objectives for non-timber values are often more important than timber production (Haymond 1988, Hodge and Southard 1992). Most recently, an "Alabama timberland values survey" conducted by the School of Forestry and Wildlife Sciences was mailed to Alabama NIPF landowners and found that the most frequent reasons for timberland ownership are to pass land on to heirs, to enjoy beauty or scenery, and for hunting or fishing (Zhou 2010). All three of the most frequently selected reasons are not associated with economic timber production, but involve non-timber amenities, which are consistent to other surveys such as "National Woodland Owner Survey" (Butler and Leatherberry 2004). These non-timber values from Alabama forests are not easily quantified, separately, but are of great contribution to the total land values, and are increasingly important to the Alabama economy.

Acreage estimates of transition land have substantially risen during the past century. In response to an expanding population and industry growth, the United States has changed from a predominantly rural to an urban nation (Kline and Alig 1998). Rural landowners become more likely to invest their farmland or timberland for development. Overall, values and uses of all kinds of rural lands have undergone dramatic change, which have affected economic development and global environmental changes. As we noted, better management of land resources to obtain sustainable economic and ecological ecosystems is increasingly important to society.

Current forecasts suggest that the slight decreases in rural land prices will likely continue in 2010 due to the economic recession (Clouser et al. 2008, Duffy and Smith 2009). However, it is expected that this trend will eventually be reversed. According to 42 forecasters surveyed by the Federal Reserve Bank of Philadelphia, the U.S. economy will likely grow at an annual rate of 2.7% over each of the next five quarters (Federal Reserve Bank of Philadelphia 2010). Abroad and domestic financial markets are expected to continually recover in the future. A weak US dollar will support the higher level of agricultural exports, and in turn, support domestic commodity prices. Therefore, it is assumed that higher agricultural incomes due to desirable commodity prices will be associated with supporting higher rural land values. Non-agriculture values of rural land such as hunting, fishing, wildlife, water production, surrounding land use, open space, and other improvements are expected to continue to have a positive impact on Alabama rural land values as well. In addition, a variety of government policies such as 1031 tax exchange, property taxes, estate taxes, federal commodity support programs, and biofuels energy policy all contribute to support solid rural land values.

Like other investments, land and timber prices cycle in response to changing markets. As land values adjust to changes in the economic climate, investing in rural land should continue to be a good hedge against inflation over the long term, especially in times of economic volatility (Mills 1988; Redmond and Cubbage 1988; Conroy and Miles 1989; Binkley et al. 1996; Sun and Zhang 2001). And with prudent management, the citizens of Alabama will continue to benefit from the many resources these lands provide.

CHAPTER IV

AN ECONOMETRICS ANALYSIS OF FACTORS AFFECTING TIMBERLAND PRICES IN ALABAMA

Abstract: Since the late 1990s, timber prices in Alabama have shown a significant decline while during the same period bare timberland price overall have increased steadily. Due in part to rapid changes in ownership, holding size, and price of timberland, land management strategies are also shifting. Additional information is needed to understand the Alabama timberland market and guide land managers and policy makers in the development of resource allocation policy. This study seeks to quantitatively estimate major determinants influencing timberland value in Alabama. Data for this current study came from the "Alabama Timberland Value Survey" conducted by the School of Forestry and Wildlife Sciences at Auburn University. Hedonic price model methods were used to determine the implicit market price for Alabama timberland. Results indicated that road frontage, lake or river presence, and older trees contributed to increased timberland price, while larger size of tract, and increased distance to the nearest urban areas had significant negative effects on timberland value. In addition, further information from this study suggests small-scale nonindustrial private landowners in Alabama place increasing importance of non-timber values rather than traditional forest based objectives such as timber production when making land management and ownership decisions.

Keywords: Alabama, forestry, landowner objectives, non-timber values, timberland

4.1 Introduction

Depending on an individual landowner's objective, forests may be managed for a variety of reasons, including timber production and other goods and services such as aesthetics, recreational opportunities, wildlife habitat, biodiversity preservation, water quality protection, and carbon sequestration (Newman and Wear 1993, Barlow and Grado 2002, Wear and Greis 2002, Raunikar and Buongiorno 2006, Stenger et.al 2009, Grado et al. 2009). Timberland has the potential to be part of non-industrial private landowners' investment portfolio with the possibility for a high rate of return and lower risk. Thus, timberland investment offers a hedge against inflation, and provides asset diversification opportunities (Mills 1988, Redmond and Cubbage 1988, Conroy and Miles 1989; Binkley et al. 1996; Sun and Zhang 2001). However, many private non-industrial forest landowners are often unaware of potential financial benefits that come from land management. In these times of financial difficulty, information is needed to provide the public with techniques to make their timberland work for them. Researchers and Cooperative Extension personnel can increase awareness among landowners, land managers, and policy makers by providing information on these shifts and realistic measures of potential impacts on the future of forest management.

Many studies have shown that timber production is often not the primary reason for owning forestland (Birch 1996). Northern Forest Lands Study (NFLS) (1990) proposed that the primary factors influencing timberland prices are individual users and their objectives rather than timber production potential. Zhang et al. (2009) proposed that as an emphasis on non-timber values increases, forestland is more likely to be owned by individuals to provide for their personal consumption of non-market amenities (goods and services).

Historically, timber prices in Alabama have shown a significant decline while during the same period bare timberland price overall have increased or remained steadily (Armstrong 1987, Sendack and McEnvoy 1989) (Figure 4). Due in part to rapid changes in ownership from industrial landowners to non-industrial landowners, holding size, and price of timberland, land management strategies are also dramatic shifting in the last 10 years (Mather 2001, Butler and Leatherberry 2004, Kendra and Hull 2005, Zhang et al. 2005, and Pan et al. 2007). An increasing importance of non-timber values to forest landowners was suggested to result in the increases in the number of small-scale family forest owners and the decreases in these owners' holding sizes in United States (Zhang et al. 2009). It is believed that actual timberland value can be affected by several factors other than the present value of expected future income from timber production.

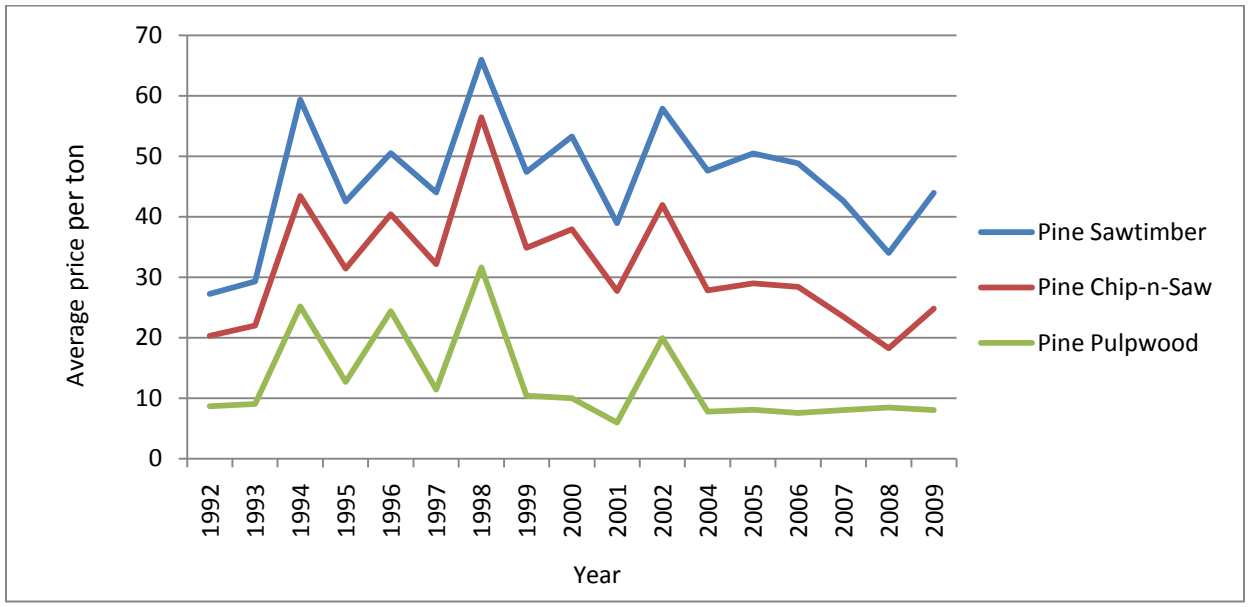

Figure 4 Annual average timber stumpage price per ton ($/ton) from 1992-2009.
Source: Timber Mart-South from 1992-2009.

The Faustmann formula is commonly used to estimate the value of forest land (Samuelson 1976, Hyde 1980). The concept of this method is that the value of forest land equals the present value of profits from all future timber sales. As an extension of the Faustmann model, Hartmann model considers non-timber values. However, the use of this approach is limited in practice since the values of most non-timber outputs are difficult to measure, such as aesthetics, wildlife habitat, and clean air (Hartman 1976, Dole 1999, Touza and Termansen 2002).

Hedonic pricing method is one practically accepted method beyond the Faustmann and Hartmann models to assess the value of non-timber amenities (Lockwood et al. 1992). Prior research has shown the utility of the hedonic price model; however, few studies have assessed landowners' own valuation of their lands.

Data from this current study provided more direct and clear insights regarding who owns Alabama's private nonindustrial timberland, how it is valued, and what motivations they have. About two-thirds of the total land surface area in Alabama is in forestland, and approximately 65 percent forest land is owned by small-scale nonindustrial private forests (NIPF) landowners (FIA 2008) (Figure 5). Forest industry (such as pulp mill and lumber mill) own 14% percent forest land in Alabama. There is no doubt that the size and structural variation of family forest landholdings has undergone dramatic change in the recent past (Birch 1996, DeCoster 1998, Mehmood and Zhang 2001, Butler and Leatherberry 2004) and Alabama is no exception (Smith et al. 2004, Pan et al. 2007).

The objective of this study was to identify the major determinants of timberland values by small-scale private landowners in Alabama by developing a hedonic price model which measured tract characteristics (tract size, site index, the age of the stand, lake or river presence, and road frontage), distance to nearest urban area, and income characteristics of landowners.

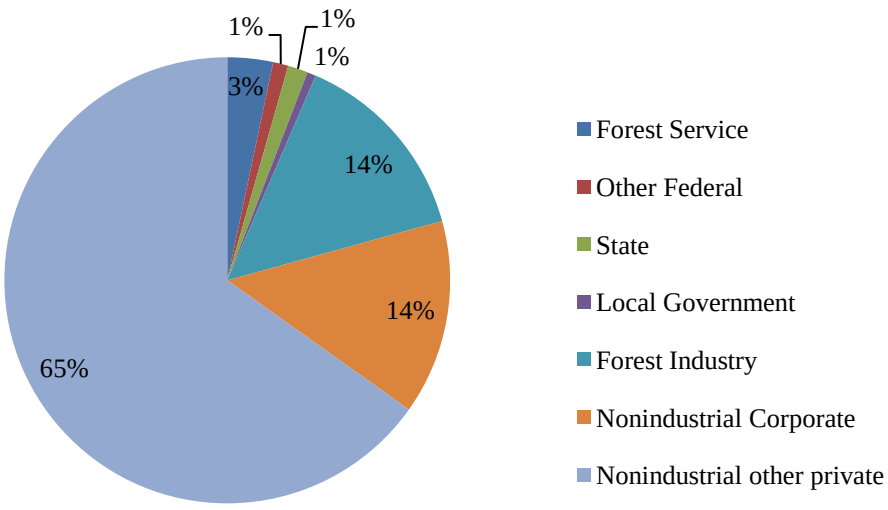

Figure 5 Percent of forestland in Alabama by ownership class, 2008.
Source: State Inventory Data Status. http://srsfia2.fs.fed.us/states/al/tables/AL_2008_tables.shtml. Forest Inventory and Analysis, 2008.

4.2 Methods

4.2.1 Study area

In Alabama, there are six generally accepted agricultural districts as delineated by the Alabama Agricultural Statistical Service (Prevatt 2000) (Figure 1). Counties located within each of the six geographic locations are similar in climate and soil type and usually have similar agricultural activities. Two counties in each of three districts: Marshall and Blount in District 2; Greene and Hale in District 4; and Butler and Conecuh in District 5 (Figure 6) were the focus of this study. Soil and timber types represented in these regions are presented in Figure 7 and Figure 8. These six counties were selected as representive of three particular regions in Alabama, so landowner attributes and attitudes could be compared across districts.

Located in the northern portion of the state, soils in Marshall and Blount counties were Appalachian Plateau type and derived from sandstone or shale (USDA 1993). Forests in this

region were primarily of upland hardwood (oak-hickory associates commonly containing *Liriodendron tulipifera*, *Ulmus* spp., *Acer* spp., and *Juglans nigra*), and comprised approximately 65% of the timberland area in Marshall County. Blount County had approximately 37% upland hardwood and 35% mixed woodland (oak-pine associates commonly including *Liquidambar* spp., *Carya* spp., and *Juglans nigra*), of total forested land in Blount County (Hartsell and Brown 2002). The population was predominately white (96%) in these counties with a total population of 57,441 persons in Blount County and 88,484 persons in Marshall County (US Census Bureau 2009). Blount and Marshall had a reported per capita income in 1999 of $16,325 and $17,089; and median ages 37.5 and 37.0 years, respectively (US Census Bureau 2009).

Green and Hale counties were located in the transition of the Coastal Plain and Blackland Prairie. Most of the soils were derived from marine sediments or alkaline combined with acid soil (USDA 1993). Of the forestland in this region, Green had an estimated 33.5% bottomland hardwood (oak-gum-cypress including *Populus* spp., *Salix* spp., *Fraxinus* spp., *Ulmus* spp., *Celtis occidentalis*, and *Acer* spp.), 25.4% upland hardwood, with the remaining 41.0% in pine and mixed woodland. Timber types in Hale County were predominately pine (33.8%) and upland hardwood (31.2%) (Hartsell and Brown 2002). In contrast to District 4, the population was predominately African American in Green (78.5%) and Hale (57.8%) counties. Hale was higher in population than Green county at an estimated 18,145 and 9,172 persons respectively. Green and Hale had per capita income in 1999 of $13,686 and $12,661; and median ages 35.9 and 34.4 years (US Census Bureau 2009).

Soils in Butler and Conecuh are of the Coastal Plain type and well suited for timber production. Timber in Butler County was predominately pine (47.9%) and mixed woodland

(20.9%). Conecuh County was also predominately pine (37.7%) and upland hardwood (24.7%) (Hartsell and Brown 2002). Butler County had population about 20,090 and was predominately white 56.9%. Conecuh County was also primarily white 55.7% with a total population of 13,066. Butler and Conecuh counties per capita income in 1999 were $15,715 and $12,964; and median ages were 37.7 and 38.0, respectively (US Census Bureau 2009).

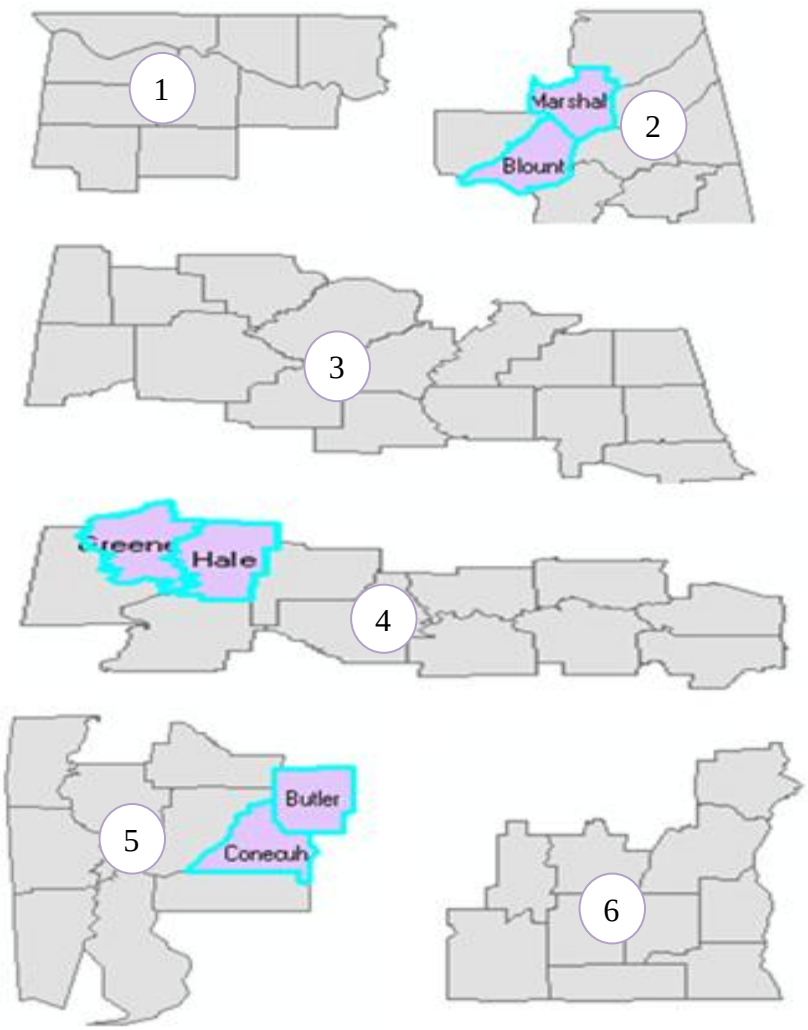

Figure 6 Alabama counties by District used to survey non-industrial private landowners as part of the Alabama Timberland Value Survey

Figure 7 Different soil types in different regions of Alabama.
Source: Map of the Soils in Alabama. http://www.mo15.nrcs.usda.gov/states/al_soils_graphic.html. USDA National Resources Conservation Service in cooperation with Alabama Cooperative Extension System. 1993.

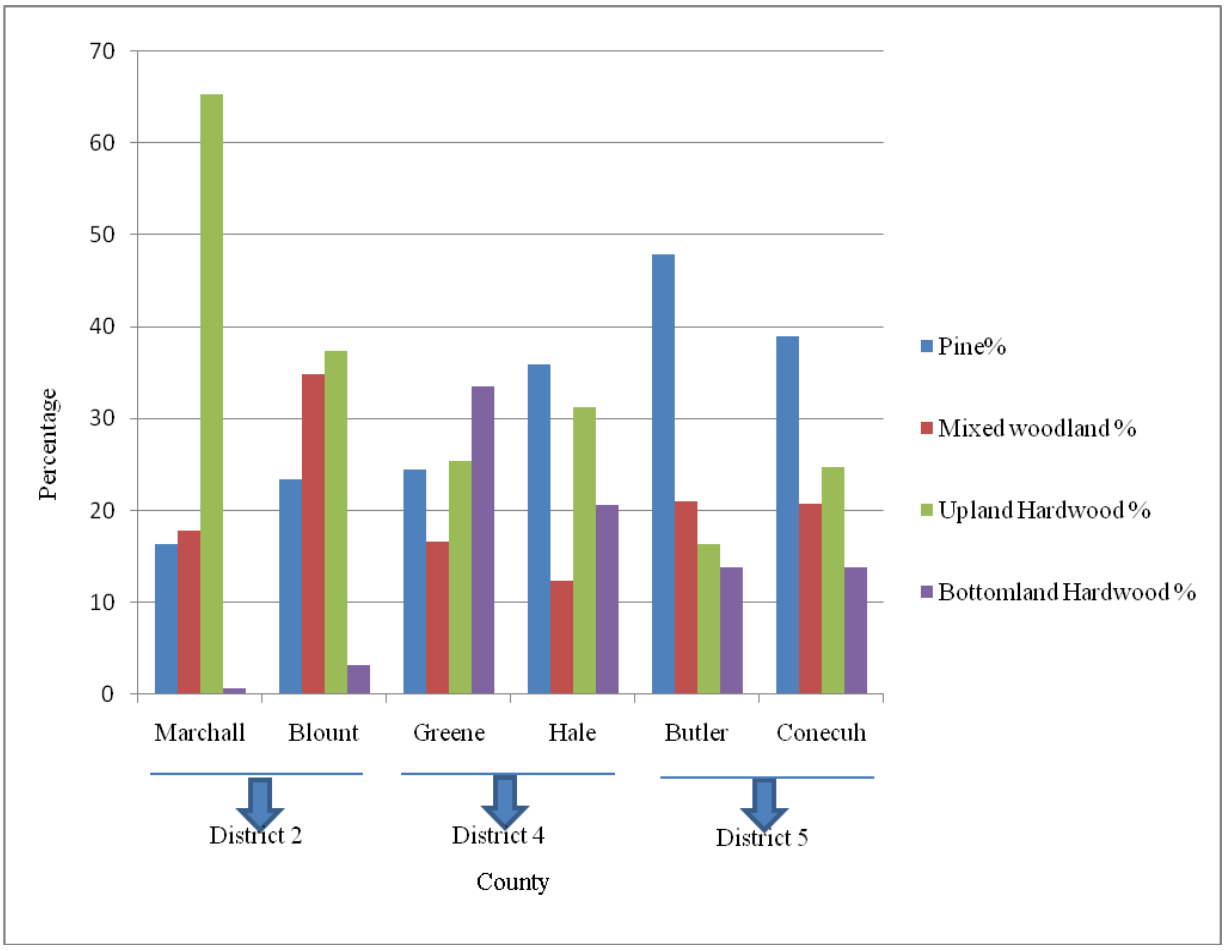

Figure 8 Percentage of different forest-type by Alabama County and District.
Source: Forest Statistics for Alabama, 2000. Table 4-Area of timberland by county: Marshall, Blount, Greene, Hale, Butler and Conecuh, and by forest-type group: Pine, Mixed woodland, Upland hardwood, and Bottomland hardwood, in 2000 Alabama.

4.2.2 Survey

A mail survey of Alabama landowners in the six county study area was conducted using a modified Dillman's Tailored Design Method (Dillman 2007). Surveys and a brief cover letter with an optional online survey website link were mailed in the first week of May 2009. The following week a reminder postcard with the survey website link was sent to those who had not yet responded.

Individuals surveyed represented small-scale forest landowners in the state. Using county tax roll information, 20% of NIPF landowners who owned between 10 and 500 acres in each county were surveyed. Landowners who owned parcels that were smaller than 10 acres or larger than 500 acres were omitted from this study so that the information on small-scale forest landowners could be highlighted. An estimated 7.5 million acres (approximately 49% of total area) in Alabama was owned in parcels that ranged from 10-499 acres in 2004 (Butler et al. 2005). Forestland owners who own parcels greater than 500 acres are often more likely to be timber production-oriented, while parcels less than 10 acres are often used for residential or development purposes, exclusively (Stephanie et al. 2007, Pan et al. 2007).

This study was developed in order to characterize the NIPF landowners in Alabama and determine their ownership objectives. Survey questions were developed to better understand objectives for owning land, the type of the forestland owned, and basic demographic features such as age, race, household annual income, occupation, and education, and their comments on factors affecting the market value of timberland.

To collect information on variables needed for the empirical analysis, respondents were also asked to provide information on the price of their most recently acquired forest lands, including tract size, presence of road frontage, presence of lake or river, age of the stand, if the

stand was forested or not, estimated site index of the parcel, and the distance to the nearest urban city (Appendix B). Timberland price per acre provided by landowners was used as a dependent variable similar to previous studies (Turner et al. 1991, Aronsson and Carlen 2000, Scarpa et al. 2000, Kennedy et al. 2002, Stephanie et al. 2007).

4.2.3 Theoretical model

In this study, the hedonic price model based on the county level cross-sectional data (six counties as a whole) was used to estimate the determinants of timberland values in Alabama. Because it was hypothesized that timberland prices are related to tract characteristics, distance to nearest urban area, and income characteristics of landowners, the conceptual model is as follows:

$$P=f\ (T,\ D,\ I)$$

Where *P* is forest land price, *T* is land tract characteristics, *D* denotes distance to nearest urban, and *I* denotes the income characteristics of the landowners.

Simple linear functional forms (linear, semi-log, and log-linear) are recommended as the most appropriate econometric approaches for a hedonic price model (Chicoine 1981, Cropper et al. 1988, Taylor 2003). In order to choose a more preferable functional form for this hedonic price model, lin-lin, lin-log, log-lin, and log-log forms were all tested using SAS 9.1 (SAS Institute 2001). When all factors were considered, the equation below was the most suitable.

$$lnPrice = \beta_0 + \beta_1 \mathrm{lnSize} + \beta_2 \mathrm{Road} + \beta_3 \mathrm{Lake} + \beta_4 \mathrm{Dis} + \beta_5 \mathrm{lnSite} + \beta_6 \mathrm{lnIncp} + \beta_7 \mathrm{age} + \varepsilon$$

Where *Price* is the timberland price per acre; *Size* is the size of timberland; *Road* and *Lake* are dummy variables. One denotes the presence of road frontage and the presence of a lake or river respectively; otherwise 0 means there was no presence of a road, lake, or river; *Dis* denotes the

distance to nearest metropolitan city; *Site* is site index, a measure of soil quality; *Incp* represents the income per capital at county level; *Age* is age of the stand.

Tract Characteristics

In previous studies, parcel size has been important in explaining variation in land prices. Many studies have found that a larger size parcel would lead to a lower price per acre (Turner et al. 1991, Roos 1996, Stephanie et al. 2007) and a smaller holding size would be worth more per acre because of increased importance on non-timber activities (Mehmood and Zhang 2001, Harrison et al. 2002, Nagubadi and Zhang 2005, Zhang et al. 2005, Zhang et al. 2009). In addition, non-timber related activities such as ecosystem diversity, aesthetics, recreation, and protection of privacy have been determined to increase timberland values (Haymond 1988, Bourke and Luloff 1994, Newman et al. 1996).

Age of a stand was expected to have a positive influence on timberland price since older trees are more valuable than younger trees, both economically and ecologically. High diversity of tree size and species can provide preferable wildlife habitat and enhance the benefits of scenic beauty (Hunter 1990, Burton et al. 1992).

The presence of road frontage was expected to have a positive effect on price because of increased access and convenience. The presence of a river or lake which enhances aesthetics, fishing and other recreational activities also increases land values. Therefore, the presence of river or lake frontage was expected to increase the price.

Site index is a measure of site quality and productivity based on tree height. It measures the ability of a site to grow trees and is based on the productive potential of a particular tree species at a given time and location. Therefore, it was expected that high site index will lead to

increases in timberland price (Roos 1995, Roos 1996, Aronsson and Carlen 2000, Scapa et al. 2000).

Distance

Distance to the nearest population area was expected to have negative influence on the timberland price (Chicoine 1981; Dunford et al. 1985; Folland and Hough 1991; Shi et al. 1997). Land closer to urban areas have the potential to receive higher rents and therefore higher per acre values than areas located at larger distances.

Income

Past studies have found that income level appeared to be an important explanatory variable affecting the utility function and owner's demands for multiple attributes of products and services from their forestland (Zhang et al. 2009). Therefore, increases in income would increase the demand for forestland, for either non-timber or timber uses. It was expected to have a positive impact on timberland price.

4.3 Results

4.3.1 Survey results

A total of 2,570 questionnaires were mailed. Of these, 197 were returned as undeliverable; and 424 responded for a response rate of 17.9%. Of these, 98 (18.4%), 89 (18.9%), 23 (28.0%), 46 (12.4%), 80 (19.0%), and 74 (14.9%) responses were from Blount, Marshall, Greene, Hale, Butler, and Conecuh, respectively.

From this survey, it was determined that Alabama forest landowners own land for a variety of reasons. No longer are these lands set aside for economic reasons alone. When results from all respondents were combined, the following reasons were found to be important reasons for ownership: to pass land on to heirs, to enjoy beauty or scenery, and for hunting or fishing (Figure 9). All three of the most frequently selected reasons were not associated with economic timber production, but instead non-timber issues.

When examined regionally, there were significant differences in NIPF landownership objectives among the northern, central, and southern regions. Northern region landowners prioritized their landownership for passing land on to heirs, forest aesthetics, part of farm or ranch, part of home or vacation home, and nature protection (Figure 10).

Central region landowners' primary objectives were for passing land on to heirs, hunting/fishing, timber production, and beauty/scenery (Figure 11). While landowners in the southern region, where farming and forest production are predominant industries, were found to own lands for passing land on to heirs, timber production, and hunting/fishing (Figure 12). Therefore, landowners in northern region were more likely to enjoy non-timber activities than landowners in the southern regions who focused more on timber motives.

As the study's focus turned to landowners' objectives based on differing tract sizes, small scale landowners, or those owning tracts of 10-100 acres, were more likely to enjoy owning their forest for non-timber activities (Figure 13). Larger scale landowners, who owned parcels ranging from 101-500 acres, were found to be more timber production-oriented in their objectives (Figure 14).

In addition, these respondents are older, white, well-educated, and wealthier. There were 0.5%, 1%, 10%, 29%, 27%, and 33% in the age range of 19-29, 30-39, 40-49, 50-59, 60-69, and

70 years or more, respectively. The respondents were predominately white (93%), and 80% of them had at least some college education. Sixty seven percent of respondents had at least $50,000 household annual income, and 33% $100,000 or more.

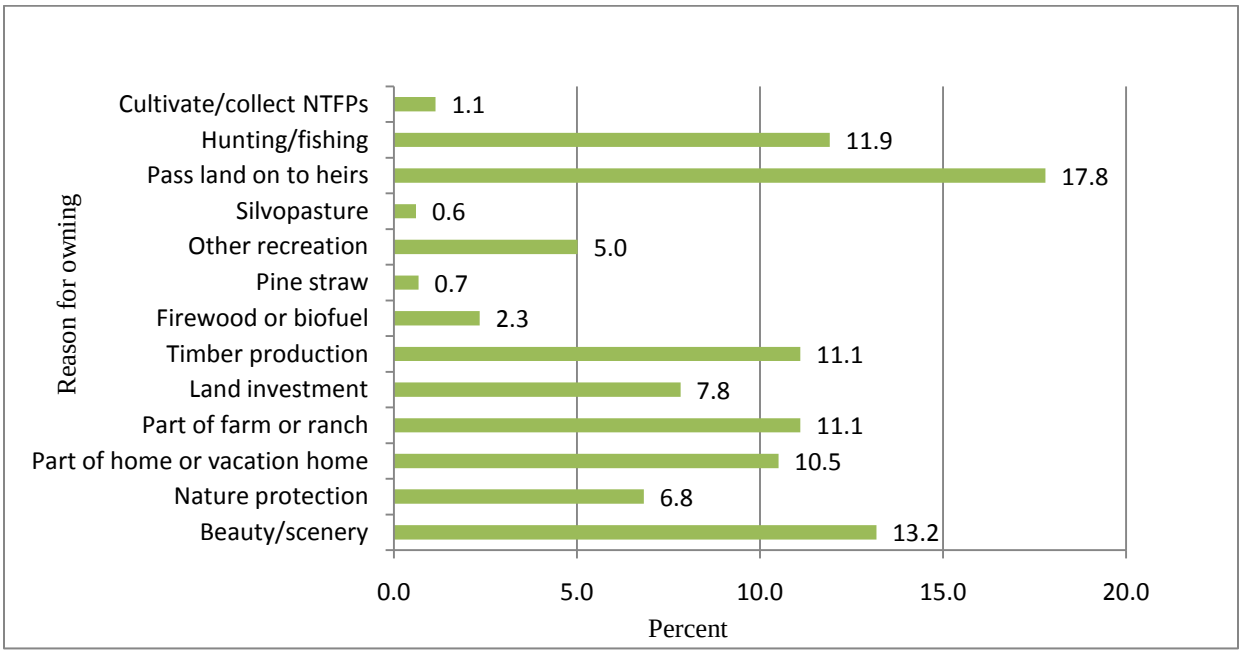

Figure 9 Statewide reasons for owning Alabama timberland in 2009 as reported by respondents to the Alabama Timberland Value Survey.

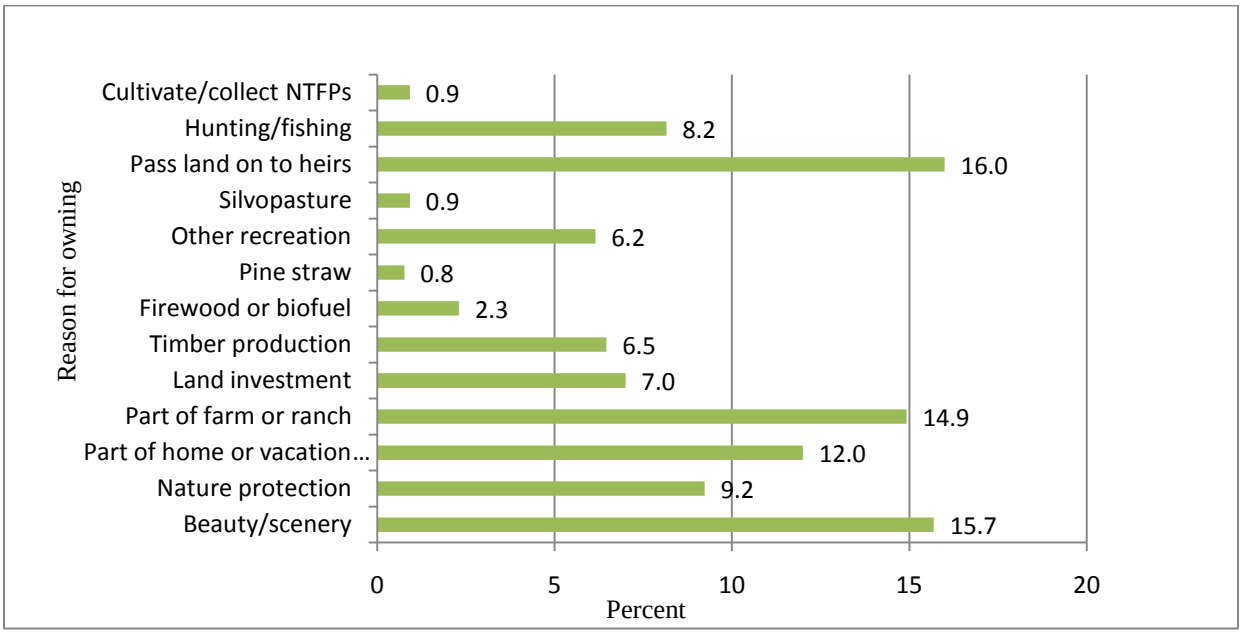

Figure 10 Northern region reasons for owning Alabama timberland in 2009 as reported by respondents to the Alabama Timberland Value Survey.

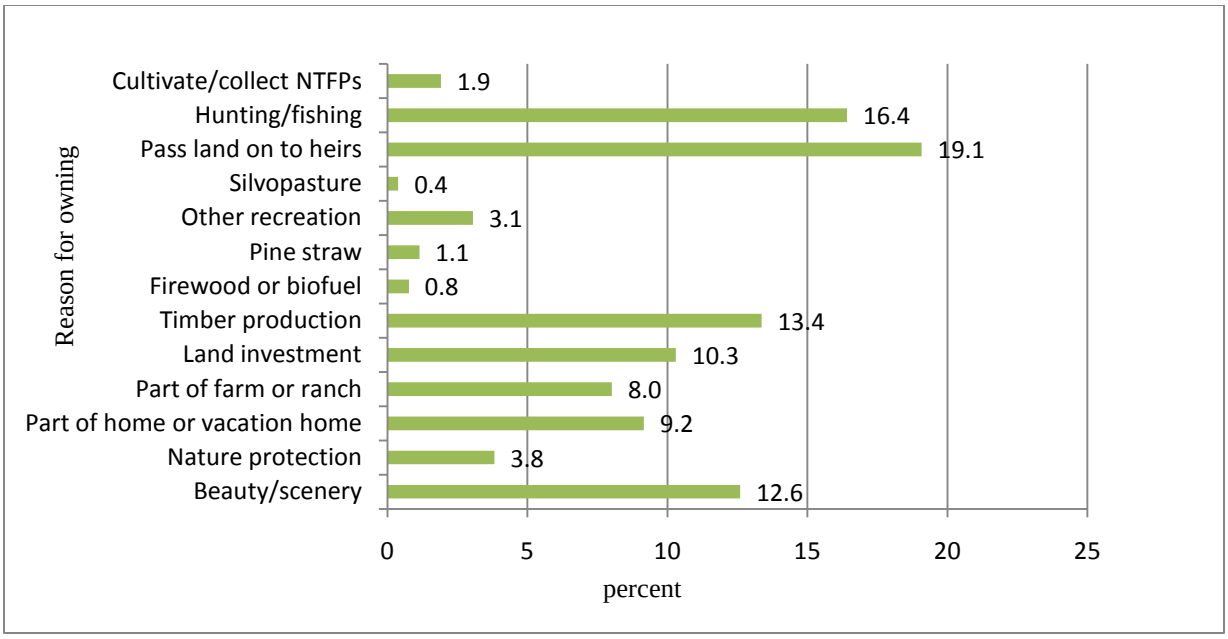

Figure 11 Central region reasons for owning Alabama timberland in 2009 as reported by respondents to the Alabama Timberland Value Survey.

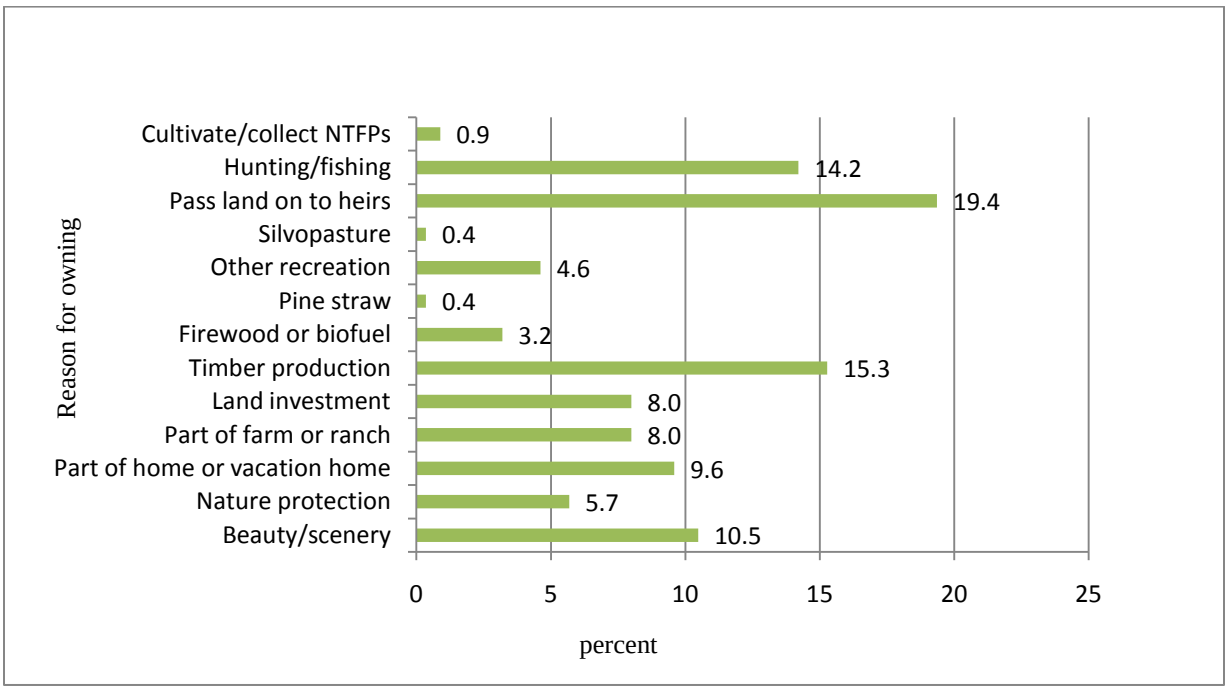

Figure 12 Southern region reasons for owning Alabama timberland in 2009 as reported by respondents to the Alabama Timberland Value Survey.

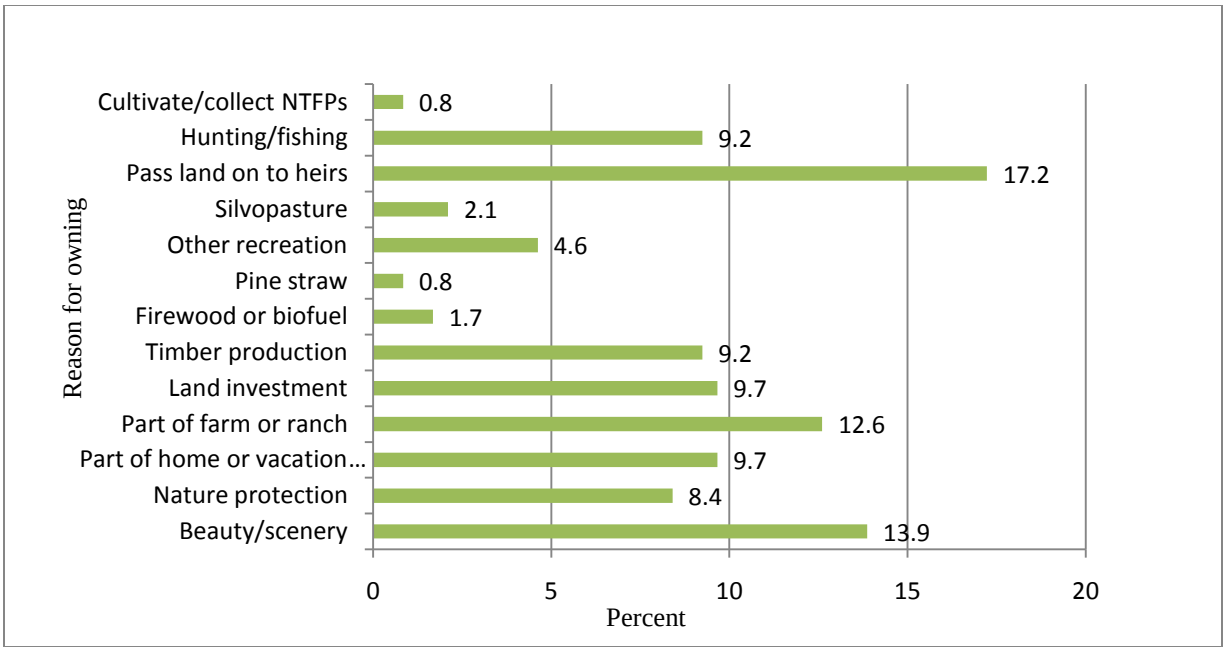

Figure 13 Reasons for owning Alabama timberland (tract size in 10-100 acres) in 2009 as reported by respondents to the Alabama Timberland Value Survey.

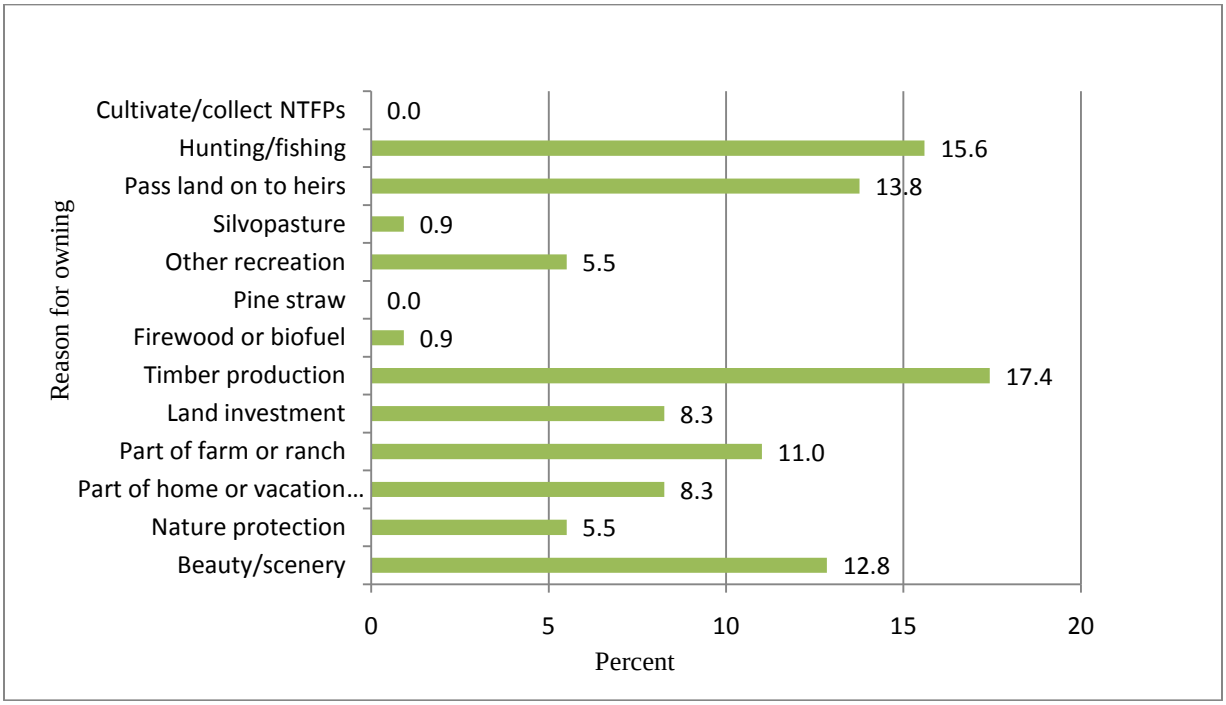

Figure 14 Reasons for owning Alabama timberland (tract size in 101-500 acres) in 2009 as reported by respondents to the Alabama Timberland Value Survey.

4.3.2 Model results

For the purposes of this study 77 observations were used for model estimation. Table 12 provided descriptions of all variables and data sources. Description and summary statistics for the variables used in the hedonic pricing analysis were presented in Table 13.

Table 12 Description of variables and data sources as used to develop a hedonic pricing model for Alabama timberland values.

Variable	Description	Expected effect	Data Sources
Price	Price of timberland per acre ($)		Alabama Timberland Value Survey
Size	Size of tracts (acres)	-	Alabama Timberland Value Survey
Age	Age of a stand (years)	+	Alabama Timberland Value Survey
Site	Site Index of timberland	+	Forest Inventory and Analysis Research Work Units (FIA) and Alabama Timberland Value Survey
INCP	Per capita income ($)	+	U.S. Census Bureau (2000)
Road	Dummy variable whether parcel fronts on a road (1,0)	+	Alabama Timberland Value Survey
Lake	Dummy variable whether parcel has lake or river (1,0)	+	Alabama Timberland Value Survey
Dis	Distance in road miles to the nearest urban areas (miles)	-	Alabama Timberland Value Survey

Table 13 Description and summary statistics of variables (N=77) as used to develop a hedonic pricing model for Alabama timberland values.

Variable	Variable Description	Mean	Std Dev	Minimum	Maximum
Price	Price of tracts per acre($)	2170.03	839.96	793	5000
Size	Size of tracts (acres)	93.49	107.72	10	500
Age	Age of a stand (years)	27.70	26.98	0	150
Site	Site Index of tracts	98.19	11.01	75.64	116.71
Dis	Distance to the nearest urban areas(miles)	46.79	32.00	10	250
INCP	Income per capita ($)	15723.47	1515.65	12661	20826
Road	whether parcel fronts on a road (1,0)	0.71	0.45	0	1
Lake	whether parcel has lake or river (1,0)	0.27	0.45	0	1

The estimations and test results from the ordinary least squares (OLS) model were presented in Table 14. Heteroskedasticity (non-constant error variance) arises often with cross-sectional data. Ordinary least squares was still unbiased and consistent whether we do not assume homoskedasticity, but the usual *t* statistics or *F* statistics could not be used for drawing inferences since OLS was no longer efficient. In this study, both the White test and Breusch-Pagan test in the model were not statistically significant at 10% level, which means heteroskedasticity was not of concern (Kennedy et al. 2002).

Another concern was that multicollinearity is often an issue with hedonic pricing model also (Kennedy et al. 1985, Stepanie et al. 2007). Employing a correlation matrix is a common method to investigate the issue of multicollinearity, testing for relationships among the independent variables. Stephanie et al. (2007) reported that no correlation exceeded 0.44 in their study. In this study, most of the correlations between any two independent variables were small; the largest correlation was 0.45 between site and size (Table 15). The variance inflation factor (VIF) was also used to test whether there is serious multicollinearity issue for each of predictors. Kennedy (1985) suggested that it is a serious indicator of multicollinearity when a VIF value is greater than 10. In this case, all independent variables were smaller than 1.5, which suggested that multicollinearity was not a serious problem with this model.

Of the seven explanatory variables in the model, five were significant. The *lnSize*, *Road,* and *lake* coefficients were statistically significant at the 1% level. Coefficient for *Dis* was statistically significant at the 5% level. *Age* was statistically significant at the 10% level, while *lnIncp* and *lnSite* had no impact on timberland prices since their coefficients were not statistically significant at 10% level.

The coefficient on *lnSize* showed that there was a statistically significant negative relationship between tract size and price per acre, which was consistent with most studies. For every 1% increase in size, the average price per acre fell by about 18%. The coefficient on *Lake* agreed with expectation, and determined that price of a forested tract will increase by 26% with presence of a lake or river. The coefficient on *Road* showed that the presence of road frontage for a tract will increase the timberland price by 21%.

The distance variable (*Dis*) measured the distance from a parcel to nearest metropolitan city in driven miles. The coefficient on this variable was significantly negative to timberland price per acre conformed to the expectation. From the mean distance (47 miles), for each 10 mile increase in the distance to the nearest urban area, the price of the parcel is expected to decrease by 2%.

The coefficient on *Age* did agree with the expectation that older age of forest stand increases price of a parcel. From the mean age (28 years old), for each 10 years increase in age of the stand, the price of the parcel is expected to increase by 2%.

The coefficients on *lnSite* showed that there was no relationship between site index and timberland price, which was not consistent with the hypothesis. In addition, the coefficient on *lnIncp* did not agree with the expectation that a higher income will increase the timberland prices.

Table 14 Estimation results from the hedonic pricing model to estimate timberland value for Alabama (Lnprice/acre as the dependent variable).

Variable	Coefficient	Standard Error	Variance Inflation Factor (VIF)
INTERCEPT	2.57	3.95	
lnSize	-0.18***	0.04	1.31
Road	0.21***	0.08	1.16
Lake	0.26***	0.08	1.03
Dis (10miles)	-0.02**	0.01	1.10
Site	0.006	0.004	1.46
lnIncp	0.52	0.39	1.21
Age	0.002*	0.001	1.12
R^2	0.42		
Adjusted R^2	0.36		
F-value	7.09***		
	Value	Significance	
White test	0.28	0.76	
Breusch-Pagan	0.61	0.75	
Number of Observations	77		

Note: *, **, and *** denote significance at 10%, 5%, and 1% levels.

Table 15 Estimation results from the correlation matrix method to test for relationships among the independent variables.

	lsize	road	river	dis	site	lincp	age
lsize							
road	0.09						
river	-0.01	0.13					
dis	0.01	-0.24	-0.002				
site	0.45	-0.04	-0.10	0.16			
lincp	-0.22	0.02	0.06	-0.13	-0.39		
age	-0.18	-0.26	0.02	0.10	-0.04	-0.06	

4.4 Discussion

4.4.1 Survey discussion

This study revealed that landowners in Alabama own land for a variety of reasons; with revenue from timber being a much lower priority than many non-timber activities. These results are consistent with other surveys such as "National Woodland Owner Survey", and previous literature (Haymond 1988, Hodge and Southard 1992, Butler and Leatherberry 2004, Butler 2008). Nationwide, the most common reasons for owning land as determined by the "National Woodland Owner Survey" was passing land on to heirs, enjoying beauty and scenery, and owning land as an investment (Butler and Leatherberry 2004). Butler (2008) found that the most commonly cited reasons were beauty/scenery, to pass land on to heirs, privacy, and nature protection. Similarly, Hodge and Southard (1992) found that the top three reasons for Virginia NIPF owners to own land was preserving nature, maintaining scenic beauty and viewing wildlife. Therefore, based on these findings, the hedonic model used for this study was more appropriate than traditional Fausmann models since non-timber values overweigh timber values for this population as well.

Landowners in different regions in Alabama had different objectives. Landowners in the Coastal plains paid more attention on timber production, while mountain region landowners were more likely to emphasize non-timber purposes. This finding was consistent to previous studies, and the factors which may explain these differences include historical land uses, site productivity, and local timber markets in the region (Kluender et al. 1999, Megalos 2000).

Many NIPF landowners are often unaware of the potential financial benefits to better land management. They often do not actively manage their forestland because of lack of

knowledge regarding opportunities and values of active forest management, low return from down timber markets, and lack of ability to practice forest management (Egan 1997). The "National Woodland Owner Survey" found that only 3% of owners had a written management plan while 16% have sought management advice.

Active forest management maintains forest health and results in a more productive forest, which in turn contributes to the sustainability of the resource, balancing and improving both non-timber and timber values at the same time. Non-timber objectives of those surveyed do not appear to exclude wood production. Alabama forests are primarily owned by non-industrial private landowners, and their status and management objectives are important to both the local economy and ecosystem as a whole. In these times of financial difficulty, information is needed to inform the public regarding ways to make their timberland work for them. Effective programs need be developed to engage landowners to actively manage so that they maximize benefits, both economically and ecologically.

The fact that many of the respondents to this current survey were older, white, well-educated, and wealthier, may explain why the most important reason to own land was to pass land on to heirs. The results are consistent to the "National Woodland Owner Survey" also where 62% of the landowners had at least some college; 68% of landowners were at least 55 years old; 95% of them were white; 54% of them had annual household income of at least $50,000 (Butler 2008). However, it is also important to note that the demographics of the respondents do not reflect the demographics of the communities as a whole. There is the distinct possibility that minority landowners did not respond to the survey. Efforts must be made to reach out to these landowners to better understand their needs.

4.4.2 Model discussion

Similar to prior studies, it was determined that a large tract size would lead to a lower price per acre (Turner et al. 1991, Roos 1996, and Stephanie et al. 2007). That also suggested that a smaller holding size would be worth more money per acre due to the increased importance of non-timber activities (including hunting, fishing, recreation, and other multiple uses). This is similar to results by Nagubadi and Zhang 2005, Mehmood and Zhang 2001, and Harrison et al. 2002. This result was also consistent with the survey finding on the relationship between landowners' objectives and their tract sizes, where small scale landowners were more willing to own their forest for non-timber activities than larger scale landowners.

As expected, the positive significance of the coefficient for the *Lake* variable was consistent with the literature in that, timberland with the presence of lake or river contributes to the higher value of land. The result displayed that the price of a forested tract will increase by 26% for the tract with the presence of a lake or river.

Not surprisingly, the presence of road frontage had significant positive impact on price of timberland, also consistent with other literature. Road frontage provides access to the tract, and can offer more opportunities for multiple uses.

Distance is an important factor affecting the timberland price. The proximity of a land to urban area that is more likely to be used for development will add value to land. Therefore, as distance to the nearest urban area decreased, the price of the parcel will sharply increase.

The coefficient on *Age* indicated that there was positive relationship between age of a stand and the price of a parcel. Timberland establishment can be costly and older trees are more valuable than younger trees. In addition, aesthetics, wildlife habitat, and recreational activities

such as hunting, are preferred in forested areas with high diversity of tree size and species, which may also explain why the price of timberland is affected by the age of the trees.

The results of this study found that there was no relationship between site index and timberland price. Because few landowners provided tract site index as part of their response, site index was estimated using average site index of the county where the parcel was located instead of the actual site index of the parcel. Site index estimates were derived from Forest Inventory and Analysis Research Work Units (FIA) and calculated as a weighted average of timberland acres by county and site class, in Alabama (Hartsell and Brown 2002). Therefore, site index estimate was not site specific, possibly making it a poor indicator in this study.

The coefficient on *lnIncp* indicated that there was no relationship between income and the price of a parcel, which was counter to expectation. Income per capita derived from U.S. Census Bureau (2009) was based on average estimates for the county and not specific to any given parcel. In addition, limited counties in this study may be the reason to explain why the price of timberland was not affected by the income per capita.

Overall, the results were consistent to previous survey results, based on examination of past literature. Non-timber values outweigh timber values to prices of forestlands, which was supported by the results that three variables, including size, road, and lake, are three most important determinants of forestland price.

Data from this current study provided more direct and clear insights regarding who owns Alabama's nonindustrial private timberland, why they owns timberland, how it is valued, both statewide and regionally. Prior authors have shown the utility of the hedonic price model, however, few studies have assessed landowners' own valuation of their lands. Land prices

valued by owners have the potential to eliminate the likelihood of sample selection bias and offer unbiased evaluation of land prices changes (Kiel and Zabel 1997).

4.5 Conclusions

The objective of this study was to identify major determinants influencing the value of timberland in Alabama by developing a hedonic price model, with particular interest from small-scale non-industrial private landowners' perspective. This study provided direct insight into Alabama landowners and their motivations. The results corroborates previous research such as "National Woodland Owner Survey", where non-timber attributes were found to be more powerful reasons for owning forestland for many NIPF landowners than were timber motives. Statewide, the most frequent reasons for owning forestland in Alabama were related to passing land on to heirs, beauty or scenery, and hunting or fishing. Regionally, landowners in southern region focused more on timber production, while northern region landowners were more likely driven by non-timber purposes. The majority of NIPF landowners who responded to this survey, were older, white, well-educated, and wealthier, with little active management on their lands.

The hedonic model analysis found that the size of a forested tract had a significantly negative relationship with regard to increased tract size and price per acre. The price of a forested tract will increase for the tract with presence of a lake or river, or with a road frontage. The coefficient on the distance to the nearest urban area was significantly negative to timberland price per acre. We also found that the price of a tract was closely associated with the age of the trees. A parcel with older trees would increase the price of forestland. Site index of the county where the parcel located and income per capita had no relationship with price of timberland in this study perhaps because of data used.

There are several implications for forest management and policy. Non-industrial private forest landowners play an important role in forest sustainability, including the sustainable production of timber, and the production of other goods or services, such as watershed protection, outdoor recreation opportunities, aesthetic enjoyment, wildlife habitats, carbon storage, soil conservation, and maintenance of air quality. However, this study confirmed that NIPF landowners in Alabama often do not actively apply forestry practice such as no timber cutting on their lands perhaps because they don't need financial return from lands, but want to protect the environment. Furthermore, they may be unaware of both economic and ecological benefits that come from active land management. Indeed, they often have objectives other than revenue products.

Also, there was the finding that NIPF landowners with multiple objectives for their land management lack information on how to better manage to achieve their objectives. Many people stated that they just leave the land as it is, not harvesting their timber, even if they would like to profit from their timberland. One respondent wrote, "I want to know how and where to get education about this information." And, most of the landowners in this study own mixed woodland, which is the combination of pine and hardwood.

Effective programs could be developed that engage small-scale NIPF landowners and encourage them to efficiently manage their forestland while collaborating with each other across property boundaries. Cooperative Extension and other outreach programs should deliver the information and education to NIPF landowners on the benefits and responsibilities associated with forest ownership. Small-scale landowners can take advantage of alternative income opportunities from forests, including agroforestry, pine straw, silvopasture, and collection of

non-timber forest products such as berries and medical supplement. Effort should continue to reach out to minority landowners who were underrepresented in this study.

Opportunities for relatively large-scale landowners include timber, hunting, and other outdoor activities. Universities should also embrace such programs as part of their curriculum to prepare their students with the education and skills needed to offer information and technical assistance of this nature to diverse population landowners.

In addition, this study provides a better understanding of forest attributes that are inducing high land prices. In order to promote optimal forestry development, policies should be formulated so as to fit forestry to the goals of the nonindustrial private forest landowners. Results from studies such as this one may be used to guide the development of cost-share programs to benefit small-scale landowners. Cost-share incentives are very popular with landowners and may entice landowners to actively manage their lands since cost-share funds support the various forestry practices, and may, in turn, increase the profits for them. Historically, landowners with relatively large forest acreage ownership who own land primarily for growing trees and to use for hunting are more likely to use cost-share funds (Kluender et al. 1999, Megalos 2000).

Future studies will further examine using alternative econometric techniques may improve the fit and estimation of the model. Because of data limitations, there was an uneven distribution of observations from different counties. Thus, the addition of landowners in these areas that were underrepresented may improve the estimation and usefulness of the model results. Additional potentially valuable variables that were not included in this study, such as specific site index estimates, seasonality effects, topography, and timber volumes may be included in the future. The addition of data on such variables may greatly enhance our knowledge about the determinants influencing timberland prices.

CHAPTER V

DISCUSSION AND CONCLUSIONS

5.1 2009 Alabama Rural Land Value

The "2009 Alabama Rural Land Value Survey" was developed based on a need to update rural land market information for Alabama. Prior to this current study Alabama rural land values from 1991 to 2000 were provided by the Department of Agricultural Economics and Rural Sociology at Auburn University. The United States Department of Agriculture and Census of Agriculture also provide some information about rural land values, however, neither of these sources includes the value of timberland, transition land, or factors that influence rural land values.

Rural lands are of marked importance to people for their cultural and ecological values. Increasingly, studies that focus on changes in rural land uses have occupied the attention of many researches, and others interested in the rural landscape and condition of the rural economy. In general, it is essential to understand the variation in land prices and uses, and factors responsible for the processes that change land-use patterns through time. As a composite good, both the economic productions as well as ecological services need to be considered.

Respondents in this current study explained that the drop in 2009 Alabama rural land prices was based on several factors. Reasons often included down economy, harder financial condition, low commodity price, high cost for input, slow sales, and depressed land market for

development. Shane et al. (2009) reported that the decline 2009 U.S. rural land values were primarily a result of the 2008-2009 world economic crises.

Respondents to the 2009 Alabama Rural Land Value Survey were not optimistic about rural land value in 2010. USDA (2009) stated that rural land prices may continue to slightly decline in 2010 because of the economic recession. However, it is projected that this downward trend will gradually stabilize and eventually be reversed. The agricultural sector may be better suited to withstand many of the negative impacts of the economic recession than other industrial sectors. Before the 2008/2009 world economic crisis, U.S. agricultural sectors had record-high farm income, exports, and prices with low farm mortgage interest rates, low inflation rates, and farm program support (Janssen and Pflueger 2009, USDA 2009). In addition, with this economic shift many people have opted for a more rural lifestyle, with the additional benefits of recreational activities, environment protection, and the creation of improved wildlife habitat on their lands.

The result of this study meets the pressing need of information for landowners, buyers, sellers, planners, appraisers, local and state governments, and tax assessors. However, the interpretation of results must be done cautiously since the results are based on averages for regions of Alabama. When using this data, individuals should consider reporting period, tract size, location, soil productivity, and surrounding land uses, when estimating the value of an individual tract. In addition, a variety of government policies such as property taxes, federal commodity support programs, local zoning, and environmental regulations, all have some bearing on rural land market values.

5.2 The Alabama Timberland Value

Non-industrial private forests are important to timber supply, and have the potential to play a stronger role in mitigating potential wood shortages. However, many landowners in Alabama do not appear to have timber production as a focus for their lands. Statewide, respondents in this study reported that the most important reasons for owning forestland in Alabama were to pass land on to heirs, beauty or scenery, and hunting or fishing. Regionally, landowners in southern region focused more on timber production, while northern region landowners were more likely driven by non-timber purposes. Results also revealed that NIPF landowners in Alabama often do not actively apply forestry practices on their lands. The reasons may include lack of knowledge regarding benefits and opportunities of active forest management, low return from timber, and lack of ability to practice forest management.

At the same time, their non-timber objectives do not appear to exclude wood production. One aspect of particular note was that landowners appeared to have the misconception that forest managed for timber precluded their objectives. They did not understand that active forest management can contribute to a sustainable forest ecosystem. For example, timber thinning can be used to improve overall forest health and vigor, creating wildlife habitat and recreation access, controlling forest density, releasing desirable tree species from competition, controlling forest insects and disease, and improving diversity (Gagonon and Johnson 2009). In addition, landowners can take advantage of alternative income opportunities from forests, like hunting, other outdoor activities, pine straw, and non-timber forest products such as berries and medical supplement because they are in market demand. Agroforestry could be an opportunity for landowners as well, which is the way to mix timber and agricultural crop or livestock production.

It can increase income, and provide environmental services such as watershed and soil protection and shade for livestock (Workman et al. 2002).

The demographics of respondents did not match that of the population of the areas surveyed. Most respondents to this survey were older, with approximately 60% of them reported to be at least 60 years old. This information may well explain their expressed desire to pass land on to heirs. Therefore, in the near future, new owners likely will have different backgrounds and objectives, and potentially less knowledge of forest management practices than previous owners. What were overarching objectives today, including timber production or enjoyment beauty/scenery, will likely shift as the transfer of lands to the next generation continues. It is also possible that the opinions of minority and female landowners were underrepresented in this survey. It is necessary to continue to improve our understanding of NIPF landowners so as to develop more informed outreach and effective policies.

Based on the findings of this research, there are important things to be considered to improve future survey of this nature, which can contribute higher quality and quantity data for meeting the objectives for further studies. The questions should be simple, clear, and understandable, for example, the phrase “predominant size” made some landowners report the size of trees rather than land acre. Other improvements would include underlining the major questions, applying a pre-test to the survey, and considering offering some incentives. If possible, send survey via email with an attached online survey link, making it easier for people to access.

Hedonic model estimation could be improved by further examining the selection bias using alternative econometric techniques. An additional survey of landowner focus groups may improve the estimation and usefulness of the model. Some potentially valuable variables may not

be included in this study, probably causing the coefficients of independent variable to be biased or inefficient. These variables may include seasonality effects of timber harvest, topography, government policies, and available timber volumes. The addition of data on such variables may greatly enhance our knowledge about the determinants influencing timberland prices.

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APPENDIX A

2009 ALABAMA RURAL LAND VALUE SURVEY

ALABAMA COOPERATIVE Extension SYSTEM
Alabama A&M and Auburn Universities

3301 School of Forestry & Wildlife Sciences
Auburn, AL 36849
(334) 844-8038

2009 ALABAMA

RURAL LAND VALUE SURVEY

Please take a few minutes to answer the Alabama Rural Land Value Survey. We ask that you report on the type of rural land uses that are common in the county and of which you have good market knowledge. **Please use a separate form for each county**. Feel free to **copy** this survey as needed to report on additional counties or to share it with other qualified respondents. **(Please Return By August 28, 2009)**

Name: _____ Occupation: _____

Address: _____

1. County on which you are reporting (**use a separate form for each county**): _____

2. Please give your estimate of the market value for **average** rural land in the above county based on the land use categories described. Also give your estimate of the predominant size tract and typical yield and pasture carrying capacity. (Land value only)

Land Use	Market Value Per Acre Now (Aug,09)	6mon.ago (Feb, 09)	Predominant Size	Productivity
	----------($/acre)-------			
Bare Cropland (without irrigation system)	_____	_____	_____ acres	_____ bu.soybeans/acre
Improved Permanent Pasture	_____	_____	_____acres	_____ acres/cow (stocking rate)
Unimproved Permanent Pasture	_____	_____	_____acres	_____ acres/cow (stocking rate)
Plantation Pine (land only, clear-cut)	_____	_____	_____acres	
Hardwood (land only, clear-cut)	_____	_____	_____acres	
Mixed Woodland (land only, clear-cut)	_____	_____	_____acres	
Plantation Pine (land and trees)	_____	_____	_____acres	_____ age (years)
Hardwood (land and trees)	_____	_____	_____acres	_____age (years)
Mixed Woodland (land and trees)	_____	_____	_____acres	_____ age (years)

------OVER----

3. Farmland and timberland moving into non-agricultural uses such as homesites, residential subdivisions, and industrial and business sites is referred to as "transition land." Please give you estimate of the *market value*, *average size*, and *distance from town* for the types of transition land listed below:

Transition Land	Market Value Per Acre		Average Size	Distance From Town
	Now	6 mon. ago		
	---------($/acre)---------		Total Acres	Miles
a.Undeveloped single homesites	_____	_____	_____	_____
b.Undeveloped residential subdivisions	_____	_____	_____	_____
c.Undeveloped commercial and industiral	_____	_____	_____	_____

4. Please give your estimate of the 2008 **cash rent** for the following (assume average farmland):

Bare Cropland (with irrigation) $ _____ per acre per year _____ (specify crop)

Bare Cropland (without irrigation) $ _____ per acre per year _____ (specify crop)

Peanut Quota Rent _____ ¢ per 1b. per year _____ (average 1bs. Per farm)

Improved Permanent Pasture $ _____ per acre per year _____ acres/cow (stocking rate)

Unimproved Permanent Pasture $ _____ per acre per year _____ acres/cow (stocking rate)

Woodland Pasture $ _____ per acre per year _____ acres/cow (stocking rate)

5. What is your opinion of the number of **timberland and farmland** transfers during the past 12 months compared to a year earlier (check one and give percentage estimate):

Timberland: ☐ Up by_____% ☐ No change ☐ Down by _____%

Farmland: ☐ Up by_____% ☐ No change ☐ Down by _____%

6. Based on current levels, where do you estimate **timberland and farmland** prices to be a year from now?

Timberland: ☐ Up by_____% ☐ No change ☐ Down by _____%

Farmland: ☐ Up by_____% ☐ No change ☐ Down by _____%

7. (Optional): We would appreciate any comments you might have about land prices, buyers/sellers, financing, leasing, or other factors affecting the market value of rural land. Please list them below:

_____

_____

The results of this survey will be returned to those that responded as soon as possible. Thank you for sharing your opinion of Alabama rural land values and cash rents with us.

APPENDIX B

ALABAMA TIMBERLAND VALUE SURVEY

3301 School of Forestry & Wildlife Sciences
Auburn, AL 36849
(334) 844-8038

ALABAMA
TIMBERLAND VALUE SURVEY

Please take a few minutes to answer the Alabama Timberland Value Survey. We ask that you report on values and uses of timberland that you currently own. **(Please Return By August 28, 2009)**

1. Do you have timberland in Alabama? ☐ Yes ☐ No (If no, please skip to #14)

2. Why do you own timberland in Alabama (you may check more than one)?

☐ To enjoy beauty or scenery	☐ To protect nature and biologic diversity
☐ Part of my home or vacation home	☐ Part of my farm or ranch
☐ Land investment (including lease to others)	☐ Timber production
☐ For production of firewood or biofuel (energy)	☐ Pine straw
☐ For recreation, other than hunting or fishing	☐ Silvopasture
☐ To pass land on to my children or other heirs	☐ For hunting or fishing

☐ For cultivation/collection of non-timber forest products (such as berries, and medical supplement)

☐ Others (please specify) _____

3. Please list month and year you obtained your most recent timberland parcel? _____

4. How did you obtain your most recent timberland? ☐ Purchased ☐ Inherit ☐ Gift

5. What is the predominant tree species on your most recent timberland acquisition (please select one)?

☐ Plantation Pine (land only, clear-cut)	☐ Plantation Pine (land and trees)
☐ Hardwood (land only, clear-cut)	☐ Hardwood (land and trees)
☐ Mixed Woodland (land only, clear-cut)	☐ Mixed Woodland (land and trees)

6. What is the parcel's distance to nearest city with a population of greater than 50,000 people (driving miles)? _____

7. Does the parcel front on a road? ☐ Yes ☐ No

8. Is the parcel on a lake or river? ☐ Yes ☐ No

9. What was the tax rate at the time you obtained the parcel? (if known) _____

10. Please complete the following information for the acquisition listed in #5 above.

Land Use	County	2009 Price Per Acre ($/acre)	Site Index	Predominant Size	Estimated Age
Plantation Pine (land only, clear-cut)					
Hardwood (land only, clear-cut)					
Mixed Woodland (land only, clear-cut)					
Plantation Pine (land and trees)					
Hardwood (land and trees)					
Mixed Woodland (land and trees)					

11. Why did you obtain your most recent timberland? (You may check more than one)?

- ☐ To enjoy beauty or scenery
- ☐ To protect nature and biologic diversity
- ☐ Part of my home or vacation home
- ☐ Part of my farm or ranch
- ☐ Land investment (including lease to others)
- ☐ Timber production
- ☐ For production of firewood or biofuel (energy)
- ☐ Pine straw
- ☐ For recreation, other than hunting or fishing
- ☐ Silvopasture
- ☐ To pass land on to my children or other heirs
- ☐ For hunting or fishing
- ☐ For cultivation/collection of non-timber forest products (such as berries, and medical supplement)
- ☐ Others (please specify) _____

12. Where do you live?

- ☐ In the county where the parcel is located
- ☐ In a county adjacent to the county where the parcel is located
- ☐ In another Alabama county (not the county or adjacent county to where the parcel is located)
- ☐ In a state other than Alabama

13. Do you plan to sell any timberland in the future? ☐ Yes ☐ No

14. Do you plan to purchase any timberland in the future? ☐ Yes ☐ No

15. Do you currently own a portable sawmill? ☐ Yes ☐ No

16. If no, would you be interested in joining into a cooperative agreement with a portable sawmill owner to operate on your land? For example: in this agreement the portable sawmill owner would mill timber from your property and the profits from the sale of the timber would be shared.

- ☐ Yes, I am already in an agreement like this with a portable sawmill owner
- ☐ Yes, I am interested in this type of an agreement
- ☐ No, I am not interested in joining a cooperative agreement with a portable sawmill owner. The primary reason that I am **not** interested is _____

17. What is your age?

- ☐ 19-29 years old
- ☐ 30-39 years old
- ☐ 40-49 years old
- ☐ 50-59 years old
- ☐ 60-69 years old
- ☐ 70 years old or more

18. What is your race?

- ☐ American Indian
- ☐ Asian
- ☐ Black or African-American
- ☐ Native Hawaiian or other Pacific Islander
- ☐ White

19. What's the best estimate of your household annual income?

- ☐ Less than $25,000
- ☐ $25,000 to 49,999
- ☐ $50,000 to 99,999
- ☐ $100,000 to $199,999
- ☐ $200,000 or more

20. What the highest degree or level of school that you have completed?

- ☐ Less than 12th grade
- ☐ High school grade or GED
- ☐ some college
- ☐ Associate or technical degree
- ☐ Bachelor's degree
- ☐ Graduate degree

21. Occupation: _____

22. (Optional): We would appreciate any comments you might have about land prices, buyers/sellers, financing, leasing, or other factors affecting the market value of timberland. Please list them below:

_____

_____

_____

The results of this survey will be returned to those that responded as soon as possible.

Thank you for sharing your opinion of Alabama timberland values and information with us.

APPENDIX C

ALABAMA FARM REAL ESTATE VALUES AND INDEX NUMBERS

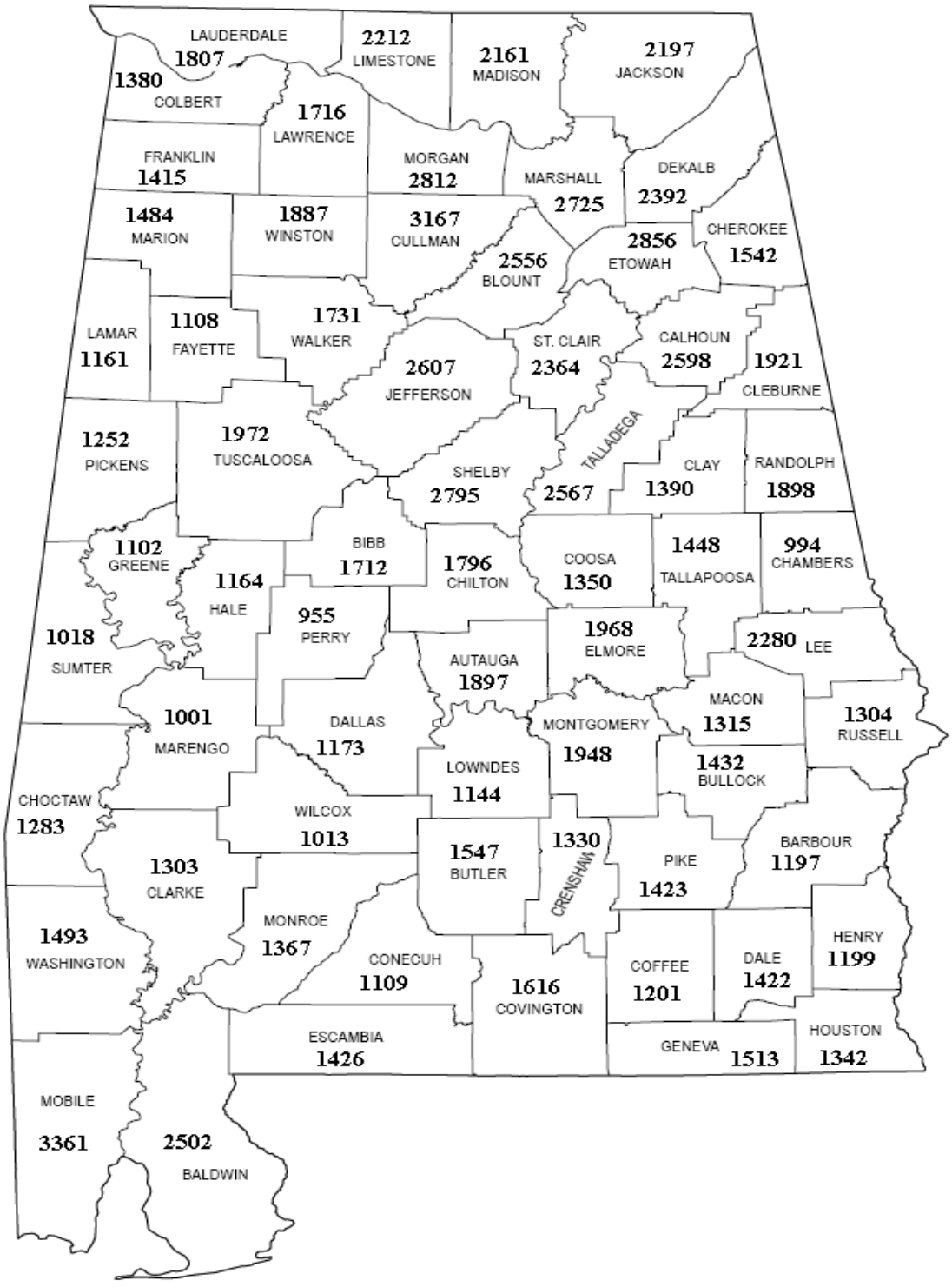

Figure 14. Average Alabama Farm Real Estate Values, 2002.
Data source: 2002 Census of Agriculture-County Data.
http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Alabama/index.asp. United States Department of Agriculture National Agricultural Statistics Services (USDA). 2007.

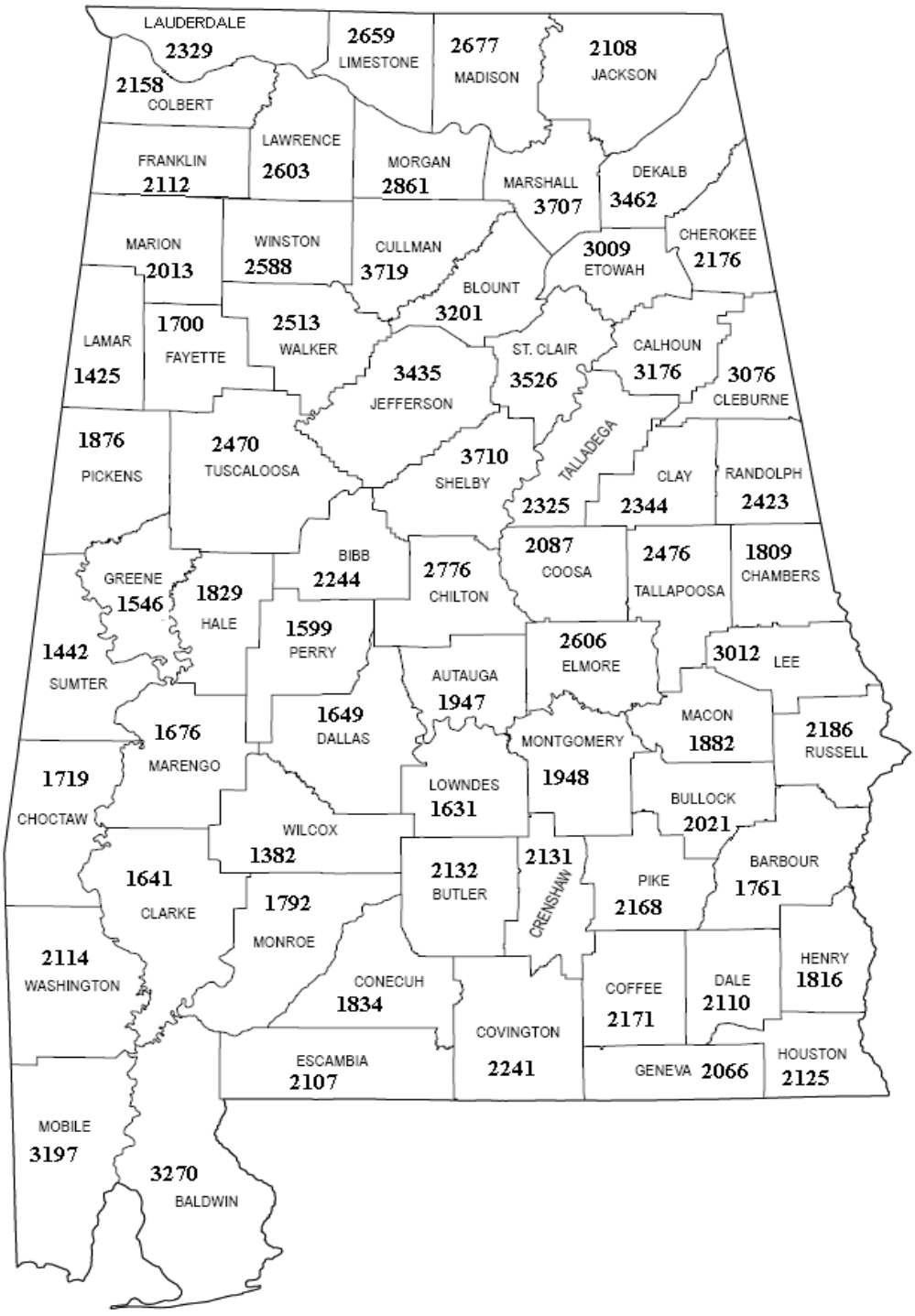

Figure 15. Average Alabama Farm Real Estate Values, 2007.
Data source: 2007 Census of Agriculture-County Data.
http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Alabama/index.asp. United States Department of Agriculture National Agricultural Statistics Services (USDA). 2007.