

Timber Investment Returns for Plantations and Native Forests in the Americas

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PURPOSE

- Financial returns drive forest investment, management, conservation, trade, and protection
- Little comparative information about timber returns for exotic and native plantations and natural stands
- Estimates for selected species in the Americas – Southern Cone, Brazil, and Southern U.S.A.
- Magnitudes of returns, differences among exotics and native plantations and natural stands
- Useful for investors, policy evaluation, timber supply models, plantation market prospects, natural stand goals, teaching and research

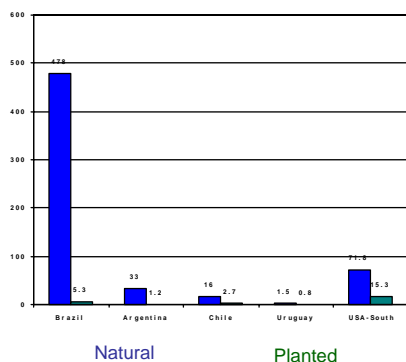


Figure 1. Forest Areas by Country, 2005 (million ha)
Source: FAO 2005; Note: 98% Natural

ANALYSIS

- Establishment costs, management costs, and stumpage sales
- Higher stumpage values in USA, Brazil, Chile
- Government subsidies analyzed also – about 50% of plantation costs, some natural stands
- Cash flow analyses to estimate market returns
- Various capital budgeting criteria employed: NPV, LEV, AEV, B:C, IRR

ANALYSIS INPUTS

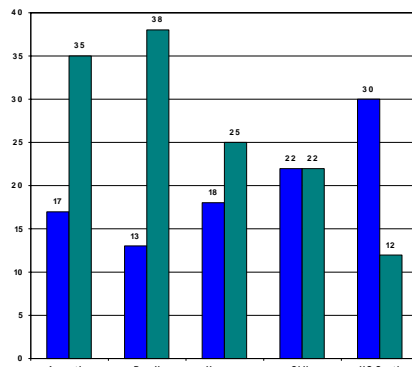


Figure 2. Average rotation ages (years) and growth rates (m³/ha/yr) by country for exotic plantation species

- Native species plantations rotations of 25 to 30 years; growth rates of 5 to 15 m³/ha/yr
- Native natural stands with rotations of 80 years; growth rates of 1 to 4 m³/ha/yr

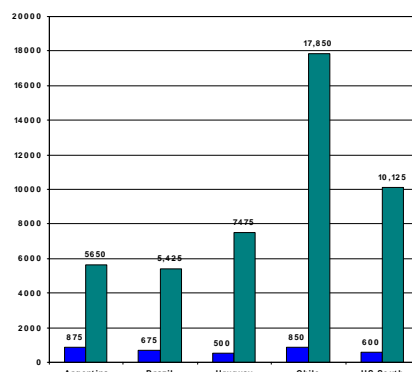


Figure 3. Average establishment costs (\$/ha) and stumpage sales (\$/ha for rotation) by country for exotic plantations

- Natural establishment costs: ~\$US 200/ha
- Natural stumpage: \$US 400/ha - \$US 3,420/ha

FINANCIAL RESULTS @ 8%

Species/Country	LEV (\$ US)	AEV (\$ US)	IRR (%)
BR-Euc grandis	5664	451	24.0
BR-Euc dunii	2872	230	22.9
BR-Erva-mate	1976	158	19.0
UR-Euc grandis	2889	231	18.4
CH-P radiata	3345	268	16.9
BR-P taeda	2495	200	16.0
UR-P taeda	2002	160	15.1
AR-Euc grandis	1241	99	13.8
UR-Euc globulus	592	47	12.8
BR-Araucaria	963	77	12.4
AR-P teada-S	412	33	10.2
AR-P taeda-N	431	34	9.6
US-P taeda planted	408	33	9.5
US-P taeda natural	-31	-2	7.8
AR-Araucaria plant	-155	-12	7.4
AR-Prosopis plant	-306	-25	4.8
US-P echinata ntrl	-507	-41	4.3
US-Hardwood natrl	-331	-27	3.6
UR-Native optimal	-138	-11	3.6
AR-Native managd	-111	-9	1.7
AR-Native no mgt	-19	-11	<0

Countries: ARArgentina, BRBrazil, CHile, URUruguay, USSouth

LEV=land expectation value, AEV=annual equivalent value, IRR=annual internal rate of return; 8% discount rate

RESULTS - NOTES

- Exotics have higher LEVs than native stands
- Brazil combines fast growth and good prices
- Plantations require large amounts of capital
- Native plantations have lower returns, but IRRs approach stock market and other asset classes
- Natural stand in subtropics low to negative returns
- Better management key to make natural tropical forests financial returns acceptable at all
- Subsidies improve returns by at least 1% in IRR, and several hundred dollars per hectare in LEV

CONCLUSIONS

Exotic Plantations and Forest Industry

- Forest sector GDP:
 - ❑ Brazil 4%, Chile 3.5%, USA 2% of country
 - ❑ Argentina, Uruguay <1%
 - ❑ 2 new pulp mills each in Chile and in Uruguay
- Plantation Prospects
 - ❑ 10% to 24% IRRs
 - ❑ Modest expansion everywhere
 - ❑ Most need and greatest prices – Chile & Brazil
 - ❑ Large supply, low prices – Argentina
 - ❑ New supply, unknown markets – Uruguay
 - ❑ Stasis or slight decline – US South
 - ❑ Least risk in most developed markets/countries

Native Species Plantations

- 4% to 10% IRRs
- Less than exotics; better than natural stands
- Growth of ~5 m³/ha/yr seems to be key
- Assumes similar stumpage prices to exotics
- Grow in areas that exotics will not
- More certain growth and prices
- Better for small farms and agroforestry
- Erva-mate good opportunity, but limited demand

Natural Stands

- 97% of forests in Americas
- Few commercial timber species
- Our estimated returns very speculative
- Little information on

- ❑ growth rates
- ❑ stumpage prices
- ❑ silvicultural responses

- USA best, at 4% to 8% for natural stands
- Unmanaged tropical stands probably a financial loss
- Selective management can produce returns of ~2%
- Perhaps perfect management can yield 4%
- Less survival risk, but more commercial species risk

Bottom Line

- Plantations profitable but costly to establish
- Management better than neglect for natural forests
- Nonmarket values important for broader analysis
- Need much more research!