An In Depth Review of Timberland Valuation

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Appraisal Regulation
Appraisal Regulation

- FIRREA - Financial Institutions Reform Recovery and Enforcement Act of 1989
  - Enabled appraisal licensure
  - Extended federal regulation over real estate appraisal of insured banks
  - Protects banks (ultimately federal government) from perceived appraisal risks
Appraisal Regulation

• ERISA - Employment Retirement Income Security Act of 1974
  – Sets ground rules for institutional real estate investments
  – Recommends designated appraisers, but no specific standards required
Appraisal Regulation

- **USPAP - Uniform Standards of Professional Appraisal Practice**
  - Real Estate Appraisal Standards and Ethics - *The appraisal rulebook*
    - By far the most important appraisal regulatory source
    - Updated periodically by federally approved Appraisal Standards Board (ASB)
Appraisal Regulation

• State Real Estate Appraisal Licensure
  – The most important appraisal regulatory source
  – Mandatory in most states for all appraisal practice
  – Non Mandatory – Non federally related appraisals do not require licensure
  – Governed by USPAP
Appraisal Regulation

- Yellow Book - Uniform Appraisal Standards for Federal Land Acquisitions 1971
  - Occasional revisions
  - Relates to valuation for direct federal land acquisitions and shared funding
Appraiser Qualifications and Regulation
Appraiser Qualifications/Regulation

- The federal Appraiser Qualifications Board (AQB) categorizes licensed appraisers into four classifications
  - Appraiser Trainee
  - Licensed Residential Real Property Appraiser
  - Certified Residential Real Property Appraiser
  - Certified General Real Property Appraiser
Appraiser Qualifications/Regulation

• Residential - Majority of practicing appraisers
  – Non-complex residential properties of 1 to 4 units

• Commercial - Need Certified General license, far fewer in number
  – Qualified to appraise all types of real property
Appraiser Qualifications/Regulation

• Timberland is one of many specialties of commercial appraisal
  – Timberland / Agricultural
  – Office
  – Industrial
  – Retail
  – Self Storage
  – Multi-family
  – Manufactured Housing Communities
  – Hospitality
  – Health Care / Congregate Care
  – Golf courses
Appraiser Qualifications/Regulation

• Professional Commercial Designations
  – MAI - Appraisal Institute commercial designation (formerly Member, Appraisal Institute)
  – ARA (Accredited Rural Appraiser) - designation from American Society of Farm Managers and Rural Appraisers (ASFMRA)
  – Other professional groups in Europe, Australia, and New Zealand
Appraiser Qualifications/Regulation

• Forestry Qualifications
  – 2 Year Associate’s Degree - often referred to as technician or internationally as forest engineer
  – 4 Year Bachelors of Science - usually regarded as professional forester
  – Masters Degree - many specialties including Forest Business, Mensuration, Finance, Economics, Resource Management
    • Many do not require undergraduate forestry degree
  – State-Required Forestry Licenses and Certifications exist in many states
    • Required for practicing “forestry” for a fee
    • Sometimes required for timber only valuations
Appraiser Qualifications/Regulation

• BS Finance and MBA
  – Includes much of the same financial training as commercial appraisal
  – Many commercial appraisers start with this
  – Rarely includes much regarding natural resources
Appraiser Qualifications/Regulation

• Qualifications for timberland valuations:
  – Must understand timber economics
    • Professional forestry training in timber growth and management
  – Must understand land economics
    • Professional real estate appraisal training for rural land and higher and better use evolution
  – Best firms combine expert forestry and specialized forest valuation expertise
  – BS or better in forestry, along with licensed, preferably designated real estate appraiser
Appraisal Definitions
Appraisal Definitions

• Fee Simple Estate
  – “Absolute ownership unencumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power and escheat.”

• Real Estate
  – “Physical land and appurtenances attached to the land, e.g., structures.”
  – Depending upon who is regulating may or may not include timber or other crops or minerals

• Bundle of Rights Theory
  – “The concept that compares property to a bundle of sticks with each stick representing a distinct and separate right of the property owner.”
Appraisal Definitions

- Partial Interests - Part of the Bundle of Rights
  - Surface
  - Minerals
    - Surface - Aggregate, traprock, water
    - Deep - Coal, oil and gas
  - Timber
    - A severable crop, usually goes with fee simple interest or with surface if minerals are separate
  - Easements
Appraisal Definitions

• In today’s environment, land/surface, timber and mineral rights may be split into separate ownerships and may be valued in any combination
Timberland Investment Characteristics

Timber & Land Attributes
Timber Attributes

**Timber**

– A crop which
  
  • grows in absolute volume and relative value
  • but **trees** grow at an ever decreasing percentage measured year over year
Timber Attributes

Parameters of Timber Growth

- **Tropical Plantations - Highest growth rates**
  - Can mature in as little as seven years (tropical pulpwood - eucalyptus, gmelina, acacia, etc.)
  - Well managed plantations may grow in volume by a sustained economic and biological rate of 10% - 15% per year

- **Natural Forests - Lowest growth rates**
  - May take 100 years - Highest quality northern veneers such as maple or sitka spruce
  - May grow as little as 1% per year
Timber Attributes

Timber Volume & Percent Growth
Natural Pine, Southeastern U.S.

- Total Volume
- Annual Percent Growth

Age:
10 15 20 25 30 35 40 45 50 55 60

Total Tons per Acre:
0 10 20 30 40 50 60 70 80 90 100

Percent Growth:
-5.0% 0.0% 5.0% 10.0% 15.0% 20.0%
Timber Attributes

Timber Volume & Value Growth
Without Product Upgrade
Natural Pine, Southeastern U.S.

<table>
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<tr>
<th>Age (Years)</th>
<th>Total Volume</th>
<th>Total Value ($)</th>
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<tr>
<td>60</td>
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Timber Attributes

Parameters of Value Growth

• **Tropical Plantations** - Highest value production rates
  – May upgrade from fiber to veneer in seven years - Eucalyptus, tropical pines, etc.

• **Temperate Plantations** - Medium value production rates
  – Pine - US South - May upgrade from fiber to chip-n-saw or small sawtimber in 15 years

• **Temperate Natural Forests** - Lowest value production rate
  – May take twenty five years or more for first upgrade from fiber to chip-n-saw or small sawtimber
  – Technologies are rapidly changing to take advantage of product upgrades in smaller plantation logs.
  – Uneven age management systems carrying high volume can produce high returns
Timber Attributes

Timber Volume & Value Growth
With Product Upgrade
Natural Pine, Southeastern U.S.

Total Value ($/Acre)

Sawtimber
Chip-n-saw
Pulpwood

Total Value

Age

Tons per acre

0 10 15 20 25 30 35 40 45 50 55 60
0 20 40 60 80 100 120 140 160 180

$0 $1,000 $2,000 $3,000 $4,000 $5,000 $6,000

79.5% 48.7% 33.2% 23.3% 16.1% 10.1% 4.5% 1.3% 8.1%

184.2%
Timber Attributes

Timber Volume & Value Growth Rates

*Natural Pine, Southeastern U.S.*

- Timber Volume Growth Rate
- $ Per Ton Growth Rate
- Total Timber Value Growth Rate

![Graph showing timber growth rates](image-url)
Land Attributes

Highest & Best Use

• Physically Possible
  – Size, shape, terrain and accessibility of land, etc.

• Legally Permissible
  – Private restrictions, zoning, environmental regulations, etc.

• Financially Feasible
  – Which potential uses are likely to produce an income

• Maximally Productive
  – Use that produces highest residual land value
Land Attributes

Highest and Best Use may range from:

- Purely commercial timberland
  - very rural
  - often mountainous or wet
Land Attributes

• Transitional lands
  – located within hour or two of metropolitan areas
  – must recognize effect of population growth over time in timber growth horizon
  – recreational potential
    • hunting
    • sports
    • proximate to tourist destinations like ski resorts, snowmobile trails, horse trails, water features, parks, national forests, etc.
Land Attributes

• Higher and better use
  – clear demand for other uses such as residential subdivisions, land fills, etc.
Land Attributes

• Higher and better use with restricted rights, i.e., conservation easements, surface use limits, etc.
  – Increasingly common to establish working forest easements to
    • protect conservation values
    • prevent subdivision
    • prevent development
Land Attributes

• Timberland appraiser must interpret market
  • Appropriately emphasize market analytical techniques which have been evolving steadily over past decade
  • Moving from static, long term timberland to recreational or eased
  • Increasing land values are shortening timberland investment horizons
  • Requiring analyst to allocate increasing values to land in timberland investments
Land Attributes

Total Sales Price per Acre vs. Size

- Updated $/Acre
- Log. (Updated $/Acre)
Appraisal
Uses &
Timberland
Appraisal Process
Appraisal Uses

The three main purposes for timberland appraisals:

1. Acquisition due diligence / acquisition value booking
2. Interim valuations, or reappraisals
3. Disposition valuation
Timberland Valuation Process

COST APPROACH

Comparable Timber Sale Data

Retail Timber Value Estimate (Subject Timber Units by Unit Values)

Land Value Allocation (Est. Unit Values X Subject Units)

Initial Subject Value Estimate

(Timber Value + Land Value)

Plus or Minus % Timber Discount or Premium

Adjusted Subject Value Estimate

(Adjusted Timber Value + Land Value)

Value Estimate

Final Value Allocation

SALES COMPARISON APPROACH

Comparable Timberland Sale Data

Timber and Land Allocations

Sales Comparison Data Presentation

Adjusted Comparable Timber Unit Values

Land Comp Adjustment Process

Adjusted Comparable Land Unit Values

Reconciliation of Separately Adjusted and Summed Land and Timber Comparables

Value Estimate

RECONCILIATION

Final Value Allocation

INCOME APPROACH

Market Expense Data, Growth Yield Output, Rate Surveys, Etc.

Harvest Schedule Projections

Projected Retail Timber Sales (Volumes X Retail Unit Values) over Holding Period

Management, Sale Expenses, Taxes, Other Income, etc.

Reversion Calculation

Projected Cash Flow Statement (10 - 50 Years)

Evaluation of Risk; Choice of Discount Rate; Discounting of Cash Flows

Value Estimate

Final Value Estimate
Timberland Appraisal Process

Three approaches to value
- The cost or component value approach
- The sales comparison approach
- The income approach
Appraisal process intends, by three approaches, to independently verify value as much as possible.

However, important interrelationships exist:

- Retail timber values must come from timber sale data
- Discounts to retail timber values must come from comparable sales or discounting
- Land values may come from “bare” land sales, or allocations from timberland sales
Timberland Appraisal Process

Various parallel methodologies exist, some better than others.

• All depend upon possessing detailed information about land, timber and timberland markets.

• In particular, the analytics rely upon assiduous allocation of timberland and timber comparable sale components, the “spreadback” process
Timberland Appraisal Process

The financial community naturally tends to rely upon income approach analytics:

• However, internal income approach components largely come from allocation analytics from timber and timberland comparables
Cost Approach
Cost Approach

The component, or cost approach, valuation, i.e., the timber value plus the “bare land” value

- May mean different analytics to different analysts
- Unit “rule” - be careful adding separate components together, it doesn’t mimic market behavior and may overestimate value
  - This is true where timber financial growth is lower than the discount rate.
  - Where timber financial growth exceeds discount rate, may underestimate value
- **Key** - Component valuation needs to be checked against comparable sales to gauge whether market is discounting off retail timber values or large land sizes.

When diligently performed, the cost approach produces a good benchmark of value and is widely practiced by buyers and sellers
Cost Approach

All timberland valuations start with an estimate of retail timber value, which is a cost approach technique.

Starts with subject timber inventory, which defines retail units, including:

- Species
- Pulpwood
- Chip and saw, or small sawtimber
- Sawtimber
- Veneer, peelers, plylogs, etc.
- Poles
Cost Approach

Timber valuation is no better than quality of inventory, including land area calculations!

- Unit madness - volume versus weight
- Species by diameter by volume by product class
- MBF, thousand board feet - US has medieval measures which obscure timber volumes and values, discourage international investors
  - International
  - Scribner
  - Doyle
- Tons, short or metric
- Cords
- Cubic meters, sometimes kilos or cunits
Cost Approach

Merchantable Timber Value Estimate

Market research to determine timber values, either on delivered or stumpage basis, depending upon structure of timber market. Sources include:
- Subject sales
- Surveys of market participants
- Price reporting services

Stumpage versus Delivered
- Depends on market structure
- If delivered, then need logging and trucking (cut and haul) costs
- If delivered, one must reconstruct trees all the way back to the stump, a very risky process
Cost Approach

Premerchantable Timber Value Estimate

- As merchantable ages have decreased, premerchantable timber has become principal component of many investments, particularly southern pine and high yield tropical plantations.

- Premerchantable analysis can be 40% - 60% of timber value.

- Discounted cash flow analysis or occasionally cost forwarding.
Cost Approach

Premerchantable Timber Value Estimate - Cont.

Analysis needs:
• Acres by age class
• Tree stocking, generation of improved or cloned stock
• Site productivity estimates, i.e., tons per acre per year, MBF per acre per year, cubic meters per hectare per year, etc.
  – What is average or segmented volume composition at age of merchantability?
Cost Approach

Premerchantable Timber Value Estimate - cont.

• Silvicultural treatments
  – Planting costs
  – Herbicide treatments
  – Fertilization treatments
• Holding costs
  – Annual taxes
  – Annual forest management fees
• Holding incomes
  – Annual recreational lease income
• Disposition income
• Discount rate

Put all of these factors together and it produces an estimate of value for each age class.
Cost Approach

Land Value Allocation

For large timberland investments, only real source of land value allocation is from comparable sale spreadbacks.

- Small land sales always have higher per acre price
- Large transactions of “bare” land don’t exist. Always have some timber value.
- Soil Expectation Value (SEV) - A discounting process that produces a residual value to the land
  - No longer a meaningful estimate of land value in the era of HBU

Therefore, if land value exists, it typically is sourced from Sales Comparison Approach.
Cost Approach

Land Value Allocation

However, many northern or emerging regions show no land value. Retail timber value exceeds the sale price. Then the discounts in sale comparables must be derived, as follows:

Applicable Mkt. Derived Discount (%) =

Comparative GTV - Comparable Total Sale Price To Gross Timber Value

Comparative Gross Timber Value

Inversion usually employed, termed Timber Capital Value (TCV) Ratio, or Gross Timber Value (GTV) Ratio:

GTV Ratio (%) =

Comparative Total Sale Price

Comparative Gross Timber Value
Cost Approach

Concluded Estimate

Add it up:
Land value allocation estimate plus estimated timber value, or

Retail timber value X GTV ratio
Sales Comparison Approach
Sales Comparison Approach

The Appraiser’s Black Art!

If done with assiduity, involves spreading sales price value to each component of comparable sale

• Land value, by land type
  – Productive forest
  – Wetland
  – Agricultural
  – Etc.

• Timber Value by product class and volume
  – Sawtimber by species and diameter
  – Chip and saw
  – Pulpwood by species group
    • Hardwood
    • Softwood

• Premerchantable by age class
Sales Comparison Approach

Sales Adjustment Grid Analysis

• Adjusts overall sales price by
  – Interest conveyed
  – Financing
  – Conditions of sale

• Adjusts land and timber components, separately if possible, by
  – Market conditions (time)
  – Location
  – Size
  – Land
    • Utility
      – Access
      – Topography
      – Soils
  – Timber
    • Quality
    • Species mix
Sales Comparison Approach

Comparable Sales produce a series of separate unit prices for application to the subject units

Then subject value is reassembled for a total value estimate

The various separate estimates are then reconciled to produce a Sales Comparison value estimate

The most credible analyses manage to:
- Bracket the subject value between comparables of similar size, type, location, etc.
- Require the least amount of adjustment
- Weight the most comparable sales in the reconciliation
Income Approach
Income Approach

Important to recognize the difference between market value and investment value.

Market Value - “the most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition are the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby

- The buyer and seller are typically motivated;
- Both parties are well informed or well advised, and acting in what they consider their best interests;
- A reasonable time is allowed for exposure in the open market;
- Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and
- The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.”
Income Approach

**Investment Value** - “the specific value of a property to a particular investor or class of investors based on individual investment requirements; distinguished from market value, which is impersonal and detached.”
Income Approach

Income Approach Steps

• Market Analysis
• Income and Expense Analysis
• Valuation
Income Approach

Market Analysis

• Profile of timberland markets
• If cost approach and sales comparison approaches already performed, much of this work has been completed
  – Have learned general picture of what market is seeking:
    • Timber types
    • Physiographic regions
    • Timber markets
    • Land markets
  – Have estimate of subject retail timber values, the most important cash flow variable
  – Know subject land values for reversion calculation, with timber the second most important cash flow variable
Income Approach

Income and Expense Analysis

Research variables in market
- Market management costs
- Market recreational lease & misc. incomes
- Market oriented silviculture and associated costs
- Range of market discount rates - various sources
- Market analytics – DCF length, reversion calculation, etc.

Know subject attributes
- Retail timber values
- Timber productivity and historic silviculture
- Management costs
- Taxes
- Legal restrictions
- Lease income
Income Approach

Discount Rates - Risk Analysis

- Most timber markets depend upon US demand
- Most timberland investments gauged by US timberland return expectations
  - Low US returns causing investment elsewhere
- US wood supply versus Siberian supply will cause volatility
- Country Risks – Mature, Developing & Emerging
  - Political
    - Corruption
    - Economic freedom
    - War
  - Currency
  - Infrastructure & Market Linkages
Income Approach

Valuation

Discounted Cash Flow (DCF) is principal valuation method for timberland

Models used to be very long, 20 - 50 years
- Rendered the projection almost pure long term income, thereby separate from other approaches, with least volatility in timber cash flows
- Avoided the problem of sales comparison analysis to estimate reversion, a risk enhancing component

As investment horizons have shrunk, projection periods have been reduced to 10 - 20 years
- Has advantage of modeling investor behavior most directly
- However, timber cash flows are more volatile
- Land values are increasingly important as part of reversion and interim income and must be more carefully estimated
Final Reconciliation
Final Reconciliation

Data and value estimates are analyzed for reliability and most emphasis is placed on analyses/valuations which appear to be most reliable for the subject property
Management of Appraisal Function
Management of Appraisal Function

At present time, it’s a seller’s market for timberland appraisal services

Develop well-defined policies with clear engagement instructions:
– Many variations of appraisal levels and reporting options exist
– Appraisers like working with clear policy direction
– If you want certain types of analyses or reporting options, you should ask for them up front
– Appraisers are highly sensitized to conflicts of interest and ethical dilemmas

Try to rotate appraisers for best valuation services
– It’s often hard to find truly competitive, comparable timberland valuation services
– This does increase valuation volatility
– Typical three-year contract is complete appraisal reported in one self contained (full narrative, comprehensive) report, followed by consecutive complete appraisals reported in abbreviated report format, in one year intervals
Management of Appraisal Function

Effective appraisal review requires some training and experience

– Send reviewers to appraisal courses (AI or ASFMRA)
– Consider contract review as an option
– Accountants often miss the forest for the trees
– The valuation is no more accurate than the statistics of the timber inventory and the accuracy of the land measurement
– Multiple analytical methods exist, define expectations
– If clients don’t read and understand appraisal reports, they shouldn’t expect understandable reports
– Resist black box analytics
Management of Appraisal Function

Appraisal market works with competitive bid structures

- The more reports in a market area, the lower the cost per report
- The more times an appraiser values a property, the lower the cost per report
- However, the more times an appraiser values a property, the more likely his latest opinion of value may resemble his previous one

Too much appraisal work is timed at end of year for fiduciary reasons

- Leads to higher appraisal fees because of the time crunch.
- Try to spread it out for everyone’s benefit
Special Issues in Timberland Valuation
Special Issues

Tract versus portfolio valuations

What may be true for a tract may not be true for a portfolio

- External market conditions, separate from timber and land economics drive tract level markets. The overall per acre value of tracts may be more important than sum of portfolio allocations

Inverse relationship between land allocation and timber allocation in tracts often exists

- If the timber value is higher, the land allocation may be lower. Conversely, if the land is sold with little or no timber, then land value allocation will be higher
Special Issues

Tract buyers like some land attributes
- frontage
- permanent access, rather than the occasional access tolerated by timberland owners
- don’t mind unproductive acreage as much
- don’t perceive the difference between unproductive and productive forests

But may not like others
- may not pay for high timber volume
- don’t want “nuked”, cutover land
- may prefer natural forests, however degraded, over pine plantations

Portfolio buyers may not pay for
- non productive land
- higher and better uses perceived by tract buyers
- poor quality plantations
Special Issues

Should land values and timber values be appraised and booked separately?

Pro
- The Internal Revenue Service requires this for accounting purposes
- Over time, rate of land value appreciation is somewhat separate from the curve of timber value, thus tracking them separately makes intuitive sense

Con
- Valuing land as if it were bare, when it will never really will be, is a practice that does not fit with reality and may lead to inflated values
- Appraisers tend to use smaller clear cut land sales, which show inflated land values
Special Issues

Phased Disposition Analyses

– Lands have moved from a “neutral” long term investment to “active” short component

– Land and timber are now tracked as separate, dynamic investment components
Special Issues

Phased Disposition Analyses

To accurately predict investment structure and behavior, must project:

- Timber rotations-planting, silviculture and harvests
- Land and timber sales-small “HBU” components sold as opportunities arise
Special Issues

Phased Disposition Analyses

Questions

• Is this land speculation or timberland investment?
• Should speculative land investments be analyzed at timberland rates?
• How accurate should models be to support investments?
Other Topics

• Wood Substitution – Softwoods and Hardwoods

• Timber Inventory Types
  – Variability in forest drives:
    • Plot design – Cost versus acceptable levels of cruise accuracy
    • Stratification of cover types?
    • Fixed versus variable radius plots?
    • Accuracy in volume or value?
  – Statistics
Information Sources

Books

Appraisal of Rural Property  ISBN# 0922154627
Appraisal of Real Estate  ISBN# 0922154678
Dictionary of Real Estate Appraisal  ISBN# 0922154724
Timberland Investments: A Portfolio Perspective  ISBN# 0881922188

Websites

http://www.appraisalinstitute.org/
http://www.asfmra.org/
http://www.appraisalfoundation.org/
Information Sources

TIMO Websites (in no particular order)

http://www.forestinvest.com/
http://www.forestlandgroup.com/
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